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# 65<sup>TH</sup> ANNIVERSARY CONFERENCE

OF THE INSTITUTE OF  
ECONOMICS, ZAGREB

November 18-19, 2004  
Zagreb, Croatia

CONFERENCE PAPERS

**65<sup>TH</sup> ANNIVERSARY CONFERENCE**  
OF THE INSTITUTE OF ECONOMICS, ZAGREB

November 18-19, 2004  
Zagreb, Croatia

**PROCEEDINGS**

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THE INSTITUTE OF ECONOMICS, ZAGREB

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**November 18-19, 2004**  
Zagreb, Croatia

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# Preface

These proceedings are a collection of papers prepared for and presented at the 65th Anniversary Conference of the Institute of Economics, Zagreb, that took place in Zagreb, on November 18th and 19th, 2004. The objective was to celebrate the 65th anniversary of the Institute by discussing the main economic challenges facing the European transition economies (EU entrants and other candidates, with a particular focus on Croatia), and by providing fresh insights and ideas on how to approach the common and country specific problems.

The topics covered in the papers reflect some of the economic issues of the contemporary Europe. On the one hand, the European Union as its dominant part is aiming to become a global leader. On the other hand, the countries in its closest neighborhood, i.e. Central and Eastern European countries are going through a process of transition that has evolved at a varying pace until now. The leaders among transition countries joined the European Union as full members in 2004, while the other group of countries is still engaged in political and economic restructuring aimed at meeting the EU standards and pre-requirements.

The Conference was organized in seven sessions and therefore the contributions addressed the following specific issues: Economic growth and development; Fiscal policy, unemployment and demographic trends; Financial sector, inflation and monetary policy; External balances, capital flows, monetary and exchange rate policies; Innovation management; Competitiveness of companies and sectors on the road to the EU; European economic space - development problems and accession challenges. The Conference Committee was proud to introduce a special poster session for economists under 30, named YES! - Young Economists' Session. Their background papers are also included in these proceedings.

All the papers that we received for the conference were subject to a double-blind review by international reviewers (from Croatia, Germany, Switzerland, UK, USA). We strongly believe to have succeeded in the attempt to select those analytical and empirical studies and papers that could provide well-founded and useful recommendations to policy makers and the business community alike.

Contributions of the researchers from the Institute of Economics, Zagreb are the outcome of the current research efforts on the project entitled "Economic Development of the Republic of Croatia on its Road to the EU: macroeconomic, microeconomic and spatial aspects", that is supported by the Ministry of Science, Education and Sports of the Republic of Croatia.

We would like to express our sincere gratitude to the Government of the Republic of Croatia, under whose high auspices the Conference was held, and all the others who have contributed not only to its success but also to the publication of this volume. Our special thanks go to many sponsors from the Croatian business community. We are also grateful to all the authors of the papers that were presented who enriched us with the valuable insights, as well as to the anonymous reviewers who took care of preserving the high quality of the selected papers. Our invited speakers, Riccardo Cappellin, Fabrizio Coricelli, Bruce L. Jaffee, George Kopits, Michael Landesmann, Dubravko Mihaljek and Slavo Radošević, held brilliant and provoking keynote speeches while numerous discussants contributed to the lively discussion and encouraged new research efforts.

Both the organization of the Conference and the publication of the proceedings would not have been possible without exceptional efforts of all the staff of the Institute of Economics, Zagreb and Denis Redžepagić, who was doing his civilian military service at the Institute at the time the Conference was being prepared.

We hope that the papers presented in this volume will stimulate further research into all the challenging areas that the Conference attempted to tackle, both within the local community and internationally.

Zagreb, May 2005

The Conference Committee

# **Growth and Development**

# Economic Reforms and Corruption in Transition Countries

Jelena Budak\* and  
Rajeev K. Goel\*\*

## Abstract

Whereas the literature on the causes of corruption has ballooned in the last two decades, studies on transition nations are still in their infancy. Attention to transition countries is important because if some factors unique to these nations can be identified, then blanket recommendations for corruption reduction in all countries can be modified to suit transition economies. This paper uses annual data over 1998-2002 for 25 transition economies to study factors that cause corruption. Two different measures of corruption are employed to test the validity of our findings. Among the factors that significantly lower corruption, the degree of economic prosperity, economic freedom and progress toward transition seem most important.

**Keywords:** corruption, transition reforms

JEL Classification: P3, H1

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*We would like to thank Prof. Vojmir Franičević for insightful comments on an earlier version of the paper presented at the 65<sup>th</sup> Anniversary Conference of the Institute of Economics, Zagreb. Remaining errors are our own.*



# 1 Introduction

Corruption in economies reduces economic efficiency and has negative implications for growth. Therefore, nations remain interested in reducing, if not eliminating, corrupt practices. Researchers have examined various factors that affect corruption. These factors include whether the prevalence of corruption in a country is affected by government size, judicial system, the degree of economic freedom, relative wages of government employees, the degree of red tape, religion, education, prosperity etc. (see Bardhan (1997), Jain (2001) and Rose-Ackerman (1999) for surveys of the pertinent literature). These studies have used country-specific as well as cross-country data. The effects of many of these variables on corruption generally remain inconclusive (see, for example, Graeff and Mehlkop (2003)). Micro-level studies, while very insightful and desirable, are especially problematic in the case of corruption as the true measure of corruption is unobservable, even more so at the individual level. Corrupt officials who are never caught have no incentive to reveal their true behavior. Furthermore, bribe-givers are not always forthcoming because, more often than not, they are benefiting either illegally or disproportionately from corrupt practices.

In this paper we examine the determinants of corruption in transition countries. More than two dozen independent nations were formed in the early nineties with the breakup of the Soviet Union and the general decline of communism. Attention to transition economies is important as many institutions in these new market economies are in their infancy. Reducing corruption is also an important assessment in the evaluation of political criteria in accessing the European Union (EU). Therefore, it is instructive to see what factors lead to corruption in the formative years and whether these factors are different from those that are known to lead to corrupt activities in other countries. On the one hand, there might be greater arbitrariness (leading to opportunities for corruption) in transition economies as institutions are not fully developed and there are fewer checks and balances. On the other hand, greater idealism among the public to build a better nation might act as a check against corruption. Transition nations might also be able to avoid some problems by learning from the experiences of other (mature) countries.

We use annual data 1998 to 2002 for 25 Eastern European transition economies to examine the determinants of corruption. Two different measures of corruption perceptions are used to test the robustness of our findings. The results are quite similar for both measures. In particular, we find that greater economic prosperity and greater economic freedom lead to lower corruption, as does greater progress in transition (i.e.,

greater maturity). However, different elements of transition progress have varying influences on corruption. Lower levels of corruption is observed in the countries that have more success in the process of accession to the EU. Any institutional factors unique to the 15 former Soviet republics do not seem to have a significant impact. Implications of these findings are discussed.

## 2 Model, Data and Estimation

The theoretical underpinnings of studies of corruption may be traced back to the seminal work of Becker (1968), where he argued that individuals balance the costs and benefits from engaging in illegal activities.<sup>1</sup> These incentives are influenced by external factors such as government policies. Researchers studying corruption have used various measures of costs and benefits of corruption to see which factors are significant. There is a lack of a consensus on the determinants of corruption in the literature as the significant influences on corruption vary depending on the measure of corruption used, the data set employed and the general inability to adequately measure corruption and quantify institutional details (Knack and Keefer (1995)).

The general form of the estimated equation is the following:

$$(1) \quad \text{CORRUPTION}_{it} = f(\text{INCOME}_{it}, \text{EDUCATION}_{it}, \text{GOVT SIZE}_{it}, \text{ECONOMIC FREEDOM}_{it}, \\ \text{TRANSITION PROGRESS}_{it}, \text{SOVIET INFLUENCE}) \\ i = 1, \dots, 25; t = 1, \dots, 5$$

Annual observations are used for 25 transition countries over the years 1998 to 2002. Two different measures of the dependent variable are used. One is the widely used corruption perceptions index from the Transparency International. This index varies from 0 to 10, with higher values signifying less corruption. Given the problems with adequately measuring the existence of corruption in a country, another corruption perceptions index available from The World Bank is used. This index has a smaller range from -2.5 to +2.5. However, higher values again represent more “clean” economies.<sup>2</sup>

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<sup>1</sup> See also Shleifer and Vishny (1993) and Tanzi (1998).

<sup>2</sup> Note that both indices are technically indices of perceptions of corruption. The Transparency International's index is an average of surveys about corruption perceptions. The World Bank index defines corruption as “the exercise of public power for private gain”.

The level of prosperity is given by the per-capita GDP to show that perhaps individuals in wealthier nations have lower discount rates and thus would be less eager to offer bribes to “jump the queue”. Government officials in wealthy nations are also relatively well paid and are thus less willing to accept/solicit bribes. Furthermore, wealthier nations generally have better institutional mechanisms to prevent corrupt practices. Greater literacy might reduce corruption when the population is better aware of its rights and duties and people are likely to be less corrupt themselves. They are also more likely to report illegal acts of others.<sup>3</sup> It might be easier to publicize the deeds of corrupt officials to an educated population and this might act as a deterrent. We use another, broader and consistent, measure of prosperity and education in the form of the Human Development Index. This index is based on three factors: literacy, GDP and life expectancy. Higher values of this index signify more literacy, greater prosperity and a longer life expectancy in a country.

Government size might also affect the level of corruption in a country. The size of government can be a deterrent or an inducement to corruption. On the one hand, if a larger government spending entails greater deterrence (policing) and enforcement measures, it might lead to lower corruption. This might be especially true in transition economies because they are in the nation building stages. On the other hand, a larger government might signify greater red tape and this is likely to result in greater corruption (Goel and Nelson (1998)).

Greater economic freedom generally signifies less governmental controls and more influence of market forces. Fewer governmental controls in turn reduce the discretionary power that government officials exercise and thus likely to reduce corrupt practices. Some factors unique to transition economies are captured in the transition index. This transition index encompasses many aspects including price liberalization, foreign exchange liberalization, degree of privatization, banking and enterprise reform and infrastructure reform. As these economies mature (i.e., greater transition progress), there is likely to be less corruption when institutions are fully developed and checks and balances minimize the discretionary powers of government officials. It would be interesting to see whether different elements of the transition phase have different influences on corruption. To that effect, we use progress toward privatization (disaggregated into large-scale and small-scale privatization) and indices of banking and

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<sup>3</sup> *Conversely, one could argue that an educated population might be more adept at devising ways to circumvent existing rules.*

nonbanking reforms.<sup>4</sup> These indices, in general, signify more play of market forces. For instance, privatization reduces bribe-seeking opportunities for government officials when their discretionary powers are reduced.<sup>5</sup> The level of general competitiveness in an economy is also used as an explanatory variable. The competitiveness index is also a component of the transition index.

Finally, some institutional factors might be unique to the former Soviet Union and we include a dummy variable to capture the influence of these factors.<sup>6</sup> For instance, to the extent there were some unique government procurement practices in the former Soviet Union, the resulting independent nations are likely to reform differently from other transition economies (due to the inertia of inherited institutions). This might have a significant influence on corruption. On the other hand, the issues facing the transition nations might have more to do with their socialist past and any linkages to the former Soviet Union might not exert any noticeable influence on corruption. The complete list of countries in our data set is in the Appendix and Table 1 provides the details about variable definitions and data sources.

### 3 Results and Discussion

We start with comparative analysis of the level of corruption in transition countries and the institutional assessments of these nations in approaching the European Union (EU). Tables 3, 4 and 5 report our estimation results on determinants of corruption. All equations were estimated using Ordinary Least Squares (OLS) and heteroscedasticity-consistent standard errors are reported. The number of observations across the two measures of corruption varies due to missing observations. The general fit of all regressions is quite decent as the adjusted-R2 is better than 0.5 in most cases and the F-value is statistically significant at least at the 5% level.

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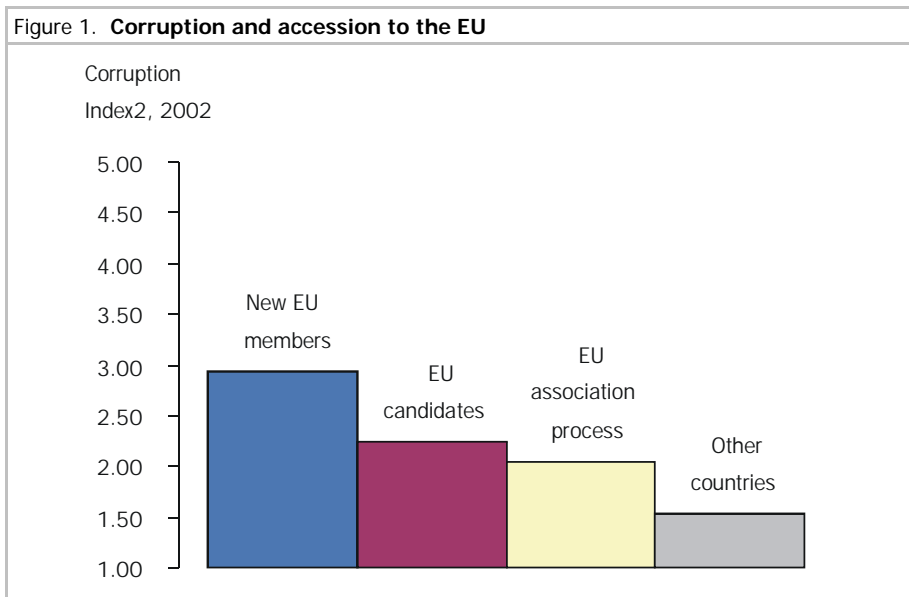
<sup>4</sup> *Recognizing some potential simultaneity issues, a one year lag on these indices is employed to make them somewhat pre-determined.*

<sup>5</sup> *However, in some transition countries the privatization processes themselves may be connected with corrupt practices. See Kaufmann and Siegelbaum (1996).*

<sup>6</sup> *However, we recognize that this framework is unable to capture all the factors potentially contributing to heterogeneities across countries.*

### 3.1 Corruption and Institutional Development

A general level of corruption prevalence in transition countries is given in Table 2. We used the corruption perception index to compare the assessments of transition countries in the accession process to the EU. In the process of accession to the EU, countries are evaluated on institutional development and in reducing corruption to satisfy political criteria for EU membership. The European Commission (March 2003) reported corruption in Albania and Croatia as a (major) problem in the stabilization and association process.<sup>7</sup> When ranked by the Corruption Index WB (2002), the top seven countries with the lowest corruption recently became new EU members, while on the bottom of the list is a group of other countries not included in the EU accession process (Table 2). Four groups of countries were formed according to their status to the EU. The associated average (perceptions) corruption index for each group clearly distinguished countries with reduced corruption and more success in accessing the EU and vice versa (Figure 1).



Source: *Governance Matters III: Governance indicators for 1996-2002*. Kaufmann et al., *The World Bank*, 2003.  
Note: Corruption Index2 is an aggregate indicator that measures perceptions of corruption defined as the exercise of public power for private gain. Higher values correspond to lower corruption on a scale from 1 to 5.

<sup>7</sup> The stabilization and association process is a contractual relation between a country in the pre-accession process and the EU. The EU monitors the progress in reforms leading to satisfaction of the criteria of political and economic compliance to the EU requirements.

## 3.2 Education and Prosperity

Economic prosperity and education are the basic control factors that are included in nearly every empirical study of corruption. We find that a higher GDP per-capita leads to lower corruption, while the effect of literacy is not statistically significant.<sup>8</sup> However, since GDP might be capturing some literacy effects, we also employ a Human Development Index (HDI) that encompasses education, economic prosperity and health conditions. An improvement in the HDI results in lower corruption. This signifies that as these nations achieve greater prosperity, the level of corruption will go down and corruption is likely to be more prevalent in poorer transition nations. These results are consistent across the two measures of corruption (Tables 2 and 3). In an earlier study of the shadow economy in transition countries over 1990-97, Eilat and Zinnes (2002) find that greater economic prosperity resulted in a smaller shadow economy.

## 3.3 Government Size and Economic Competitiveness Educating Corruption

Table 4 examines the influence of government size and competitiveness on corruption. GovGDP (or general government expenditure as a percentage of GDP) captures the effect of government size on corruption. A larger government might involve better monitoring of discretionary powers of government officials or it might involve more bureaucratic red tape. It has been found that a bigger government size resulted in greater corruption in the case of the United States (Goel and Nelson (1998)). However, greater government size for transition countries leads to lower corruption and this effect is statistically significant when the Transparency International (TI) corruption perceptions index is used as the dependent variable. This suggests that perhaps greater government size in transition economies resulted from more expenditure on police (e.g., a larger police force and better training) and the judicial system - institutions that are likely to reduce corruption.<sup>9</sup> Therefore, good governance assessments such as government efficiency, rule of law and greater transparency in government policies and procedures may explain the corrupt practices better than government size itself. However, May et al. (2002) examined the effects of various governance measures on the level of unofficial

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<sup>8</sup> *The low variability in the literacy measure in our sample of high literacy transition countries might have some role in the statistical insignificance of the related coefficient.*

<sup>9</sup> *Although, in certain cases police and judiciary might themselves be corrupt.*

economy in transition countries, and found most of these measures to be statistically insignificant.

The effect of greater competitiveness is generally positive (i.e., greater competitiveness lowers corruption) and significant under one measure of corruption. The findings with respect to the effect of economic freedom are mixed in the literature. On the one hand, Goel and Nelson (2004) find that greater economic freedom reduced corruption in a large sample of developed and developing nations. On the other hand, Graeff and Mehlkop (2003) find that the effectiveness of economic freedom on corruption is sensitive to a country's development level. We also used a broad measure of competitiveness, called the transition index to examine its effect. This index is broader than the competition index because it includes many factors (e.g, privatization, competitiveness, infrastructure and banking reforms, etc.) beyond merely those enhancing competitiveness. An improvement in the transition index results in lower corruption and this finding is robust across the two measures of corruption. Given the composition of the transition index, this implies that comprehensive reforms involving price liberalization, privatization, foreign exchange liberalization, banking and infrastructure reforms are likely to result in lower incidence of corruption.<sup>10</sup>

Finally, to account for the different institutional aspects of former Soviet republics, a zero-one dummy variable (SDUM) is included that takes the value of one for the fifteen former republics and zero otherwise (see the Appendix). The resulting coefficient was not statistically significant in any case, suggesting that institutions unique to the former Soviet Union were not having a perceptible impact on the corrupt activities in transition countries.<sup>11</sup>

### 3.4 Transition Reforms and Corruption

Since the main contribution of this work is to understand the factors unique to transition economies in influencing the prevalence of corrupt activities in these countries, we

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<sup>10</sup> We also included as explanatory variables key macroeconomic variables such as inflation rate and the unemployment rate. The respective coefficients were not statistically significant suggesting that these variables did not affect corruption in an appreciable manner in transition economies. Details are available from the authors upon request.

<sup>11</sup> However, one should bear in mind the possibility that these institutions might still be prominent and that our dichotomous treatment is unable to capture the related complexities. Furthermore, our relatively small sample size prevents us from including country-specific dummy variables.

revisit the effect of transition progress in Table 5. Transition progress is disaggregated into large scale and small scale privatization and into banking and nonbanking reforms. These factors might affect the level of economic freedom to different degrees and can thus have varying influences on corruption. The decomposition of the scale of reforms is also important for policy purposes. While all the components of transition progress have the right sign (i.e., greater progress results in lower corrupt activity), the statistical significance of the coefficients varies. Nonbanking reforms seem to significantly lower corruption across both measures, while the effect of banking reforms is also positive and significant in one case. Greater privatization, however, does not seem to have a statistically significant effect. An important policy implication is that if corruption reduction is an important goal for policymakers, then attention to nonmarket reforms should take precedence over some other initiatives, such as privatization initiatives. Again, the broad measure of transition progress (TranIdx) significantly reduces corruption in both cases. The effects of the other variables, HDI and SDUM, are consistent with our earlier findings in Table 4.

## 4 Concluding Remarks

Whereas the literature on the causes of corruption has ballooned in the last two decades, studies on transition nations are still in their infancy. Attention to transition nations is important because if some factors unique to these nations can be identified, then blanket recommendations for corruption reduction in all countries can be modified to suit transition nations. This paper uses annual data over 1998 - 2002 for 25 transition economies to study factors that cause corruption. The underlying theoretical model draws on the seminal work of Becker (1968). Two different measures of corruption perceptions are employed to test the validity of our findings. Among the various factors that significantly lower corruption, the degree of economic prosperity, economic freedom and progress toward transition seem most important. Any lingering legacy from Soviet-era institutions does not seem to be having a perceptible effect on corruption.

The results show that the level of corrupt activity declines with economic prosperity. While the findings for transition countries are generally consistent with those found for broader samples of countries, our results suggest that a bigger government might not necessarily be contributing to greater corruption in transition nations. In fact, the effect of a larger government size in transition countries seems in fact to *decrease* corruption. Whether this effect persists as these economies mature remains to be seen. Furthermore,



the coefficient on the transition index is statistically significant in all cases. However, when the aggregate transition index is decomposed, the coefficients on the different components of the transition index not significant everywhere. This suggests that comprehensive efforts toward reform are more effective in reducing corruption, rather than piecemeal moves toward reforming some sectors of the economy. In particular, banking and nonbanking reforms seem to be relatively more effective at checking corruption than efforts toward greater privatization.

It is hoped that as better data become available further light can shed on the causes and effects of corruption in these countries. Possible extensions to this line of research include incorporating additional institutional details and to examine potential simultaneity issues between corruption and some of its determinants.

<b>Table 1. Variable definitions and sources</b>		
<b>Variable</b>	<b>Definition (average [min; max])</b>	<b>Source</b>
Corruption Index (TI)	Corruption perceptions (scale: 0 to 10); higher value, less corruption (3.47 [1.5; 6])	www.transparency.org
Corruption Index2 (WB)	Corruption perceptions (scale: -2.5 to +2.5); higher value, less corruption (-0.37 [-1.21; 1.08])	World Bank
GDPpc	Per-capita GDP (PPP US \$); (6616.4 [988; 18404])	IMF
Literacy Rate	Percent of literate population age 15 and above (97.93 [83.5; 100])	www.undp.org
Human Dev Idx (HDIIdx)	Human Development Index (simple average of life expectancy index, education index and GDP index); higher values better (0.773 [0.66; 0.88])	www.undp.org
LSprv-1	Index of large-scale privatization (lagged 1 year); higher value, more privatization (2.92 [1.0; 4.0])	EBRD
SSprv-1	Index of small-scale privatization (lagged 1 year); higher value, more privatization (3.70 [2.0; 4.3])	EBRD
BNKref-1	Index of banking reforms (lagged 1 year); higher value, more reforms (2.46 [1.0; 4.0])	EBRD
NBNKref-1	Index of nonbanking reforms (lagged 1 year); higher value, more reforms (2.12 [1.0; 3.7])	EBRD
GovGDP	General government expenditure (% of GDP) (35.0 [13.9; 56.6])	EBRD
Comp	Index of competition policy; higher value, more competition (2.2 [1.0; 3.0])	EBRD
TranIdx	Transition index; (scale: 1 to 4) Higher value, more progress (2.8 [1.3; 3.8])	EBRD
SDUM	Dummy variable for former Soviet republics (0.6 [0, 1])	

<b>Country</b>	<b>EU status</b>	<b>Corruption Index2 (WB)</b>
Slovenia	MC	3.39
Estonia	MC	3.16
Hungary	MC	3.10
Poland	MC	2.89
Czech Rep.	MC	2.88
Slovakia	MC	2.78
Lithuania	MC	2.75
Croatia	SAP*	2.73
Latvia	MC	2.59
Bulgaria	CC	2.33
Romania	CC	2.16
Armenia	none	1.78
Macedonia	SAP	1.77
Belarus	none	1.72
Kyrgyzstan	none	1.66
Albania	SAP	1.65
Moldova	none	1.61
Russian Federation	none	1.60
Ukraine	none	1.54
Georgia	none	1.47
Uzbekistan	none	1.47
Kazakhstan	none	1.45
Azerbaijan	none	1.43
Tajikistan	none	1.43
Turkmenistan	none	1.29

Source: Governance Matters III: Governance indicators for 1996-2002. World Bank, June 2003.

Note: Corruption Index2 is an aggregate indicator that measures perceptions of corruption defined as the exercise of public power for private gain. It reflects frequency of paying bribes to get things done, effects on the business environment, grand corruption in political arena and state capture by elite. Higher values correspond to better outcomes (lower corruption) on a scale from 1 to 5. (Original scale was -2.5 to +2.5).

MC-member countries: new EU members from May 2004. CC- candidate countries. SAP-countries in stabilization and association process to EU. None-countries not in the process of accession to the EU (former Soviet republics except Baltic states).

\* Croatia is ahead of other countries in SAP, and it is expected that Croatia will become an EU candidate country in 2004.

	Dependent variable: Corruption Index (TI)		Dependent variable: Corruption Index2 (WB)	
	GDPpc	0.0002** (0.00003)		0.0001** (0.00001)
Literacy rate	0.005 (0.16)		0.01 (0.007)	
HDIdx		16.05** (3.05)		10.47** (0.84)
N	50	50	38	38
adj. R2	0.54	0.39	0.72	0.75
F-value	29.3**	31.8**	49.1**	114.0**

Notes: All equations included a constant term. The results for the coefficient on the constant term are not reported but are available upon request. The number of observations varies between the two measures of corruption due to missing data. Heteroscedasticity-consistent standard errors are in parentheses below the parameter estimates. \*\* denotes significance at the 5% level.

	Dependent variable: Corruption Index (TI)							
	GDPpc							0.0001** (0.00004)
Literacy Rate							-0.04 (0.16)	0.05 (0.14)
HDIdx	10.57** (3.51)	10.66** (3.51)	9.80** (3.23)	13.01** (3.52)	9.26** (2.69)	10.72** (3.22)		
GovGDP			0.03* (0.01)	0.05** (0.02)	0.03 (0.02)			
Comp	1.31** (0.38)	1.34** (0.43)	1.06** (0.38)				0.69 (0.41)	
TranIdx					0.94** (0.37)	1.07** (0.43)		0.75* (0.39)
SDUM		0.04 (0.28)		0.009 (0.30)				
N	50	50	50	50	50	50	50	50
adj. R2	0.52	0.51	0.53	0.45	0.59	0.55	0.55	0.60
F-value	27.2**	17.7**	19.8**	14.6**	24.4**	31.7**	21.2**	25.3**

Notes: All equations included a constant term. The results for the coefficient on the constant term are not reported but are available upon request. SDUM is a dummy variable that takes the value of one for the fifteen former Soviet republics and zero for all other countries in our sample. Heteroscedasticity-consistent standard errors are in parentheses below the parameter estimates. \*\* denotes significance at the 5% level; \* denotes significance at the 10% level.

	Dependent variable: Corruption Index2 (WB)							
GDPpc							0.0001** (0.00002)	0.0001** (0.00001)
Literacy Rate							0.005 (0.009)	0.01 (0.008)
HDIdx	9.11** (1.46)	9.19** (1.54)	8.17** (1.87)	9.59** (1.40)	6.82** (1.50)	8.05** (1.30)		
GovGDP			0.007 (0.006)	0.007 (0.01)	0.009 (0.006)			
Comp	0.24 (0.20)	0.25 (0.20)	0.24 (0.20)				0.31 (0.21)	
TranIdx					0.37** (0.13)	0.35** (0.14)		0.41** (0.15)
SDUM		0.03 (0.11)		0.003 (0.12)				
N	38	38	38	38	38	38	38	38
adj. R2	0.76	0.75	0.75	0.74	0.80	0.80	0.73	0.80
F-value	58.4**	37.9**	38.9**	36.9**	52.1**	76.1**	34.5**	49.7**

Notes: All equations included a constant term. The results for the coefficient on the constant term are not reported but are available upon request. SDUM is a dummy variable that takes the value of one for the fifteen former Soviet republics and zero for all other countries in our sample. Heteroscedasticity-consistent standard errors are in parentheses below the parameter estimates.

\*\* denotes significance at the 5% level

	Dependent variable: Corruption Index (TI)				Dependent variable: Corruption Index2 (WB)			
HDIdx	13.13** (3.61)	12.87** (3.79)	9.18** (2.04)	10.98** (3.29)	9.72** (1.06)	9.97** (1.03)	6.65** (1.40)	8.32** (1.39)
LSprv-1	0.37 (0.25)				0.10 (0.07)			
SSprv-1		0.37 (0.27)				0.06 (0.07)		
BNKref-1			0.47 (0.30)				0.21** (0.10)	
NBNKref-1			0.89** (0.25)				0.21** (0.11)	
TranIdx				1.12** (0.47)				0.37** (0.14)
SDUM	-0.24 (0.31)	-0.30 (0.30)	0.21 (0.18)	0.11 (0.25)	-0.01 (0.12)	-0.01 (0.12)	0.04 (0.08)	0.07 (0.09)
N	50	50	50	50	38	38	38	38
adj. R2	0.43	0.41	0.72	0.55	0.75	0.74	0.83	0.80
F-value	13.1**	12.5**	32.3**	20.8**	38.2**	36.3**	45.2**	49.9**

Notes: All equations included a constant term. The results for the coefficient on the constant term are not reported but are available upon request. The number of observations varies between the two measures of corruption due to missing data. SDUM is a dummy variable that takes the value of one for the fifteen former Soviet republics and zero for all other countries in our sample. Heteroscedasticity-consistent standard errors are in parentheses below the parameter estimates.

\*\* denotes significance at the 5% level

# Appendix

## List of Transition Economies

Albania, Armenia\*, Azerbaijan\*, Belarus\*, Bulgaria, Croatia, Czech Republic, Estonia\*, Georgia\*, Hungary, Kazakhstan\*, Kyrgyzstan\*, Latvia\*, Lithuania\*, Macedonia, Moldova\*, Poland, Romania, Russian Federation\*, Slovakia, Slovenia, Tajikistan\*, Turkmenistan\*, Ukraine\*, Uzbekistan\*

*Note: \* denotes former Soviet republic.*

*Data for Bosnia and Herzegovina and for Serbia and Montenegro are not available.*

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# Post-communist Judicial System: Deep-rooted Difficulties in Overcoming Communist Legacies - with Special Regard to Croatia

Bruno Schönfelder\*

## Abstract

Post-communist lawlessness has caused considerable concern and resulted in much misguided theorizing. The paper criticizes some of the more common misconceptions. Among them are the disregard for private law enforcement, the failure to realize the interdependence between the range of rights to be enforced and the cost of enforcement, the mistaken view that the rule of law is basically a matter of public choice and the preference for administrative remedies over judicial remedies. After discarding such attempts at explanation, the paper proposes that the analysis should focus on other issues instead. All of them happen to be related to a legacy of communism. These include the downgrading of civil and constitutional law, the instability of legal rules, as well as the underdeveloped separation of powers and very peculiar causes of court congestion.

**Keywords:** enforcement cost, civil law society, centralism, *ovrha* (Engl. distress, execution, enforcement)

**JEL Classification:** K4, P37

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This paper consists of two parts. The first part criticizes some theories of post-communist lawlessness that were proposed by economists in recent years. The second part presents an alternative view at the example of Croatia. It outlines some preliminary hypotheses that may help to understand why progress towards the rule of law has been slow.

A proposition by Hayek (1960, p. 208) may offer a useful starting point: “The importance which the certainty of the law has for the smooth and efficient running of a free society can hardly be exaggerated. There is probably no single factor which has contributed more to the prosperity of the West than the relative certainty of the law which has prevailed there.” It may be worth noting that this proposition is meant to refer not only to the modern age, but to a part of medieval times as well. This part presumably began in the eleventh century, which is widely regarded as the time when the rise of the Western World gained momentum.

Empirical growth theory has made some efforts at pinning down the causality proposed by Hayek, but it has not been very successful at that. Gathering relevant data is an arduous job, certainty of law is very difficult to measure and all the available measures are garbled. Irrespective of their popularity, the qualitative assessments produced by various rating agencies and the Freedom House often appear implausible and unreliable. The only numbers that are readily available relate to the judiciary rather than to legal certainty. And these data may seem to disprove Hayek. One surely can count lawyers and other legal professionals. Including the latter is important, e.g. Japan is well-known for its small bar but researchers sometimes fail to realize that Japan has more legal professionals per capita than the USA<sup>1</sup>. All developed Western nations keep large numbers of legal professionals. However, more legal professionals does not always result in more growth, various examples of the contrary are available in the Third World. Quite a number of economists even think that more lawyers means less growth, the existence of a negative correlation was alleged by some. The statistical analyses undertaken to establish this claim are inconclusive for several reasons. Magee, Brock and Young (1989) count lawyers instead of legal professionals, so this procedure is likely to be misleading. Murphy, Shleifer and Vishny (1991) try to avoid this mistake by taking the share of law students in the overall population of college students. However, most of

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<sup>1</sup> Similarly, observers who point out that in the US lawyers are much more numerous than e.g. in Germany or Austria often fail to realize that in these latter countries tax accountants usually are business majors, while in the US this legal service is for the most part provided by law school graduates.

their results are statistically insignificant and their interpretation is rather debatable<sup>2</sup>. Even if the purported negative correlation happens to exist, it should not be interpreted as indicating causality or disproving Hayek's claim. To recognize how the augmentation of lawyers may increase social welfare and why this may fail to occur, consider one of the possible chains of causation. There is a causal link from lawyers to legal certainty. Rational people litigate only if the outcome is uncertain, this uncertainty may be due either to legal or factual uncertainty. Lawyers earn their money by identifying such uncertainties, legal uncertainty thus results in litigation and a larger body of precedent, precedents gradually remove legal uncertainty. This happy outcome, however, is achieved only if statute law is sufficiently stable and if an accumulation of precedents is appreciated as a legitimate procedure of rule-making. If instead statute law keeps changing at a rapid pace, as is still the case in Croatia, the body of precedent is subject to a rapid depreciation. The body of precedent may be likened to a capital stock. Changing statute law at a rapid pace is like destroying real capital, it deprives the work of lawyers of much of its usefulness for the general public<sup>3</sup> and thus greatly reduces the return on the investment which society makes by educating lawyers. Another reason why the return of the Croatian precedent production continues to be deplorably low is that it is still fairly difficult to find precedents. Judicial decisions and opinions are often not published and even if they are in principle accessible, the development of information systems which support research of precedents is still in its infancy<sup>4</sup>.

The argument that a large body of precedent is tantamount to more legal certainty may appear as strange to those who tend to view civil law systems such as the Croatian as systems in which precedent is of minor relevance. The prevalence of this prejudice is to

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<sup>2</sup> *They claim to have found evidence that the allocation of talent provides the crucial chain of causation. More law students means that less talent is available for engineering studies, which they consider more relevant for economic growth. They do not claim to have revealed any other causal nexus, their data actually disprove the (fairly popular) idea that lawyers contribute to rent-seeking and thus reduce the efficiency of investment. "...suggests that lawyers reduce growth creating activities but not through reducing the incentives to invest." (ibidem p. 529) It may be significant that in their data the combined share of law students and engineering students is only 20 percent. The remaining 80 percent of college students should offer a sufficient supply of talents if engineering studies really suffer from a shortage of talent as Murphy et al. seem to be claiming. Also, law students often have talents that differ considerably from those of engineering students. On the other hand, the best talents for engineering might well be found at some other faculties rather than among law students.*

<sup>3</sup> *Increasing the body of precedents and thus legal certainty is a positive externality produced by lawyers while working for their private gain. Instability of statute law reduces or eliminates this positive externality.*

<sup>4</sup> *Udruga Sudačka mreža (an association of judges) has undertaken an important initiative to solve this problem. It is worth noting that in this regard Croatia is lagging behind Bulgaria.*

quite some extent a communist legacy that lingers on<sup>5</sup> because the proponents of this view rarely or never read code commentaries, written in highly developed civil law systems like e.g. the German one. If they were to read such commentaries, they could not help but realize that they refer to precedents quite frequently and not dramatically less often than treatises written in common law countries. Thus, the argument that more lawyers means more legal certainty holds, provided that statute law is sufficiently stable. However, there is another proviso. The stability of statute law does not translate into more growth if the statutory principles whose meaning has been ascertained are such that they inhibit economic growth, or if it is not possible to contract around the provisions that have these detrimental effects. In other words, if a large portion of inefficient provisions are *ius cogens*, the investment into the judicial system is wasted again. This presumably is a major difference between common law and civil law systems; statute law often tends to be *ius cogens*, common law tends to offer more flexibility. Examples to illustrate the resulting possibilities of waste may easily be found in the German economic history. If legal certainty supports economic growth, this is presumably so because it supports the division of labor which has long been recognized as the fountainhead of growth. Arguably, a highly developed division of labor is virtually unattainable in the absence of the rule of law. However, not all legal systems support the division of labor. For instance, Germany had a rather developed judicial system and large numbers of well educated lawyers in 1947, but the division of labor in the German economy at the time was roughly comparable to the time of Charlemagne<sup>6</sup>. The legal system did not support the division of labor, but rather inhibited and prevented it, thus preventing growth.

## 1 Theories of Post-Communist Lawlessness: a Critical Review

Presumably, few economists disagree with Hayek's tenet that legal certainty contributes strongly to economic growth. Economists also claim to be experts on issues of economic

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<sup>5</sup> *To be sure, this fallacy is not universally held. For an account that stresses judge-made law see e.g. Kačer (2003, p. 445).*

<sup>6</sup> *This historical comparison is due to Eucken (1950). In 1947, food was rationed in Germany but rations were at starvation level. In order to survive, people needed to engage in subsistence agriculture or acquire additional food on the black market. This was very time-consuming, town dwellers needed to undertake lengthy (railway and bus) trips to the countryside arranging barter deals with peasants. In theory, town dwellers were all required to work in their jobs, but foremen understood that absenteeism was a necessity to assure survival.*

growth, thus the fact that they have been inclined to ignore this causality is a bit of a paradox. Sometimes they cannot avoid dealing with it as, for example, if problems caused by legal uncertainty and missing law enforcement proliferate. After 1995, post-communism forced economists to face these problems. This was the point when most economists lost interest in the economics of transition. Those who remained in the field often turned to strange theories. This theorizing of the late nineties tended to take on an unduly alarmist tone. Sometimes it was claimed that as a result of weak law enforcement most post-communist countries were heading towards total disaster. Nowadays, one can easily realize how misguided such alarmism was. Even the post-communist countries in which law enforcement continues to be extremely weak such as e.g. Ukraine, Albania or Moldova have experienced some economic recovery. These countries have not fallen into a bottomless pit; often they have established a viable sort of crony capitalism. There seem to be only two “chronically sick” European post-communist countries, they are Serbia and Belarus, and even their disease is not as terminal as it is often represented. Both of them were relatively affluent in 1990 and this affluence has not been completely wasted yet, so their story is more about stagnation than about collapse.

The alarmist view was based on two misconceptions. The first misconception concerned the role of private versus public law enforcement. The second was an exaggeratedly negative account of crony capitalism. These misconceptions in turn gave rise to several misguided economic theories of law enforcement. This theoretical section of the paper first sketches the misconceptions and then turns to three false theories.

Misconception one is that law enforcement is narrowed down to public law enforcement, this is the statist view of law enforcement which ignores private law enforcement. As an empirical matter, however, private enforcement is quite significant even in modern economies, with substantial resources spent on various kinds of self-enforcement and self-protection. Self-enforcement tends to be more cost-effective in protecting contract rights than in protecting property rights. Self-enforcement often relies on the building of reputations, on reputational capital. For instance, the small share of non-performing loans in Western bank portfolios is not due mostly to superb performance of bailiffs but rather to the fact that persons who at some point of their careers default on their loans tend to find themselves cut off from further lending. Meaningful credit information is available and people service their loans as regularly as they can to avoid getting on the black list. In the early years of post-communism such reputational capital was largely non-existent, and even where it had existed to some extent before – and Yugoslav socialism provided more opportunities for building reputational capital than the Soviet-type socialism – the pre-

existing reputational capital was debased by the dramatic change of circumstances. Numerous new enterprises were formed, but their owners were often less interested in building reputational capital because they were often struggling for survival and their future was extremely uncertain. However, after a couple of years, i.e. in the late 1990s, these inhibiting factors became less relevant in the countries that had embarked on transition in 1990 and the usual self-enforcement mechanisms that the normal conduct of business hinges on started to become more powerful. As a result, those legal rules which support business, transactions have increasingly been abided by voluntarily. This phenomenon has been observed in most post-communist countries. A prominent example is Khodorovsky, the former owner of Yukos, who is now being tried. Most likely he had been a great villain, but even he got somewhat more honorable as of late.

Second, for a while quite a number of economists commented on crony capitalism as if it were a recipe for disaster. And what followed after communism was often some sort of cronyism. The very negative account of crony capitalism, which has been so popular among economists, misses out on an important distinction. Public law enforcement does not necessarily mean that the law is enforced as a public good; instead it may be enforced as a private good<sup>7</sup>. Enforcing the law as a private good means that enforcement is haphazard and highly selective and that only a very limited number of people can actually rely on it. This is cronyism. To be sure, countries characterized by crony capitalism will not manage to catch up with the US or affluent Western European countries. However, there is some middle ground between affluence and disaster. In their celebrated analysis Haber et al. (2003) demonstrated at the example of Mexico that crony capitalism can result in rather respectable growth rates, and that it may well improve livings standards more significantly than e.g. socialism managed to do. So even if there is no rule of law proper, i.e. if a government does not protect the rights of most people, but only those of the select few, this may suffice to generate growth provided that at least some of these select few have entrepreneurial zeal and talent.

After these remarks on two widely held misconceptions the stage is set to turn to three false theories. The theories will be named according to their best-known proponents. The first theory was proposed by Roland (2000), the second by Stiglitz and the third by Shleifer and Vishny<sup>8</sup>. Roland's theory will be criticized first. He rightly observes that law

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<sup>7</sup> *This distinction seems to have been pioneered by Gambetta's (1993) analysis of the mafia.*

<sup>8</sup> *Relevant writings are numerous, but Hoff and Stiglitz (2004) and Glaeser, Johnson and Shleifer (2001) are particularly illustrative of the type of arguments presented.*

enforcement is costly and goes on to argue that post-communist countries often cannot afford such costs because they lack sufficient tax revenue. From this he infers that the government should protect some part of the economy from competition and keep it under its tutelage. He hopes that, as a result of such protection, this part of the economy will be profitable enough to generate the stream of tax revenue required to finance law enforcement. This theory has several flaws. The most significant flaw in Roland's approach is that he abstracts from the interdependence between the set of rights to be protected and the cost of enforcement. However, this interdependence is enormously important. Protecting private property, contract rights and personal safety but little else does not cost so much, all East European countries can afford it. Enforcement costs, however, grow enormously if a much broader set of rights is to be enforced and in particular, if this set of rights includes so-called social and economic rights, which to quite some extent stand in conflict with private property rights. If a country cannot afford law enforcement, the primary reason is that the set of rights which it tries to enforce is too large and there is too much conflict between these rights<sup>9</sup>. By the way, Germany also offers a good example of the costs that an overextension of the set of rights, social and economic rights in particular, can cause. Germany has been on a decline since the early nineties, but the real decline has been less dramatic than the statistically recorded decline. There is an indication that the German shadow economy has grown significantly. This means a decline of law enforcement, with the costs of enforcing the law growing more and more out of proportion to what a society is ready and able to spend on enforcing it.

A second strand of fallacious theorizing, represented e.g. by Stiglitz, attempts to conceptualize the rule of law as a matter of public choice. This is a sort of constructivist approach to the issue. Stiglitz contemplates under which circumstances citizens vote for the rule of law and which policy measures render it more likely that citizens will vote for rather than against it. E.g. Stiglitz conjectures that citizens tend to vote against the rule of law if they consider the prevailing distribution of wealth as illegitimate. Moreover, he argues that citizens are likely to vote for the rule of law if the return on their investments is high. From this he infers that the government should refrain from the policies that tend to reduce the return on investment. Stiglitz represents monetary stability as a measure which depresses return rates, and argues for a policy of moderate inflation and currency undervaluation. This view may be criticized for a number of reasons which are beyond the scope of this paper. However, the key flaw of his argument lies in the way he poses the problem. Citizens of post-communist countries rarely mean to vote against the rule of

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<sup>9</sup> See Posner (1995) for a succinct elaboration of this point.

law. There have been numerous parties and politicians whose endeavors arguably are incompatible with the rule of law but they have rarely advertised this, nor have they inserted it in their party programs in an easily discernible way. For instance, it is debatable to what extent Putin's "dictatorship of the law", which has been one of his key slogans, is compatible with the rule of law but one should not assume that these cleavages are common knowledge among Russian voters. Presumably, most Russians rather think that this so-called dictatorship of the law and the rule of law is one and the same thing. Neither are there any anarchist movements attracting a significant number of votes anywhere in Eastern Europe. Even if one were to adopt a narrow view of law as a concept focusing on private property, one cannot claim that the parties which have been explicitly hostile to private ownership have commanded much support among the voters since 1995. Enthusiasm for nationalization is largely a matter of the past. The ex-communist parties including the Russian communists typically no longer make the abolishment of private property and terrorizing the bourgeoisie a key program issue. The real issue in elections is not whether one is for or against the rule of law; it is more about different understandings of the rule of law. In addition, voters often strive for other social goals in addition to the rule of law and fail to realize that these other social goals may be partly or fully incompatible with the rule of law. Voters often hold onto the misconception that the rule of law is tantamount to tough crime-fighting.

Another problem with how Stiglitz poses the problem is that the real difficulty with the rule of law rarely lies in the promulgation of principles; rather it is the host of practical problems of implementation. These problems are far too numerous to be solved within one legislature, they are a matter of decades. Still, another criticism of Stiglitz's theorizing is that people in real life are more pragmatic, more Coasian than Stiglitz thinks. It is not really so important to them whether the big shots acquired their wealth in a legitimate way provided that they create jobs, pay their workers well and behave decently. E.g. in Croatia people do not really care so much about the origins of Todorić's money provided that he allocates his resources prudently and in ways that promote the Croatian economy. Most likely the issue of the legitimacy of privatization policies really is much less relevant than Stiglitz tends to believe. To summarize, Stiglitz's approach is quite misleading. Small wonder that his modeling effort results in extremely implausible conclusions. E.g. in his model the rule of law becomes the more likely the poorer the nation gets. According to him, the rule of law is ultimately unavoidable, those who do not have it become more and more impoverished and that will give rise to the rule of law. Also, he excludes the very possibility of law enforcement as a private good.

A third strand of theorizing, which will be referred to as the Shleifer and Vishny approach, focuses on slack and incompetence in the courts and the subversion of courts and argues for a partial substitution of judicial procedures by government regulation because, in their view, regulatory agencies are less easily subverted and capable of more decisive action against wrongdoings. According to them, regulatory authorities need to play a key role in creating the rule of law. They focus on three major shortcomings of courts, one of them being incompetence. Incompetence of courts, particularly of commercial courts that need to deal with new and complicated fields such as e.g. agency law, certainly is a major problem and even more so if judges lack sufficient incentives to acquire relevant knowledge. However, notice that these disputes can often be put to arbitration, so this offers a ready solution for contract disputes, although not for torts. Arbiters may be selected according to their competence. Creating a regulatory authority may be thought of as a solution for the remaining problems only if the country has a sufficient number of experts to fill the key positions of the regulatory authority. However, if such experts are actually available, one could just as well create a specialized court or a specialized department of an existing commercial court and appoint these experts as judges. The latter is the more expedient solution in particular because such a specialized need not require such numerous expert staff as does a regulatory agency. This is so because in civil litigation the most labor intensive part of work, i.e. the gathering and organization of evidence, can be left to the litigants' attorneys and the choice of a sufficiently competent attorney is up to the litigant. Attorneys are self-employed; they have powerful incentives to acquire the knowledge their clients need. In contrast, a regulatory agency needs to do much of this work of gathering and organizing evidence by itself, and it requires considerable staff to discharge these duties. Hence, creating a specialized court is much easier than creating a regulatory agency capable of handling the issue.

Shleifer and Vishny are also concerned about slack. In civil litigation the building and arguing of a case is largely up to the attorneys<sup>10</sup>, thus the relevant incentive problem is not primarily about providing incentives to judges but about whether litigants and their attorneys have sufficiently strong incentives. This may be a problem if gathering relevant evidence is difficult (or if there are major problems of market failure in the market for

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<sup>10</sup> *However, in Croatia it is only since the 2003 reform of the civil procedure that civil litigation has primarily been based on the adversarial system. Up to 2003, it had strong inquisitorial elements. In the inquisitorial system the distinction between courts and administrative regulation is somewhat blurred.*



attorney services<sup>11</sup>). Quite a number of civil law countries have failed to react to this problem. The problem can often be solved if the stakes are increased sufficiently and if the attorney is effectively made a co-owner of the stake. This can be done by adding punitive damages to compensatory damages and by allowing contingent fees contracts, these are well-known incentive devices widely used in common law systems. It is not transparent why a civil law country should refuse to adopt them. Awarding punitive damages or a multiple of what would be needed to compensate a winning plaintiff, and contingent fees, i.e. a contract between the plaintiff and his attorney according to which the latter receives a certain share of the award, creates powerful incentives to litigate a case. For sure these are not weaker than even the strongest incentives a regulatory agency can possibly offer to its employees<sup>12</sup>. So the second argument of Shleifer and Vishny is not much better than the first.

There is a bit more to their third claim. It concerns corruption in the courts. It is less than clear how venal Croatian courts are. Hard evidence is virtually unavailable but extremely strange court decisions, that appear explainable only by corruption, are not at all rare. Shleifer's and Vishny's basic argument is the following: Consider behavior that may result in an accident causing large damage, assume that this damage occurs with the probability of only one percent. Thus, the expected value of damages is only one percent of the actual damage if it occurs. One possible approach of the law is prohibiting this behavior outright and employing a police force or a regulatory agency to enforce this prohibition. Alternatively, the law can confine itself to entitling the victim of the accident to damages, and the stake of the victim may be blown up by allowing punitive damages. If there is no police force or regulatory agency supervising the activities that provide the opportunity for the potentially damaging behavior, cases will come to court only if there is a victim. And if there is, the damage is large by assumption. This creates a strong incentive for the defendant to corrupt the court, a lot is at stake for him and, consequently, he will be ready to offer a large bribe. The larger the bribes offered, the more likely it is that judges will

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<sup>11</sup> *This seems to be the case in Croatia but not much research has been done on this issue yet. Presumably, the key problem is the adequate provision of quality signals. This is a problem in much of continental Europe. An adequate treatment of these issues is beyond the scope of this paper.*

<sup>12</sup> *Quite a number of jurists are inclined to shudder at the thought of contingent fees. However, this prejudice may need to be reconsidered. In debt-collection, arrangements which are effectively equivalent to contingent fees are perfectly common. If a creditor sells a claim to a debt-collection agency, he often receives only a fraction of the claim's face-value, the debt-collection agency in essence operates on something like a contingent fee contract. If this works well in debt-collection, why not extend such incentive-providing devices to tort law ?*

turn out to be bribable. If instead, there is a police force or a regulatory agency authorized to fine those who engage in the potentially dangerous activity and if the agency employs sufficient personnel to catch most of those who do engage in it, a moderate fine may suffice to deter people from this activity. If the fine is small, the incentive for bribing is small as well, and consequently officials are more likely to resist the temptation to take bribes. Notice that this superiority of regulation depends on a crucial condition. The personnel employed by the agency must be numerous and competent enough to catch misbehavior with a large likelihood, and they must be sufficiently well supervised and paid to resist the temptation offered by small bribes. In the countries with rampant corruption these conditions are often unlikely to be met, so it may be easier to make sure that courts cannot be bribed. In principle, it is not so hard to make the judiciary largely corruption free; judicial organization offers numerous opportunities to limit corruption. Devices for limiting corruption in courts are trial by jury, having judges sit in panels, a well-defined court venue and case-allocation system, publicity of trials, etc. If a country does not use such opportunities for limiting corruptions in the face of widespread corruption, this is presumably due to a lack of political will. However, if there is no political will to fight corruption, regulatory agencies are likely to prove corruptible as well. Key devices for fighting corruption in the public administration are paying officials well and back-loading their salaries, e.g. granting liberal old-age pensions, which an official will lose if he is dismissed because he is found venal. The staff required to run a regulatory agency is much larger than the number of judges and court officers such as bailiffs that are required to run a specialized court. Hence, paying the required personnel well enough to make them unbribable is much more difficult under administrative regulation.

Thus, in summary, the theories expounded by some economists to explain insufficient law enforcement in post-communist countries do not improve our understanding of the real issues. It is worth noting that all of these theories largely neglect communist legacies. The second part of the paper discusses some issues which are more relevant for understanding the real difficulties hindering the rule of law in Croatia. On closer inspection, most of these difficulties turn out to be related to communist legacies. Surely the list of difficulties presented in this paper is incomplete. Law enforcement is a multi-faceted affair and there are no panaceas.

The second part of this paper is organized around the following topics: topic one concerns the neglect of constitutional and civil law, topic two is the instability of rules, topic three concerns the separation of powers, topic four court congestion and its causes.

## 2 Some Communist Legacies Revisited

### 2.1 Relevance of Constitutional and Civil Law

As has been pointed out by Croatian legal scholars such as e.g. Gavella (2001), Yugoslav law was a member of the socialist law family, it was not a hybrid between socialist and western law. Two of its most distinctive features were the marginalization of constitutional law and of civil law. Yugoslav communism featured a sort of pseudo-constitutionalism, constitutions for the most were a facade, they had a propagandistic and legitimizing function, but they were not meant to limit government and certainly they did not limit it in actual fact. Thus, constitutional law proper started only in post-communism. However, it is not yet taken very seriously. Post-communist Croatia has witnessed a flood of unconstitutional legislation and administrative rule-making. Quite often the flaws of these rules, their unconstitutionality, could easily have been recognized by a lawyer who was ready to think about them. Thus, most of these mistakes could have been avoided if one had taken some care. The fact that the constitutional court has invalidated thousands of laws and regulations does not indicate judicial activism. The constitutional court actually has leaned towards self-restraint. Thus, the large number of rules declared unconstitutional testifies to the disregard of constitutional principles that has characterized rule-making. Presumably, the framers of these unconstitutional rules did not intentionally violate constitutional principles; they just did not think of them. Thus, the primary issue has been inertia. To make matters worse, rulings of the constitutional court have frequently been ignored, and this is decidedly worse than inertia.

Another feature of communist law was the marginalization of private law; under Yugoslav communism private law was only moderately more significant than in Soviet-type systems. Moreover, in the narrow sphere allowing for private law, its efficiency was greatly reduced e.g. by promoting schemes for divided ownership. The best example of this, of course, was real estate where the principle of *superficies solo cedit* was abandoned and titling de-emphasized. Symptomatic for this development were the illustrious “*nekretnine u izvanknjižnom vlasništvu*” (Engl. off-register title properties). Among the lasting results was a decay of land registers. Unfortunately, there have been no vigorous efforts at their improvement until quite recently. Another common feature of Yugoslav and Soviet-type law was that the judicial machinery available for enforcing civil law claims, e.g. debt collection, was debased and rendered unable to collect major amounts of debt within a reasonable time.

The impact of these legacies on post-communist Croatia continues to be felt in much administrative rule-making. The rules created by public administration and regulatory agencies quite frequently amount to nothing less than legislation, in effect they arrogate legislative functions and quite often cover ground which in Western Europe is the domain of civil law, i.e. they substitute civil law by public law. Public administration rather than parliament is the framer of this public law. An example of this sort of administrative rule-making is the Croatian National Bank, which in the course of the 1990s essentially framed a bankruptcy law *sui generis* for banks. At the time, this may well have been unavoidable because both the parliament and the courts failed to fill the gaps of existing bankruptcy law or take proper account of the special problems raised by defunct banks<sup>13</sup>. These gaps needed to be filled somehow, or severe damage might have occurred. Thus, legislation by the National Bank was presumably necessary to prevent worse things from happening, so it became a legislator by default. Note that the National Bank thus acted according to the advice offered by Shleifer and Vishny. The most serious danger in it is that the assumption of legislative functions by the public administration and the substitution of private law by public law comes to be regarded as more than an emergency measure, required in the immediate aftermath of communism and war. It should be understood that this sort of stopgap is no longer acceptable in more settled circumstances.

### 3 Instability of Legal Rules

Much of Western Europe, e.g. Germany, suffers from instability of legal rules but this instability is largely confined to public law, administrative law, tax law and social security in particular. In Croatia, however, civil law and criminal law have been highly unstable as well. Instability of law is almost by definition incompatible with the rule of law; in order to rule, law must be certain, whereas instability reduces or eliminates legal certainty. The rule of law means that citizens structure their behavior in a way to avoid the violation of laws. This is clearly impossible if they cannot know the law. The rule of law is a political ideal, which in reality cannot be approximated more than imperfectly. The real danger thus is not that the reality falls short of the ideal, but rather that the ideal is lost out of sight or that it ceases to be regarded as a goal of legal policies.

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<sup>13</sup> *Clearly, a run-of-the-mill bankruptcy procedure sometimes is unsuitable for banks, special provisions may be required.*

The persistent legislative over-activism prevailing in Croatia suggests that stability of legal rules is not considered desirable; all law including civil law rather tends to be regarded either as an instrument of shaping society according to the ever-changing priorities and goals of politicians, or as an instrument employed by politicians in order to style themselves as doers, men of action. Creating this image of a man of action seems to be a nearly infallible recipe for popularity in most democracies, e.g. German chancellor Gerhard Schröder has resorted to this device as much as any Croatian politician. Rewriting laws and spending money are the actions that the man of action may take to prove himself. The resulting damages can be kept within tolerable limits if legislative activism is confined to a circumscribed sphere of public law which, hopefully, is of limited relevance for much of society. Confining the men of action to such a circumscribed sphere may be possible if society at large has abandoned utopian inclinations and has become sufficiently skeptical of all grand outlines and holistic designs. Whether this prerequisite is fulfilled in Croatia is debatable; e.g. the idea that the government should propose grand strategies to guide the economic development still seems to enjoy quite some popularity, as illustrated by the frequent calls for a development strategy for the country.

Thus, it may be less than surprising that even civil legislation continues to be amended with irritating frequency. Bankruptcy law is a good example. Since the enactment of a completely new bankruptcy code in 1996, there have been two amendments already and both have been major. Recently, in fall 2004, the Minister of Justice announced the next major revision. Since Croatian bankruptcy law is basically similar to German law, it is natural to compare the Croatian speed of legislation with that in Germany as well. The new German bankruptcy law enacted in 1994 superseded the bankruptcy law dating back to 1877; the latter had not undergone much change during the 120 years from its enactment. The 1994 law was drafted by a committee formed in 1978; the committee worked on its draft for seven years, it was then revised by the ministry of justice and discussed by government for another six years. Parliamentary discussion extended for two years. Between the enactment of the new law and its taking effect there was an interval of five years, during which the old law continued to be applied. This five-year interval was thought of as necessary to give judges and lawyers a chance to get familiar with the new law. Actually, the new law does not work too well; there have been numerous unexpected difficulties when it was finally enforced<sup>14</sup>. This description may suggest to the reader that Germans tend to be overly pedantic, so it may be worth noting

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<sup>14</sup> *On this see e.g. Uhlenbruck (2004).*

that the grand US bankruptcy law reform of the 1970s proceeded at a slow pace as well. This is not to argue that Croatia could and should have taken similarly long, this was not possible because much of the legal legacy of Yugoslavia was dysfunctional and needed to be substituted by something else. However, this problem was solved in 1996/97, when key elements of the new civil law were enacted. The two amendments of the bankruptcy code enacted since 1996 have definitely been too much and prepared in too much haste, the second amendment in particular was a quick and dirty move and introduced new defects<sup>15</sup>. Nevertheless, it presumably was the minor evil; some had wanted no less than a total revision of the code that was avoided. Similar stories can be told about other fields of civil law.

The law of civil procedure has suffered similarly under excessive legislative activism. A good example is “*ovršni zakon*” (Engl. distress/execution act, enforcement statute), which since its enactment in 1996 has already suffered two major amendments, both of which have been described as sloppy and inconsistent<sup>16</sup>. In Germany, the key enactment regulating execution dates back to 1877, much of this 1877 law is still in force.

Croatian criminal law was unstable throughout the 1990s as well, since then matters have improved.

The usual pretext for rewriting laws is that there have been some abuses. The possibility of curbing these abuses by reinterpreting the law and through judge-made rules rarely seems to be considered. However, case law may even be capable of resolving quite a number of the incompatibility problems, which inevitably arise if legislation is enacted in great haste. Unfortunately, in Croatia judge-made law still tends to be viewed as a matter of minor relevance. This neglect of judicial precedent and case law has been reflected by the prevailing habit that most appellate court decisions and opinions until quite recently have remained unpublished. Contempt of case law, as well as legislative over-activity, testifies to a persistent influence of legal positivism. The neglect of constitutional principles may similarly be traced to legal positivism since legal positivism amounts to denying that all law must be built on a body of more permanent principles. The persistent influence of positivism would be easier to understand if Croatia were devoid of a tradition of Catholicism. The concept of natural law has been highly important in

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<sup>15</sup> See *Dika et al. (2003)*

<sup>16</sup> See *Crnić (2004)*.

Catholicism, so in a Catholic country it should be expected to exert some influence and it is sort of a paradox that its influence really has been so weak<sup>17</sup>.

## 4 Separation of Powers

The judiciary is by its very nature a relatively weak power; it depends on support provided by other powers and by society at large. If other branches of government are essentially united and form a unitary power, the judiciary has little chance of asserting itself. Thus, a meaningful separation of powers is crucial. It is rather obvious that in Croatia the separation of powers continues to be underdeveloped. This is mostly due to the new Croatian centralism, which in some respects mirrors the centralism that – even though it had been disguised in various ways – really was a persistent tendency under communism. In post-communist Croatia the hazards of centralism have been enhanced further by a high degree of politicization, which has prevailed in much of the civil service. Understandably, the state of emergency brought about by post-communism and war was not the most suitable environment to stress the separation of powers, but this emergency has been over for quite a number of years. The constitutional amendments of 2001 eliminated the predominance of the president and thus paved the way towards de-concentrating power. However, as of now power is still highly concentrated in the hands of the executive branch of government, in particular the prime minister and the cabinet. Parliamentarianism proper remains underdeveloped and, as a result, the cabinet is in actual fact both the executive branch and the legislator. The weakness of parliament is most clearly revealed by the enduring popularity of abridged (“*hitno*”) legislative procedures<sup>18</sup>. The power of the cabinet has declined somewhat since 2000, but this has only been due to the fortuitous circumstance that all governments since then have depended on fragile coalitions of a multitude of parties. This has been a blessing in disguise. Still, this circumstance is no more than a mediocre substitute for an institutionalized separation of powers. Notice the economic substance of this argument: it applies anti-trust analysis to government. The underlying presumption is that monopoly in government is the most dangerous sort of monopoly.

In modern democracies parties often impose discipline on their parliamentary deputies, deputies usually vote with their party leadership. In Croatia this discipline is even further

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<sup>17</sup> *It is no less of a paradox that most economists are unfamiliar with the idea of the law of nature. This idea was central for classical economic thought, as even a casual reading of “The Wealth of Nations” reveals. Or see e.g. Hume (1998[1753], p. 92).*

<sup>18</sup> *For some material illustrating the weakness of parliament see Bratić (2004).*

enhanced by the autocratic structures within most if not all parties. As a result, the traditional separation of powers between executive and legislative branches is bound to be less meaningful than it used to be in the nineteenth century and there is a need for supplements. The most effective supplement is decentralization, federalism. A further group of elements that effectively enhance the separation of powers in EU-members are European institutions, Brussels and the European courts of justice. Although many of the critical remarks raised against Brussels are justified, it seems difficult to understand why so many people fail to realize that Brussels has one overriding advantage: in many EU-members the separation of powers is underdeveloped and EU-institutions make up for this defect. Croatia's current state as a prospective EU-member already provides it with some of these benefits.

While centralism could be justified during the war, it may seem like a paradox that Croatia has done so little to de-emphasize centralism since 1996. This is so because it runs counter to Croatian traditions, Croatia differs from most Central European and East European countries by its lack of a centralist tradition. The absence of such a tradition is a distinction which post-communist Croatia has so far failed to derive an advantage from.

A peculiar circumstance relevant for the topic of this paper is that the Croatian judiciary in some sense has been a victim of centralism twice. First, because centralism tends to promote the unity of powers and legislative over-activism, a continuous reshaping of rules according to the ever-changing priorities of politicians. If, instead, the pursuit of certain goals by means of legislation required lengthy negotiations and difficult compromises with sub-national authorities, the speed of rule-making by parliament and the executive branch of government would be much reduced. And this is precisely what is desirable for enhancing the real role of the judiciary<sup>19</sup>.

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<sup>19</sup> *This is not the only reason to oppose centralism. Another problem, which also concerns the judiciary and is even more important than the arguments presented in the text, is the paradox of power. The only stable solution to this paradox known is limited government. For an admirably lucid presentation of the issue the reader may again be referred to Haber et al., op cit. who write on p. 5 of their text: „The literature is just beginning to specify the exact configuration of the institutions that force limited governments to respect their own laws regarding individual political and economic rights. ...The literature suggests...that what is key is that individual political actors cannot exceed the authority granted to them by the law. If they do so, they are subject to sanctions that are imposed by other branches or levels of government...These sanctions are not imposed in arbitrary or ad hoc fashion: the sanction mechanisms are themselves prescribed by the law. In the United States, for example, the president is limited by a bicameral legislature, an independent judiciary, state and local governments, and a professionalized civil service....”*



Second, as paradoxically as it may seem, the judiciary has suffered from centralism also because – unlike in most other parts of government – the administration of justice was effectively decentralized along county lines and it occurred in a way that (until the amendment of the code of civil procedure enacted in 2003) concentrated the legislative functions of the judiciary at the county level. This is so because in most civil litigation the chain of appeals ended at the appellate court, appeals to the Supreme Court were so severely limited in number that its case-load was amazingly small. In every developed legal system, irrespective of whether it is of common law or civil law origin, appellate and supreme courts are to some extent legislators. In post-communist Croatia this legislative function was to an unusual extent concentrated on the appellate rather than on the Supreme Court level. However, most counties are simply too small to allow for the development of a sufficiently detailed case law. This arrangement has thus resulted in a lack of legal certainty.

It may seem that this argument is inconsistent as it calls for and rejects federalism at the same time. However, there is no contradiction. The legislative and the executive powers are in need of a more meaningful separation of powers that can be brought about by federalism. The judiciary, in contrast, is weak; there is no good reason to weaken it even further by federalizing it, this is counterproductive and reduces rather than strengthens the separation of powers.

## 5 Court Congestion

Most economists and similarly a large part of the Croatian society seem to think of the judiciary as overloaded, complaints about court queues are commonplace. This appears to be the most popular complaint about courts, it is thought of as the most serious obstacle to the rule of law. If this were really true, we would be facing a puzzle. If the court queue is the key problem, traders should be expected to exploit the available opportunities to avoid the queue i.e. they should opt for arbitration, but in reality they rarely do so. This is an observation suggesting that much of the common thinking about court queues is somewhat superficial. Moreover, the proposition that the judiciary is overwhelmed by excessive litigation is not really confirmed by the available statistics. This fact is obscured by the habit to represent judicial workload in terms of “matters” (Croat. predmeti). “Predmeti” is a broad term that includes e.g. a broad variety of actions undertaken in the course of a distress procedure as well as making entries in public registers such as the commercial register and the land register. Making such entries usually does not involve a dispute, this

work does not normally necessitate the involvement of judges, it can be delegated to auxiliary personnel provided that appropriately skilled auxiliary personnel is available in sufficient numbers. That this is not yet the case is a major problem of the Croatian judiciary, similar to many other post-communist countries. Data on the speed of the judiciary often report the time needed to process the average “predmet”, this measure suggests optimistic conclusions which are much more positive than what the public thinks so the average time needed for processing a “predmet” is not at all long. However, it seems that this measure of judicial efficiency is garbled by the small share of litigation in the overall number of “predmeti” which amounts to millions per year and keeps growing<sup>20</sup>.

Rather than focusing on the compositum mixtum of “predmeti”, it seems more useful to distinguish between different kinds of activities undertaken by courts and investigate them separately. In subdividing court activities it seems natural to view litigation, and civil litigation in particular, as an important subdivision since a free enterprise economy is primarily ordered by civil law that is why it is more appropriately referred to as a civil law society. Some data on civil litigation are available in the statistical yearbook<sup>21</sup>. Unfortunately, these data do not cover commercial disputes. However, presumably an upper bound on the number of commercial disputes can be found by comparing the available figures on judges in the various jurisdictions and assuming similar case loads. When comparing the resulting estimates on overall civil litigation, including commercial disputes, with East Central European countries two observations are striking. Firstly, the Croatian per capita civil case load is not too high. Secondly, a disproportionate share of civil litigation is accounted for by disputes concerning employment contracts, their share is much larger than in most, if not all East Central European countries. With regard to this share Croatia is similar to Germany, which suggests that Croatian and German employment law are suffering from similar defects<sup>22</sup>. Disregarding employment-related disputes, the civil case load per capita of the Croatian population stands at little more than

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<sup>20</sup> For such data see e.g. Crnić (2001).

<sup>21</sup> See e.g. *Statistički ljetopis Republike Hrvatske 2002* p. 529. It is a pity that more detailed judicial statistics have not yet been made accessible to the public, even though they do exist.

<sup>22</sup> Both Croatian and German labor law essentially allow for discharges of workers only for „good cause”. Clarifying the meaning of the expression “good cause” and proving in court that the requirement is fulfilled often amount to a demanding or even impossible task, even if the worker clearly misbehaved. The Croatian labor statute attempts to specify “good cause” to some extent, but in a way which is unlikely to solve the dilemma. Moreover, Croatian and German labor law take a rather restrictive attitude towards temporary contracts, which in some other European countries e.g. Denmark are quite widespread and help avoid many of the problems caused by the “good cause” doctrine.

half of e.g. the Slovak load. In terms of its per capita civil case load, Croatia is more similar to Bulgaria or Russia than to Slovakia<sup>23</sup>. Thus, contrary to a widespread view (expounded even by the Minister of Justice) Croatians are not very litigious, they tend to avoid courts except if they have a dispute with their employer. In this perspective, it seems difficult to argue that Croatia has arrived at a civil law society. The limited amount of civil litigation suggests an even more limited use of contract remedies. This is symptomatic for the underdevelopment of a civil law society, since contract is the most important instrument supplied by the law supplies to an individual to shape his own position.

Another significant sub-group of “*predmeti*” is constituted by enforcement procedures under the law of civil procedure i.e. under the enforcement statute (*Croat. ovršni zakon*). While data on civil litigation indicate that the use of judicial remedies is of rather moderate frequency, the number of “*ovrhe*” is high indeed, “*ovrhe*” are a multiple of the number of civil judgments. According to Crnić (2004, p. 4), there are about 300,000 “*ovrhe*” per year. Part of this incongruity is due to the fact that final judgments provide only a fraction of the enforceable titles, giving rise to an “*ovrha*”. According to Crnić, their share is only about 20 percent. Comparing the resulting figure of 60,000 “*ovrhe*” with the figures on overall civil litigation (114,900 suits in 2001<sup>24</sup>) it turns out that civil judgments in a majority of cases are not complied with voluntarily. Since it seems unlikely that all defendants are genuinely insolvent – and initiating an “*ovrha*” would not make much sense either – such a large number of “*ovrhe*” suggests that judgment-debtors as well as most other debtors often expect to get away with non-compliance. Thus, high insecurity about the success of an “*ovrha*” even against a solvent debtor seems to be the only way to explain their large number. Presumably, this is one of the key problems of the Croatian legal system.

Searching for the proximate cause is not an overly difficult assignment. The 1996 reform of civil procedure abandoned some of the debtor-friendly features of Yugoslav enforcement law, but it represented less than a radical shift towards empowering creditors. Well-informed critics such as Crnić (2004) stress the lack of procedural

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<sup>23</sup> For Slovak data see e.g. *Štatistická ročenka Slovenskej republiky 2000* p. 555. Russian resp. Bulgarian data are not readily accessible through their national statistical yearbooks, but some data have been collected from various sources by Varese (2001) resp. Schönfelder (2005).

<sup>24</sup> As mentioned above, this figure does not include commercial disputes. However, notice that it refers to disputes, not to judgments. Since the number of judgments is surely smaller than the number of disputes and since some civil litigation does not involve problems of enforcement (think of a divorce which does not result in alimony claims), 115,000 appears like a reasonable upper bound for the number of judgments potentially giving rise to enforcement problems.

efficiency, characterizing much of “*ovršni zakon*”, and point out that it reduces the chances of creditors to collect<sup>25</sup> considerably. If debt collection procedures were less tedious and more efficient, solvent debtors usually would prefer to comply voluntarily and quite a number of allegedly insolvent debtors would suddenly find out that they are solvent. The Supreme Court has suggested changes towards more procedural efficiency upon several occasions. As mentioned above, there have been two major amendments but they did not proceed along the lines suggested by the Supreme Court. These two amendments were somewhat ambivalent, in some respects they strengthened (judgment-)creditors, in some others they strengthened debtors, and it is difficult to strike a balance. Probably the overall effect on the debtor-creditor balance of powers was not much different from zero. Since this occurred under both HDZ- and SDP-led governments, it seems difficult to avoid the conclusion that protecting debtors’ interests rather than creditors’ rights continues to be a more pressing concern for most politicians and presumably for numerous voters as well. As long as this state of affairs persists, progress will be limited. One of the unfortunate consequences of this situation is that it makes a fool out of judges and earns them much undeserved criticisms. If a judgment is not complied with and enforceable titles turn out to be effectively unenforceable, the public tends to blame the courts even if they are not at fault because they are powerless. Ultimately, this state of affairs tends to discredit the very idea of the rule of law.

## 6 Concluding Remarks

Some of the announcements recently made by the Minister of Justice seem to suggest that judicial policies may be continuing on a zigzag course. Apart from announcing a number of welcome changes, which among others would relieve judges from much clerical work and allow them to focus their attention on litigation, her promise to amend bankruptcy law in a way to facilitate reorganization suggests that debtors may actually be strengthened. It also neglects the fact that for the vast majority of bankrupt companies an effort at reorganization is simply a waste of time and resources, they should be liquidated promptly. Among the Minister’s favorite ideas is that Croats litigate too much and should instead engage in out-of-court settlement, which may be facilitated e.g. by mediation. However, mediation seems to be flunking the market test virtually anywhere

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<sup>25</sup> Marković (2003, p. 404) put it like this: „Sudska praksa pokazuje da su ovršni postupci, u pravilu, predugi i da vjerovnici teško ostvaruju svoja prava.” (Court practice shows that enforcement procedure, in principle, takes too long, making it very difficult for (judgment-)creditors to collect.)

in the world. Croatians are not litigating too much. The problem rather is that the value of litigation is greatly debased by the fact that enforcement of judgments is so unreliable. If the latter problem were fixed, Croatians would presumably litigate more but courts would have less work with “*ovrhe*” because debts would more often be served voluntarily. Then, courts could allocate most of their resources to litigation and this would seem like a very reasonable priority.

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# Evaluating Macroeconomic Strategies with a Calibrated Model

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## Abstract

In several catching-up CEE countries we experience an expenditure boom explained by arguments referring to intertemporal consumption optimization. We have calibrated a model assuming externalities from foreign direct investments and a country risk premium, dependent on the debt/GDP ratio. In the model the internal rate of return on marginal savings turned out to be about 18 percent, higher than the level that any estimate of the time preference might justify. Its existence is due to the fact that externalities produced by both saving and investment are not internalized by private agents. Fiscal policy should make the necessary adjustments to approach optimum.

**Keywords:** intertemporal consumption, calibrated model, fiscal policy

**JEL Classification:** E21, E27, E62

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# 1 Introduction

After a long period of transformational recession CEE countries seem to enter a new phase of development, that of catching-up with the rest of Europe. Having recognized this development, many politicians and many citizens are starting to feel, partly in response to political campaigns, that after a successful political and economic system change time has come for a “welfare system change”. People have suffered enough from the recession prompted by reforms, it is time to consume more now. As most countries have no net external reserves to use – on the contrary, Hungary for example embarked on the transformation with large debts – the source of excess consumption could be future output. This high future output, the prospect of a rapid catching-up process is the main argument that incites people into an exuberant demand for higher wages and higher consumption.

The rationale behind such an intertemporal reallocation of consumption depends on the time preference of consumers. We do not dare put a numerical value to this preference either in the aggregate or for individuals. What we try instead is to calculate the opportunity cost of switching future consumption for present consumption. Or putting it another way, we try to determine the real return of aggregate savings around the current level of net savings in Hungary. Although we had Hungary in mind when calibrating the model, the differences among CEE countries are not so large that our qualitative conclusions would not hold for other countries in the area as well.

The lessons to be learned from the simulations of the model are related to fiscal policy. Our assumption is that foreign capital in Hungary – similarly to other catching-up countries – has a positive external effect on productivity. Similarly, personal or government savings have a positive external effect on the risk premium component of interest rates. Therefore, the decentralized decisions of agents will not lead to an optimum and fiscal policy has the task of correcting the market failure. This correction has an obvious target in a higher stock of resources that produce the externalities. Our model does not provide a recipe for the tools that should be used to correct the market, or to what extent. Basically, the government can influence intertemporal allocation in two ways: by using the tax structure and – in a non-Ricardian world – making savings itself. In our model these tools are not specified. We do not model how the tax system affects



consumption<sup>1</sup> or how government savings affect aggregate savings. In addition, we do not consider any other effects of the fiscal policy on output. We know, for example, that fiscal debt has distortionary effects on future working incentives that may lead to future losses of output.<sup>2</sup> We add only one element to the evaluation of the fiscal policy. This element is based on the fact that whatever the channel the fiscal policy uses in correcting market failures, governments have to give account of whether they did their job well. The social opportunity cost that a society faces as a consequence of personal and government choices might be used as a yardstick of their performance.

In Chapter 2 we give a verbal description and justification of the main assumptions, in Chapter 3 we present the equations, in Chapter 4 the simulation results and in Chapter 5 the conclusions.

## 2 Main Assumptions and Features

The model is classical, assuming market clearing. The economy is a small open economy where capital flows are unconstrained but their speed is dampened by adjustment costs. Tradables and non-tradables are distinguished in an implicit way. The model is classical, the price level is not determined, variables are expressed in real terms, the real exchange rate is the price of non-tradables in terms of tradables, normalized with the similar ratio abroad.

The catching-up process is modeled in the following stylized way. Labor supply is constant – more or less in accordance with actual demography. The growth rate of the total factor productivity (TFP) is equal to the world rate in the long run. During the catching-up period the additional growth originates partly from capital accumulation and partly from an additional TFP growth, arising from externalities produced by the inflow of foreign direct capital.

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<sup>1</sup>Valentinyi (2000) analyzed the effect of the tax system directly on the catching-up process. His model differs from ours as he does not assume externalities and the catching-up process consists of an accumulation of real and human capital.

<sup>2</sup>The literature is too rich for referring to it. Blanchard (1990) summarizes the problem in a simple model, Alesina–Ardagna (1998), and Perotti (1999) are some of the recent empirical works on the topic.

The speed of the catching-up process depends on the speed of the capital accumulation process. Capital stocks (foreign and domestic) reach their steady state anyway, but the speed depends on the country risk premium and the real exchange rate movements. The higher the country risk and the weaker the exchange rate, the faster the capital accumulation.

## 2.1 The Externalities of Foreign Direct Capital

The external effect of FDI is various. It is difficult to separate these effects but we might distinguish two kinds.

- 1) The agglomeration effect is a well-known concept of regional economics. Economic growth is not smooth geographically, because geographic concentration brings savings (savings in transport, communication, or other transactional or informational costs) in production and sales.<sup>3</sup> This means that each investment improves the profitability of the next entrant, i.e. it produces externality. This phenomenon exists independently from the country of investment origin. Foreign direct investment flows add to this externality only by their net value.
- 2) In a catching-up country FDI may incorporate a higher level of know-how. This know-how does not remain within a firm but spreads through contacts with other firms: suppliers will be trained or forced to a quality and discipline that comes with a higher production culture of the entrant foreign firm. This external effect – in contrast to the agglomeration effect – depends on the gross FDI inflow.

We do not model the agglomeration effect, the productivity effect of this process is considered in the exogenous TFP term of the production function. We model only the external effect of FDI as a free supplier of know-how.

It is clear that with an increase in the share of foreign capital the know-how supplier effect of foreign capital diminishes. We reflected this feature in our model by specifying the production function in a way that when approaching the steady state, the external effect of FDI approaches 0.

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<sup>3</sup>See *Krugman (1990) and Venables (1996)*.

## 2.2 The Saving-Investment Link in an Open Economy

In the introductory economics textbook version of the open economy model, with the opening up of capital markets the period-by-period budget constraint that establishes a link between consumption and investment disappears and the two flows become more independent. We know that capital markets are not perfect and therefore a strong separation of the two systems is not justified.<sup>4</sup> Risks, information constraints and adjustment costs create virtual walls across countries. Capital adjustment is not only gradual, but it does not lead to an equalization of returns either. Country returns contain differing country risk premiums. These premiums depend on the same factor that influences the return in closed capital markets: the level of savings. This brings us back to the feature of the closed capital market economy.

Saving behavior affects the return on capital through two channels: (a) in the medium run a drop in demand weakens the real exchange rate (and decreases the real interest rate) (b) a decrease in the debt level decreases the country risk premium

Let us examine these two factors in more detail.

## 2.3 Demand and the Real Exchange Rate

The idea of the concept of real effective equilibrium exchange rate<sup>5</sup> builds on Dornbusch (1980) who says that an increase in demand makes relative costs of non-tradables higher because tradables demand is met by imports, while output has to switch to non-tradables in order to meet increased demand. This means that the real exchange rate will appreciate. Because of the real interest rate parity this means a higher interest rate. This way an increase in consumption crowds out investment like in the closed capital market economy.

This feature is included into our model but it works only in the medium run. In the long run, the real exchange rate is independent from demand. In the long run, relative costs in the non-tradable sector will not increase because there are no sector-specific production factors by assumption, allowing for factor flows to equalize relative returns across

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<sup>4</sup>See *Feldstein–Horioka (1980)* for the first demonstration of this "puzzle".

<sup>5</sup>See for example *Faruqee (1995)*, *Stein (1999)*.

sectors at the starting rates. This adjustment process leads to the purchasing power parity (PPP) or the Balassa-Samuelson path as the more general case.<sup>6</sup> The half-life of the adjustment process is about 4-5 years according to the “international consensus” view.<sup>7</sup>

This way our model combines the PPP and the “sustainability” approach to the equilibrium real exchange rate. The difference between the two approaches lies in the assumption about the speed of adjustment of production factors. The sustainability approach considers the convergence to PPP to be too slow to be taken into account at all. In our approach the half-life of 4-5 years is too short to be disregarded. As a consequence, the real exchange rate and the trade balance are related only in the medium run, while in the long run PPP (Balassa-Samuelson equilibrium) holds.

Stein (1999) defines a concept of the long-term equilibrium real exchange rate in his NATREX<sup>8</sup> model. In this definition, in the long run, capital stock is in a steady equilibrium state. This definition would be useful for conclusions about the real exchange rate only if the adjustment process of capital stocks were faster than the adjustment process of production factors across tradable and non-tradable sectors. Otherwise, PPP is the long-term equilibrium. Economic history shows that the processes leading to debt accumulation are very slow, they may take decades.<sup>9</sup> The process towards PPP may be slow, but in any case faster than this.

We calibrated the model to take into account these differences in the speed of adjustment. This way a fiscal shock appreciates the real exchange rate in the short run, in the long run however – in contrast to the NATREX model – the rate is determined not by a drop in demand because of the debt burden, but by the convergence process to the Balassa-Samuelson path. In the long run, there is no direct interaction between net exports and the real exchange rate. If demand depreciated the real exchange rate, this

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<sup>6</sup>According to the Balassa-Samuelson hypothesis, productivity in the tradable sector increases faster than that in the non-tradable sector and the gap between the productivity rates depends on the rate of aggregate productivity growth. Therefore the real exchange rate of fast growing economies strengthens.

<sup>7</sup>See Rogoff (1996) about the international consensus.

<sup>8</sup>NATREX (Natural rate of equilibrium exchange rate) and similar concepts are based on the classical assumption of zero output gap (called internal equilibrium), and the equilibrium real exchange rate is defined as the common slope of the production possibilities frontier and the utility function. While these models consider the strictly convex production possibilities frontier as given even in the long run, in our model the elasticity of substitution between sectoral outputs becomes infinite in the long run.

<sup>9</sup>A formal model for this behavior is given in Simon-Várpalotai (2001).

could happen only because the accumulated debt leads to a higher country risk interest premium. This in turn suppresses investments and the suppressed foreign component of investments affects TFP and the real exchange rate through the Balassa-Samuelson effect.

## 2.4 The Country Risk Premium

As discussed before, the existence of country risk constrains the wedge between consumption and investment in a country, partly taking over the role of an instantaneous budget constraint. This allows the interest rate and capital returns to differ from international rates permanently, preserving the feature of the closed economy Ramsey-model, where impatient consumer behavior leads to a lower steady state capital stock and output.<sup>10</sup>

The country risk has to be an important issue in macroeconomic policy as individual risk taking renders negative externalities.<sup>11</sup> Each borrower adds to the country risk premium, but the cost of additional risk caused to others is not internalized in his/her own calculations. Macroeconomic policy has the task of correcting this market failure.

Before discussing the calibration of the impact of risk, let us make some remarks about the nature of the risk premium before and after joining the currency union. Indebtedness leverages an economy and thus magnifies the relative variance of its income. For foreign investors who sell in the country this means a higher demand risk and accordingly a higher revenue risk. For lenders of financial assets this means a higher default risk and exchange rate risk.

Upon joining the currency union, the currency risk disappears but the leverage of the economy does not change. The total risk depends on whether the flexible exchange rate system itself added to the aggregate risk or not, and whether it was a stabilizing or a destabilizing factor on the economy. We do not take up this issue of discussion. In the model we take a middle road by assuming that the total risk of investments does not change by this system change. Technically, we do not distinguish between financial and

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<sup>10</sup>*In our model the risk of higher consumption today is taken into account only as a country risk premium, which means practically a default risk. The risk for the consumer should have been specified in the consumption function, if we had used a structural formulation.*

<sup>11</sup>*See Harberger (1986).*

direct investment risk, rather all the risks are considered simply as a source of interest rate premium. In case of modeling the effect of the currency union, we had to give account of the distribution of risk between financial and physical capital.

### 3 Model Equations

As our model describes an infinitely growing economy, we normalize growing variables by output. This way we analyze the path towards a steady state of the rates of variables to output. Normalized variables are given in small letters, while steady state values are denoted by a bar above the variable.

#### 3.1 Output

Output is determined by a Cobb-Douglas production function homogenous at first degree:

$$Y_t = A_t K_{f,t-1}^{\alpha_f} K_{d,t-1}^{\alpha_d} L^{1-\alpha},$$

where  $L$  labor supply is fixed ( $L = 1$ ),  $K_f$  and  $K_d$  are foreign and domestically owned capital,  $A_t$  productivity, including the external effect of foreign capital ratio:

$$A_t = A_0 (1 + \mu^{fp})^t e^{\gamma \frac{K_{f,t-1}}{Y_{t-1}}},$$

where  $A_0$  is a scaling factor of output,  $\mu^{fp}$  is the exogenous constant component of TFP growth, and  $e^{\gamma \frac{K_{f,t-1}}{Y_{t-1}}}$  is the output generating externality, implied by the ratio of foreign owned capital.<sup>12</sup> For the sake of easier calculation we transformed capital stock variables to rates:

$$(D1) \quad Y_t = A_0 (1 + \mu^{fp})^t e^{\gamma k_{f,t-1}} k_{f,t-1}^{\alpha_f} k_{d,t-1}^{\alpha_d} Y_{t-1}^{\alpha} L^{1-\alpha}.$$

Growth rate of output:

$$(D2) \quad g_t = \frac{Y_t - Y_{t-1}}{Y_{t-1}}.$$

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<sup>12</sup>We can easily check whether the production function is homogenous at first degree by multiplying the explanatory variables by a constant.

The change in  $Y_t/Y_t^w$ , the output level relative to the world, depends on the difference between  $g_t$  domestic and  $g_w$  (assumed constant) world growth rates :

$$(D3) \quad Y_t/Y_t^w = \frac{1+g_t}{1+g^w} Y_{t-1}/Y_{t-1}^w.$$

### 3.2 Capital Accumulation and Investment

Equations for capital accumulation are standard, where  $\delta$  is the depreciation rate:<sup>15</sup>

$$(D4) \quad k_{f,t} = \frac{1-\delta}{1+g_t} k_{f,t-1} + i_{f,t}$$

$$(D5) \quad k_{d,t} = \frac{1-\delta}{1+g_t} k_{d,t-1} + i_{d,t}$$

The dynamics of  $i_{f,t}$  and  $i_{d,t}$  investments are described in the spirit of Tobin-q theory similarly to a model with quadratic adjustment costs ( $\Psi(i,k) = i + \beta_k \frac{i^2}{2k}$ ). Accordingly, investments have a positive correlation to profits over alternative returns cumulated into the future ( $A_{f,t}$  and  $A_{d,t}$ )

$$(D6) \quad i_{d,t} = \frac{\Pi_{d,t}}{\beta_{kd}} + \frac{\delta + \bar{g}}{1 + \bar{g}} k_{d,t-1}$$

$$(D7) \quad i_{f,t} = \frac{\Pi_{f,t}}{\beta_{kf}} + \frac{\delta + \bar{g}}{1 + \bar{g}} k_{f,t-1},$$

where  $\frac{\delta + \bar{g}}{1 + \bar{g}} k_{d,t-1}$  and  $\frac{\delta + \bar{g}}{1 + \bar{g}} k_{f,t-1}$  are parts of investment that maintain an unchanged capital-output ratio at a  $\bar{g}$  growth rate.

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<sup>15</sup>Written in level form:  $K_{f,t} = (1-\delta)K_{f,t-1} + I_{f,t}$ . Dividing by  $Y_t$ :

$\frac{K_{f,t}}{Y_t} = (1-\delta)\frac{K_{f,t-1}}{Y_{t-1}}\frac{Y_{t-1}}{Y_t} + \frac{I_{f,t}}{Y_t}$ , and using the definition of  $g_t$  and regrouping produces the above formula.

### 3.3 Consumption

We use a reduced form equation for describing consumption behavior.  $c^t$  consumption is a linear function of  $y_t^{lab}$  labor income and  $w_t$  net wealth. This functional form is standard in econometric models. Its advantage is that it is easy to estimate and it leads to a finite and positive steady state consumption-output ratio. Calibration models are often based on the Euler equation that assumes a representative consumer living infinitely. The advantage of the latter is that in this case the model is built on the structural parameters of behavior of the representative consumer (Chatterjee, Sakoulis and Turnovsky, 2003) use this approach when simulating the effect of capital flows on growth in open economies). We discarded this approach because recent results in theory show that the assumption of a homogenous consumer and infinite horizon simply does not give a good description of aggregate consumption (see Carroll, 2001). The behavior of the rich differs from the behavior of the poor so much that taking averages is not a fruitful approach. Although the interest rate does affect consumption even in the new models of consumption, the impact is so small that we took the liberty of disregarding it for the sake simplicity.

$$(D8) \quad c_t = \beta_w \frac{w_{t-1}}{1+g_t} + \beta_y y_t^{lab}.$$

In the above equation the coefficients of  $\beta_w$  and  $\beta_y$  have been calibrated in a way that the consumption ratio converges to its  $\bar{w}$  steady state value with a half-life of  $\theta^{14}$ :

$$(P1) \quad \beta_w = 1 + r^{-pf} - (1 + \bar{g}) \exp\left(\frac{\ln 0.5}{\eta}\right)$$

$$(P2) \quad \beta_y = 1 - \left[1 - \exp\left(\frac{\ln 0.5}{\eta}\right)\right] \frac{\bar{w}}{y^{lab}}.$$

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<sup>14</sup>See Appendix A. for a detailed derivation.



### 3.4 Incomes, Asset balances, Returns

$B_{f,t}$  and  $B_{d,t}$  the return on capital is determined by the Cobb-Douglas consumption function by profit maximizing behavior. Production factors get a fixed share from income:<sup>15</sup>

$$(D9) \quad \pi_{f,t} = (1 + g_t) \frac{\alpha_f}{k_{f,t-1}}$$

$$(D10) \quad \pi_{d,t} = (1 + g_t) \frac{\alpha - \alpha_f}{k_{d,t-1}}.$$

The  $y_t^{lab}$  labor income is the rest of income after deducting capital income:

$$(D11) \quad y_t^{lab} = 1 - \frac{\pi_{f,t} k_{f,t-1} + \pi_{d,t} k_{d,t-1}}{1 + g_t}.$$

$r_t^d$ , domestic real interest rate is determined by the interest rate parity corrected for the risk premium:

$$(D12) \quad r_t^d = \theta(q_t - q_{t+1}) + \rho_t + r^w,$$

where  $r^w$  is the constant “world interest rate”,  $\Delta_t$  the country risk premium,  $q_t$  the real exchange rate (price of non-tradables in terms of tradables),  $\theta$  a constant weight parameter that converts a change in the relative price of the two sectors into a change in the relative price of non-tradables to the aggregate of both sectors. This makes the right-hand side consistent with the definition of the real interest rate.<sup>16</sup>

The  $\Delta_t$  country-risk premium depends on net financial assets ( $nfa_t$ ):<sup>17</sup>

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<sup>15</sup>The profit maximization condition:  $\pi_{f,t} = \frac{\partial Y_t}{\partial K_{f,t-1}}$ . The formula above was produced by using the definition of  $g_t$ .

<sup>16</sup>In equation (D12) we approximated relative rates of changes with differences in the rates.

<sup>17</sup>Debt as a risk factor may be defined in several ways. The traditional measurement is the ratio of net foreign financial assets (interest-bearing debt) to income. The alternative concept adds net real assets to the numerator. The choice depends on whether we perceive real assets to be a good hedge against labor income risk. In the model we followed the usual approach that considers only interest bearing debt as a risk factor.

$$(D13) \quad \rho_t = \max\{0; -\beta_\rho nfa_t\}$$

The definition of variables  $A_{f,t}$  and  $A_{d,t}$  used in equations (D6) – (D7):

$$(D14) \quad \Pi_{f,t} = \sum_{k=t+1}^{\infty} [(\pi_{f,k} - \delta) - r_k^d]$$

$$(D15) \quad \Pi_{d,t} = \sum_{k=t+1}^{\infty} [(\pi_{d,k} - \delta) - r_k^d]$$

When substituting from equation (D12), we see that an investment decision depends on the foreign interest rate, risk premium, and the real exchange rate as cost factors. The latter in a way that expected appreciation increases expected return.

Net foreign financial assets:<sup>18</sup>

$$(D16) \quad nfa_t = \frac{(1 + r_t^d)nfa_{t-1} - \pi_{f,t}k_{f,t-1}}{1 + g_t} + tr_t + i_{f,t},$$

where  $tr_t$  is the trade balance, and  $i_{f,t} - B_{f,t} k_{f,t-1} / (1 + g_t)$  the net foreign capital related flows (FDI minus profit flows).

For the sake of simplicity we assume that local residents do not directly invest abroad. A net wealth of the country ( $w_t$ ) is then:

$$(D17) \quad w_t = nfa_t + k_{d,t}.$$

The return on net wealth is the sum of the return on net financial and net real assets:

$$(D18) \quad r_t^{pf} = \frac{(\pi_{d,t} - \delta)k_{d,t-1} + r_t^d nfa_{t-1}}{k_{d,t-1} + nfa_{t-1}}.$$

Identity of the trade balance:

$$(D19) \quad tr_t = 1 - c_t - i_{f,t} - i_{d,t}.$$

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<sup>18</sup>Written in a level form:  $NFA_t = (1 + r_t^d)NFA_{t-1} + TR_t + I_{f,t} - \pi_{f,t}K_{f,t-1}$ . Similarly as in the equation for capital accumulation, dividing through by  $Y_t$  we arrive at:  $\frac{NFA_t}{Y_t} = (1 + r_t^d) \frac{NFA_{t-1}}{Y_{t-1}} \frac{Y_{t-1}}{Y_t} + \frac{TR_t}{Y_t} + \frac{I_{f,t}}{Y_t} - \pi_{f,t} \frac{K_{f,t-1}}{Y_{t-1}} \frac{Y_{t-1}}{Y_t}$ , and using the definition of  $g_t$  we get the formula above.

### 3.5 The Real Exchange Rate

We assume that during the catching-up process the real exchange rate appreciates because of the Balassa-Samuelson effect. The rate of this appreciation depends on the growth difference to the world rate:

$$(D20) \quad q_{BS,t} = q_{BS,t+1} - \beta_{BS}(g_t - g^w),$$

where higher  $q_{BS,t}$  means appreciation and  $\lim_{t \rightarrow \infty} q_{BS,t} = 1$ . This constraint makes the domestic relative price equal to the world rate in a steady state. The defined  $q_{BS}$  path is an equilibrium path that actual rate converges to along the path described below.

The distribution of consumer and investment demand between tradables and non-tradables is determined by maximizing a CES function:

$$(D21) \quad \begin{aligned} & \max \left[ A_{tr} (c_{tr,t} + i_{tr,t})^{-\beta_d} + A_{ntr} (c_{ntr,t} + i_{ntr,t})^{-\beta_d} \right]^{\frac{1}{\beta_d}} \\ & \text{s.t. } (c_{tr,t} + i_{tr,t}) + q_t (c_{ntr,t} + i_{ntr,t}) = c_t + i_{f,t} + i_{d,t} \end{aligned}$$

where  $tr$  and  $ntr$  subscripts denote the tradable and non-tradable sectors,  $\beta_d$ ,  $A_{tr}$ , and  $A_{ntr}$  are parameters of the CES function. From the first order conditions:

$$(D22) \quad q_t = \frac{A_{ntr}}{A_{tr}} \left( \frac{c_{ntr,t} + i_{ntr,t}}{c_{tr,t} + i_{tr,t}} \right)^{-\beta_d - 1}.$$

Let us assume that consumer and investor CES functions are the same:

$$(D23) \quad \frac{c_{tr,t}}{c_{ntr,t}} = \frac{c_{tr,t} + i_{tr,t}}{c_{ntr,t} + i_{ntr,t}}$$

$$(D24) \quad \frac{i_{tr,t}}{i_{ntr,t}} = \frac{c_{tr,t} + i_{tr,t}}{c_{ntr,t} + i_{ntr,t}}.$$

The composition of the total output in terms of tradables,

$$(D25) \quad y_t = y_{tr,t} + q_t y_{ntr,t}$$

is determined by a CET (constant elasticity of transformation) production function:

$\left[ B_{tr,t} y_{tr,t}^{-\beta_s} + B_{ntr,t} y_{ntr,t}^{-\beta_s} \right]^{\frac{1}{\beta_s}}$ , where  $B_{tr,t}$ ,  $B_{ntr,t}$  are parameters changing in time and  $\Xi_s$  is a constant parameter. The marginal rate of transformation is equal to the real rate of exchange:

$$(D26) \quad q_t = b_t \left( \frac{y_{ntr,t}}{y_{tr,t}} \right)^{-\beta_s - 1},$$

where  $b_t = \frac{B_{ntr,t}}{B_{tr,t}}$ .

The condition that the non-tradable market is closed:

$$(D27) \quad y_{ntr,t} = c_{ntr,t} + i_{ntr,t}.$$

In the CET function the  $\frac{B_{ntr,t}}{B_{tr,t}}$  ratio is not constant. The reallocation of production factors from one sector into another may be interpreted as a change in the weighting parameters. There is a ‘‘Balassa-Samuelson weighting parameter’’ path, which equates the actual  $q_t$  to the  $q_{BS,t}$  real exchange rate path:<sup>19</sup>

$$(D28) \quad b_t^{BS} = q_{BS,t} \left( \frac{1 - tr_t}{\left( \frac{A_{tr}}{A_{ntr}} q_{BS,t} \right)^{\frac{1}{\beta_s + 1}} + tr_t q_{BS,t}} \right)^{\beta_s + 1}.$$

Various shocks result in the differences in sectoral wages and profits, but the adjustment process of factor allocation in the weights of supply change and the real exchange rate converges to the Balassa-Samuelson path. We use a reduced formulation without explicitly modeling the adjustment process:

$$(D29) \quad b_t = b_t^{BS} - \lambda_s (b_{t-1}^{BS} - b_{t-1})$$

### 3.6 Calibration of the Parameters

The model has 29 variables,  $Y_t$ ,  $Y_t/Y_t^W$ ,  $g_t$ ,  $k_{d,t}$ ,  $k_{f,t}$ ,  $i_{d,t}$ ,  $i_{f,t}$ ,  $c_t$ ,  $B_{d,t}$ ,  $B_{f,t}$ ,  $y_t^{lab}$ ,  $r_t^d$ ,  $\Delta_t$ ,  $A_{d,t}$ ,  $A_{f,t}$ ,  $nfa_t$ ,  $w_t$ ,  $r_t^{pf}$ ,  $tr_t$ ,  $q_{BS,t}$ ,  $q_t$ ,  $c_{ntr,t}$ ,  $i_{ntr,t}$ ,  $c_{tr,t}$ ,  $i_{tr,t}$ ,  $y_{tr,t}$ ,  $y_{ntr,t}$ ,  $b_t^{BS}$ ,  $b_t$  in 29 equations. There are two additional equations that determine the values of  $\Xi_w$  and  $\Xi_y$ .

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<sup>19</sup>See Appendix B for the derivation.

Parameters of the model:  $A_0, \forall, \forall_f, \cdot_{itf}, \zeta, (\kappa_f, \kappa_d, \bar{\zeta}_{\kappa_f}, \bar{\zeta}_{\kappa_d}, *, 2, r^w, g^w, \bar{\zeta}_A, \bar{\zeta}_{BS}, \frac{A_{nr}}{A_r}, \bar{\zeta}_d, \bar{\zeta}_s, \delta_s, \theta, \bar{w}$ .

For the starting value of capital ratios we used the estimates of Darvas and Simon (1999) and Pula (2003), the share of foreign capital was estimated from accumulating FDI data:  $\kappa_d = 1.1$ ,  $\kappa_f = 0.4$ . The rest of stock values for the beginning of 2003 were taken from the national income accounts:  $nfa = -0.25$  and  $w = 0.85$  comes from an identity. For the  $Y_t/Y_t^w$  relative level of income we assumed  $Y/Y^w = 50\%$ , which is the Hungarian level relative to the average of the European Union.

The  $r^w$  world interest rate was taken to be 4%, the depreciation rate 9%. The 2 relative weight of tradables was assumed as 0.5. The coefficient of the country risk, measured as the rate of debt, is  $\bar{\zeta}_A = 0.1$ , meaning that a 10 percent increase in debt raises the interest rate by 1 percentage point.<sup>20</sup> The  $\bar{w}$  steady state wealth ratio was chosen by the assumption that  $nfa = 0$ . The  $\theta$  half-life parameter is 10 years.

The production function.  $A_0 = 0.932438$  was chosen so that in the first year of simulation output equals 1. Capital share is the international usually observed  $\forall = 0.3$ . Total factor productivity growth rate was calibrated in a way that in a steady state growth equals the world rate,  $g_w = 2\%$ , therefore  $\mu = (1 + \bar{g})^{1-\alpha} - 1 = 0.01396$ .

The external effect of foreign capital was calibrated in a way that actual GDP growth should fit the values calculated from the calibrated model in the period of 1996-2003. This criterion gave a coefficient of the external effect  $\zeta = 0.4$ , meaning that a 1 percent increase in the foreign capital ratio increases TFP by 0.4 percentage point. This figure is higher than the 0.21 estimated by Jakab and Kovács (2002) on the Central East European panel data. Barrell and Pain (1997) made an estimation for Great Britain. In Great Britain the role of foreign capital as a supplier of know-how externality might be small, and instead the estimated coefficient reflects the agglomeration effect (Krugman, 1991; Venables, 1996) – as it is assumed by the authors as well. Thus their coefficient of 0.27 is not comparable to our figure, especially because in our model the agglomeration effect is included in the exogenous component, while they do not specify an exogenous TFP at all.

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<sup>20</sup>Edwards (1984) arrived at a half-elasticity of 0.6-1.0 in a panel estimation. At a level of about 2% this is roughly the corresponding figure to our linear coefficient of 0.1. Our figure is definitely more cautious than the assumed 0.4 in Fagan, Gaspar and Pereira (2002). The relation between risk and debt is presumably non-linear, but in our simulations we do not depart so far from the base scenario to take this into account.

Figure 1. **Contribution to GDP growth of production factors, exogenous TFP and externalities (1996. = 100 %) according to (D1) production function with calibrated parameters**

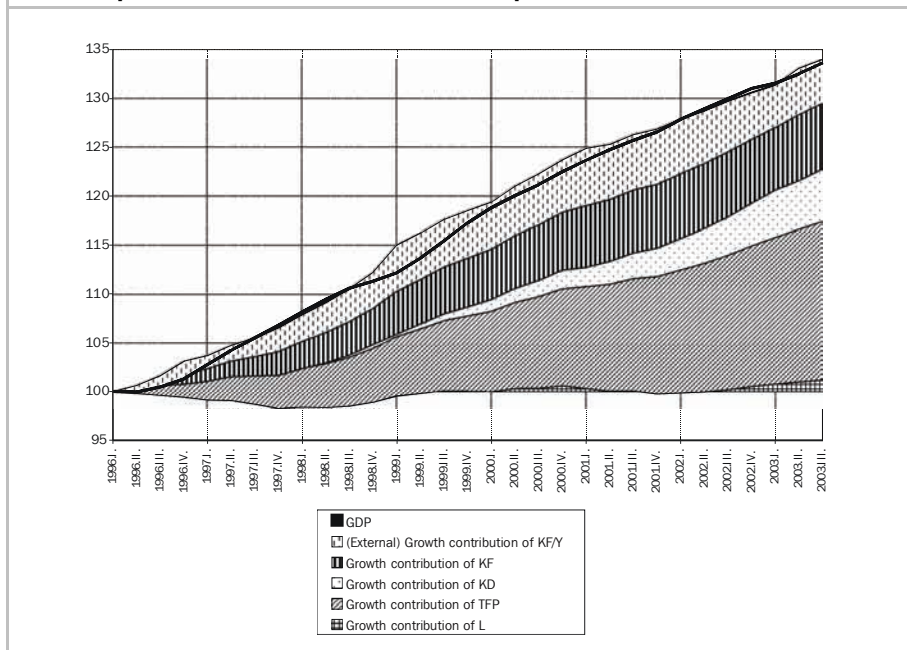


Figure 1 shows how various components contributed to GDP growth.

We assumed that in the steady state Hungarian productivity is at the 80 percent level of the European average. This is in line with the arguments of Darvas and Simon (1999).

Investment behavior is explained in line with the Tobin-q theory. In order to estimate the speed of adjustment, very much empirical work can be found in the literature. The estimated parameters are in a broad range. In the model  $\Xi_{k_f}$  and  $\Xi_{k_d}$  is the parameter determined by adjustment costs. Estimates in the empirical literature on the adjustment cost parameter range between 1.4 and 16.1.<sup>21</sup> We chose a value between the two extremes, assuming  $\Xi_{k_f} = \Xi_{k_d} = 10$ .

<sup>21</sup>Summers (1981) estimated a value of 16.1, Eberly (1997) arrived at a range of between 1.4 and 3 using micro data. Cummins, Hasset and Oliner (1997) using US company data estimated parameters of between 5 and 10.

In the real exchange rate block the Balassa-Samuelson appreciation effect of additional growth,  $\Xi_{BS} = 0.5$ ,  $\frac{A_{nr}}{A_r} = 1$ . We chose the exchange rate elasticities of demand and supply,  $\Xi_d = 2$ ,  $\Xi_s = -3$  to make a 1 percentage point deterioration of the trade balance consistent with a 2 percent appreciation of the real exchange rate. This number is in line with the estimations of Jakab and Kovács (2002) for exports and imports. At the starting date the real exchange rate is in equilibrium by assumption. This assumption is indifferent for the policy lessons derived from the model and it has no relevance to the actual real exchange rate either, as the real exchange rate in our model is the rate of the hypothetical case when the output gap equals 0. In the short run, for example during a disinflation process, this assumption is probably untenable.

In the supply function the  $\delta_s$  parameter that determines the speed of adjustment across sectors was chosen to be consistent with the 5 years half-life of the convergence to the Balassa-Samuelson equilibrium,  $\delta_s = 0.87055$ .

In Table 1 we summarized the assumptions on parameters, starting values, and the implied steady state values.

<b>Parameters</b>		<b>Calculated coefficients</b>	
$\theta$	= 10	$\Xi_Y$	= 0.70981
$\bar{w}$	= 1.56923	$\Xi_W$	= 0.16204
$\psi$	= 0.3		
$\psi_f$	= 0.1		
$\zeta$	= 0.4		
$\tau_{dp}$	= 0.01396		
$\Xi_{kf}$	= 10		
$\Xi_{kd}$	= 10		
*	= 0.09		
2	= 0.5		
$\mu^w$	= 0.04	<b>Steady state values</b>	
$g^w$	= 0.02	$\bar{r}^d$	= 0.05
$\Xi_A$	= 0.1	$\bar{g}$	= 0.02
$\Xi_{BS}$	= 0.5	$\bar{\lambda}$	= 0
$\frac{A_{nr}}{A_r}$	= 1	$\bar{c}$	= 0.74615
$\Xi_d$	= 2	$\bar{\tau}_f + \bar{\tau}_d$	= 0.23077
$\Xi_s$	= -3	$\bar{\tau}$	= 0.02308
$\delta_s$	= 0.5	$\bar{y}^{lab}$	= 0.7
		$\bar{B}$	= 0.13
		$\bar{r}^{pf}$	= 0.05
<b>Starting values</b>			
$k_d$	= 1.1	$\bar{K}_d$	= 1.56923
$k_f$	= 0.4	$\bar{K}_f$	= 0.78461
$nfa$	= -0.25	$\bar{nfa}$	= 0
$\Upsilon\Upsilon^w$	= 0.5	$\Upsilon\Upsilon^w$	= 0.77172

## 4 Simulations

### 4.1 Catching-up Paths

Firstly, we show growth (catching-up) paths implied by the parameters of Table 1. We calculate 4 alternative scenarios. In the case that we consider the most probable, both the externality of foreign capital and the risk premium are important factors. In the other variants we show what will happen if one of the two factors or both are omitted. By showing the alternatives, we try to give a picture of the sensitivity of the results on critical assumptions of the model.

In the first column we show the paths calculated on the assumption that foreign capital has an external effect. The two paths differ on the assumption whether indebtedness increased the risk premium. In the absence of a risk premium the catching-up process is faster.

In the second column we calculated with a model where productivity growth is entirely exogenous. This exogenous productivity growth is equal to the sum of exogenous and externalities-driven growth, calculated in the baseline case where both externalities and risk premium exist. Here again the existence of risk constrains the speed of catching-up. However, as in this case the role of foreign capital is minor, the existence of the risk premium does not make much difference.

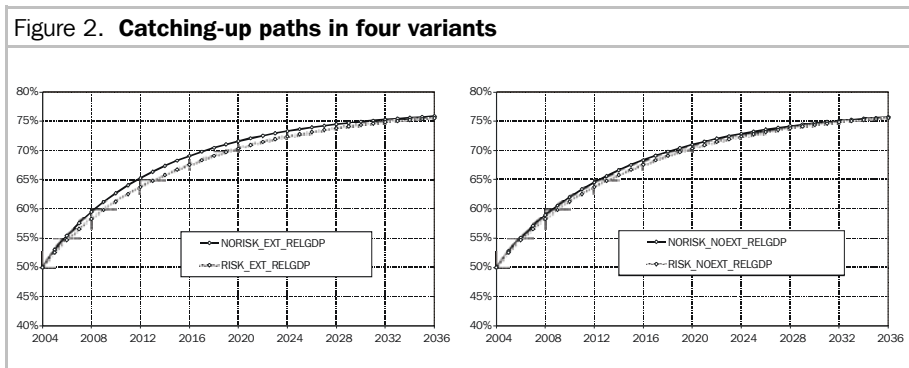
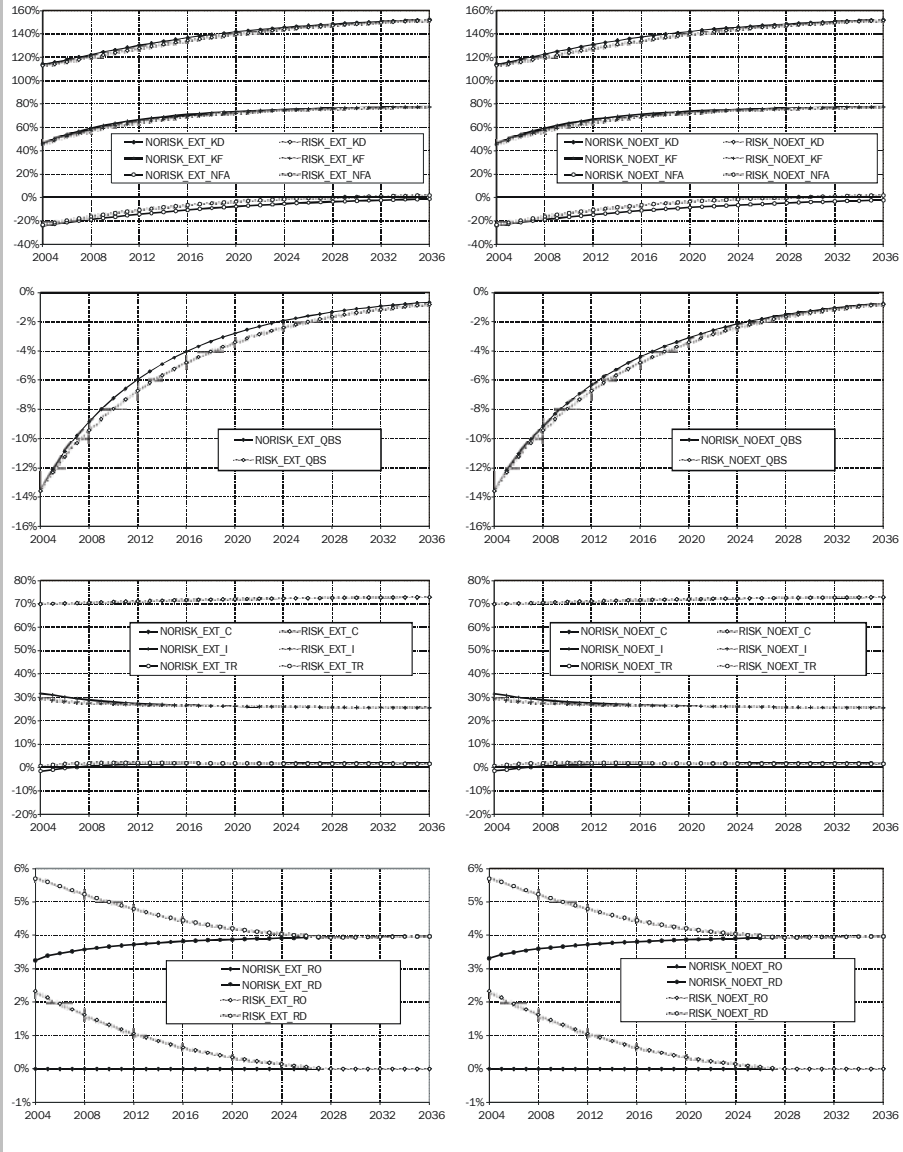




Figure 2. continued



Note: In the right-hand column the assumption holds that foreign capital has an external effect, while this assumption is dropped from the left-hand column. Black curves indicate variants where endogenous risk premium is absent, while grey curves show variants with an endogenous risk premium.

## 4.2 Effects of Consumption Shocks

None of the four paths can be interpreted as an optimum, in the sense that it maximizes the value of consumer utility functions. We discarded this approach when bringing the consumption function from outside into the model. We could have chosen to calculate the intertemporal optimum with a representative consumer or a social preference function in mind, then calculate a “suboptimum” as the solution of the decentralized task with the distortions created by externalities and calculate the optimal tax system that leads to the social optimum. Although we do not deny that the theoretical rigor of such an approach is a merit, we believe that the parameters of a social preference function are rather uncertain so it is better to keep the model used for drawing policy lessons simple because its results are easier to interpret. Therefore, we simply made a present value calculation that answers the question of what the intertemporal rate of substitution at the baseline path between consumption is today and tomorrow.

The consumption shocks need not be interpreted as fiscal consumption shocks. However, if we want to draw policy conclusions, it is natural to consider them as consumption shocks forced out by the fiscal policy. It is reasonable to assume this possibility because Ricardian equivalence exists only in the infinite horizon representative consumer case.

We calculated the effect of two kinds of shocks:

- 1) In a transitory consumption shock the consumption ratio increases by 1 percentage point in the first period (year) but the steady state wealth ratio does not change.
- 2) In a permanent consumption shock the consumption ratio increases by 1 percentage point in the first period (year) and the steady state wealth ratio decreases by the same 1 percentage point.

The consumption shock exerts its influence through the following channels. A transitory shock increases demand that appreciates the currency and – because of the interest rate parity – it raises the interest rate. At the same time, interest rates are affected by the resulting increase in the risk premium. A higher interest rate decreases expected net profits and investments including FDI will be lower, reducing productivity growth. Later consumption adjusts to meet the targeted wealth ratio and investments rebound to put the economy onto the original steady state level. In case of a permanent shock the targeted wealth ratio is lower, which means a permanently higher risk premium and lower output and productivity level in the steady state.

A summary indicator of the shock impact is the internal interest rate. When used as a discount factor, the present value of future foregone consumption equals the gain in present consumption, or putting it another way, the sum of differences to the baseline in consumption flows equals 0. As Table 2 shows, if we do not believe in externalities and risk premiums, we arrive at a 4.2%–5.0% interest rate. This is significantly higher than the world real interest rate adjusted with the Balassa-Samuelson effect,<sup>22</sup> but not so high that it could not easily be explained by a high time preference. However, if we assume the existence of a risk premium, the implicit interest rate increases to more than 7.4 percent, and the inclusion of externalities brings the interest rate to the level of 17.2-18.1 percent. This is a shockingly high rate, higher than anything observed on the markets normally.

	With foreign capital externalities		Without foreign capital externalities	
	With risk premium	Without risk premium	With risk premium	Without risk premium
Transitory shock	17.2%	6.3%	10.0%	5.0%
Permanent shock	18.1%	5.1%	7.4%	4.2%

We tested the robustness of the results in a sensitivity analysis. We changed the parameter values by 50 percent one by one and calculated the results again. The differences from the baseline are shown in Table 3.

As we see for most of the parameters, even a 50 percent change does not result in a change in the internal interest rate higher than 1 percent. In the variants without country risk premium the sensitivity is even lower. The parameters that have the strongest impact on the interest rate are the parameters influencing capital accumulation and productivity directly, such as  $\zeta$ , the external effect of foreign capital,  $\bar{\alpha}_{kd}$  and  $\bar{\alpha}_{kf}$ , the adjustment costs of investment, and  $\bar{\alpha}_A$ , the risk premium coefficient. Even these parameters cause changes in the range of 2 percent only and the highest value is 3.2 percent.

Summing up the results from the sensitivity analysis, we can say that the figures in Table 2 are robust, the conclusions do not change qualitatively even if some parameters change considerably.

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<sup>22</sup>In the presence of the Balassa-Samuelson effect real interest rate parity holds only in terms of the tradable sector, while the basket will appreciate.

Table 3. Analysis of parameter sensitivity:  
Implicit interest costs of a unit change in consumption, difference from the baseline

	Transitory shock						Permanent shock					
	With foreign capital externalities			Without foreign capital externalities			With foreign capital externalities			Without foreign capital externalities		
	With risk premium	Without risk premium	With risk premium	Without risk premium	With risk premium	Without risk premium	With risk premium	Without risk premium	With risk premium	Without risk premium	With risk premium	Without risk premium
$\eta=10$	-0.7%	1.1%	0.2%	1.4%	-0.7%	-0.1%	-0.6%	-0.1%	-0.6%	0.0%	0.0%	0.0%
$\eta=15$	0.4%	-0.5%	0.1%	-0.5%	0.3%	0.0%	0.4%	0.0%	0.4%	0.0%	0.0%	0.0%
$\gamma=0.3$	-1.6%	-0.5%	0.1%	0.1%	-2.5%	-0.2%	0.0%	-0.2%	0.0%	0.1%	0.1%	0.1%
$\gamma=0.5$	1.7%	0.6%	0.0%	-0.1%	2.6%	0.3%	0.0%	0.3%	0.0%	-0.1%	-0.1%	-0.1%
$\beta_{kr}=\beta_{kr}=10$	2.1%	1.3%	0.8%	0.1%	1.3%	0.5%	0.5%	0.5%	0.5%	0.0%	0.0%	0.0%
$\beta_{kr}=\beta_{kr}=5$	-1.4%	-0.5%	-0.6%	0.0%	-0.9%	-0.2%	-0.4%	-0.2%	-0.4%	0.0%	0.0%	0.0%
$\rho=0.09$	0.2%	0.1%	-0.1%	0.0%	0.6%	0.0%	-0.1%	0.0%	-0.1%	0.0%	0.0%	0.0%
$\rho=0.10$	-0.2%	-0.1%	0.1%	0.0%	-0.5%	0.0%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%
$r_w=0.03$	-0.5%	-0.9%	-1.1%	-1.1%	-0.1%	-1.6%	-1.2%	-1.6%	-1.2%	-1.5%	-1.5%	-1.5%
$r_w=0.05$	0.6%	0.9%	1.1%	1.1%	0.2%	1.3%	1.2%	1.3%	1.2%	1.2%	1.2%	1.2%
$\beta_p=0.1$	-0.3%	0.0%	-1.6%	0.0%	-3.2%	0.0%	-1.1%	0.0%	-1.1%	0.0%	0.0%	0.0%
$\beta_p=0.15$	2.2%	0.0%	1.4%	0.0%	2.0%	0.0%	0.8%	0.0%	0.8%	0.0%	0.0%	0.0%
$g=0.01$	-0.1%	0.1%	0.1%	0.2%	-0.1%	0.4%	0.2%	0.4%	0.2%	0.3%	0.3%	0.3%
$g=0.03$	0.1%	-0.1%	-0.1%	-0.2%	0.1%	-0.7%	-0.2%	-0.7%	-0.2%	-0.5%	-0.5%	-0.5%

**Table 3. continued**

	Transitory shock						Permanent shock					
	With foreign capital externalities		Without foreign capital externalities		With foreign capital externalities		Without foreign capital externalities		With risk premium		Without risk premium	
	With risk premium	Without risk premium	With risk premium	Without risk premium	With risk premium	Without risk premium	With risk premium	Without risk premium	With risk premium	Without risk premium	With risk premium	Without risk premium
$\beta_{bs}=0.5$	0.3%	0.4%	0.3%	0.3%	-0.3%	0.3%	0.3%	0.0%	0.2%	0.1%	0.1%	0.1%
	-0.3%	-0.5%	-0.3%	-0.3%	-0.3%	-0.3%	-0.1%	0.0%	-0.2%	-0.1%	-0.1%	-0.1%
$A_{nr}/A_r=1$	-0.2%	-0.3%	-0.2%	-0.2%	-0.2%	-0.2%	-0.1%	-0.1%	-0.1%	0.0%	0.0%	-0.1%
	0.2%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%
$\beta_d=2$	-0.4%	-0.5%	-0.3%	-0.3%	-0.3%	-0.3%	-0.2%	-0.2%	-0.2%	-0.1%	-0.1%	-0.1%
	0.3%	0.3%	0.2%	0.2%	0.2%	0.2%	-0.1%	-0.1%	-0.1%	0.0%	0.0%	-0.1%
$\beta_s=-3$	0.6%	0.8%	0.5%	0.5%	0.5%	0.5%	0.3%	0.3%	0.4%	0.1%	0.1%	0.1%
	-1.1%	-1.4%	-0.9%	-0.9%	-0.8%	-0.8%	-0.4%	-0.4%	-0.5%	-0.2%	-0.2%	-0.2%
$\theta=0.5$	-1.4%	-1.7%	-1.1%	-1.1%	-1.0%	-1.0%	-0.7%	-0.7%	-0.6%	-0.2%	-0.2%	-0.2%
	1.2%	1.4%	0.9%	0.9%	0.8%	0.8%	0.6%	0.6%	0.7%	0.2%	0.2%	0.2%
$\lambda_s=0.87055$	-0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	0.1%	-0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

*In the individual lines all parameters are the same as in the baseline except the parameter indicated.  
(For the values of 0.87055; 0.75786 and 0.91722 for the corresponding half-lives are 5; 2.5 and 7.5 years.)*

## 5 Summary and Assessment

Fiscal discipline has a large role in the real convergence process of Central and East European Countries. Fiscal policy aimed at cutting indebtedness by restraining consumption creates higher macroeconomic stability and an incentive for investors. This attracts foreign investment in a period when this increases productivity through external effects. Estimates of the model show that additional saving may bring an 18 percent return for consumers.

This rate is higher than any reasonable market rate but this is not surprising when the external effects incorporated into the model are considered. The question is whether this rate is consistent with the preferences of society? Is it reasonable for the government not to decide to increase savings if additional saving brings an 18 percent real yield?

We know that the social utility function is not the sum of individual utility functions. Part of the population has a very high time preference,<sup>25</sup> resulting in a behavior that considers savings a buffer stock against short-term income losses at best. Some of these “liquidity constrained” consumers are willing to take loans at a real rate even higher than 18 percent. These consumers might be satisfied with a policy strategy that reallocates future consumption into the present at an opportunity cost of 18 percent. However, whether such a policy should be seen as serving social welfare is questionable. Namely, there are many who would consider a borrowing at an 18 percent interest unreasonable. However, as this interest rate is not internalized for them, they have no direct free choice of making such a return by saving.

In this paper we did not discuss how the government could internalize this return. We set it as our task only to calculate the magnitude of a return that would allow policy makers to make choices on the basis of correct information.

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<sup>25</sup>The idea of a high rate of time preference had come up as early as in Friedman (1957), and Carroll (1992) was one of those who contributed most to the rigorous analysis of the consequences. Most empirical econometric models use the related concept of Mankiw, who perceives the majority of consumers to be liquidity constrained, consuming as much as they earn. (The fiscal implications of this behavior are discussed in Mankiw (2000).)

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## Appendix A: Derivation of the Parameters in the Consumption Function

In the  $c_t = \Xi_w w_{t-1} / (1+g_t) + \Xi_y y_t^{lab}$  consumption function  $\Xi_w$  and  $\Xi_y$  have been determined by the constraint that consumption should converge to a  $\bar{w}$  steady state wealth ratio with  $\theta$  half-life. Let us first write the equation for  $w_t$  wealth accumulation, using  $k_{d,t} = \frac{1-\delta}{1+g_t} k_{d,t-1} + i_{d,t}$  and  $nfa_t = \frac{(1+r_t^d)nfa_{t-1} - \pi_{f,t} k_{f,t-1}}{1+g_t} + tr_t + i_{f,t}$  equations.<sup>24</sup> Thus:

$$nfa_t + k_{d,t} = \frac{(1+r_t^d)nfa_{t-1} - \pi_{f,t} k_{f,t-1}}{1+g_t} + tr_t + i_{f,t} + \frac{1-\delta}{1+g_t} k_{d,t-1} + i_{d,t},$$

and by using definitions  $tr_t = 1 - c_t - i_{f,t} - i_{d,t}$  and  $y_t^{lab} = 1 - \frac{\pi_{f,t} k_{f,t-1} + \pi_{d,t} k_{d,t-1}}{1+g_t}$  – equations (D11) and (D19) –, after rearranging:

$$nfa_t + k_{d,t} = \frac{(1+r_t^d)nfa_{t-1} + (1+\pi_{d,t} - \delta)k_{d,t-1}}{1+g_t} + [y_t^{lab} - c_t],$$

and by substituting  $r_t^{pf}$  and the definition of the wealth ratio ( $w_t = nfa_t + k_{d,t}$ ) we get

$$w_t = \frac{1+r_t^{pf}}{1+g_t} w_{t-1} + [y_t^{lab} - c_t].$$

The consumption block in a narrow sense is a difference equation system for  $c_t$  and  $w_t$ :

$$c_t = \beta_w \frac{w_{t-1}}{1+g_t} + \beta_y y_t^{lab}$$

$$w_t = \frac{1+r_t^{pf}}{1+g_t} w_{t-1} + [y_t^{lab} - c_t].$$

After substituting  $c_t$  into the second equation and rearranging:

$$(F1) \quad w_t = \frac{1+r_t^{pf} - \beta_w}{1+g_t} w_{t-1} + (1-\beta_y) y_t^{lab}.$$

Disregarding from the interaction among  $y_t^{lab}$ ,  $g_t$ ,  $r_t^{pf}$  and  $w_t$  around steady state the half-life of the differential equation is determined by  $\frac{1+r_t^{pf} - \beta_w}{1+g}$ . If we want to calibrate the model to a given  $\theta$  half life, then by determining  $\Xi_w$  from  $\frac{1+r_t^{pf} - \beta_w}{1+g} = \exp\left(\frac{\ln 0.5}{\eta}\right)$  we

<sup>24</sup>See equations (D6) and (D16).

get the (P1) formulation. From a given  $\bar{w}$  we can express  $\bar{\Xi}_y$  from equation (F1), because  $\bar{w} = \exp\left(\frac{\ln 0.5}{\eta}\right)\bar{w} + (1 - \beta_y)y^{-lab}$ , and by rearranging we get the form (P2) that determines  $\bar{\Xi}_y$ .

## Appendix B: Derivation of the Equations in the Real Exchange Rate Block

We give here the derivation of equation (D28) that determines the  $b_t$  changing variable. Let us write  $q_{BS,t}$  everywhere instead of  $q_t$  and replace  $c_{ntr,t} + i_{ntr,t}$  in equation (D22) by the accounting identity (D27), and substitute the budget constraint of consumption and investment (D21) for  $c_{tr,t} + i_{tr,t}$ :

$$(D30) \quad q_{BS,t} = \frac{A_{ntr}}{A_{tr}} \left( \frac{y_{ntr,t}}{c_t + i_t - q_{BS,t} y_{ntr,t}} \right)^{-\beta_d - 1}.$$

Rearranging for  $y_{ntr,t}$  and using  $c_t + i_t = 1 - tr_t$ :

$$(D31) \quad y_{ntr,t} = \frac{1 - tr_t}{\left( \frac{A_{tr}}{A_{ntr}} q_{BS,t} \right)^{\frac{1}{\beta_d + 1}} + q_{BS,t}}.$$

In equation (D26) by using equation (D25) we write  $1 - q_{BS,t} y_{ntr,t}$  instead of  $y_{tr,t}$  and plugging in for  $y_{ntr,t}$ :

$$(D32) \quad q_{BS,t} = b_t \left( \frac{\frac{1 - tr_t}{\left( \frac{A_{tr}}{A_{ntr}} q_{BS,t} \right)^{\frac{1}{\beta_d + 1}} + q_{BS,t}}}{1 - q_{BS,t} \frac{1 - tr_t}{\left( \frac{A_{tr}}{A_{ntr}} q_{BS,t} \right)^{\frac{1}{\beta_d + 1}} + q_{BS,t}}} \right)^{-\beta_s - 1}.$$

Expressing  $b_t$  and rearranging we get the formula (D28).

# **Fiscal Policy, Unemployment and Demographic Trends**

# The Stability and Growth Pact from the Perspective of the New Member States

Gábor Orbán\* and  
György Szapáry\*\*

## Abstract

The purpose of this paper is to examine the fiscal characteristics of the new members in the light of the requirements of the SGP and the criticisms levelled against the Pact and to see in what ways their initial conditions differ from those faced by the current euro zone countries in the run-up to EMU. Overall, because of the lower debt levels and greater yield convergence already achieved, the new members will be able to rely less on gains from yield convergence than the current eurozone members were able to do in the run-up to EMU. EU accession will also have a negative net impact on the budgets of the new members in the early years of membership. We also look at the cyclical sensitivities of the budgets and find that in the new members the smoothing capacity of the automatic stabilizers might be weaker than in the current euro zone members. Beyond these general characteristics, we also emphasize that there are large differences in the starting fiscal positions of the new members. Some of the policy implications of our findings are discussed.

**Keywords:** EU enlargement, fiscal policy, fiscal rules, Stability and Growth Pact  
**JEL Classification:** E61, H6, H87

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# 1 Introduction

The ten new Members States (NMS)<sup>1</sup> of the EU have to comply with the budgetary objectives stipulated in the Maastricht Treaty (MT) and the Stability and Growth Pact (SGP), and are subject to the EU budgetary surveillance framework including, where relevant, the activation of the Excessive Deficit Procedure (EDP). However, as long as they have not adopted the euro, the NMS will not be subject to the so called enhanced budgetary surveillance under the EDP, nor to the sanctions foreseen for the members of the Economic and Monetary Union (EMU)<sup>2</sup>. The NMS have the obligation to enter the EMU and therefore to meet the Maastricht criteria of public finance, inflation, interest rate and exchange rate, but they have the freedom of choosing the timing of the adoption of the euro.

The purpose of this paper is to examine the fiscal characteristics of the new members in the light of the requirements of the SGP and the criticisms levelled against the Pact and to see in what ways the initial conditions of the NMS differ from those faced by the current euro zone countries in the run-up to EMU. The paper is organized as follows. Section II briefly summarizes the main features and criticisms of the SGP, as well as the principal proposals for improvement of the Pact found in the literature. Section III examines the fiscal characteristics of the NMS from the perspective of meeting the Maastricht criteria on the road to EMU and from the broader perspective of the SGP framework. This section ends with a summary of our findings. Section IV discusses some of the policy implications of our findings.

## 2 The Stability and Growth Pact

### 2.1 Features

The SGP and its rules are well known and well documented and we briefly recall only its main features and the rationale behind them<sup>3</sup>. A unique feature of EMU is that monetary policy is centralized in the hands of the European Central Bank (ECB) while fiscal policy remains decentralized in the hands of the governments of the individual member

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<sup>1</sup> *Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovenia, Slovakia.*

<sup>2</sup> *For a description of the EDP, see Gros et al. (2004) and Cabral (2001).*

<sup>3</sup> *A good description of the SGP and how it works can be found in Gros et al. (2004), Fatás et al. (2003), HM Treasury (2004), European Commission (2000, 2002, 2003) and ECB (1999).*

states. It was therefore recognized that to support the ECB's responsibility to maintain price stability and to prevent free-riding, fiscal policy had to be subject to rules in order to ensure discipline of public finances. These rules consist of two pillars. First, to become a member of EMU, a country's general government deficit/GDP ratio cannot exceed 3 percent and its general government debt/GDP ratio cannot exceed 60 percent; in case the latter ratio is exceeded, the country has to demonstrate that its debt is being reduced and approaching the reference value at a satisfactory pace. Second, Member States have to respect the medium-term budgetary objective of 'close to balance or in surplus' in order to allow for normal cyclical fluctuations, while keeping the deficit within the reference value of 3 percent of GDP. The 3 percent reference value for the deficit can be breached only under exceptional circumstances, when the excess results from an unusual event outside the control of the Member State and which has a major budgetary impact, or when it results from a severe economic downturn, defined as an annual fall of real GDP of at least 2 percent. A smaller, at least 0.75 percent decline in GDP, can be considered as exceptional taking into account the abruptness of the downturn and the accumulated loss of output relative to past trends.

It is a legitimate question to ask how the reference values of 60 percent of GDP for the government debt and 3 percent of GDP for the fiscal deficit were chosen. It has been suggested (Thygesen, 2002) that 60 percent was the average debt ratio of the EU members around 1990 (the MT was signed in 1992) and if countries kept their deficit at the 3 percent limit, their debt would converge to 60 percent, assuming that nominal GDP is rising at a trend rate of approximately 5 percent per year: 3 percent real growth (assumed to be the potential output growth in the EU) plus 2 percent inflation (in line with the ECB's inflation target of 2 percent or less). While these reasonings have not been made officially public as far as we know, it is widely assumed that they lay behind the selection of the reference values.

## 2.2 Criticisms of the SGP

The main criticisms levelled against the SGP can be grouped under the following headings on the basis of what the Pact is seen as lacking: strong enough analytical foundations, symmetry, flexibility, incentives for good quality fiscal consolidation, and enforceability<sup>4</sup>. We discuss these in turn below.

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<sup>4</sup> *There is a good review of the criticisms of the SGP in Buti et al. (2003a).*

#### a) Lack of Clear Analytical Foundation

A frequently mentioned criticism which seems to have dented the most the credibility of the SGP in the eyes of academics is that its main provisions lack a clear analytical foundation. The rationale behind the 'close to balance or in surplus' rule is debt sustainability, which means that the government cannot run a Ponzi scheme where debt grows forever, but it has to satisfy its intertemporal budget constraint, that is to say, the present discounted value of its expenditures must equal the present discounted value of its revenues. However, as pointed out by Perotti et al. (1997), debt sustainability thus defined is of little practical use, since the intertemporal budget constraint has an infinite time horizon that does not sufficiently constrain government policies: anything can be assumed about the future. The intertemporal budget constraint depends on GDP growth, inflation and real interest rates, but the SGP does not take into account the differences in these areas across countries. Typically, catching-up economies such as the NMS have higher potential growth and higher inflation due to the Balassa-Samuelson (BS) effect, which is an equilibrium phenomenon<sup>5</sup>. Thus, catching-up economies could, *ceteris paribus*, run higher deficits than more developed countries without jeopardizing the long-term sustainability of public finances.

Furthermore, the SGP does not address the critical issue of what is the optimal level of debt and treats low and high debt countries identically. Implicitly, the 'close to balance or in surplus' rule over the cycle means that eventually the debt will be run down to zero. Zero debt may not be an optimal solution since it ignores the benefits of the intergenerational distribution of taxes to finance, for example, infrastructural investments and reforms in the pension and health care systems that will benefit future generations<sup>6</sup>. The optimal level of debt depends, *inter alia*, on whether the interest payments on the debt crowd out worthwhile investments and whether the disincentive effects of higher distortionary taxes to cover the interest payments are important or not (Aiyagari and McGrattan, 1998). From that perspective, low debt countries have more room for

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<sup>5</sup> Kovács (2004) reports estimates in the literature of the BS effect that vary from less than one percent to up to 6.9 percent per year, and von Hagen and Zhou (2004) report estimates varying between about 2 and 4 percent.

<sup>6</sup> Buiter and Grafe (2002) make the intriguing point that the 'close to balance or in surplus' rule could possibly mean that the EU governments will become net creditors. This would lead to the ironic result of the (partial) socialization of the means of production in the long-run, as governments will have to invest their cash surpluses in bonds and stocks of the private sector. Here we note that running a surplus in normal times was originally intended for countries with high debt ratios (above 60%) and therefore the government becoming a net creditor in the long-run is more a theoretical possibility than a real threat.

maneuver than high debt countries. The uniform deficit rule does not take into account the higher need for infrastructural investments in countries where the initial stock of public capital is insufficient, as in the catching-up NMS. Furthermore, the uniform reference value of the debt does not explicitly take into consideration the contingent liabilities due to population ageing and the state of pension reform that can vary from one country to another.

A further criticism from an analytical standpoint is that the SGP disregards the aggregate fiscal stance of the EMU. In a monetary union, what matters from the point of view of macroeconomic stability is the fiscal stance of the union as a whole and not the fiscal stance of individual countries. The fiscal policies of large countries have a greater impact on the fiscal stance of the union than the fiscal policies of smaller countries.

#### b) Lack of Symmetry

Two issues are relevant under this heading. First, for countries which have not yet reached the 'close to balance or in surplus' position, the requirement that they reduce continuously the deficit may entail procyclical policies in an economic downturn. This problem has been mitigated by the European Council decision of March 2003, specifying that the above requirement will be judged on the basis of the cyclically adjusted budget position. However, countries which have not yet reached the 3 percent deficit level and are therefore outside of the euro zone have to satisfy the Maastricht reference value in nominal and not cyclically adjusted terms in order to be able to join EMU. In the run-up to EMU, these countries may therefore confront a situation in which they have to follow a procyclical policy. Second, while the SGP sets a limit on the maximum deficit and foresees penalties for breaking it, the Pact does not specify surpluses and does not otherwise provide enough incentives for reducing the deficit and/or accumulating surpluses during boom periods. The failure of sufficiently reducing the deficits in the upswing of 1998-2000 is seen as the major reason for the breaking of the deficit criterion by several Member States in 2002 and 2003<sup>7</sup>.

#### c) Lack of Flexibility

The loss of independent monetary policy within the EMU calls for the preservation of fiscal flexibility to cope with asymmetric shocks or the asymmetric effects of common shocks. This means that countries should have enough room to let the autonomic

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<sup>7</sup> See *Fatás et al. (2003)*.



stabilizers operate fully or, if necessary, to use discretionary policy to respond to shocks. The question then is whether the 3 percent deficit reference value provides the needed flexibility. The answer to this question depends on the starting level of the deficit and the output smoothing capacity of the automatic stabilizers. Some studies have found (Eichengreen and Wyplosz, 1998 and Kiander and Virén, 2000) that the deficit limit might not provide enough flexibility for some of the EU-15 countries.

#### d) Quality of Fiscal Consolidation

The quality of fiscal consolidation matters because taxes and expenditures affect output differently due to their different impact on income distribution and incentives. Empirical research has demonstrated that consolidation relying on current expenditure cuts rather than tax increases are likely to last longer and are thus more successful (Alesina and Perotti, 1995 and 1997; Perotti et al. 1997; Buti and Sapir, 1998; von Hagen et al. 2001). The SGP, by defining the fiscal target in terms of deficit numbers, neglects the quality of fiscal adjustment. Von Hagen et al. (2001) provide empirical evidence that high debt to GDP ratio and weak domestic and international economy induce governments to undertake expenditure-based rather than revenue-based consolidation strategies. This proves that governments will undertake quality adjustment under economic constraints, but the SGP does not explicitly provide incentives for undertaking quality consolidation.

#### e) Enforceability

The major criticism in this area is that the fines and penalties foreseen within the SGP framework are difficult to enforce, because the decision to subject a country to the penalties lies in the hands of the Economic and Financial Affairs Council (ECOFIN) which is composed of politicians who are more understanding of and therefore more indulgent toward the problems faced by their peers. The decision of November 25, 2003 to hold the EDP for France and Germany in “abeyance for the time being” is an unmistakable sign of such indulgence. The frequent recourse to one-off measures and creative accounting has also undermined the seriousness of the enforcement procedures. Most importantly, the long time lags involved in the enforcement procedure mean that the penalties, even if enforced, will come too late to trigger timely responses. Prior to EMU, there was an incentive to adjust in order to join the currency union, but inside EMU that carrot disappears and the stick remains of dubious efficiency.

## 2.3 Proposals for Improvement Found in the Literature

There have been many proposals for improvement of the SGP and even its usefulness has been questioned (De Grauwe, 2002)<sup>8</sup>. Nonetheless, there is broad consensus among academics and opinion makers that as long as fiscal policy remains decentralized, there is a need for fiscal rules in the EMU. Buti et al. (2003a) review the EU fiscal rules against the criteria of Kopits-Symansky and Inman<sup>9</sup> and conclude that overall these rules perform quite well with respect to these compliance criteria, except with regard to enforcement. Generally, the proposals for improvement try to address one or several of the criticisms discussed above, although none of the proposals represent a Pareto improvement, in that none of them solve all problems outlined above and may even aggravate some of them (Buti et al., 2003a). Buiters and Grafe (2002) propose the 'permanent balance rule' that takes into account different initial positions (debt level, stock of public sector capital, stage of pension reform) and different future development paths (GDP growth, inflation). The rule requires that the inflation-and-real-growth-adjusted permanent government budget is in balance or in surplus. This rule is attractive theoretically, but it requires estimating future growth and inflation which could become a contentious issue and hence would be difficult to enforce. Another analytically attractive proposed rule is the one that would consider the fiscal stance of the euro area as a whole and would allocate "deficit shares" to individual countries. These shares could be assigned by a decision of ECOFIN (the French proposal)<sup>10</sup>, or by the markets through a system of tradable budget deficit permits (Casella, 2001). The main arguments against such a scheme is that the risks of triggering a financial crisis are not uniform across governments (Buti et al. 2003a) and that the allocation of deficit shares, whether by bureaucratic/political decision or by the markets, requires a degree of political coordination and cooperation that seems to be lacking for the time being.

Other proposals aim at applying the "golden rule", whereby investment expenditure is excluded from the deficit calculation. Blanchard and Giavazzi (2004) propose to exclude net investment (gross investment less depreciation) from the deficit on the grounds that depreciation of public capital is equivalent to current expenditure. The rationale for the golden rule is that borrowing should be allowed to finance investments since their return

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<sup>8</sup> *There is a review of the various proposals in Buti et al. (2003a) and also in HM Treasury (2004).*

<sup>9</sup> *Kopits and Symansky (1998) and Inman (1996). See also Kopits (2001).*

<sup>10</sup> *Proposal put forward by the Minister for Finance of France at the informal Ecofin Council in Dresden in April 1999 (Buti et al., 2003a).*

will occur in the future and hence their cost should be distributed over time. Excluding investment from the deficit would remove the financial constraint on public investment under the SGP and could also help avoid procyclical tightening of fiscal policy in a downturn. Although intuitively appealing, the arguments advanced against the golden rule<sup>11</sup> are that it is difficult to determine what constitutes investment, it could lead to a bias in favor of physical assets, it would provide new incentives for creative accounting, and that it could undermine the efforts to consolidate the public finances.

A final set of proposals which we would like to mention deals with institutional reforms. Wyplosz (2002) proposes to establish in each country Fiscal Policy Committees entrusted with the responsibility to set annual deficit targets consistent with long-run debt sustainability. Fatás et al. (2003) argue for the creation of a Sustainability Council at the level of the euro area, with the task of monitoring the sustainability of Member States' public finances<sup>12</sup>. The idea behind these proposals is to find in the fiscal area a counterpart to national central banks or the ECB that could bring governments to better adhere to fiscal discipline. The idea is appealing but a lot depends on the political will of elected governments to respect more strictly the recommendations of the proposed national Fiscal Policy Committees or the euro area Council than they currently respect the recommendations of the Commission.

This objection could be raised against the proposal by Eichengreen (2004), although it clearly has the advantage of addressing the problem with the SGP at its roots. According to this proposal, only those member states would be subjected to numerical fiscal rules has weaknesses in its budgetary and labor market institutions or pension systems, carrying the risk of chronic fiscal deficits. However, in order to evaluate the progress made in structural reforms, the setting up of an independent, yet legitimate body would become necessary, which is hardly imaginable in the present framework of cooperation between member states. Furthermore, an excessive deficit procedure was initiated in 2002-2003 against the same countries that the author categorized as having weak institutions, so the proposal would in fact not bring considerable practical changes to the SGP.

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<sup>11</sup> See, for instance, *European Commission (2003) and Buti et al. (2003a)*.

<sup>12</sup> Others, for instance *Gros et al. (2004)*, have also made similar proposals.

### 3 Fiscal Characteristics of the New Member States

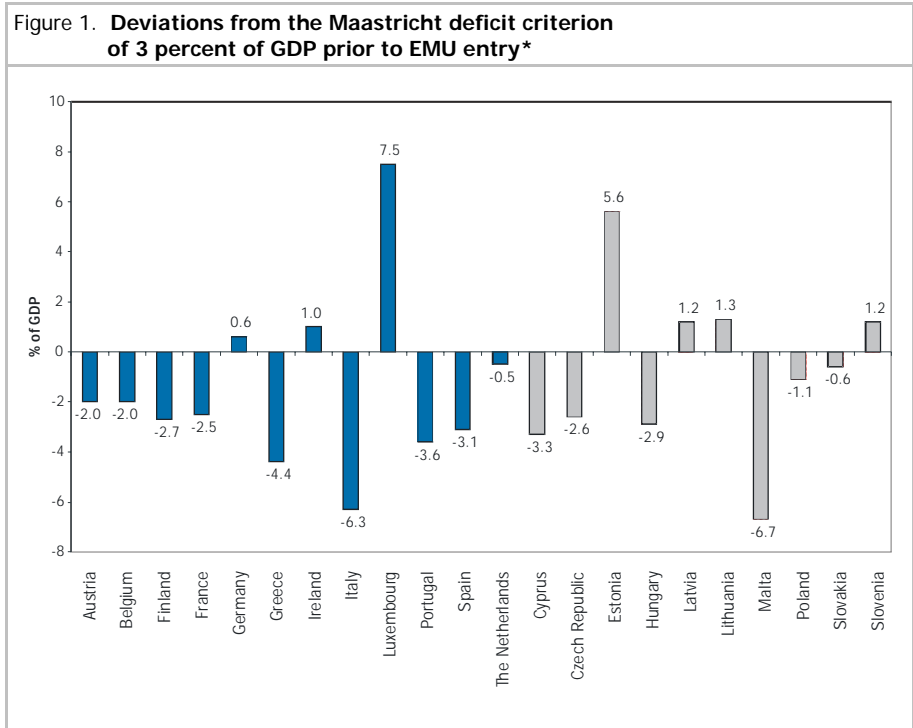
The fiscal characteristics of the NMS have to be assessed from two perspectives: (1) from the narrower perspective of meeting the numerical deficit and debt Maastricht criteria on the road to euro adoption; and (2) from the broader perspective of the SGP framework in the light of the criticisms of the Pact and the proposed improvements discussed above. Although the issues are linked, it is useful from a policy point of view to approach the assessment separately from the above two perspectives. Such an assessment has to consider the initial conditions faced by the NMS, as well as the challenges lying ahead. We undertake this exercise by comparing the situation of the NMS with the experiences of the current euro zone members.

#### 3.1 The Road to EMU

On their way toward adopting the euro, the NMS face the task of reducing their fiscal deficits to the Maastricht criteria of 3 percent of GDP. Several NMS have announced that they want to enter the EMU by 2008 or earlier, while others plan to join later. On the whole, a distance of five years from EMU entry appears to be a good benchmark to which to compare the starting positions of the current euro zone members with the starting positions of the NMS. Figure 1 shows the deviation from the 3 percent deficit in 2003 for the NMS and five years prior to entry into the EMU for the current members (1996 for Greece and 1994 for the others). With the exception of Malta, the deviations for the NMS are about the same or less than were the deviations for the majority of the current EMU members. The starting deficit conditions of the NMS are thus not worse than the conditions faced by the current members five years prior to joining the EMU. In fact, for the three Baltic states and Slovenia the conditions are significantly more favorable.

As regards government debt, it is generally lower in the NMS than it is in the euro zone countries currently or five years prior to EMU entry (Figure 2). The exceptions are Cyprus, Malta and Hungary. There are several reasons behind the low debt levels in the NMS from Central and Eastern Europe. First, the Baltic States did not inherit any of the liabilities of the former Soviet Union while Poland obtained partial debt forgiveness. Second, some countries (e.g. Hungary) used privatization receipts to reduce the government debt. Third, a part of the social safety net expenditures were borne by state enterprises, most notably in the form of within-the-gate unemployment. When these enterprises were privatized, the new owner often took over their debts, which was then

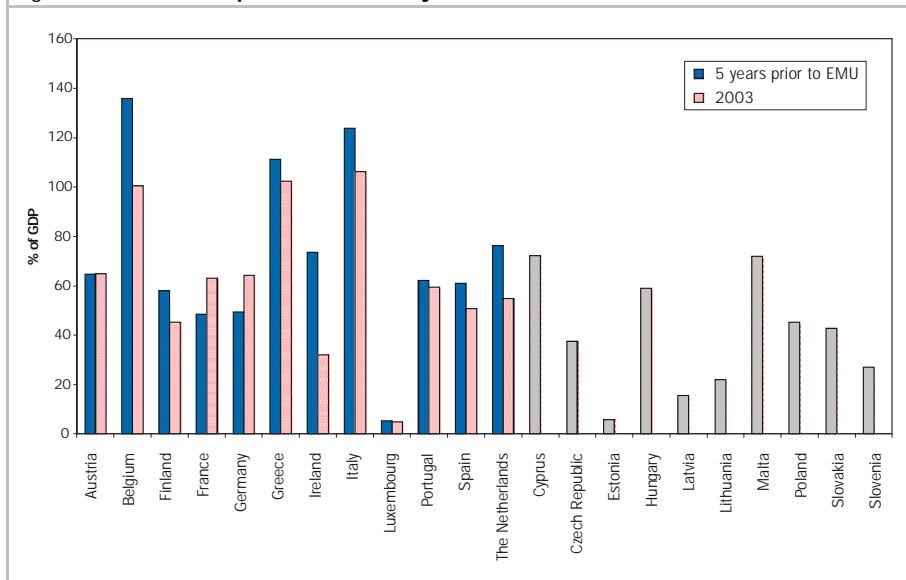
reflected in a lower purchase price. There were also developments in the opposite direction, most notably when the government assumed the debts of state-owned banks and enterprises in order to consolidate them prior to privatization<sup>13</sup>.



\* For the euro zone members, five years prior to EMU entry: 1996 for Greece and 1994 for the other members. For the new Member States, the data refer to 2003. General government net borrowing as a ratio of GDP on the basis of ESA95. The figure for the Czech Republic does not include debt assumptions. Source: EUROSTAT and Ministry of Finance of the Czech Republic.

<sup>13</sup> P. Kiss and Szapáry (2000) review the impact of debt assumptions on Hungary's public finances.

Figure 2. Debt ratios prior to EMU entry and in 2003\*



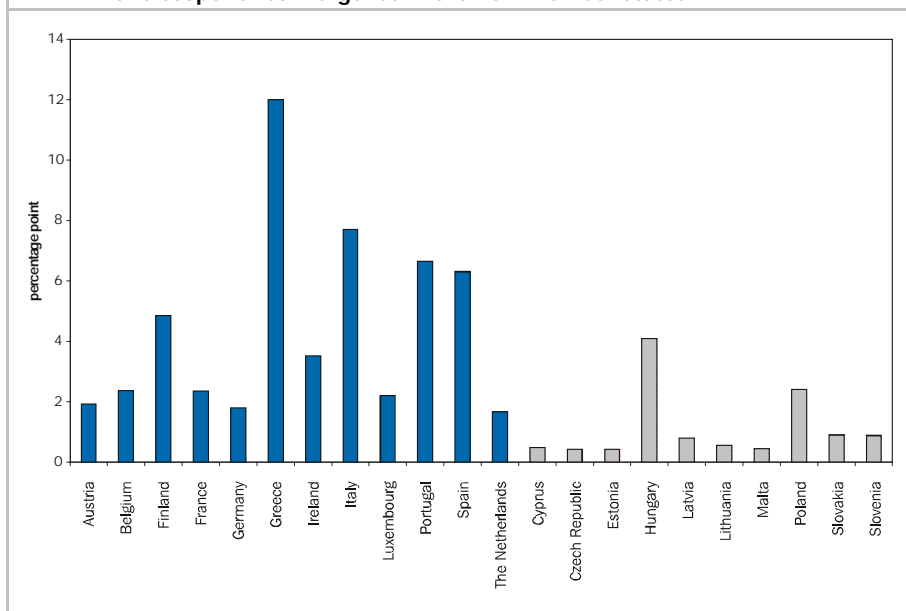
\* For the euro zone members, in 2003 and five years prior to EMU entry: 1996 for Greece and 1994 for the other members. For the new Member States, the data refer to 2003. General government consolidated budget debt as a ratio of GDP.

Source: EUROSTAT.

The lower level of debt has implications for the way in which the fiscal consolidation needed to reach the 3 percent Maastricht deficit criteria can be achieved. Together with the greater convergence of bond yields already obtained by the NMS (Figure 3), the new member countries will be able to rely less on the gains from interest rate convergence to reduce the deficit than were the current euro zone countries (Figure 4). During the last five years prior to EMU entry, such gains represented between 2.4 to 5 percent of GDP in half of the current euro zone members, while among the NMS only Hungary and Poland can expect to have gains over 1 percent of GDP<sup>14</sup>. The greater convergence of bond yields in the NMS is a result of the progress with disinflation and the markets' expectations that these countries will join the EMU in the not too distant future, which have contributed to a reduction of the risk premia. Another factor reducing the potential gains from yield convergence is that in some of the NMS a large portion of the government debt is in foreign currency where the scope for interest rate convergence is limited.

<sup>14</sup> In estimating the gains for the NMS, we assumed that the debt/GDP ratios remain constant. The interest rates used were effective yields calculated as interest payments divided by the debt ratio of the previous year.

**Figure 3. Bond yield convergence in the run-up to EMU and scope for convergence in the new member states\***

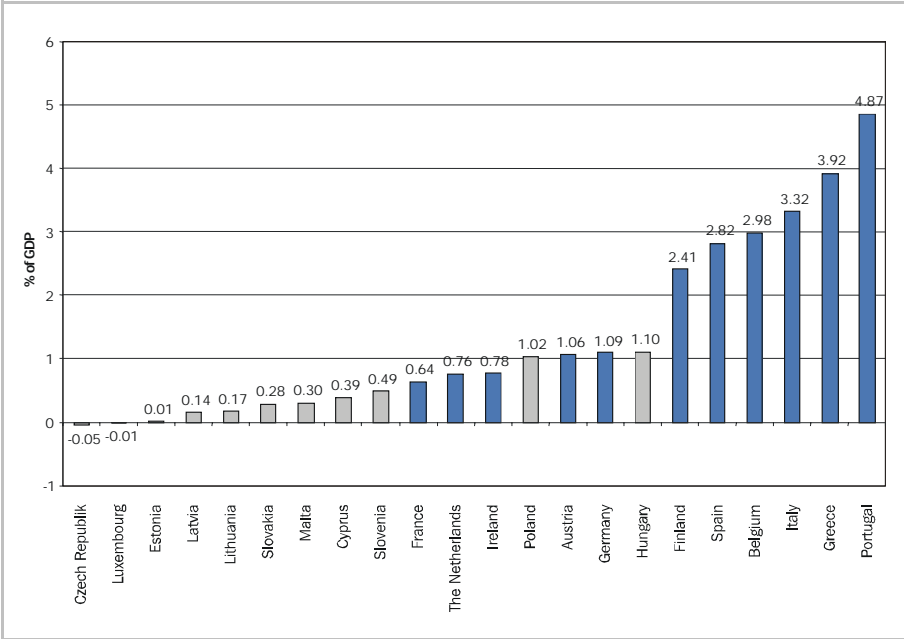


\* For EMU countries, convergence criterion bond yields: the difference in yields between March 1995 and March 2000 for Greece and between March 1993 and March 1998 for the other EMU countries. For new Member States, the difference between domestic convergence criterion bond yields and the convergence criterion euro bond yield in January 2004.

Source: EUROSTAT.

Figure 5 shows the required changes in the primary balance to reach the 3 percent Maastricht deficit limit. A negative value shows the required improvement and a positive value the “permissible” deterioration. For the high-debt NMS (Cyprus, Hungary, Malta) and the Czech Republic, the required improvements are significantly higher than were necessary for most of the euro zone members, owing to the smaller gains from yield convergence in the former group. Only high-debt Italy and France, where the yield convergence five years prior to EMU was already nearly complete, needed primary balance improvements similar to those of the above mentioned new members. In these latter countries, therefore, most of the adjustment to reach the 3 percent limit will have to be made in the primary balance.

Figure 4. **Gains in interest payments due to bond yield convergence in the run-up to EMU\***

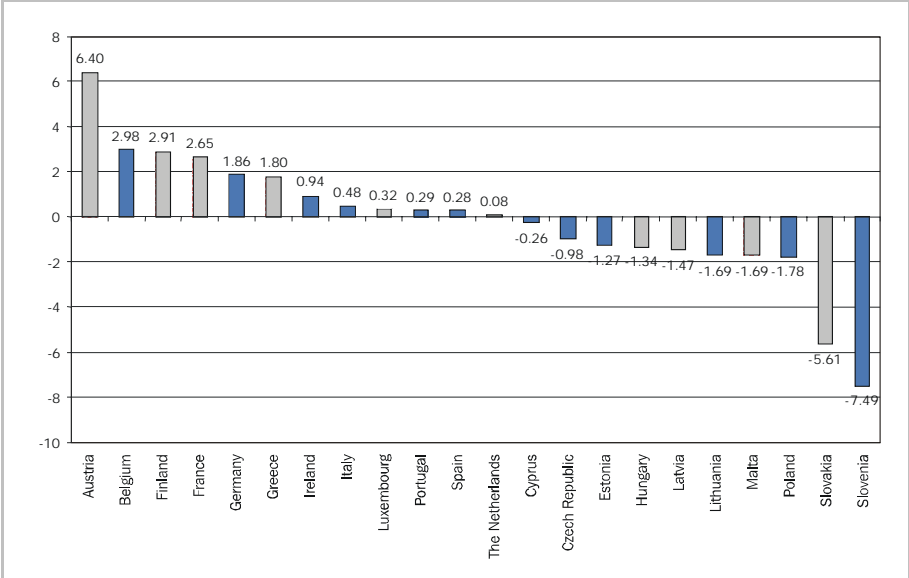


\* For the euro zone countries, interest rate convergence gains during 1995-2000 for Greece and during 1993-1998 for the other euro zone members. The calculations were made on the basis of the end of period debt/GDP ratios. For all countries we assumed constant debt/GDP ratios. The interest rates used were effective yields calculated as interest payments divided by the debt ratio of the previous year in every case. The gains thus calculated do not necessarily correspond to the actual improvements in the interest payment balances in the case of current eurozone members due to changes in the debt/GDP ratios during the period considered.  
Sources: Authors' calculations using data from EUROSTAT.

This brings us to examine the size and composition of government spending in the NMS. The adequate size of government spending is difficult to determine since it depends on a country's social preferences. One benchmark that can be used to judge the relative size of government is per capita income: when incomes rise, the demand for certain publicly provided services, such as education, R&D, infrastructure services tend to increase so that low income countries might need extra room to accommodate these higher expenditures as per capita incomes rise.



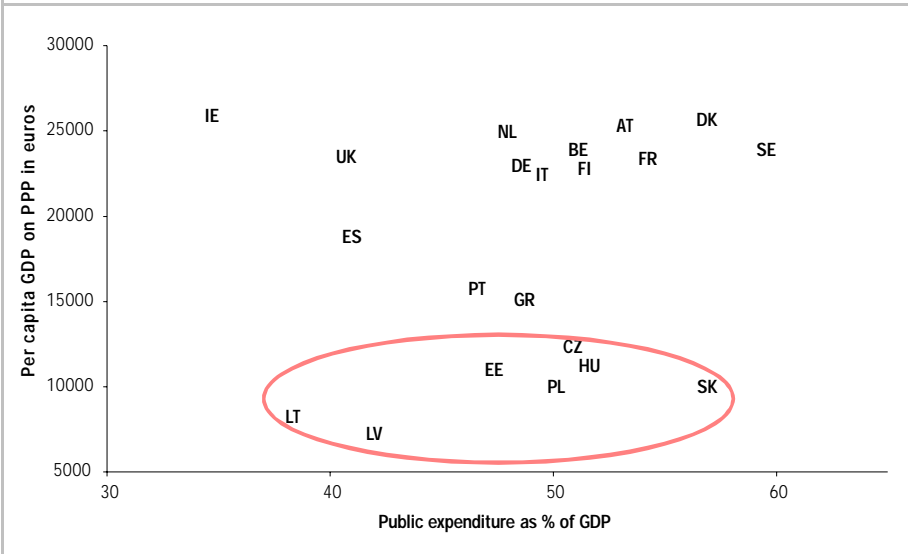
Figure 5. **Required improvements in the primary balances to reach the Maastricht deficit criterion of 3 percent taking account of gains from bond yield convergence\***



\* See footnote for Figure 4. A negative value shows the required improvement and a positive value the "permissible" deterioration in the primary balance in order to meet the 3 percent deficit limit. Sources: Authors' calculations using EUROSTAT data for debt ratios and Magyar Nemzeti Bank for euro bond yields.

Figure 6 plots the level of government expenditure as a ratio of GDP against per capita income on a purchasing power parity basis. What the Figure illustrates is that in the Visegrád countries (the Czech Republic, Hungary, Poland and Slovakia) the spending levels are about the same as in those EU members where the levels of expenditure are the highest, even though the per capita income is much smaller in the Visegrád countries. Thus, using per capita income as a benchmark, the governments in these new member countries appear to be oversized. Von Hagen (2004) comes to the same conclusion using regression analysis where, in addition to per capita income, he also takes into consideration the openness of the economy on the grounds that more open economies are more exposed to external shocks and therefore need larger government sector as a buffer. It is necessary to point out though that both per capita income and openness are imperfect benchmarks to judge the adequacy of the size of the public sector, because they ignore the important question of which sector, public or private, can provide most efficiently the services.

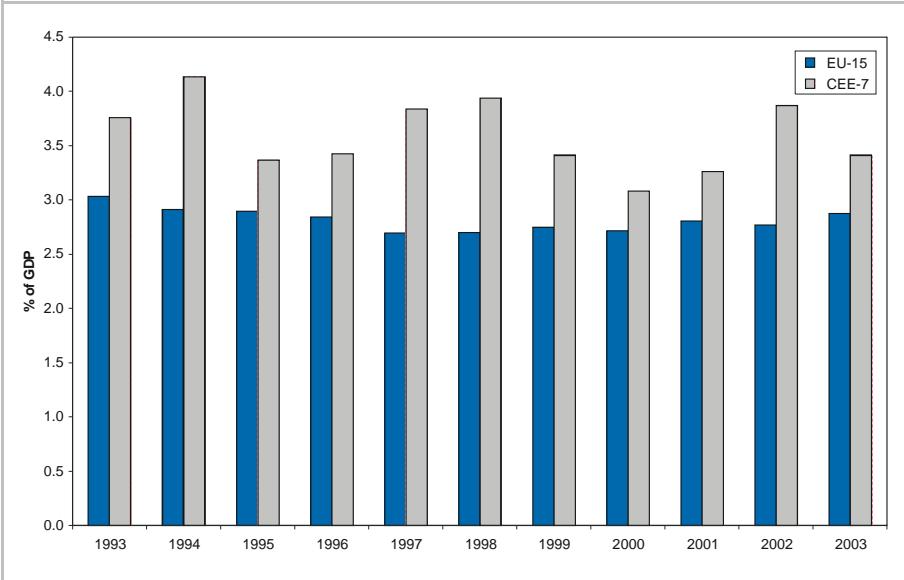
Figure 6. **Per capita income and government spending in the EU and the CEEs, 1998-2003 averages\***



\* Luxembourg and Slovenia are not included.  
Source: EUROSTAT.

The above findings about the level of expenditure in the NMS have to be looked at in conjunction with the special needs for additional spending in these countries. It is common wisdom that transition economies need to strengthen their infrastructure. Since the early 1990s, average government investment has been consistently higher in the Central and Eastern European transition countries than in the EU (Figure 7). This is normal, since the social marginal productivity of infrastructural investment will tend to be higher in less developed countries. For the period ahead, the transition countries will need to maintain a relatively high level of public investment expenditure given their relatively low stock of public capital.

Figure 7. **Average government investment ratios in the EU-15 and the CEEs\*, 1993-2003**



\* Slovenia is not included. Figures are unweighted averages. Data for 2003 are preliminary. Sources: AMECO database and Magyar Nemzeti Bank.

Furthermore, EU accession will involve additional government expenditure and some revenue loss for the new members, which will be offset only partly by transfers from the EU. The net effect will be negative in the initial years of membership due to the combination of the following main factors: (1) the new members have to pay immediately after accession their contribution to the EU common budget; (2) a part of the EU transfers to finance projects are channeled directly to private sector recipients with no positive direct effect on the budget; (3) those transfers that are channeled to the budget for project implementation have to be pre-financed by the government; (4) the EU transfers cannot be used to finance projects which, in the absence of the transfers, would have been financed from the budget (the principle of additionality); (5) there is a domestic co-financing requirement of EU-financed projects; (6) there will be increased administrative burden associated with the implementation of EU financed projects; and (7) the removal of custom duties on imports from EU members and the sharing of customs receipts on imports from third countries involve a loss of revenue. These negative effects will be partly compensated by the phasing out of domestic agricultural subsidies which will be replaced by EU subsidies.

Several authors have estimated the net direct budgetary effects of accession (see Table 1). All the authors have come up with a net negative direct effect on the budget during the first years of membership. The estimates range between 1 and 4.75 percent of GDP per year. The rather wide range of these estimates reflects the differences in the underlying assumptions regarding absorption capacity and the space and cost of financing the *acquis communautaires*, such as environmental protection and infrastructure. These estimates concern only the direct budgetary effects, which may be mitigated by favorable indirect effects that are difficult to quantify, such as those resulting from accession-driven private sector activity. However, these favorable effects will come on stream only gradually and the assessment that accession will lead initially to a higher burden on the budget is not questioned.

<b>Authors</b>	<b>Net Annual Negative Effect (percent of GDP)</b>
Kopits and Székely (2004)	3-4.75
Antezak (2003)	1.7-3.1
IMF (2004)	1.0-1.5

### 3.2 The SGP Framework

Two issues are relevant from the perspective of the SGP framework: the cyclical sensitivity of the budgets and debt sustainability.

#### a) Cyclical Sensitivity

In the SGP framework, the automatic stabilizers are to be allowed to operate fully without breaching the 3 percent deficit limit. The European Commission has calculated cyclical safety margins for each of the EU-15 countries<sup>15</sup>, showing the size of the deterioration in the budget balance in case output falls below potential. Subtracting these safety margins from the reference value of 3 percent, we obtain the so-called “minimal benchmark” which a country should at least achieve over the cycle in order to avoid breaching the 3 percent limit in a downturn.

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<sup>15</sup> *European Commission (2000, 2002).*

Using the methodology of the European Commission (2000), we calculated the safety margins for the eight new members from Central and Eastern Europe (CEEs) (Table 2)<sup>16</sup>. Despite somewhat higher output volatilities<sup>17</sup>, the cyclical safety margins are generally lower in the CEEs than in the EU-15, as a result of lower sensitivity of the budgets of the CEEs to the economic cycle. The lower sensitivity is explained essentially by the smaller reliance on cycle-sensitive direct taxes and the significantly lower shares in total spending of cycle-sensitive expenditures on unemployment benefits<sup>18</sup>. One reason for the smaller reliance on direct taxes and the correspondingly higher reliance on indirect taxes is that tax evasion has been a widespread problem in the CEEs and the collection of indirect taxes has proved to be more efficient. Other reasons are tax holidays and the low level of corporate taxes, which have been used as an incentive to attract foreign investment. The smaller share of expenditures on unemployment compensation is due to the generally less generous benefits.

The lower cyclical safety margins mean that the “minimal benchmark”, i.e. the maximum deficit to be respected over the cycle without running the risk of breaching the 3 percent limit, is higher in the CEEs<sup>19</sup> than in the EU-15<sup>20</sup>. This finding has to be looked at in conjunction with the smoothing capacity of the automatic stabilizers. Many authors have researched and calculated the output stabilization effects of automatic stabilizers in

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<sup>16</sup> As discussed in the Annex, this methodology, which estimates the output gap by an HP-filtered trend approach, has several weaknesses and has been improved by the Commission by using a production function approach (European Commission, 2002). We used the former methodology because of the lack of readily available production function calculations for the CEEs. For Hungary, P. Kiss and Vadas (2004) estimate cyclical sensitivities and output gaps using three different methods: that of the European Commission (2002), the ECB (Bouthevillain et al., 2001) and a methodology developed by the authors to take into account the specific fiscal and economic characteristics of Hungary. For the sake of comparability, we did not use the P. Kiss and Vadas (2004) estimates for Hungary.

<sup>17</sup> See Darvas and Szapáry (2004) for a discussion of output volatilities in the EMU and the CEEs.

<sup>18</sup> Direct taxes as a ratio of GDP averaged 14 percent in the EU-15 and 10 percent in the CEEs in the period 1992-2002. Unemployment benefit payments to GDP averaged 1.73 percent in the EU-15 and 0.68 in the CEEs (Sources: AMECO and Riboud et al. 2002).

<sup>19</sup> Our estimates of the cyclical safety margins of the budgets of the CEEs are fairly close to those calculated by IMF (2004), but are substantially lower than those calculated by Coricelli and Ercolani (2002). These authors estimate the safety margins for Hungary and Poland to be over 3 percent, mainly because they find output to be more volatile. This may be due to the inclusion of the years 1990-1994 which were characterized by high transition-induced output volatility. For this reason, we excluded those years from our calculations.

<sup>20</sup> For the EU-15, the output gaps are those calculated by European Commission (2002) using the more sophisticated production function methodology, while for the CEE-8 we used the HP-filtered trend approach. The HP-filter approach yields even smaller minimal benchmarks for the EU-15.

the EMU<sup>21</sup>. Calculating these effects for the CEEs is beyond the scope of this paper and should be the subject of future research. One factor which tends to weaken the smoothing capacity of automatic stabilizers in the CEEs is that they are small open economies (except Poland) where the smoothing capacity is reduced by the leakages through imports. The lower cyclical budget sensitivity together with the openness of the CEEs imply that these countries may have to rely more on discretionary measures to smooth the economic cycle. There are, however, risks involved in using discretionary changes and one has to ensure that the discretionary measures are reversible and do not lead to a deterioration of the underlying budget position (see European Commission, 2002).

	Cyclical budget sensitivity	The largest value of output gap	Cyclical safety margin	Minimal benchmark
		in percent	in percent	in percent
<b>EU-15</b>	<b>0.50</b>	<b>3.83</b>	<b>1.97</b>	<b>-1.03</b>
Austria	0.30	5.17	0.90	-2.10
Belgium	0.60	3.83	2.30	-0.70
Denmark	0.80	5.14	2.70	-0.30
Finland	0.70	3.00	3.80	0.80
France	0.40	3.25	1.30	-1.70
Germany	0.50	3.38	1.40	-1.60
Greece	0.40	5.43	1.30	-1.70
Ireland	0.35	3.75	1.70	-1.30
Italy	0.45	3.25	1.50	-1.50
Luxemburg	0.60	4.86	3.10	0.10
Netherlands	0.65	3.33	2.30	-0.70
Portugal	0.35	3.54	1.80	-1.20
Spain	0.40	2.80	1.50	-1.50
Sweden	0.70	3.14	2.20	-0.80
United Kingdom	0.50	3.60	1.80	-1.20
<b>CEE-a</b>	<b>0.41</b>	<b>4.26</b>	<b>1.68</b>	<b>-1.32</b>
Czech Republic	0.40	4.20	1.70	-1.30
Estonia	0.41	4.78	1.95	-1.05
Hungary	0.44	3.65	1.62	-1.38
Latvia	0.33	4.22	1.39	-1.61
Lithuania	0.33	6.05	2.01	-0.99
Poland	0.49	3.87	1.88	-1.12
Slovakia	0.40	3.87	1.55	-1.45
Slovenia	0.45	3.44	1.54	-1.46

Sources: EU-15: European Commission (2002); CEE-8: see Annex.

<sup>21</sup> Buti et al. (2003b); Buti and van den Noord (2003 and 2004); Brunila et al. (2002); European Commission (2002); Barrell and Pina (2000); Kiander and Virén (2000); van den Noord (2000).

## b) Debt Sustainability

As seen earlier, the debt levels in the NMS are generally lower than in the EMU members. As catching-up economies, they also have a higher potential growth rate, as well as higher BS-induced inflation and hence lower real interest rates once they are in EMU and face similar nominal interest rates. The combination of these factors would, *ceteris paribus*, imply that the NMS could run higher deficits and still maintain the long-run sustainability of public finances. However, when assessing debt sustainability, one also has to take into account future liabilities. The most important of these are future pension payment obligations and health care outlays for the elderly due to population ageing.

As can be seen in Table 3, the old-age dependency ratios in the CEEs are somewhat below those of the EU-15, but the fertility rates are also smaller which, combined with an increase in life expectancy that will accompany the growth in per capita income in the CEEs, will sharply raise the dependency ratios. In the Czech Republic, Hungary and Poland these ratios are projected to double or more than double by 2050. The burden that these population trends implies for the government budgets can be reduced by reforming the pension systems, such as introducing a second pillar funded scheme (but the transition cost of exiting from the pay-as-you-go system remains), raising the level of retirement age, tightening eligibility for early retirement or reducing the replacement rate. About half of the CEEs have already introduced a multi-pillar system and others plan to do so (European Commission, 2003). A second element of future liabilities that can burden the budgets of the CEEs in the years ahead is the overall stock of guarantees granted mostly for enterprise borrowings in the sectors of public transportation and energy. Although the stock of guarantees has been substantially reduced as a result of privatization, it remains important in some countries.

It is difficult to judge the optimal target for public debt. It depends, as said, on the crowding out effect of interest payments and the negative output effect of distortionary taxes to finance these payments. Furthermore, it also depends on the future rate of return of the expenditures that are financed by borrowing, such as investments and reforms that benefit future generations, or reforms that reduce future liabilities (e.g. pension reforms). IMF (2004) suggests a prudent public debt ratio of around 45 percent of GDP for the CEEs. The UK Government's fiscal policy objective is to maintain net debt below 40 percent of GDP over the economic cycle. Using these numbers as a benchmark for illustrative purposes – but without suggesting that this is an appropriate debt level for all countries under all circumstances – we show in Table 4 the improvement in the primary

balances needed to reach a 40 percent debt/GDP ratio within ten years in the CEEs. A positive value in Table 4 shows in percent of GDP the size of the improvement in the primary balance needed now and to be kept constant in order to reduce the debt/GDP ratio to 40 percent in ten years in case the current level of debt exceeds 40 percent, or the improvement needed in order not to exceed the limit in case the current level of debt is less than 40 percent. A negative value indicates the “permissible” deterioration in the primary balance without exceeding the debt limit. As can be seen from Table 4, Cyprus, the Czech Republic, Hungary and Malta need significant improvements in the primary balances in order to avoid that their debt levels exceed 40 percent of GDP by 2013. This is because both the debt levels and the primary deficits are high in these countries. Poland and Slovakia need only a small improvement, while the Baltic countries and Slovenia could in principle let their primary balances deteriorate, since they have low debts and low primary deficits or have surpluses.

	Old-age dependency ratios total fertility		
	(in percent)		Rate
	2000	2050	2003
EU	<b>25.95</b>	<b>51.40</b>	<b>1.57</b>
Belgium	28.10	49.50	1.62
Denmark	24.20	40.30	1.72
Germany	26.60	53.20	1.31
Greece	n.a.	n.a.	1.25
Spain	27.10	65.70	1.25
France	27.20	50.80	1.89
Ireland	19.70	45.70	1.97
Italy	28.80	66.80	1.26
Luxembourg	n.a.	n.a.	1.63
Netherlands	21.90	44.90	1.73
Austria	25.20	58.20	1.40
Portugal	26.70	50.90	1.47
Finland	25.90	50.60	1.72
Sweden	29.40	46.30	1.65
United Kingdom	26.60	45.30	1.64
<b>NMS-10</b>	<b>22.00</b>	<b>53.30</b>	<b>1.29</b>
Cyprus	n.a.	n.a.	1.49
Czech Republic	21.90	57.50	1.17
Estonia	n.a.	n.a.	1.37
Hungary	23.70	47.20	1.30
Latvia	n.a.	n.a.	1.24
Lithuania	n.a.	n.a.	1.24
Malta	n.a.	n.a.	1.46
Poland	20.40	55.20	1.24
Slovakia	n.a.	n.a.	1.19
Slovenia	n.a.	n.a.	1.21

Sources: *OECD (2003) and EUROSTAT.*

<sup>22</sup> *Old-age dependency ratio is equal to (persons aged 65+)/ (persons aged 20-64). Total fertility rate is defined as the average number of children who would be born alive to a woman during her lifetime. In more developed countries, a rate of 2.1 is considered to be replacement level.*



Table 4. **Primary deficit gaps to reach 40 percent debt/GDP ratios in ten years under different assumptions for growth and real interest rates (in percent of GDP)**

<b>Cyprus</b>			<b>Czech Rep.</b>		
<i>GDP-growth</i>	<i>Real interest rates</i>		<i>GDP-growth</i>	<i>Real interest rates</i>	
	2%	4%		2%	4%
3%	5.66	6.78	3%	3.08	3.84
4%	5.12	6.22	4%	2.72	3.46
5%	4.59	5.67	5%	2.35	3.09
<b>Estonia</b>			<b>Hungary</b>		
<i>GDP-growth</i>	<i>Real interest rates</i>		<i>GDP-growth</i>	<i>Real interest rates</i>	
	2%	4%		2%	4%
3%	-6.53	-6.12	3%	3.21	4.19
4%	-6.74	-6.32	4%	2.74	3.70
5%	-6.95	-6.52	5%	2.27	3.22
<b>Latvia</b>			<b>Lithuania</b>		
<i>GDP-growth</i>	<i>Real interest rates</i>		<i>GDP-growth</i>	<i>Real interest rates</i>	
	2%	4%		2%	4%
3%	-1.70	-1.12	3%	-1.80	-1.28
4%	-1.99	-1.41	4%	-2.06	-1.54
5%	-2.28	-1.70	5%	-2.32	-1.79
<b>Malta</b>			<b>Poland</b>		
<i>GDP-growth</i>	<i>Real interest rates</i>		<i>GDP-growth</i>	<i>Real interest rates</i>	
	2%	4%		2%	4%
3%	8.64	9.76	3%	1.12	1.96
4%	8.10	9.20	4%	0.72	1.54
5%	7.58	8.65	5%	0.32	1.13
<b>Slovakia</b>			<b>Slovenia</b>		
<i>GDP-growth</i>	<i>Real interest rates</i>		<i>GDP-growth</i>	<i>Real interest rates</i>	
	2%	4%		2%	4%
3%	1.08	1.88	3%	-1.71	-3.93
4%	0.68	1.48	4%	-2.03	-4.10
5%	0.30	1.08	5%	-2.34	-4.27

Source: Authors' calculations based on EUROSTAT data.

### 3.3 Summary of Findings

Our main findings regarding the fiscal characteristics of the NMS from the perspective of the Maastricht criteria and the SGP can be summarized as follows.

There are large differences among the NMS as to their starting fiscal positions. The budget deficits of the Baltic states and Slovenia were already smaller than 3 percent of GDP in 2003 and these countries have also the lowest debt/GDP ratios among the NMS, well below 60 percent of GDP. Estonia scores the highest, with practically no government debt and an overall budget surplus. Those countries which have recorded the largest deficits in 2003, Cyprus, the Czech Republic, Hungary and Malta, have also the

highest debt levels. Clearly, the NMS cannot be regarded as a group but have to be looked at on a case-by-case basis.

The new members, particularly those with less favorable starting fiscal positions, face great challenges on the road to EMU because the potential budgetary gains from yield convergence are limited and EU accession will have a net negative impact on their budgets in the initial years of accession. At the same time, pension and other needed reforms, as well as the necessity to keep up with the higher level of infrastructure investment, imply additional budgetary burdens.

The level of debt is generally lower in the NMS than in the EMU members. They also have higher potential growth and will face lower real interest rates within EMU due to the higher BS-induced inflation, which improve their prospects of debt sustainability. However, they also face considerable budgetary pressures in the medium to long-run because of the high stock of government guarantees in some countries and ageing related future pension and health care payment obligations.

## 4 Policy Implications

The main ideas that we would like to communicate in this paper which have a policy implication are the following:

- 1) From a debt sustainability perspective, the lower debt and the prospect of faster growth implies that those NMS where the deficit is significantly below 3 percent could be given a longer period of time to reach the 'close to balance or in surplus' position. This would be also justified because the NMS need more infrastructural development and EU accession will put additional burden on the budgets in the initial years of membership. We should remember that in the run-up to EMU, the current cohesion countries were the recipients of much larger EU transfers than what the NMS are expected to receive in the coming years. More research should be undertaken to define debt sustainability taking also into account future liabilities, so that more concrete guidelines could be issued for the required speed of adjustment.

It has been sometimes suggested that the SGP or its interpretation need to be modified to take into account the special circumstances of the new Member States. The large differences in the initial conditions of the NMS do not support that argument. Indeed, several current EMU members have lower debt than some of the

NMS and the less developed current euro zone members have also higher potential growth than the other members. The improvement of the SGP is needed not because of enlargement, but because it makes good economic sense to take into account the differences in initial conditions for all countries. Enlargement only highlights the need for improvement by widening the differences among countries subject to the provisions of the SGP.

A misconception has to be corrected in this regard. In many documents and declarations reference is made to the “equal treatment” of members when talking about the uniform application of the provisions of the SGP. Equal treatment in an economic sense would mean that one differentiates according to initial conditions and future liabilities. Uniformity in this case is not equal treatment. One can, therefore, support those suggested improvements in the SGP that would take into account more explicitly differences in debt levels, economic growth, demographic trends and reforms that reduce future liabilities.

- 2) There are good reasons for keeping the 3 percent limit even from the perspective of the NMS, because those new members which exceed that limit are also those which have the highest debt levels. They have, therefore, an interest in reducing the deficit to below 3 percent earlier rather than later so that they can benefit from a reduction in debt service payments which would free resources for other purposes – and that irrespective of when they plan to join EMU.

There is another reason why the high-deficit NMS have to reduce the fiscal deficit. As long as they are not within the EMU, they are exposed to speculative capital movements triggered by market perception about the sustainability of the external payments position<sup>23</sup>. While the rate of investment in the NMS will remain high, they also face the prospect of an erosion of net household savings as a result of credit booms. Household credit is typically very low in the CEEs and one can expect a rapid growth in such credit as a result of the declining interest rates, the prospect of higher permanent income levels, and the greater willingness of banks to lend to households as they move into retail banking, an area which the banks have eschewed so far because of the higher perceived risks. Hungary has already experienced a sharp reduction in net household savings in recent years. Under these circumstances, the burden falls on the budget to maintain an external position which is seen as viable by the markets. If the cyclical upturn that has just started proves to

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<sup>23</sup> *Barnhill and Kopits (2003) discuss the fiscal vulnerabilities faced by emerging markets.*

be durable, this would be an ideal time to accelerate the consolidation in the high-deficit NMS, thus reducing the risk of having to pursue procyclical policy in a downturn. Since the government sector in most high-debt NMS is already oversized relative to their per capita income, consolidation should be done through cutting current primary spending, while leaving room for those expenditures that are necessary for the building up of the stock of public capital and for the implementation of reforms that will bring long-term benefits.

- 3) More emphasis should be placed on improvements in budgetary procedures. Budgetary practices vary a great deal from one country to another: the forecasting, planning, implementing, accounting and monitoring procedures are not the same. Deficiencies in these areas can lead to forecasting errors and ex-post revisions of data that make enforcement difficult and eventually undermine credibility. Guidelines for best practices in budgetary procedures could be issued by the Council and included in the monitoring under the SGP.
  
- 4) Finally, we have to remind ourselves that the Maastricht-related constraints have led to a significant reduction in the deficits and debt levels of the current euro zone members and there is no evidence that it has impaired the stabilization role of fiscal policy or that it had negatively affected public investment (Gali and Perotti, 2003). While rules are necessary to ensure the proper functioning of the single monetary policy, the need for rules goes beyond that: fiscal rules are justified in their own rights as an instrument to foster budgetary discipline. Markets will eventually penalize the sinners but markets react generally too late, by which time the cost of adjustment is already high. Enlargement strengthens the need for rules, since one can observe in several NMS mounting popular pressure for relaxing fiscal policy as expectations have been heightened with EU accession and the appetite for reforms has weakened. The rules have to be respected by all, however. It will be difficult to muster the critically important political support in the new Member States for the commitment to meet the 3 percent deficit requirement to join the monetary union while current members continue to breach that limit.

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## Annex: The Calculation of Cyclical Safety Margins

The cyclical safety margin shows the size of the deterioration in the budget balance in case output falls short of potential output. Subtracting these safety margins from the 3 percent reference value of the Maastricht Treaty, we obtain the so-called “minimal benchmark”, which is the cyclically adjusted deficit consistent with the 3 percent limit. The calculation of cyclical safety margin consists of two steps: the calculation of the largest output gap that a country is likely to encounter and the sensitivity of its budget to the economic cycle. The budget sensitivity indicator is an elasticity of the budget deficit to the output gap, calculated as a weighted average of elasticities of the following budget items: direct taxes, indirect taxes and social security contributions on the revenue side, and unemployment benefits on the expenditure side.

### 1 The Largest Value of Output Gap

We followed the methodology used in European Commission (2000). The output gap is obtained as the logarithmic difference of actual and trend output:

$$(1) \quad OG_{it} = y_{it} - \hat{y}_{it}$$

where  $OG_{it}$  stands for the output gap for the  $i$ -th country in period  $t$ ,  $y_{it}$  is the log of actual output for country  $i$  in period  $t$ , and  $\hat{y}_{it}$  is the trend of log output  $y$  for the  $i$ -th country in period  $t$ .

The largest output gap that country  $i$  is likely to face ( $GAP_i$ ) is calculated as a combination of three sub-indicators: a) the absolute value of the largest negative output gap recorded in country  $i$  over the whole sample period (1995-2002 in our case); b) the unweighted average of the three largest negative output gaps in all countries studied (the 10 new Member States in our case) over the whole sample period; and c) the average volatility of the output gap in each new Member State, measured as twice its standard deviation. The largest value for the output gap is calculated as the mid-point of the worst two of these three sub-indicators. We excluded from our calculations the years before 1995, a period of a transformation recession when GDP fell sharply in the CEEs.

## 2 The Budget Sensitivity Indicator

The sensitivity of the budget (*SENS*) to the output gap is a weighted average of the elasticities of budget items for each country:

$$(2) \quad SENS = \varepsilon_{DT} dt + \varepsilon_{IT} it + \varepsilon_{SC} sc - \varepsilon_{UB} ub$$

where  $\varepsilon_{DT}$ ,  $\varepsilon_{IT}$ ,  $\varepsilon_{SC}$ , are the output elasticities of revenue from direct taxes, indirect taxes and social security contributions;  $\varepsilon_{UB}$  is the output elasticity of unemployment benefits, and  $dt$ ,  $it$ ,  $sc$  are the ratios of revenue received from direct taxes, indirect taxes and social contributions to GDP.  $ub$  is the ratio of unemployment benefits to GDP.

## 3 Cyclical Safety Margins and Minimal Benchmarks

Cyclical safety margins (*CSM*) are calculated as a product of the largest output gap and the budget sensitivity indicator:

$$(3) \quad CSM_i = GAP_i \times SENS_i$$

The value of *CSM* shows the extent to which the budget balance in a given country is likely to deteriorate in times of severe economic downturn.

Finally, the minimal benchmark (*MB*) is the gap between the cyclical safety margin and the Maastricht reference value of 3 percent:

$$(4) \quad MB_i = 3\% - CSM_i$$

The minimal benchmark shows the cyclically adjusted deficit consistent with the 3 percent reference value.

## 4 Sources and Description of Data

The Commission uses annual GDP figures since 1960 for the calculation of trend GDP and output gaps. In the Central and Eastern European countries, the sample period is very short due to structural changes and severe transformation recessions in the early nineties, so we took seasonally adjusted quarterly data since 1995 (on constant 1995 prices). For the sources of quarterly data refer to Darvas and Szapáry (2004). Following

the methodology of the Commission, we obtained trend output using the Hodrick-Prescott filter with the standard parameter of 1600 for quarterly data<sup>24</sup>.

For the relative weight of each revenue item we used the AMECO database. As for the expenditure side, in the absence of readily available data across countries for a sufficiently long period of time, we used the data for unemployment benefits from Riboud et al. (2002); for the output elasticity of unemployment benefits, we used the estimate for the Czech Republic calculated by the Czech Ministry of Finance which can be regarded as an approximation of the elasticities in the CEEs.

## 5 Assumptions and Limitations of the Methodology

There are some implicit assumptions in the Commission's methodology of calculating cyclical safety margins which limit its applicability and require caution when interpreting the results, as pointed out also by the Commission itself. Namely, constant values are assumed for (1) the share of the relevant budget items in the total budget (in our case these were 10-year averages); (2) the cyclical elasticities of the relevant budget items; and (3) the structure of GDP so that a 1 percentage point change in output gap is assumed to affect all tax bases in the same way<sup>25</sup>. We did not attempt to estimate the income elasticities of the revenue items due to the shortage of readily available data. Instead, we assumed that they are equal to one. This is very close to the average value estimated for the OECD countries (see van den Noord, 2000).

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<sup>24</sup> *European Commission (2000) calculated the output gap as a deviation of output from trend obtained using the HP-filter. However, in its latest calculation (European Commission, 2002), the Commission estimated potential output using the production functions approach.*

<sup>25</sup> *This assumption was relaxed in the more sophisticated approach of Bouthevillain et al. (2001).*

# Fiscal Implications of the Ageing Population in Croatia

Sandra Švaljek\*

## Abstract

Demographic changes altering size and age-profile are recognised in many countries, including within the EU, as an important determinant of both the size and the structure of government expenditures and revenues in the long run. In Croatia, having a negative population growth rate and total fertility rate below 2.0, projected demographic trends are quite similar to those in the rest of Europe. Therefore, significant budgetary implications of the so-called ageing population phenomenon can be expected.

The aim of this paper is to use the standard methodology developed by the European Commission in order to assess the long-term implications of ageing population on the sustainability of public finances in Croatia. The results of the analysis show that demographic changes could, in the long-run, place Croatian public finances on an unsustainable path, and imply the necessity of adopting fiscal policy actions aimed at avoiding the negative budgetary consequences of an ageing population.

**Keywords:** sustainability of public finances, ageing population, age-related expenditures

**JEL Classification:** E62, H51, H55, H6, J11

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# 1 Introduction

In recent decades, in almost all developed countries, similar demographic trends can be observed. Extended life expectancy coupled with low fertility rates have changed demographic images, leading to a rising population of the elderly, and a diminishing population of those in younger age cohorts. The result of such trends is the so-called ageing population phenomenon, the economic, fiscal and social consequences of which deserve increased attention.

Both the OECD and EU countries recently developed similar methodologies aimed at assessing the fiscal consequences of ageing populations. The methodologies are focused on long-term projections of age-related expenditures, whereby the age-related expenditures mainly relate to public pension expenditures, health and long-term care expenditures and education expenditures. The impact of ageing populations on tax revenues, however, is generally not taken into consideration.

The available demographic projections indicate that in Croatia, having a negative population growth rate and total fertility rate below 2.0, the ageing population phenomenon will be more and more pronounced, posing a great challenge to the sustainability of government finances.

In this paper, standard methodology developed by the European Commission's Economic Policy Committee working group on ageing populations is used in order to assess the long-term implications of an ageing population on the sustainability of public finances in Croatia. In some details, however, the analysis in this paper departs from the standard methodology for different reasons which will be explained later.

The paper is divided into five sections. Following the introduction, the second section presents the main demographic trends until 2050. These come from United Nations' demographic projections. It also indicates the implication of these developments on the evolution of the working-age and elderly populations. The long-term effects of demographic developments on pensions and health-care expenditures, and social security contributions are assessed in the third section of the paper. After that, in the fourth section, the evolution of debt levels is extrapolated assuming that the tax burden and non-age related primary expenditures remain constant as a share of GDP at the 2005 level over the projection period, the interest-growth rate differential remains around zero, and age-related expenditures evolve in line with the projections. The assumptions

regarding age-related expenditures, initial budget position and the interest-growth differential from the baseline scenario is then relaxed in order to test the sensitivity of results to the underlying assumptions. Synthetic indicators of required adjustment effort are also calculated. The results made it possible to verify whether, in the long-run, the sustainability of public finances can be preserved in light of the ageing population. The final section concludes and indicates the avenues of possible improvements in the assessment of long-term analysis of public finance sustainability in light of population ageing in Croatia.

## 2 Demographic Projections

### 2.1 Underlying Assumptions

The age-related expenditure and social security contribution projections presented in the paper are based on demographic projections prepared by the United Nations (United Nations, 2003). Although criticized by Croatian experts, these are still the only available official demographic projections for Croatia, which explains their use in the paper<sup>1</sup>. Within the EU, budgetary implications posed by ageing populations used to be assessed on the basis of the demographic projections prepared by national statistics institutes, and the most recent assessments are made using the demographic projections prepared by Eurostat (Economic Policy Committee 2003, 2001). The same source of data for demographic projections should guarantee the use of the same methodology and thus the comparability of demographic projections for all of EU member states. In the near future, Eurostat should make demographic projections for all EU countries, both old and new, as well as Bulgaria and Rumania, and four EFTA countries (Economic Policy Committee, 2003.) Unfortunately, Eurostat has no plans to produce demographic projections for Croatia as a new candidate country yet.

The United Nations have prepared six demographic projection variants, four of which are available on the web. These four variants – medium variant, high variant, low variant and constant-fertility variant, will be used in this paper when assessing the fiscal implications of demographic changes, with medium variant taken as a starting point for the baseline scenario. The demographic projection variants differ among themselves with

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<sup>1</sup> *There are, however, several demographic projections carried out by independent experts, e.g. Mrđen (2004), Grizelj (2004) and Rozga (2003).*

respect to the assumptions made regarding the future course of fertility (United Nations, 2003).

The different projection variants can be described by the underlying assumptions, and the most important of them are presented in Table 1. It can be seen that in all the variants, except the high variant, fertility rates are too low to ensure a natural replacement of the population or to stabilize its age structure. In the medium variant, the fertility rate will, in the period 2005-2010, stand at 1.7, and will go up to 1.9 in the period 2045-2050. These fertility rates are similar to ones in the EU, where the average fertility rate stood at 1.5 in 2000, and is projected to rise to 1.8 in 2050 (Economic Policy Committee, 2001.)

Life expectancy at birth is expected to increase over the projection period from 74.1 years for men and 78.6 years for women in the period 2005-2010 to 76.6 years for men and 82.6 years for women in the period 2045-2050. For the EU, average life expectancy at birth for men is projected to rise from 75.3 in 2000 to 80.5 years in 2050, and for women from 81.4 in 2000 to 85.5 years in 2050.

Table 1. **Demographic projections, underlying assumptions for all variants**

	Medium variant			High variant		
	2005-2010	2045-2050	change	2005-2010	2045-2050	change
Total fertility rate <sup>1</sup>	1.67	1.85	0.18	1.81	2.35	0.54
Life expectancy (both sexes)	74.9	79.6	4.7	74.9	79.6	4.7
Male life expectancy	74.1	76.6	5.5	74.1	76.6	5.5
Female life expectancy	78.6	82.6	4.0	78.6	82.6	4.0
Population growth rate (%)	-0.26	-0.58	-0.32	-0.16	-0.11	0.05
Net migration (thousands)	-5	-5	-5	-5	-5	-5

	Low variant			Constant-fertility variant		
	2005-2010	2045-2050	change	2005-2010	2045-2050	change
Total fertility rate <sup>1</sup>	1.53	1.35	-0.18	1.60	1.60	0.00
Life expectancy (both sexes)	74.9	79.6	4.7	74.9	79.6	4.7
Male life expectancy	74.1	76.6	5.5	74.1	76.6	5.5
Female life expectancy	78.6	82.6	4.0	78.6	82.6	4.0
Population growth rate (%)	-0.35	-1.04	-0.69	-0.31	-0.85	-0.54
Net migration (thousands)	-5	-5	-5	-5	-5	-5

Note: <sup>1</sup>children per woman.

Source: UN, 2003.

Unlike in EU countries, for which the net inward migration of 0.2% of total population throughout the projection period is predicted, Croatia is expected to have a permanent net outward migration of more than 0.1% of its total population<sup>2</sup>.

## 2.2 Main Trends

As result of these demographic developments, the size of the Croatian population falls in all the demographic projection variants, with the size of the population being almost 20 percent lower in 2050 than in 2005, according to the medium demographic projection variant (see Table 2).

	Medium variant			High variant		
	2005	2050	change	2005-2010	2045-2050	change
Total population	4405	3581	-824	4420	4022	398
Median age	40.2	44.9	4.7	40.0	40.6	0.6
Elderly <sup>1</sup> (as % of total population)	17.0	25.0	8.1	16.9	22.3	5.4
Working age population <sup>2</sup> (as % of total population)	66.5	59.1	-7.4	66.2	58.0	-8.2
Old age dependency ratio <sup>3</sup>	25.5	42.3	16.8	25.5	38.5	13.0
Share of older workers in working age population <sup>4</sup>	16.8	21.2	4.4	16.8	19.3	2.5
Very old as % of elderly <sup>5</sup>	18.1	30.4	12.3	18.1	30.5	12.4

	Low variant			Constant-fertility variant		
	2005	2050	change	2005-2010	2045-2050	change
Total population	4391	3192	-1199	4398	3355	-1043
Median age	40.3	49.2	8.9	40.2	47.3	7.1
Elderly <sup>1</sup> (as % of total population)	17.0	28.3	11.3	17.0	26.8	9.8
Working age population <sup>2</sup> (as % of total population)	66.7	59.9	-6.8	66.6	59.6	-6.9
Old age dependency ratio <sup>3</sup>	25.5	46.9	21.4	25.5	44.9	19.4
Share of older workers in working age population <sup>4</sup>	16.8	23.5	6.7	16.8	22.4	5.6
Very old as % of elderly <sup>5</sup>	18.1	30.5	12.4	18.1	30.5	12.4

Notes: <sup>1</sup>Population aged 65+; <sup>2</sup>Population aged 15-64; <sup>3</sup>Population aged 65+ as % of population aged 15-64;

<sup>4</sup>Population aged 55-64 as % of population aged 15-64; <sup>5</sup>Population aged 80+ as % of population aged 65+.

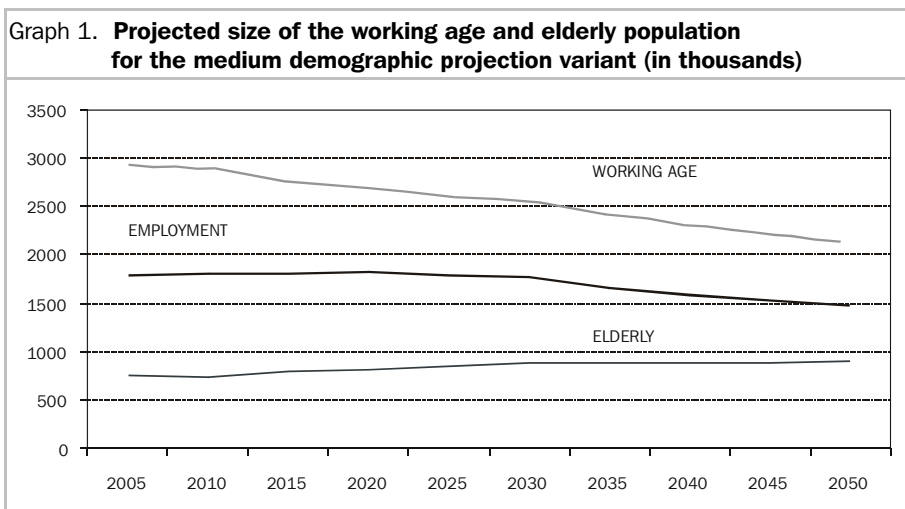
Source: UN, 2003; author's calculations.

<sup>2</sup> Contrary to that, some authors e.g. Mrđen (2004) argue that net inward migration can be expected in Croatia in next three decades.



The number of elderly persons aged 65 and above will rise by almost 20 percent, as presented in Graph 1, and their share in the total population will grow from 17 percent in 2005 to 25 percent in 2050 (in the medium variant). For the sake of comparison, the increase in elderly persons in EU member countries is projected to be much higher, or some 70 percent.

At the same time, the working age population (persons aged between 15 and 64) is projected to fall by almost 30 percent and its share in the total population to decline from 67 percent in 2005 to 59 percent in 2050. The labour force itself is going to be older, too, with the share of workers aged between 55 and 64 in the total workforce increasing by 4 percentage points. The drop in the working age population in the EU between 2000 and 2050 is projected to be some 18 percent.



*Note: Working age population refers to persons aged 15 to 64.*

*Elderly population refers to persons aged 65 and above.*

*Source: UN, 2003; author's projections.*

The old-age dependency ratio (defined as persons aged over 65 as a percentage of the working age population) is, according to the medium variant, going to rise from 26 percent in 2005 to 42 percent in 2050, a development which is quite similar to the European average, where the old-age dependency ratio is projected to grow from 24 percent in 2000 to 49 percent in 2050. This means that in Croatia, the number of persons of working age for every elderly person aged 65 and over will go down from 4 to 2.4 and in the EU the same number will go down to only 2 persons.

The number of the very old (population aged 80 or more) is, according to the medium variant, going to double (from 135 thousand in 2005 to 272 thousand in 2050). Although this rise could have a significant impact on public spending on health and long-term care for the elderly, this development is far less dramatic than in the EU, where the number of very old is projected to triple from 2000 to 2050.

It has to be stressed that long-term population projections must always be taken with caution. In the special Croatian case, where there is only one official source of demographic projections, and where the projections it offers cannot be compared to data from other sources, even greater caution is needed when using the data. Therefore, the development of national demographic projections currently underway within the Croatian Bureau of Statistics must be welcomed, and the assessment of the fiscal implications of demographic changes should be revised once the population scenarios developed by the national statistics institution become available<sup>3</sup>.

### 3 Effects of Demographic Changes on Government Revenues and Expenditures

The Economic Policy Committee working group on ageing populations assesses possible effects of demographic changes on government revenues and expenditures by making long-term projections of the so-called age-related expenditures, such as public pension expenditures, health and long-term care expenditures and education expenditures. For the sake of consistency, it also includes unemployment benefit in its assessment, although this is not considered to be related to ageing.

In this paper, Croatian long-term fiscal sustainability will be assessed by projecting elements of both expenditures and revenues. Among the expenditure items, the analysis will include public pension expenditures and health expenditures, and among the revenue items pension contributions and other social security contributions.

The standard methodology does not take account of the development of public revenues in light of ageing populations, since the age structure of the population is not seen as the key determinant of their size and evolution. The reasoning behind this is as follows. Firstly, pensioners pay income taxes which can increase collected tax revenues. Secondly,

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<sup>3</sup> *This information can be found in Grizelj (2004).*

it is argued that older workers, whose share in the working-age population rises, earn higher wages than young workers, thereby compensating for the negative effect of the decreasing working-age population on taxes. Recent studies on consequences of ageing populations on tax revenues confirm that population ageing can have ambiguous effects on tax revenues. Finally, the experience shows that the level of public spending is the main determinant of tax revenues as a share of GDP<sup>4</sup>.

There are, however, two reasons for taking into account the development of social security contributions in the Croatian case, the first one being the fact that social security contributions are paid only by those employed, and not by pensioners. In addition, even if the older workers earned higher wages in the future, the amount of collected social security contributions would probably not be high enough to offset the loss of contributions due to the falling number of younger employees, since, unlike taxes, social security contributions are regressive in their nature. In addition, a projection of pension contributions should be made to capture the effects of pension reform on collected pension contributions.

There are some other expenditure items in Croatia that could be sensitive to demographic changes, such as expenditure on unemployment benefit, child benefit and maternity leave, and also education expenditures, but at the moment it seems that their projection would have to consider non-demographic factors driving public spending, which are very hard to project. Therefore, the projection of these expenditure items is left for some other projection exercise.

### 3.1 Macroeconomic Assumptions

Long-run projections of government expenditures and revenues are based on macroeconomic assumptions regarding labour force participation rates, unemployment rates, real GDP rates and CPI inflation.

Labour force participation rates up to 2010 are, in accordance with the EPC working group on ageing populations methodology, based on projections by the ILO (1997). Participation rates for men are constant for all age groups. The participation rate for

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<sup>4</sup> *Review of the main findings of studies on consequences of ageing populations on government revenues can be found in Economic Policy Committee (2003, p. 20).*

women in the 15-54 age group are assumed to converge by 2050 to within 10 percentage points of the participation rate for men in the same age group. The participation rates for women in the 55-64 age group is allowed to converge by 2050 to within 20 percentage points of the participation rate for men in the same group (see Table 3).

**Table 3. Labour market participation rates used in projections**

	15-54			55-64			65+		
	2005	2050	change	2005	2050	change	2005	2050	change
<b>Male</b>	82.3	85.0	2.7	41.3	45.0	3.7	14.6	12.0	-2.6
<b>Female</b>	69.0	75.0	6.0	18.5	25.0	6.5	7.0	6.0	-1.0

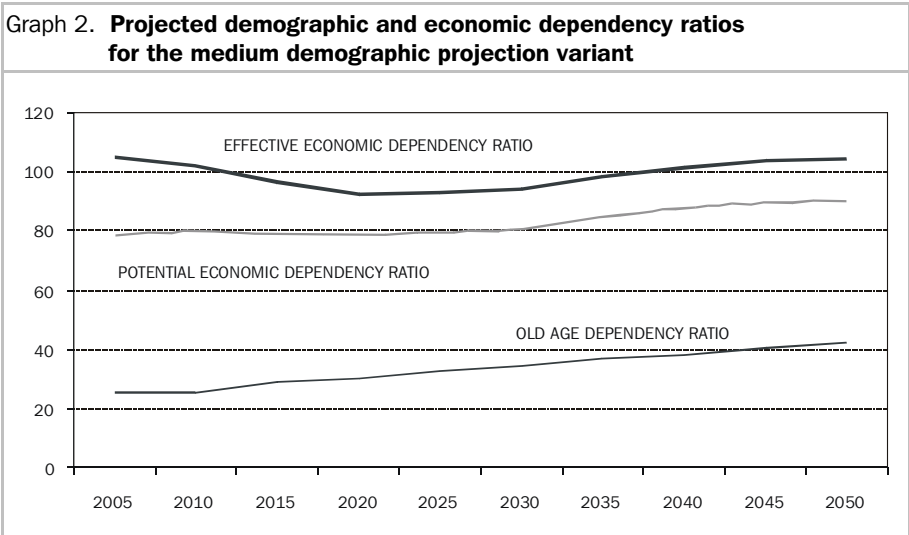
*Note: Participation rate = active population as a % of working-age population.  
Source: ILO, 1997; author's projections.*

Unemployment rates are assumed to fall from 17 percent in 2005 to 7 percent in 2050. In EPC working group on ageing populations methodology, unemployment rates are assumed to fall to their structural level, as defined by the OECD, by 2005 and to stay constant thereafter (Economic Policy Committee, 2001). For Croatia, there are no estimates of structural unemployment rate available. It is assumed that by 2050 Croatia could reach an unemployment level of 7 percent, equal to the structural unemployment rate of EU member countries with the highest structural unemployment rates.

Higher participation rates and lower unemployment rates will offset some of the impact of demographic developments on the balance between economically active and inactive persons who must be supported. Therefore, the potential fiscal influence of ageing does not so much depend on the old-age dependency ratio, but more on the potential and effective economic dependency ratios, the *potential economic dependency ratio* being the number of potentially inactive persons as a percentage of the total labour force, and the *effective economic dependency ratio* being the number of unemployed persons as a percentage of the number of persons employed. These dependency ratios are calculated for Croatia, based on labour force assumptions, and presented in Graph 2.

As is shown in the graph, the effective economic dependency ratio is projected to fall until 2020, and then to rise reaching its initial level in 2050. In the same period, the old-age dependency ratio is expected to rise throughout the projection period, and at the end of the projection period to increase by two-thirds compared to the initial level.

The real gross domestic product is projected to grow 3.5 percent annually, and the labour market productivity in the baseline scenario is projected to grow by 2.8 percent on average annually. It is expected that the annual inflation rate will remain stable at 2.5 percent.



*Note: Potential economic dependency ratio = population aged 15+ not in the labour force as a % of the number of persons in the labour force.*

*Effective economic dependency ratio = persons aged 15+ who are not employed as a % of number of persons employed.*

*Source: UN, 2003; author's projections.*

### 3.2 Effects of Demographic Changes on Public Pension Expenditures

As for the possible effects of demographic changes on public pension expenditures, Croatia has a rather unique position in Europe, since it launched pension reform in 1998 aimed at reducing fiscal pressure resulting from the existing PAYG system, and introduced a three-pillar pension system in 2002. The pension system in Croatia now consists of a downscaled PAYG pension pillar, a mandatory fully-funded pillar, and a voluntary fully-funded pillar<sup>5</sup>. Due to pension reform, in the future, one can expect diminishing public spending on pensions expressed as a share of GDP, in spite of the rising number of elderly. However, in the same period, due to the reduction of the rate of

<sup>5</sup> More information on Croatian Pension Reform can be found in Anusic, O'Keefe, Madjarevic-Sujster (2003).

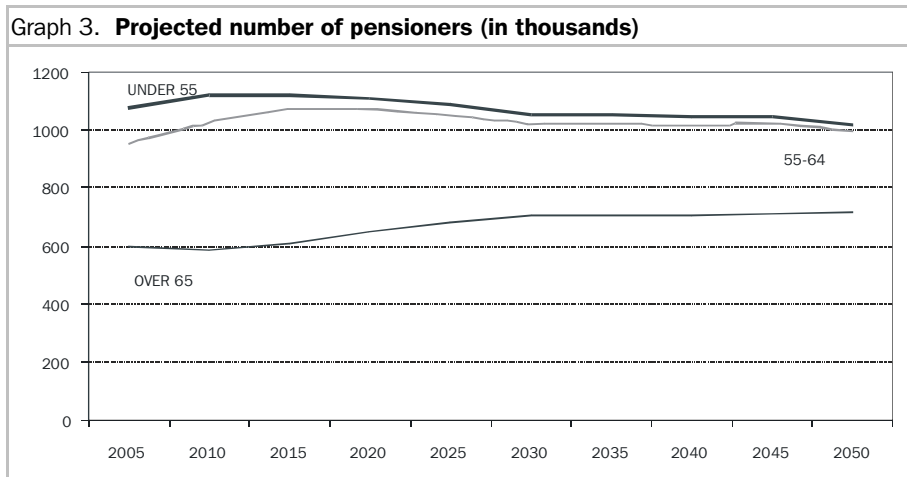
pension contributions for those that entered the second pillar (individuals below the age of 40 as of July 2000 and employees between the ages of 40 and 50 as of July 2000 who chose to join the multi-pillar system), the revenues from pension contributions will also go down, so that this effect should not be neglected when projecting future fiscal trends.

The starting point for the projection of public pension expenditures was the projection of the number of pensioners. In the last decade, the Croatian pension system has faced a huge inflow of pensioners, and the immense resulting deterioration of the so-called system dependency ratio (the ratio between contributors to the pension system and pensioners). The inflow of pensioners was not driven by demographic factors, but was predominantly influenced by economic (transition and privatisation influenced restructuring) and political factors (war). In the future, it is expected that economic and political forces driving early retirement will vanish and, in addition, that new legislation regulating normal retirement and early retirement age, as well as access to the system of disability and survivors pension, would put further restrictions on the retirement of persons of younger age groups. The share of pensioners younger than 55 is assumed to diminish gradually from 11 percent in 2005 to 3 percent in 2050, and the share of pensioners younger than 65 is expected to fall from 44 percent in 2005 to 30 percent in 2050. As a result of such assumptions, the number of pensioners should first rise until 2015, and then fall since the reduction in the number of early retired persons is projected to counterbalance the rise in the number of pensioners stemming from the population aged 65 and over (see Graph 3).

This projection is much more optimistic than the one found in Anusic, O'Keefe and Madjarevic-Sujster (2003), and which projects a constant rise in the number of pensioners, and is slightly more optimistic than the one that can be found in Marušić (2001), which expects a decline in the number of pensioners after 2020. The idea behind the optimism regarding the development of the number of pensioners in this paper is that one cannot expect high inflows of pensioners in the next few years, since many of those who would reach the normal retirement age during this period, have already been retired through various pension buy-out schemes, early retirement schemes or as war veterans.

For the projection of public pension expenditures it was also necessary to incorporate in the projection the number of persons aged 40 to 50, as of July 2000, who did not opt for the multi-pillar pension system and will, therefore, receive a pension from the first pillar. For this purpose, this projection exercise made use of the information that 77 percent of

employed persons aged 40 to 50 as of July 2000 did not opt for the multi-pillar pension system.



Source: UN, 2003; author's projections.

The projection of public pension expenditures is based on the projection of the number of pensioners, both those in the first pillar and those in the multi-pillar system. It also takes into account the corresponding formulas for the calculation of benefits<sup>6</sup> as well as the indexation at wages introduced at the beginning of 2004. The average gross pension in the initial period is expected to be some 2,200 kuna.

Public pension expenditures are calculated for the baseline scenario, in which average gross wages grow 6 percent annually, and for two alternative scenarios. In the high average wage growth scenario, wages are assumed to grow at 7 percent annually, i.e. the rate of average wage growth is higher than the nominal GDP growth. In the low average

<sup>6</sup> For those insured only in the first pillar, the following formula is applied:

(1) Amount of pension = actual pension value \* personal points \* pension factor.

For those insured in both mandatory pillars, a two part formula is applied. For years of service in the old system, the benefit is calculated in the same way as for those insured only in the first pillar, and for years of service in the new system the so-called basic pension is calculated in accordance with the following formula:

(2) Basic pension =  $0.25 * \text{actual pension value} * \text{personal points} * \text{personal factor} + 0.0025 * \text{average wage in Croatia in 1998 indexed at the same rate as the actual pension value} * \text{years of service in the new system}$ .

wage growth rate scenario, average wage growth is 5 percent annually. Results of the projection are presented in Table 4.

	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>change</b>
Baseline scenario	13.1	13.6	13.5	13.1	12.0	10.4	9.2	8.0	7.0	6.3	-6.8
High average wage growth scenario	13.2	14.4	14.9	15.1	14.1	12.9	11.8	10.5	9.4	8.7	-4.6
Low average wage growth scenario	13.0	12.8	12.2	11.3	10.0	8.4	7.1	6.1	5.3	4.7	-8.3

Source: Author's estimates.

Projected public pension expenditures are expected to fall in all scenarios, the decreases ranging from 4.6 to 8.3 percentage points of GDP. Such developments result from the application of new legislation introduced with pension reform. The projection exercise presented in this paper projects public pension expenditures in 2040 to reach 8 percent of GDP, while in the projection made by Anusic, O'Keefe and Madjarevic-Sujster (2003), the comparable figure is 8.2 percent of GDP, while in the projection made by Marusic (2001), public pension spending is projected to be around 6 percent.

In the EU, public pension expenditures are at the same time expected to grow around 5 percentage points of GDP on average (Economic Policy Committee, 2003). Such a difference in results between Croatia and the EU can be explained by two factors. Firstly, most EU countries rely on PAYG pension schemes. Secondly, EU countries expect a large inflow of pensioners belonging to the so-called baby-boom generation in the next decade, while in Croatia the members of the baby-boom generation are mostly already retired.

To discern the effect of population ageing on public pension expenditures from other factors, it is useful to decompose the results of the pension spending projection according to the four explanatory factors driving the projected changes in its share of GDP. These four factors are *population ageing effect* measuring changes in the ratio of persons aged 55 and over to the population aged 15 to 64, *employment effect* measuring changes in the share of the population of working age that are employed, *eligibility effect* measuring the share of the population aged 55 and over that receive a pension, and *benefit effect* measuring changes in the average pension relative to output per worker.



Table 5 compares the changes in each of these ratios between 2005 and 2050<sup>7</sup>. It is obvious that the ageing effect is the only force driving public pension expenditures upwards, and, with other ratios remaining at their initial level, the pure effect of population ageing will result in an increase in pension spending in terms of GDP by 6.5 percentage points.

	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	% change
Dependency ratio <sup>1</sup>	42.3	45.1	50.4	51.5	53.6	54.4	58.4	60.9	62.7	63.5	50.1
Inverse of employment ratio <sup>2</sup>	163.2	161.1	152.1	147.7	145.0	144.2	145.0	145.7	145.0	143.6	-12.0
Benefit ratio <sup>3</sup>	21.9	21.8	21.7	21.5	19.7	17.5	14.5	12.1	10.2	9.0	-58.7
Eligibility ratio <sup>4</sup>	86.7	85.7	80.9	79.8	78.1	75.7	74.9	74.1	75.3	75.9	-12.4

Notes: <sup>1</sup>Dependency ratio = population aged 55+ as % of population aged 15-64; <sup>2</sup>Inverse of employment ratio = population aged 15 to 64 as % of number of persons employed; <sup>3</sup>Benefit ratio = average pension as % of GDP per person employed; <sup>4</sup>Eligibility ratio = number of pension beneficiaries as % of persons aged 55+.

Source: Author's estimates.

### 3.3 Effects of Demographic Changes on Public Expenditures on Health and Long-Term Care

The expenditures on health and long-term care are considered to be highly related to age and therefore are projected within the assessments of long-term fiscal implications of ageing. According to the standard methodology, public expenditures on health and long-term care should be projected separately. In the case of Croatia, however, it is not possible to disentangle long-term care expenditures and total healthcare expenditures. Therefore, long-term care expenditures will be for the purpose of this paper considered as part of health expenditures. For the sake of simplicity, it will also be assumed that the age profiles for public expenditures on long-term care correspond to those for public expenditures on healthcare.

Since there are, unfortunately, no data available on age profiles for public expenditures on healthcare in Croatia, this exercise will be based on the assumption that average

<sup>7</sup> The following equation is used:

$$(3) \quad \frac{\text{PensionsSpending}}{\text{GDP}} = \frac{\text{AveragePensionBenefit}}{\text{GDP/ Employment}} * \frac{\text{Pensioners}}{\text{Population(55+)}} * \frac{\text{Population(55+)}}{\text{Population(15 - 64)}} * \frac{\text{Population(15 - 64)}}{\text{Employment}}$$

For further information see Dang et al. (2001).

expenditures per head on healthcare for different age groups (expressed as a share of GDP per capita) correspond to the typical age distribution of healthcare expenditures in EU member countries. Justification for such an assumption can be found in the fact that average expenditures per head on healthcare for different age groups are quite similar across EU countries, so that one can believe that the age distribution of healthcare expenditures in Croatia could not significantly differ from the European pattern.<sup>8</sup> Due to the fact that projections started from an estimation of the age profiles for public expenditures on health and long-term care, and not from the exact data, in order to avoid the stacking of miscalculations, it is taken that there are no significant differences between the age profiles for males and females.

The distribution of average expenditures per head on healthcare in Croatia is estimated on the basis of the average distribution in EU countries, but applying this distribution to total expenditures on health and long-term care in Croatia. The figure for the total expenditures on healthcare refers to 2001, since this is the most recent year for which official data on healthcare expenditures are available. In 2001, the total expenditures on health and long-term care in Croatia were as high as 8.2 percent of GDP, which is rather high compared to the European weighted average of 6.6 percent of GDP in 2000. The estimated age profiles for public expenditures on health and long-term care in Croatia are presented on Graph 4.

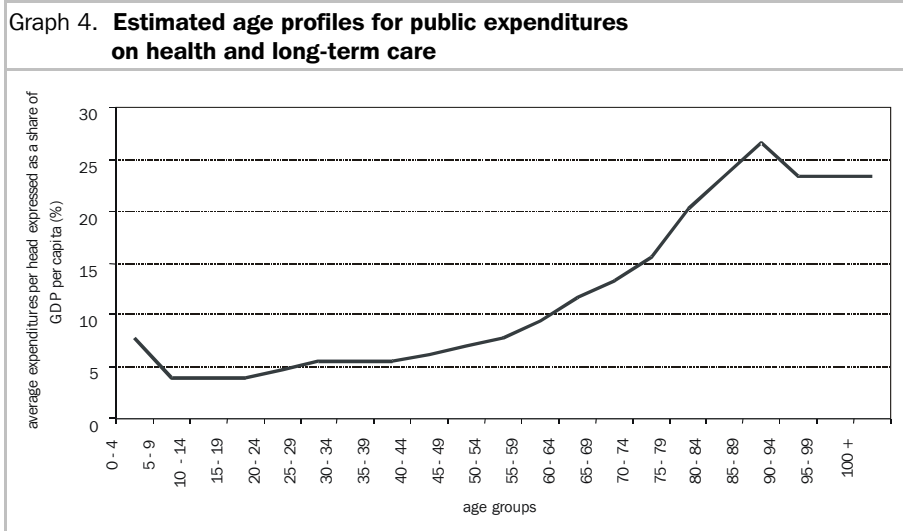
The projection of public expenditures on health and long-term care in Croatia is carried out using the assumption that expenditures per head on health and long-term care grow at exactly the same rate as GDP per capita. The relative magnitudes of expenditures per head across age groups are considered to be the same in all projection years, and to be the same as in the base year profiles. Projections are made for all the four demographic projection variants and presented in Table 6.

According to the results obtained, the pure consequence of demographic changes on expenditures on health and long-term care over the projection period would be around 1.3 percentage points of GDP in the medium variant, i.e. between 0.8 and 1.8 percentage points in other demographic projection variants. The result is somewhat more optimistic than the one obtained for the EU countries, where ageing is projected to raise health and long-term care expenditures between 2000 and 2050 from 1.7 to 3.2 percentage points of

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<sup>8</sup> *In the recent study by Bezděk, Dybczak and Krejdl (2003) on fiscal implications of population ageing, we can see that the age distribution of healthcare expenditures in the Czech Republic is also very similar to the typical age distribution of healthcare expenditures in the old EU countries.*

GDP or 2.2 percentage points on average, when calculated using the same approach as the one in the projection of health and long-term care expenditures for Croatia (European Policy Committee, 2003).



Source: Author's estimates.

**Table 6. Projected public expenditures on health and long-term care for all demographic projection variants (as % of GDP)**

	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	change
Medium variant	8.2	8.4	8.7	8.7	8.8	8.9	9.2	9.3	9.4	9.5	1.3
High variant	8.2	8.4	8.5	8.6	8.7	8.9	9.0	9.1	9.1	9.0	0.8
Low variant	8.2	8.4	8.6	8.8	8.9	9.2	9.4	9.7	9.8	10.0	1.8
Constant-fertility variant	8.2	8.4	8.6	8.7	8.9	9.1	9.3	9.5	9.7	9.8	1.6

Source: Author's estimates.

It should be stressed that the projections of the development of health and long-term care costs in Croatia should be taken with caution, since they result from the application of a large number of assumptions. It would therefore be important that institutions in Croatia (e.g. the Croatian Institute for Health Insurance) provide data that are necessary for better quality results of such analysis, in particular data on health and long-term care expenditures by age groups.

The approach used in this exercise is relatively simple, but has at least one drawback. It ignores the concentration of health expenditures at the end of life irrespective of age at death, and tends to overestimate the impact of demographic changes on overall expenditure level. Therefore, the Economic Policy Committee working group on ageing populations suggests producing the optional scenario that takes account of the concentration of health expenditures towards the end of life. Such a scenario implies running projections which include estimates of so-called death-related costs. Although the results of such projections would be interesting for Croatia, their production requires a higher reliability of input data than in the Croatian case, and they cannot be carried out within the current exercise.

### 3.4 Effects of Demographic Changes on Revenues From Social Security Contributions

As previously mentioned, in the case of Croatia it also seems reasonable to run projections of the long-term effects of ageing on revenues from social security contributions. Two projections have been made, one for the contributions for pension insurance, and one for all other types of contributions. The contributions for health and unemployment are treated together because they share the same calculation base and differ only in the rates applied.

As for the revenues from pension contributions, they are based on the projection of the number of employees in the first pillar only, for which a 20-percent rate is applied, and on the projection of the number of employees in the multi-pillar system, for which a 15-percent rate is applied. It is assumed that average gross wages will develop proportionally for both groups of insured persons. It is also assumed that the compliance of contributions will gradually improve from the initial 85 percent to 94 percent in 2050 (a similar assumption is made by Anusic, O'Keefe and Madjarevic-Sujster, 2003).

The results of the projection presented in Table 7 reveal that the decrease in collected pension contributions, resulting from both changes in legislation and demographic developments, could be as high as 3.6 percentage points of GDP, i.e. between 3.1 and 4 percent if the alternative demographic projections are also taken into account.

The projection of revenues from other social security contributions is simple, and consists in applying statutory rates to the average gross wage of employed persons. It is also based on the assumption of gradually improved collection of contributions from 85 percent in 2005 to 94 percent in 2050.

	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	change
Medium variant	7.6	7.5	7.1	6.5	6.0	5.7	5.2	4.7	4.4	4.1	-3.6
High variant	7.7	7.7	7.2	6.7	6.2	5.8	5.5	5.1	4.8	4.6	-3.1
Low variant	7.7	7.7	7.2	6.6	6.0	5.6	5.1	4.6	4.1	3.7	-4.0
Constant-fertility variant	7.7	7.7	7.2	6.6	6.1	5.6	5.2	4.7	4.3	3.9	-3.8

*Source: Author's estimates.*

Due to the reduction in the number of employed persons caused by demographic factors, other revenues from social security contributions will also fall according to the projection (see Table 8). In the scenario based on the medium demographic projection variant, the projected fall in collected revenues from other social security contributions amounts to 3 percentage points of GDP over the projection period, and in alternative scenarios between 2.5 and 3.5 percent.

	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	change
Medium variant	7.7	7.8	7.6	7.4	6.9	6.6	5.9	5.4	5.0	4.7	-3.0
High variant	7.8	8.0	7.8	7.5	7.1	6.7	6.3	5.9	5.5	5.3	-2.5
Low variant	7.8	8.0	7.8	7.4	6.9	6.4	5.8	5.3	4.8	4.3	-3.5
Constant-fertility variant	7.8	8.0	7.8	7.5	7.0	6.5	5.9	5.4	4.9	4.5	-3.3

*Source: Author's estimates.*

These simple calculations show that the pure effect of demographic changes together with the effect of the changes in legislation regulating pension contributions could lead to a significant reduction in collected social security contributions, which currently provide approximately one third of total general government revenues.

Although the simulations of developments carried out in this exercise should not be considered as forecasts, but rather projections of possible outcomes, they may indicate that demographic changes could lead to important changes in the size and structure of government revenues and expenditures. The next section will try to assess the effects of these changes on the overall sustainability of public finances.

## 4 Assessment of the Sustainability of Public Finances in Light of Ageing Populations

After the so-called age-related expenditures are projected, as well as the revenues that could be treated as being determined by demographic developments in the Croatian case, it is possible to assess the long-run sustainability of public finances. For this purpose, standard methodology developed by the Economic Policy Committee working group on ageing populations will be applied. This methodology consists of a two-step procedure. In the first step, the evolution of the budget balances and debt levels is extrapolated on the basis of baseline projections. The second step consists of the calculation of different synthetic indicators of the required adjustment effort. Both sets of sustainability tests will be done for Croatia.

### 4.1 Extrapolation of Debt and Budget Balance Developments up to 2050

First, the long-term sustainability of public finance will be assessed by extrapolating debt and budget balance developments up to 2050. As suggested by the EPC working group, sustainable public finances will be defined as those complying with the budgetary requirements of EMU, i.e. avoiding excessive deficits, keeping debt levels below the 60 percent of GDP reference value, and respecting the “close to balance or in surplus” requirement of the Stability and Growth Pact (European Policy Committee, 2001). A breach of the reference values for either budget balance or debt during the projection period indicates that there may be a risk of budgetary imbalances emerging due to ageing population and that measures may be required to ensure the sustainability of public finances (European Commission, 2003.)

In order to verify whether current fiscal policy in Croatia meets the sustainability requirements in the long-run, several tests have been undertaken: a baseline test and seven stress tests. In accordance with standard methodology, a baseline test is run by extrapolating budget balances and debt levels on the basis of the baseline projections of age-related expenditures and revenues. The starting position in terms of the current budget balance, level of debt, primary spending and revenues other than social security contributions are the figures for 2005 reported by the Ministry of Finance in its *Fiscal policy guidelines for 2005-07 period* (“Načela fiskalne politike za razdoblje 2005. – 2007. godine”, Ministry of Finance, 2004).

It is further assumed that revenues other than social security contributions as well as non-age related primary expenditures will remain stable as a share of GDP at the 2005 level over the projection period, interest-growth differential remains at around zero<sup>9</sup>, and age-related expenditures and social security contributions evolve in line with previously presented projections. Seven stress tests have been carried out in order to test the sustainability of public finances under different circumstances. Three stress tests are run using different demographic projection variants. The other two stress tests are done by setting the initial total and primary budget balance at a level 1 percentage point more/less favourable compared with the baseline scenario. The remaining two stress tests assume the interest rate-growth rate differential as being higher/lower by 1 percentage point.

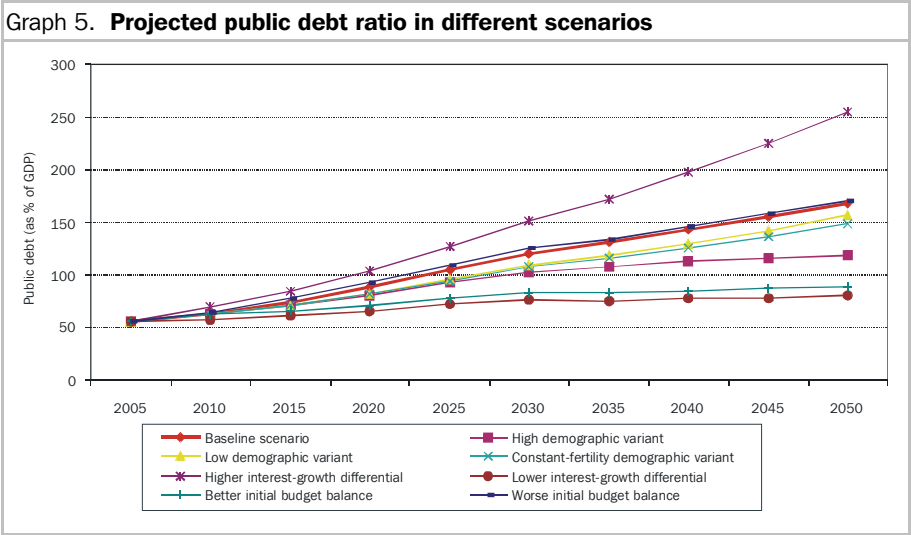
The budget balances that result from the extrapolation up to 2050 are presented in Table 9, and the debt levels in Graph 5. It is obvious that in every scenario the fiscal balance, already rather unfavourable in the initial period, deteriorates even further as a consequence of pure demographic changes. In the baseline scenario, the budget balance resulting from the projections reaches a level of 11.8 percent of GDP, and a level of debt of 167 percent of GDP in 2050.

	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Baseline scenario	-3.7	-5.5	-6.9	-8.1	-9.0	-8.9	-10.0	-10.5	-11.1	-11.8
High demographic variant	-3.7	-5.1	-6.2	-7.3	-7.9	-7.8	-7.8	-7.8	-7.6	-7.5
Low demographic variant	-3.7	-5.1	-6.3	-7.6	-8.6	-9.0	-9.6	-10.3	-11.2	-12.3
Constant-fertility demographic variant	-3.7	-5.1	-6.3	-7.6	-8.4	-8.7	-9.2	-9.8	-10.4	-11.3
Higher interest-growth differential	-3.7	-7.0	-8.9	-10.7	-12.4	-13.4	-15.2	-17.0	-18.9	-21.2
Lower interest-growth differential	-3.7	-4.2	-5.1	-5.7	-5.9	-5.2	-5.5	-5.4	-5.3	-5.4
Better initial budget balance	-2.7	-4.6	-5.6	-6.3	-6.7	-6.1	-6.4	-6.4	-6.4	-6.5
Worse initial budget balance	-4.7	-6.6	-8.2	-9.4	-10.4	-10.4	-11.2	-11.8	-12.3	-13.0

Source: Author's estimates.

<sup>9</sup> A nominal interest rate of 6 percent is assumed, and a nominal growth rate of 6.1 percent resulting from the assumption of 2.5 percent inflation and 3.5 percent real growth rate. A 6 percent nominal interest rate is also assumed in EPC working group projections.

The budget balance remains negative throughout the projection period in all scenarios even though the simulations are based on a projection of the budget balance for 2005 that assumes fiscal consolidation and improvement of the budget balance compared to the preceding year. The most dramatic developments can be expected if the interest rate increases above the level of the nominal growth rate, in which scenario the budget balance could reach 21 percent of GDP in 2050. Very high levels of deficit would also result from a higher initial budget balance and fertility rates lower than in the medium demographic projection variant.



Source: Author's estimates.

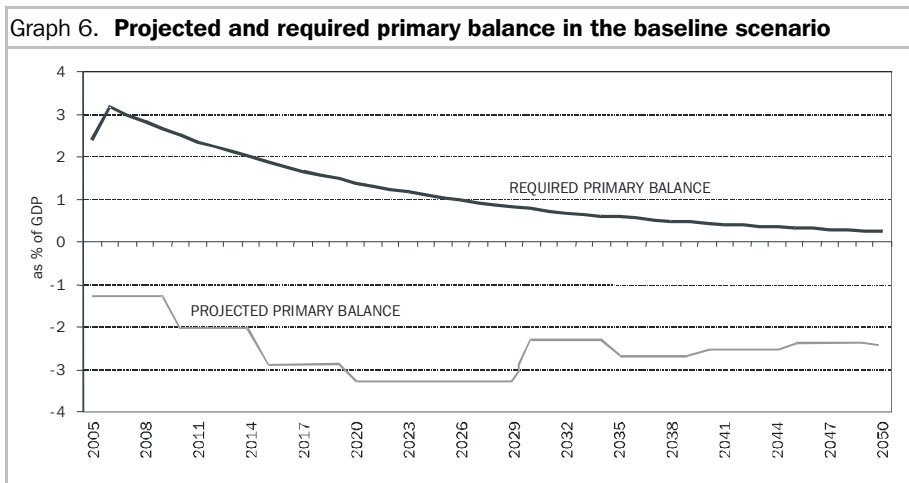
Starting from 56 percent of GDP in 2005, the debt ratio breaches the debt requirement of 60 percent of GDP already in 2010 in all the scenarios except the low interest-growth rate differential scenario, where the requirement is breached in 2015. The sustainability is at highest risk in the alternative scenario assuming a higher interest rate-growth rate differential, and this scenario leads to a debt ratio of 255 percent of GDP in 2050. High risk is also coupled with a worse initial budget balance and demographic developments resulting from low or constant fertility rates.



## 4.2 Synthetic Indicators of the Required Adjustment Efforts

In accordance with standard methodology, there are different measures that provide an estimate of the scale of budgetary adjustment required for a sustainable public finance position to be reached.

A first synthetic indicator considers the difference between the projected primary surplus based on the projections and the primary surplus necessary to ensure a balanced budget in all the years of the forecasts. Such a synthetic indicator is calculated for Croatia for the baseline scenario. The calculated required primary balance and the projected primary balance are shown in Graph 6. As can be seen from the graph, the difference between them is large over the entire projection period, and amounts to 2.7 to 4.7 percentage points of GDP.



Source: Author's estimates.

A second synthetic indicator is the measure of the tax (financing)<sup>10</sup> gap. This measures the difference between the current tax ratio and the constant tax ratio over the projection

<sup>10</sup> The EPC working group previously called these indicators “tax gaps”, but in its recent documents it suggests using the term “financing gap”, since the previously used term could lead to the wrong conclusion that it is the tax ratio that should be changed if the public finance position proves to be unsustainable in the long-run. Instead, the positive financing gap should be considered as an indication that an appropriate combination is needed of changes on both the revenue and the expenditure side of the budget.

period necessary to achieve a pre-determined debt level at a specified date in the future. The EPC working group calculates three gaps. T-1 measures the difference between the current and constant tax ratio required to reach the same debt level in 2050 that would result from a balanced budget position being maintained over the entire projection period. T-2 measures the difference between the current and constant tax ratio required to reach a debt level of 40 percent of GDP in 2050. The T-3 measure is similar to tax gap measures found in economic literature based on the present value budget constraint. It indicates the change in tax revenues as a share of GDP that would guarantee compliance with the intertemporal budget constraints of the government. It equates the actualised flow of revenues and expenditures over an infinite horizon (Economic Commission, 2003; Economic Policy Committee, 2003).

For Croatia, all three financing gap measures are calculated. In addition, a fourth financing gap measure is included, measuring the difference between the current and constant tax ratio required to reach a debt level of 60 percent of GDP in 2050. The calculated indicators measure the required change in government revenues (as a percentage of GDP) other than revenues from social security contributions, since those revenues are projected separately and treated as being dependent on demographic changes.

The results of the calculation of financing gaps are shown in Table 10.<sup>11</sup> A positive financing gap implies that revenues other than social security contributions should be increased, or that non-age related expenditures should be reduced, or that further

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<sup>11</sup> The applied formula for the T-1 to T-3 financing gaps is as follows:

$$(4) \quad T_{\text{fin3}} = \frac{r-n}{1+r-n} \frac{b_{2005} - b_{2050}(1+r-n)^{-45} + \sum_{i=1}^{45} (1+r-n)^{-i+1} g_{2005+i}^{\text{AR}} - \sum_{i=1}^{45} (1+r-n)^{i+1} \text{SSC}_{2005+i}}{1 - (1+r-n)^{-45}} + g^{\text{NAR}},$$

where  $g^{\text{NAR}}$  is the actual share of non-age related expenditures on GDP (assumed to remain constant),  $\text{SSC}$  is the share of social security contributions on GDP,  $g^{\text{AR}}$  the share of age-related expenditures on GDP,  $b$  debt ratio,  $r$  is the nominal interest rate, and  $n$  is the nominal growth rate (both assumed to be constant).

The formula for the T-4 gap is as follows:

$$(5) \quad \frac{\tau}{r-n} \left( 1 + \frac{T-4}{t} \right) = b_t + \frac{\sum_{i=1}^{45} g^p (1+n)^i}{(1+r)^i} + \frac{g_p}{(r-n)} \left( \frac{1+n}{1+r} \right)^{45} - \frac{\sum_{i=1}^{45} \text{SSC}(1+n)^i}{(1+r)^i} - \frac{\text{SSC}}{(r-n)} \left( \frac{1+n}{1+r} \right)^{45},$$

where  $\tau$  is the actual share of tax revenues on GDP (assumed to remain constant), and  $g^p$  is a share of primary expenditures on GDP (assumed to remain constant after 2050).

reforms of the pension or healthcare system should be undertaken in order to reduce the impact of ageing on government expenditures.

**Table 10. Financing gap indicators in different scenarios (as % of GDP)**

	T-1 <sup>1</sup>	T-2 <sup>2</sup>	T-3 <sup>3</sup>	T-4 <sup>4</sup>
Baseline scenario	3.7	2.9	2.3	2.4
High demographic variant	3.1	2.2	0.7	1.8
Low demographic variant	3.9	3.1	3.6	2.6
Constant-fertility demographic variant	3.7	2.9	3.0	2.5
Higher interest-growth differential	4.3	3.8	4.9	3.5
Lower interest-growth differential	3.2	1.9	-1.1	1.2
Better initial budget balance	2.6	2.8	1.3	1.3
Worse initial budget balance	4.7	3.9	3.3	3.4

Notes: <sup>1</sup>T-1 = difference between the current and constant tax ratio required to reach the debt level in 2050 that would result from a balanced budget position over the entire projection period, <sup>2</sup>T-2 = difference between the current and constant tax ratio required to reach a debt level of 40 percent of GDP in 2050; <sup>3</sup>T-3 = difference between the current and constant tax ratio required to reach a debt level of 60 percent of GDP in 2050; <sup>4</sup>T-4 = change in tax ratio that would ensure the intertemporal budget constraints of the government were respected.

Source: Author's estimates.

The financing gaps, assuming positive values in all scenarios, indicate the necessity of fiscal adjustment if the sustainability of public finances is to be maintained in the long-run. The size of the adjustment varies depending on the definition of sustainability, i.e. the choice of the reference value. If the goal of fiscal policy is a debt ratio in 2050 of the same size as that in the initial period, a fiscal adjustment of the size of 2.6 to 4.7 percentage points of GDP (depending on the underlying assumptions) throughout the projection period is required. If the targeted debt ratio in 2050 is to meet the reference value of 40 percent of GDP, the required adjustment effort would be between 1.9 and 3.9 percentage points of GDP. The third calculated financial gap suggests that the flow of revenues and expenditures would be equalized over an infinite horizon if a fiscal adjustment of 0.7 to 4.9 percentage points of GDP took place in all the years in the projection period. Only in the case of a negative difference between the interest and growth rate, could the intertemporal budget constraint of the government be obeyed even without any fiscal adjustment. The sustainability gap measured by the T-4 indicator is less strict than the one measured by the T-2 indicator, requiring the debt level to converge to 60 percent of GDP in 2050. As is shown in Table 8, an adjustment of the size of 1.2 to 3.4 percentage points of GDP would be needed for public finance to comply with such a sustainability requirement.

## 5 Conclusions

The analysis presented in this paper indicates that, in spite of the introduction of pension reform, Croatian public finances are highly sensitive to demographic changes. The long-term sustainability tests reveal a clear risk of emerging budgetary imbalances caused not only by demographic changes, but also by the initial budgetary set-up. To insure sustainability, an improvement in the budget balance and debt reduction as soon as possible are essential. In order to minimize the negative budgetary implications of ageing, healthcare expenditures as a share of GDP should be reduced and better control should be achieved over public expenditures on health, especially by controlling the evolution of age-related expenditures. Efforts should be made to increase compliance of social security contributions.

The budgetary implications of ageing should be permanently assessed, and efforts should be made in order to develop methodology and to include other age-related budgetary items in the assessment. In future assessments, non-demographic factors influencing the evolution of government expenditures and revenues should also be considered. It will be necessary to improve the statistical basis for the analysis, and also to take into consideration qualitative information while reaching policy conclusions. Additional sensitivity tests should also be carried out.

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# The Determinants of Wages in Croatia: Evidence from Earnings Regressions

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## Abstract

The paper explores the determinants of wages in Croatia by using individual record data from the Labor Force Survey for the second half of 2003. Both ordinary least squares and quantile regression estimates of the returns to education, experience and gender are presented. The paper also presents occupation and regional effects on remuneration differentials. Special attention is given to the public-private sector wage gap and its variation across the wage distribution. The study finds that the average public sector wage premium is around 9%. Relatively low-paid workers benefit more from working in the public sector than high-paid workers do. The premium decreases with the education level. Conditional wages of the employees in education sector show that they are the worst positioned among public sector industries. Variance decomposition reveals education and occupation as two major observable causes of wage differentials in Croatia.

**Keywords:** returns to education, public sector wage premium, quantile regression, Croatia

**JEL Classification:** J31, P23

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# 1 Introduction

This paper analyzes the structure of wages in Croatia in the early 2000s using both OLS and quantile regression techniques. It aims to assess the returns to various individual characteristics, as well as the effect of observed job and employer attributes upon wages. Within this background, the emphasis is given to the returns to education and the public-private sector wage gap.

The determinants of wages estimated by earnings regressions have been under examination in developed countries for a long time. In the last decade, empirical research on the topic has been accompanied with studies for transition countries (see e.g. Orazem and Vodopivec, 1995; Rutkowski, 2001; Skoufias, 2003). In the case of Croatia, a majority of earnings analyses has been performed by looking at *average* wages, their evolution in time and cross-section comparisons, without explicit estimation of wage regressions. For example, Nestić, Lovrinčević and Mikulić (2001) compare average wages in public administration and manufacturing industry in Croatia and observe higher average wages in public sector. They conclude that one of the reasons for that is higher education of employees in that sector, but they did not estimate the impact. The only formal estimation of earnings functions for Croatia was undertaken by Bisogno (2000), with the input data for 1998 and by the use of OLS technique.

Another strand of earnings analyses in Croatia was related to the public sector wages in the context of public administration reform and fiscal consolidation. World Bank (2002) reported that public sector wages in Croatia absorbed around 12% of GDP, much more than the average for the Central and Eastern European countries, and that this was more attributable to relatively high wages in public administration than to overstuffed public sector. One of the policy recommendations that followed was to contain public sector salaries. On the other side, unions claim that public sector employees are underpaid and that their relative position, compared to the private sector, has worsened recently. The main argument for the claim is found in the comparison of *average* wages in industry and public administration. The factors behind differences in the averages of private and public sector wages were completely left aside in this discussion.

This paper goes well beyond average wages for certain groups of employees. It uses individual record data from the Labor Force Survey as a base for wage regressions and is intended to provide a detailed description of the determinants of wages in Croatia. Moreover, quantile regression techniques employed in the study allow for exploring the

effect of each of the explanatory variables across the whole distribution, rather than just the effect upon the mean like in least squares estimates.

The paper is structured as follows. Section 2 presents the data sources and preliminary evidence on wage distribution in Croatia. Section 3 contains model specification. Section 4 comments on the major findings in wage equation estimate such as the effects of education, experience, gender, occupation, firm size and location. The impact of each of the explanatory variable on the dispersion of conditional wage distribution is estimated as well. Section 5 is devoted to the public-private sector wage gap. In addition to the gap estimated in general case, gap is also estimated at various education levels, for males and females separately, for different coverage of public sector and for several most common occupations. The return to education is presented in the Section 6. Section 7 provides the results of variance decomposition aimed at estimation of relative importance of the different factors explaining wage inequality. Section 8 offers concluding comments.

## 2 Data Description

The data employed in this study was obtained from *Labor Force Survey* (LFS) for the second half of 2003. The survey was carried out by the *Central Bureau of Statistics* (CBS) and administered to a random sample of Croatians living throughout the country. It covered 7,070 households and 19,529 resident individuals of all ages and employment status. For the purpose of this study, the sample was restricted to those over 15 years of age, who were in paid employment and were not self-employed. The latter is because entrepreneurial skills and capital invested in self-employment generate remuneration that cannot be separated from payment for work. Occasional and family workers were excluded also as their earnings exhibit an unclear link to human capital attributes. A total of 4,825 individuals were left in the sample. The survey collects information on usual monthly wages on the main job (net of contributions and taxes) and hours of work usually performed per week, thus making it possible to obtain hourly wage rates. Hourly wages were preferred so as to compensate for possible differences in wages stemming from variations in working hours. There is also abundant information on individual characteristics such as gender, age, actual work experience and education but also on employer and job characteristics, among which we use firm size, industry, ownership status, occupation and working conditions.



	No. of obs.	Mean wage per hour	Std. dev.	Median wage per hour	q0.9/q0.1	q0.75/q0.25
All	4825	21.26	11.25	18.75	2.80	1.77
Females	2211	20.00	10.03	18.13	2.82	2.00
Males	2614	22.32	12.09	20.00	2.89	1.73
Public sector	2182	23.86	9.70	22.50	2.50	1.58
Private sector	2643	19.11	11.98	15.63	2.96	1.75
Unfinished primary	84	15.67	7.25	13.75	2.33	1.56
Primary	632	15.92	7.86	14.88	2.19	1.50
Voc. secondary	1630	17.94	7.95	16.25	2.57	1.75
Gen. secondary	1501	20.84	8.81	20.00	2.40	1.60
2-year college	372	27.13	13.39	25.00	2.14	1.43
College graduate	563	32.96	13.83	30.00	2.63	1.50
Postgraduate	43	46.80	20.37	43.75	2.67	1.36

*Data source: LFS 2003/II.*

Table 1 presents summary statistics of wage distribution for sampled individuals while means and standard deviations of variables used in the study can be found in Table A1 in the Appendix. There are 46% of women in the sample, and around 45% of employees are working in the public sector. It has to be noted that public/private sector distinction here is based on the ownership status.<sup>1</sup> In that way, public sector is defined in a wide sense, enterprise included. About 15% of workers have got only primary school education or lower, while on the other hand, some college or postgraduate degree accounts for 21% of workers in the sample. Secondary education obviously prevails among Croatian workers.

The average wage for workers from the sample is a little over 20 kuna per hour. The wage rate is, on average, higher for men than for women, and higher for public sector employees as compared to private sector employees. As expected, the higher the educational level, the higher the average wage rate associated with it. It can be noted that all the averages considered here are unconditional means, meaning that none of the

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<sup>1</sup> *Such a classification follows from the survey questionnaire, where surveyed individuals (employees) are asked to position themselves among those “working in state-owned enterprises, institutions and organizations”, “working in enterprises undergoing the process of privatization”, and “working for employers in the private sector”. In this study, the first two categories (of which the second one is minor) are considered the public sector. Regardless of definition, relatively high portion of employment in the state-owned sector reminds once again on the disproportionate role of the Government in the economy, and to the need to give stronger role to the private sector as still-standing policy goal in Croatian transition to full-flaged market economy.*

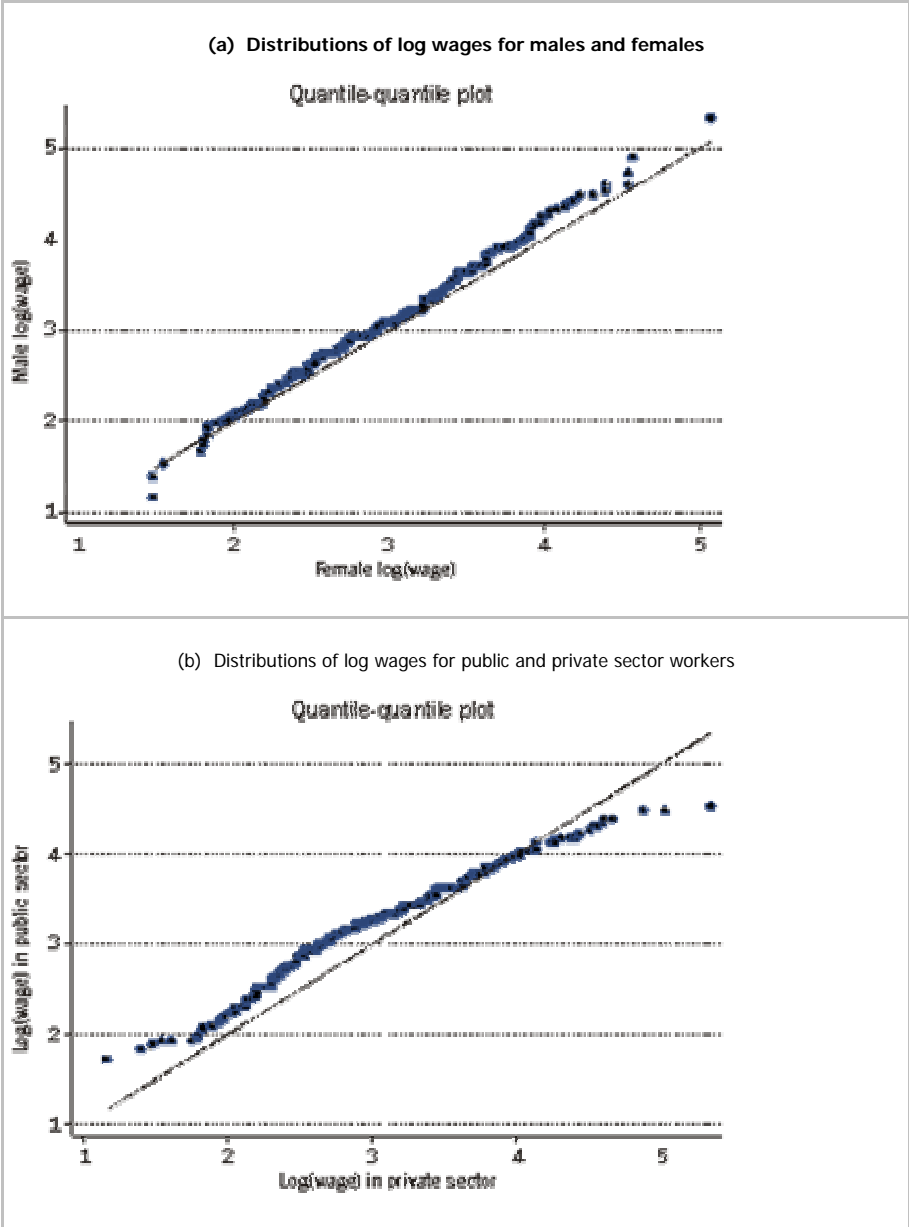
differences in the stock of human capital or job characteristics of selected groups were taken into account. The means are, however, sensitive to outliers. Therefore, median wages are also presented as well as selected quantile (percentile) ratios for specific groups. The median wage is lower than the mean wage for all groups, indicating that the distributions are skewed to the right. Quantile ratio 0.9/0.1 of 2.8 for the total sample seems rather low by the standards of industrialized countries, suggesting rather compressed distribution of hourly wages.<sup>2</sup> Also, this may indicate a problem of underreporting, presumably more pronounced at the upper tail of the distribution. It seems that there are no striking differences in 0.9/0.1 and 0.75/0.25 quantile ratios between wage distributions for males and females, or between wage distributions for workers with different educational attainment. However, public sector wages seem less dispersed than private sector wages.

A more informative comparison of distributions can be provided by quantile-quantile plot. This kind of graph relates quantiles of the variable on the vertical axis to quantiles of the variable on the horizontal axis. A point at the symmetry line indicates that a quantile of one distribution has the same value as the corresponding quantile of the other distribution. Figure 1 contains two plots of wage distributions separated by gender and sector. The upper panel of the figure provides quantile-quantile plot of distributions of log hourly wages for male and female workers. Most of the observations are slightly above the diagonal line, implying that wages for male workers are a bit higher than wages for female workers for comparable quantiles of wage distributions. At lower to middle quantiles the difference is quite small, but when approaching higher quantiles, the male/female wage gap becomes larger. In other words, among higher-paid workers there is a larger relative discrepancy between male and female wages than among lower-paid workers. The lower panel of Figure 1 shows a quantile-quantile plot of log wage distributions for public and private sector workers. It can be seen that public sector wages are higher than private sector wages at lower and middle quantiles, while at higher quantiles private sector workers are generally paid more. This evidence illustrates the importance of investigating wages at different points of distribution.

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<sup>2</sup> Gini coefficient of hourly wages calculated from our sample is 0.25, which is lower than in other transition countries, where it is around 0.30 as reported in Rutkowski (1991). Compressed wage distribution in Croatia is observed also in Rutkowski (2003).

Figure 1. **Quantile-quantile plots of empirical distributions**



The observed (unconditional) wage differential between male and female or between public and private sector employees could be due to a difference in the stock of human capital, which further implies different productivity. As part of the preliminary evidence, Table 2 suggests that formal education could be an important factor in explaining sector-

based wage differences. Observed higher wages in the public sector may be due to the fact that public sector employees are better educated than their counterparts in the private sector, at least if judged by the share of post-secondary education. However, it seems that education differences could not help much in explaining gender-based wage differentials as employed women are generally better educated than employed men.

Table 2. **Educational attainment of employees by sector and gender (in %)**

	Private sector	State sector	Male	Female
Unfinished primary	1.8	1.7	2.3	1.1
Primary	13.6	12.5	12.9	13.3
Vocational secondary	41.8	24.1	42.8	23.2
General secondary	30.7	31.6	25.9	37.3
2-year college	4.7	11.4	6.3	9.4
College graduate	7.2	17.0	8.8	15.0
Post-graduate	0.2	1.7	1.0	0.8

Data source: LFS 2003/11.

### 3 Model Specification

The earnings functions used in this study follow the standard Mincer-type specification (Mincer, 1974), where the log wage rate is regressed to the set of variables representing individual characteristics of workers, but also job and company characteristics. In addition to the model estimated by OLS, the quantile regressions are run to enable further insight into the structure of wages.

Quantile regression techniques allow exploring the effect of each of the explanatory variables across the whole distribution, rather than just the effect upon the mean like in least squares estimates.<sup>3</sup> An estimation procedure in the quantile regression model can be viewed as the problem of minimizing a sum of absolute residuals.<sup>4</sup> To put it simply, the solution at different quantiles is found by asymmetrical weighting of absolute residuals.

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<sup>3</sup> *The quantile regression model was originally introduced by Koenker and Bassett (1978). For the notion of quantile regressions, see Koenker and Hallock (2001), while for a more detailed exposition of recent advances in the technique see Bushinsky (1998).*

<sup>4</sup> *Quantile regression models are also known as least absolute value models (LAV or MAD) and L1-norm (from minimizing L1-norm of vector of deviations) models. Historically, the method of least absolute deviations was first proposed by renowned Croatian scientist Ruđer Bošković (aka Ruggero Giuseppe Boscovich) in his observations on the Earth's flattening in 1757, even before the least squares work of Gauss in 1809. For a brief exposition of Bošković' method see, for example, Teunissen (2000).*

For the estimation at lower quantiles, the higher weights are given to the negative residuals, and the opposite is done at upper quantiles. Unlike some other estimation procedures aimed to characterize different parts of distribution, here the estimation is performed using all available observations.

The quantile regression model is formulated as

$$(1) \quad \ln W_i = X_i' \beta_\theta + u_{i\theta}, \quad \text{Quant}_\theta (\ln W_i | X_i) = X_i' \beta_\theta,$$

where  $\ln W_i$  denote the log wage of worker  $i$ ,  $X_i$  is a vector of explanatory variables,  $X_{i1} \equiv 1$ , and  $\beta_\theta$  is a vector of coefficients.  $\text{Quant}_\theta (\ln W | X)$  denotes  $\theta$ th conditional quantile of  $\ln W$ , conditional on the regressor vector  $X$ . Partial derivative of the conditional quantile of  $\ln W$  with respect to regressor  $j$ ,  $\partial \text{Quant}_\theta (\ln W | X) / \partial x_j$  could be interpreted as the marginal change in the  $\theta$ th conditional quantile due to marginal change in the  $j$ th element of  $X$ . When  $X$  contains a set of distinct variables, than every one of these derivatives is given just by  $\beta_{\theta j}$ , measuring marginal change mentioned above. An interesting case would appear if the  $\beta_\theta$  coefficients vary systematically across  $\theta$ 's, indicating that the marginal effect of particular explanatory variable is not uniform across different quantiles of the conditional distribution of  $\ln W$ .

Quantile regressions are estimated at five points of the log (hourly) wage distribution; 0.10, 0.25, 0.50, 0.75 and 0.90 quantiles. In order to take into account a correlation among the various quantile regressions, the quantiles are estimated simultaneously, thus allowing a formal comparison of coefficients describing different quantiles. Estimations of standard errors are obtained via bootstrapping using 50 replications.<sup>5</sup>

Vector  $X$  used in the empirical estimation in this section includes variables representing education, experience, occupation, company size and region, and dummy variables for women, immigrants, non-regular working hours, rural area and public sector employees.

Education is defined by a set of seven dummy variables, describing the highest degree obtained.<sup>6</sup> A dummy takes the value 1 if a person holds a degree and 0 otherwise. In

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<sup>5</sup> In quantile regressions, the bootstrap standard errors could be preferable to those calculated analytically as suggested by Rogers (1992). In this study, estimation procedures are performed using STATA software package.

<sup>6</sup> Concerning educational attainments, an alternative was to use the number of years of formal education. However, preliminary runs including quadratic specification showed lower explanatory power of this variable.

regressions, unfinished primary school dummy is omitted. Work experience is defined as the total years of actual employment, including experience with former employers. Occupation is represented by a set of dummy variables for each of the ten occupation categories defined according to standard (ISCO) classification. The omitted category is elementary occupation. There are four dummies for company size, defined with respect to the number of employees. The dummy for firms with the less than 10 employee is omitted in regressions<sup>7</sup>. The region variable consists of five dummies for territorial units defined according to a NUTS-2 proposal for Croatia that was made by a CBS-appointed task group in 2004 (not yet officially adopted). Each regional dummy takes the value 1 if an individual lives in the region and 0 otherwise. The dummy for Northern Croatia is the referent category. The dummy variable for living in a rural area takes the value 1 if an individual lives in a rural area and 0 otherwise. The dummy for immigrants takes the value 1 if someone has come from abroad to the current place of residence since 1991, the year when Croatia declared its independence and when war operations in the wider region began.<sup>8</sup> The dummy variable for non-regular working hours is defined in order to pick up the effect of bad working conditions and takes the value 1 in two cases: (i) if one always works nights, and (ii) if one sometimes works nights *and* sometimes on Saturdays *and* sometimes on Sundays.<sup>9</sup> In all other cases this dummy takes the value 0. The public sector dummy takes the value 1 if an individual works in state-owned institutions and enterprises, and 0 otherwise. A set of fourteen dummies for industry affiliation is

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<sup>7</sup> *Oi and Idson (1999) find that the wage gap in large enterprises over small firms is rather large. They provide several theoretical explanations that might be also relevant for Croatia, from monitoring costs and efficiency wages to some productivity hypotheses. However, the aim of this variable in our study is not just to account for possibly different practices in the wage setting among companies of different size, but also to check for bias in underreporting. Anecdotal evidence suggests that the practice in small privately-owned firms is to pay a portion of the earning in a regular way, including taxes, and another portion in cash without proper documentation or tax obligations. In that case, one can imagine that an employee interviewed within LFS reports only a regular part of the earnings, for she might consider only this part of the earnings the "usual monthly wage on the main job".*

<sup>8</sup> *"Immigrant" is possibly not a fully correct term since most of individuals entering Croatia in post-1991 period are ethnic Croats having Croatian citizenship and arriving from neighboring countries, without need to go through any specific administrative procedure usually connected with immigration. This variable is chosen to account for some specific problems of adoption that can be reflected in wage differentials.*

<sup>9</sup> *This criterion might seem rather weak in describing "bad" working conditions, but only 16 percent of Croatian workers were exposed to such conditions. Apart from the always/sometimes/never distinction in working at nights and weekends, other indications of working conditions were not available in the Labor Force Survey.*

included in only one regression specification, aimed at exploring industry wage variations. Otherwise, the industry variable is not used.<sup>10</sup>

## 4 Wage Function Estimates

Table 3 presents the coefficients obtained in OLS and quantile regression estimates of wage function in Croatia. The overall explanatory power of the regressions seems satisfactory. Most of the coefficients are significant at a 5% level. A log-linear specification of the wage function allows us to treat the coefficient (if multiplied by 100) as a percentage change in conditional hourly wage that was due to marginal change in a corresponding regressor. Since explanatory variables are mostly defined as dummy variables, interpretation of the coefficients should be done relative to the omitted category. For instance, coefficients for general secondary education in the OLS estimate indicate that average wage for a worker who completed general secondary school is expected to be 21% higher than wage of a worker who did not finish primary school, all other characteristics being equal.

Some of the estimated coefficients are quite uniform over the whole range of distribution (i.e. similar at different quantiles of the conditional wage distribution) and consistent with the least squares result. However, some coefficients are largely different for various quantiles. The statistically significant difference in the coefficients at the lower and upper quantiles suggests that a corresponding variable is associated with an increase or a decrease in the *dispersion* (inequality) of conditional wages. Table 4 reports on the “coefficients” that are in fact the differences between the 0.9 and 0.1 quantile coefficients, and the 0.75 and 0.25 quantile coefficients. For a variable with significant and positive differences, its marginal effect increases as one moves along the distribution that further implies spreading out the conditional wage distribution, and vice versa. Interpretation of the results presented in Table 4 will be parallel to that referring to Table 3.

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<sup>10</sup> *Although industry wage differentials might be substantial, inclusion of the industry variable to account for unobserved differences in ability is questioned by Krueger and Summers (1988). However, industry wage differentials in Croatia might be affected by ownership, since there are industries that are clearly dominated by state-ownership such as utilities, education, health care and public administration. Since this study is more interested in ownership effect and wants to have it distinguished from industry effect, variables for industry affiliation are not used in the analysis, unless otherwise stated.*

**Table 3. OLS and quantile regressions (dependent variable: log wage per hour)**

	OLS	Quantile				
		0.10	0.25	0.50	0.75	0.90
Constant	<b>2.361</b> (0.043)	<b>1.929</b> (0.073)	<b>2.169</b> (0.046)	<b>2.332</b> (0.047)	<b>2.546</b> (0.053)	<b>2.761</b> (0.120)
Education (vs. unfin. primary)						
Primary	<i>0.067</i> (0.039)	<i>0.101</i> (0.062)	0.042 (0.046)	<b>0.085</b> (0.043)	<i>0.084</i> (0.045)	<i>0.109</i> (0.116)
Voc. secondary	<b>0.133</b> (0.039)	<b>0.158</b> (0.067)	<b>0.107</b> (0.045)	<b>0.166</b> (0.040)	<b>0.156</b> (0.046)	<b>0.184</b> (0.124)
Gen. secondary	<b>0.215</b> (0.040)	<b>0.232</b> (0.068)	<b>0.218</b> (0.047)	<b>0.242</b> (0.041)	<b>0.225</b> (0.048)	<b>0.257</b> (0.122)
2-year college	<b>0.334</b> (0.044)	<b>0.351</b> (0.076)	<b>0.312</b> (0.046)	<b>0.355</b> (0.045)	<b>0.372</b> (0.058)	<b>0.390</b> (0.123)
College graduate	<b>0.463</b> (0.052)	<b>0.403</b> (0.081)	<b>0.405</b> (0.057)	<b>0.471</b> (0.047)	<b>0.562</b> (0.065)	<b>0.608</b> (0.139)
Post-graduate	<b>0.690</b> (0.071)	<b>0.552</b> (0.121)	<b>0.624</b> (0.076)	<b>0.658</b> (0.078)	<b>0.816</b> (0.111)	<b>0.816</b> (0.153)
Experience	<b>0.012</b> (0.002)	<b>0.015</b> (0.003)	<b>0.014</b> (0.002)	<b>0.011</b> (0.002)	<b>0.014</b> (0.002)	<b>0.010</b> (0.003)
Experience sq. (/100)	<b>-0.019</b> (0.005)	<b>-0.028</b> (0.008)	<b>-0.025</b> (0.005)	<b>-0.016</b> (0.005)	<b>-0.024</b> (0.006)	<i>-0.014</i> (0.008)
Female	<b>-0.153</b> (0.010)	<b>-0.095</b> (0.019)	<b>-0.126</b> (0.014)	<b>-0.158</b> (0.014)	<b>-0.180</b> (0.012)	<b>-0.205</b> (0.021)
Immigrant	<b>-0.061</b> (0.030)	-0.054 (0.043)	<b>-0.096</b> (0.044)	<b>-0.095</b> (0.028)	<b>-0.086</b> (0.035)	0.007 (0.063)
Occupation (vs. elementary)						
Plant&machine oper.	<b>0.063</b> (0.022)	0.019 (0.042)	0.044 (0.027)	<b>0.069</b> (0.021)	<b>0.095</b> (0.027)	<b>0.079</b> (0.037)
Craftsman	<b>0.176</b> (0.022)	<b>0.184</b> (0.033)	<b>0.175</b> (0.025)	<b>0.169</b> (0.019)	<b>0.174</b> (0.019)	<b>0.188</b> (0.042)
Farming	-0.004 (0.056)	0.062 (0.238)	0.024 (0.058)	-0.010 (0.070)	0.056 (0.061)	<i>0.094</i> (0.057)
Service&sales	<b>0.064</b> (0.021)	<i>0.064</i> (0.035)	<b>0.074</b> (0.028)	<b>0.082</b> (0.024)	<b>0.072</b> (0.023)	<b>0.049</b> (0.035)
Clerk	<b>0.226</b> (0.021)	<b>0.266</b> (0.037)	<b>0.219</b> (0.027)	<b>0.223</b> (0.022)	<b>0.259</b> (0.022)	<b>0.238</b> (0.034)
Technician	<b>0.343</b> (0.024)	<b>0.352</b> (0.045)	<b>0.369</b> (0.026)	<b>0.349</b> (0.024)	<b>0.324</b> (0.028)	<b>0.313</b> (0.041)
Professional	<b>0.391</b> (0.041)	<b>0.481</b> (0.064)	<b>0.421</b> (0.045)	<b>0.379</b> (0.045)	<b>0.322</b> (0.055)	<b>0.407</b> (0.069)
Management&adm.	<b>0.703</b> (0.062)	<b>0.616</b> (0.121)	<b>0.597</b> (0.072)	<b>0.638</b> (0.080)	<b>0.718</b> (0.103)	<b>0.877</b> (0.116)
Military	<b>0.384</b> (0.048)	<b>0.555</b> (0.052)	<b>0.455</b> (0.044)	<b>0.389</b> (0.043)	<b>0.347</b> (0.033)	<b>0.321</b> (0.058)
Non-regular hours	<b>0.080</b> (0.014)	0.037 (0.029)	0.030 (0.019)	<b>0.085</b> (0.016)	<b>0.113</b> (0.017)	<b>0.140</b> (0.027)



	OLS	Quantile				
		0.10	0.25	0.50	0.75	0.90
Firm size (vs. <10 empl.)						
10-50 empl.	<b>0.069</b> (0.015)	<b>0.067</b> (0.027)	<b>0.061</b> (0.017)	<b>0.062</b> (0.015)	<b>0.049</b> (0.017)	0.023 (0.025)
50-200 empl.	<b>0.065</b> (0.015)	<b>0.081</b> (0.027)	<b>0.053</b> (0.016)	<b>0.043</b> (0.014)	<i>0.029</i> (0.018)	0.026 (0.021)
>=200 empl.	<b>0.101</b> (0.016)	<b>0.072</b> (0.033)	<b>0.075</b> (0.015)	<b>0.102</b> (0.017)	<b>0.092</b> (0.016)	<b>0.073</b> (0.021)
Region (vs. north)						
West	<b>0.069</b> (0.018)	0.045 (0.028)	<b>0.042</b> (0.018)	<b>0.057</b> (0.018)	<b>0.057</b> (0.024)	<b>0.066</b> (0.027)
Central	<b>0.070</b> (0.015)	0.032 (0.025)	<b>0.046</b> (0.021)	<b>0.083</b> (0.016)	<b>0.082</b> (0.019)	<b>0.083</b> (0.027)
East	<b>-0.038</b> (0.017)	<b>-0.086</b> (0.025)	<b>-0.072</b> (0.020)	<i>-0.032</i> (0.017)	-0.027 (0.022)	0.005 (0.026)
South	<b>0.046</b> (0.017)	0.014 (0.028)	0.016 (0.022)	<b>0.059</b> (0.019)	<i>0.040</i> (0.022)	0.048 (0.033)
Rural	<b>-0.041</b> (0.010)	<b>-0.038</b> (0.019)	<b>-0.029</b> (0.012)	<b>-0.030</b> (0.011)	<b>-0.046</b> (0.012)	<i>-0.033</i> (0.019)
Public	<b>0.086</b> (0.011)	<b>0.182</b> (0.023)	<b>0.164</b> (0.014)	<b>0.114</b> (0.011)	<b>0.053</b> (0.013)	-0.011 (0.016)
(R2) Pseudo R2	(0.466)	0.255	0.310	0.320	0.300	0.291

Notes: The numbers in parentheses are standard errors computed using bootstrap estimator. The standard errors for the least-squares estimates are computed using White method. Bold letters indicate significance at a 5%-level, whereas italics indicate significance at a 10%-level.

Having a regression specification shown in Table 3, the constant may be interpreted as the conditional quantile of the log wage distribution (or the conditional expectation of log wage in case of the OLS estimate) for a male employee with unfinished primary school and no experience, who is engaged in some elementary occupation, working in a private firm with less than 10 employees with regular working hours and living in an urban part of Northern Croatia. For example, the median of the conditional wage distribution for this group of employees is around 10 kuna per hour.<sup>11</sup>

<sup>11</sup> Conditional distribution is the distribution of wages that would result in a sample of individuals who are all identical with respect to the observed attributes.

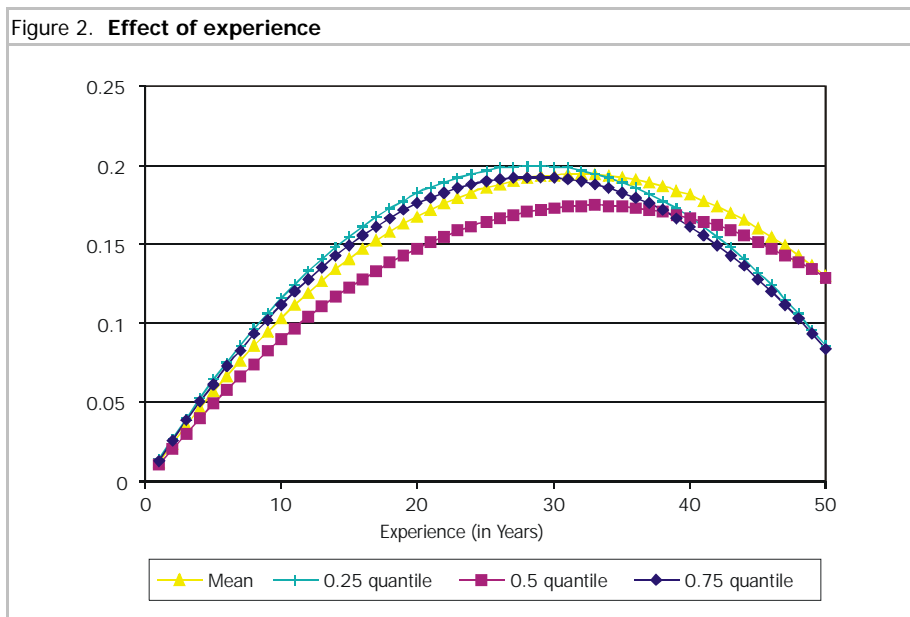
	0.90-0.10 Interquartile regression		0.75-0.25 Interquartile regression	
	Coef.	Std. err.	Coef.	Std. err.
Education (vs. unfin. primary)				
Primary	0.007	0.116	0.042	0.056
Vocational sec.	0.026	0.119	0.049	0.060
General sec.	0.026	0.124	0.006	0.062
2-year college	0.039	0.121	0.060	0.070
College graduate	0.206	0.142	<b>0.157</b>	<b>0.072</b>
Postgraduate	0.264	0.183	0.192	0.127
Experience	-0.005	0.003	-0.001	0.002
Experience sq./100)	0.015	0.010	0.001	0.006
Female	<b>-0.110</b>	<b>0.025</b>	<b>-0.054</b>	<b>0.013</b>
Immigrant	0.060	0.084	0.010	0.045
Occupation (vs. elementary)				
Plant&machine operator	0.060	0.059	0.052	0.036
Craftsman	0.004	0.048	-0.002	0.026
Farming	0.032	0.225	0.032	0.070
Service&sales	-0.016	0.041	-0.002	0.030
Clerk	-0.028	0.043	0.040	0.036
Technician	-0.039	0.048	-0.045	0.036
Professional	-0.074	0.080	-0.099	0.060
Management&admin.	0.261	0.159	0.120	0.111
Military	<b>-0.233</b>	<b>0.068</b>	<b>-0.108</b>	<b>0.041</b>
Non-regular hours	<b>0.102</b>	<b>0.040</b>	<b>0.083</b>	<b>0.020</b>
Firm size (vs. <10 empl.)				
10-50 empl.	-0.044	0.041	-0.011	0.020
50-200 empl.	<i>-0.055</i>	<i>0.033</i>	-0.024	0.021
>=200 empl.	0.001	0.034	0.017	0.020
Region (vs. north)				
West	0.022	0.040	0.016	0.029
Central	0.051	0.031	0.036	0.024
East	<b>0.091</b>	<b>0.042</b>	0.045	0.026
South	0.034	0.041	0.024	0.025
Rural	0.005	0.022	-0.017	0.016
Public	<b>-0.193</b>	<b>0.028</b>	<b>-0.111</b>	<b>0.019</b>

Note: Standard errors are computed using bootstrap estimator. Bold letters indicate significance at a 5%-level whereas italics indicate significance at a 10%-level.

The effect of education on wages increases with education level. At the 0.5 (median) quantile, wage for a worker who completed primary school was 8.5% higher than for someone who did not complete primary school, while for a worker with a post-graduate degree the difference over unfinished primary school is around 65%, other things being equal. The effect of education is a bit stronger in median regression estimates than in OLS estimates of the mean effect, except for the postgraduate education. Completed primary education does not necessarily ensure an increase in wages when compared to unfinished primary school, since a positive value of the coefficient is not significant at

the usual 5% levels (except at the medium of conditional wage distribution). It seems that the Croatian economy values unfinished and finished primary school roughly the same, and what makes a difference in the quest for higher wages is secondary and higher education. It also appears that general secondary education could provide higher wages than vocational secondary education.

The pattern of the education effect across different quantiles of conditional wage distribution is not very clear, although the effect seems stronger at higher quantiles. The results of formal testing for difference between coefficients presented in Table 4 suggest that education beyond primary school is not associated with higher dispersion of wages in a statistically significant way. The only exception is college education that significantly affects the 0.75-0.25 quantile spread of conditional wage distribution, as compared to the distribution for unfinished primary school. One interesting policy implication could be depicted here. An increase in the education level of the Croatian labor force that might be achieved in the future would not necessarily lead to a greater wage inequality.



The impact of experience on wages was assessed by means of coefficients for both a linear and a quadratic term of the years of experience. The cumulative effect of the two experience variables estimated at different points of the conditional wage distribution is depicted in Figure 2. The pattern of the effect is concave, increasing for less experienced workers, peaking at experience of around 30 years and decreasing thereafter. An employee with actual work experience of 30 years can expect, on average, almost 20% higher wages than a new entrant. However, the return to any additional year of experience after working for more than 30 years is negative. The experience-wage profiles at the various quantiles are not distinct in any particular order.

The Croatian labor market allows some disparity between wages for males and females, particularly at the right tail of the distribution, as revealed by the coefficients on dummy variable for female shown in Table 3. At the 0.1 quantile of the conditional wage distribution, employed women earn about 10% less than men, but at the 0.9 quantile the difference is higher and their wage is 20% lower. In other words, in high-paid jobs, women are relatively more disadvantaged than in low-paid jobs. On average, women earn some 15% less than men with the same observed characteristics. It can be noted that disclosed gender wage gap in Croatia is substantial, but comparable to many other countries.<sup>12</sup>

Workers who moved to Croatia after 1991 are faced with certain wage penalty, as compared to workers residing in the country for a longer period. The effect is estimated to be significant only at the central part of conditional wage distribution. At the lower and upper tails of the conditional distribution, the difference in wages between native and non-native workers was not statistically significant. However, on average (estimated by OLS), immigrants can expect to earn some 6% less than other comparable workers do.

Occupation of the worker is an important factor in wage determination. Having controlled for other observed characteristics shown in Table 3, it can be seen that all other occupations yield higher wages than elementary occupations (except farming), especially management and administration related jobs. No systematic behavior of the occupation effects can be revealed for different quantiles at which regressions are estimated.

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<sup>12</sup> Machado and Mata (2001) report on resembling (in level, but also in pattern across wage distribution) gender wage differential in Portugal in mid 1990s, just as Garcia, Hernandez and Nicolas (2001) for Spain. Rutkowski (2001) finds gender-based differential in transition countries in the late 1990s in a range of 20-30%. Orazem and Vodopivec (1995) estimated the gap in Slovenia at around 10% in the early 1990s.

Working at night and on weekends can produce higher wages, as revealed by the coefficient for non-regular working hours dummy. The effect is much more relevant at the upper tail of the conditional wage distribution. For example, the wage premium for non-regular working hours at the 0.9 quantile of the conditional distribution is 14%, much higher than at the median. Relatively low-paid workers hardly can benefit from unpleasant timing of work, since the positive effect on wage is rather low, and it is not statistically significant at usual levels.<sup>13</sup>

Larger companies tend to pay more to workers with the same characteristics. The average hourly wage for a worker in a company with more than 200 employees can be some 10% higher than for someone with the same attributes working in a firm with up to 10 employees. The effect of the company size does not appear to exert a clear pattern along the conditional wage distribution.

The regional-based differences in wages in Croatia are notable. Otherwise comparable worker in Central Croatia can earn some 10% more than a worker in Eastern Croatia. Such a difference is not very sensitive to the choice of the quantile at which we estimate regression. Moreover, a worker's residence in a rural area is usually associated with lower wages.

The marginal effect of regressors on the dispersion of conditional wage distributions shown in Table 4 is informative for further elaboration. Similar to education, it can be seen that occupation, company size and region generally exhibit no significant differences in the marginal effects at the upper and lower tail of the distribution. It appears that these variables exert only a pure location shift effect on the conditional wage distribution. For this effect, the quantile regression results are mostly compatible with the OLS results. However, the effects of gender, ownership and irregular working hours are not constant across the conditional distribution of log wages. For these three variables, quantile regression results do a good job representing a whole range of effects along the wage distribution. For example, the conditional wage distribution for women is less dispersed than that for men, implying that the gender pay gap should be significantly different at higher quantiles than at lower quantiles. Non-regular working hours spread out the conditional wage distribution meaning that their effect on wages is stronger for highly paid jobs. State ownership tends to compress the wage spread.

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<sup>13</sup> *It can be noted here that an additional job holding was not proved to be significant determinant of wages in main job. This might suggest that acceptance of a low-paid regular job was not motivated by an additional job holding.*

## 5 Public-Private Sector Wage Gap

The regression coefficients for the public sector dummy variable shown in Table 3 describe the wage premium related to work in state-owned institutions and enterprises, as compared to work in private sector. A positive value implies wage premium for working in public sector, while a negative one depicts existence of wage penalty. It can be seen that the public sector wage premium varies with the quantile of conditional wage distribution; it is substantial at the lower tail but it gradually ceased out as we move along the distribution. That premium is statistically insignificant at the higher tail. For example, at the 0.10 quantile, a public sector worker is estimated to be paid about 18% percent more than a worker with the same attributes but working in the private sector. At the 0.75 quantile, a public sector wage premium is around 5%, while at the 0.9 quantile we find negative premium (penalty), but not statistically significant at usual levels. In other words, relatively low-paid workers benefit more from working in the public sector than high-paid workers do.

The OLS estimate suggests that a worker in the public sector can expect some 9% higher hourly wage than a worker with the same characteristics in the private sector. Presumably high underreporting of wages in private sector may challenge this finding. However, the estimated model controls for the company size, so it might account for underreporting in small, predominantly private firms. The problem of relatively high wages that are underreported remains and it is probably more pronounced for private sector wages. However, there are several factors working in favor of observed public sector premium. First, the choice of the hourly wage as a dependent variable takes into account longer working hours of private sector workers.<sup>14</sup> The most usual comparison of wages in Croatia is made for wages on a monthly level, thereby overlooking working hours as an important factor for wage determination. Second, unions are more pervasive in the public sector, and this could be putting upward pressure on wages. Third, high unemployment in Croatia allows private sector employers to find workers they need even when they offer poor wages. Fourth, for state-owned sector there is political pressure to behave as a “good” employer providing relatively high wages, especially because the cost-cutting market pressures are mostly lacking.

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<sup>14</sup> *The data from our sample shows that an average public sector worker is engaged 40.7 hours per week, while for a private sector worker the average is 42.3 hours.*

The public/private sector wage gap observed in Table 3 is estimated in a model specification that constrains the gap to be the same, regardless of education level. It is interesting to employ the alternative specification that allows the coefficients to change across the various education levels. This is done by interacting the set of educational dummies with the indicator variable for the public sector and by including these interactive dummies in the previous specification.<sup>15</sup> Table 5 presents resulting coefficients for interactive variables that are to be interpreted as public sector wage premiums by education level.

	OLS	Quantile				
		0.10	0.25	0.50	0.75	0.90
Unfin. primary	0.061 (0.070)	0.140 (0.124)	<b>0.205</b> ( <b>0.075</b> )	<i>0.158</i> ( <i>0.082</i> )	0.010 (0.081)	-0.340 (0.238)
Primary	<b>0.106</b> ( <b>0.028</b> )	<b>0.097</b> ( <b>0.038</b> )	<b>0.139</b> ( <b>0.034</b> )	<b>0.161</b> ( <b>0.032</b> )	<b>0.099</b> ( <b>0.032</b> )	0.030 (0.053)
Voc. secondary	<b>0.085</b> ( <b>0.018</b> )	<b>0.129</b> ( <b>0.044</b> )	<b>0.142</b> ( <b>0.026</b> )	<b>0.126</b> ( <b>0.022</b> )	<b>0.087</b> ( <b>0.022</b> )	0.029 (0.030)
Gen. secondary	<b>0.097</b> ( <b>0.017</b> )	<b>0.219</b> ( <b>0.042</b> )	<b>0.193</b> ( <b>0.025</b> )	<b>0.109</b> ( <b>0.023</b> )	<b>0.056</b> ( <b>0.021</b> )	-0.038 (0.025)
2-year college	<b>0.084</b> ( <b>0.041</b> )	<b>0.366</b> ( <b>0.060</b> )	<b>0.232</b> ( <b>0.047</b> )	<b>0.113</b> ( <b>0.047</b> )	-0.052 (0.061)	<b>-0.146</b> ( <b>0.079</b> )
College graduate	<i>0.057</i> ( <i>0.034</i> )	<b>0.280</b> ( <b>0.067</b> )	<b>0.161</b> ( <b>0.047</b> )	-0.013 (0.048)	-0.055 (0.045)	0.007 (0.068)
Post-graduate	-0.219 (0.183)	0.296 (0.468)	-0.148 (0.403)	-0.317 (0.204)	<b>-0.339</b> ( <b>0.159</b> )	-0.181 (0.142)

Notes: The numbers in parentheses are standard errors computed using bootstrap estimator. The standard errors for the least-squares estimates are computed using White-Huber method. Bold letters indicate significance at a 5%-level, whereas italics indicate significance at a 10%-level.

The quantile regression results suggest two findings. First, the level of premium is sensitive to the choice of the quantile at all education levels. With only a few exemptions, there is a much higher premium associated with working in the public sector at low than at high quantiles. In other words, the premium is higher for low-paid workers than for high-paid workers at all education levels. Higher educated public sector workers are often faced with a negative premium (penalty), especially those at high quantiles. This further implies that the conditional wage distribution for public sector workers is more compressed than for private sector workers, and this seems to be valid for every

<sup>15</sup> This approach is applied by Poterba and Rueben (1994).

education level. However, results for unfinished primary school and postgraduate education exhibit certain problems with the statistical significance that is related to the small sample. Second, the public sector wage premium is substantial at a lower to middle level of education and it turned negative (penalty) at college and post-graduate education, as suggested by the estimation at the middle of the distribution (0.50 quantile). The OLS estimate mostly confirms the second finding, but with still positive public sector wage premium for college graduates.

Labor market situation in Croatia can explain observed pattern of the premium. There is rather high unemployment among workers who obtained primary and secondary education that allows private sector employers to set wages for these workers well below public sector ones. For relatively scarce highly educated workers, however, private sector employers need to ensure higher wages than public sector to attract them to move in.

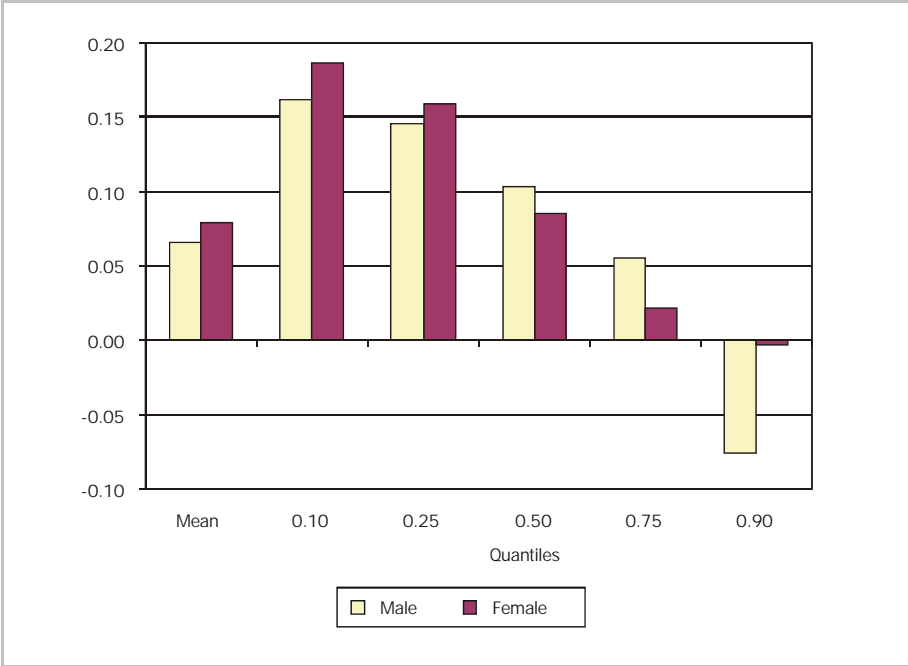
Gender-based differences in the public sector wage premium are also explored. Separate wage equations for males and females were run with the interest in the coefficients for public sector dummy evaluated at various points of the conditional wage distribution. Figure 3 shows the result. On average (OLS estimate) the public sector wage premium is higher for a female worker than for a male worker. For both, males and females, the premium diminishes as we move along the distribution and it became negative at the upper tail. For low-paid jobs, i.e. at the lower quantile, the premium is a bit higher for females than males.<sup>16</sup> At the 0.90 quantile, males employed in the public sector are faced with substantially lower wages than otherwise comparable males employed in the private sector. For high-paid female workers, such a wage gap between sectors is statistically insignificant.

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<sup>16</sup> *The similar finding is documented in Mueller (1998), and Disney and Gosling (1998).*

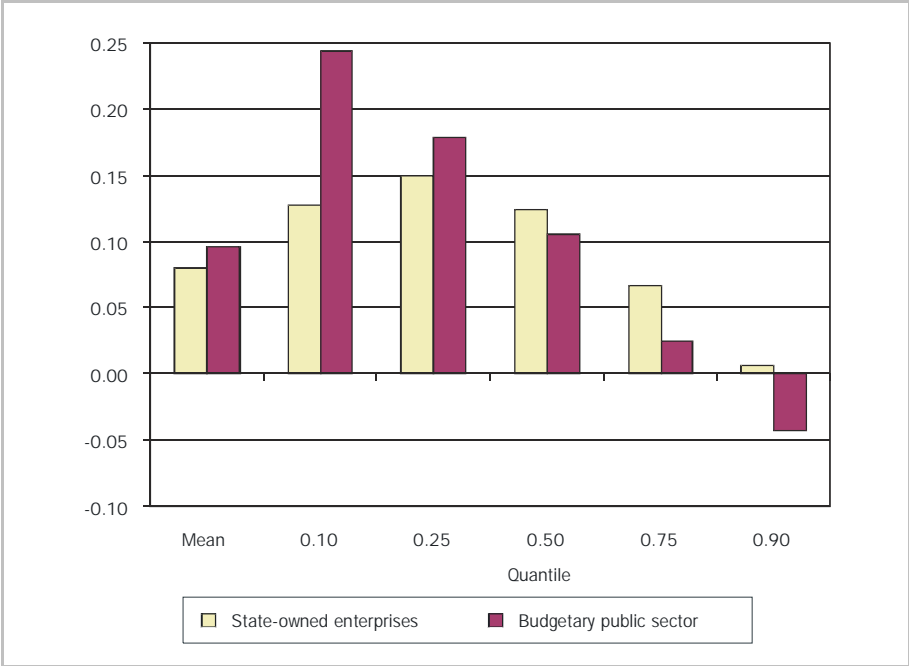


Figure 3. **Public-private sector wage gap by gender**



Our definition of the public sector as state-owned institutions and enterprises may be challenged with the alternative in the quest for the difference in wage determination between state-owned enterprises and state-owned institutions. Since the Labor Force Survey does not allow direct distinction between the two parts of the wider public sector, a combination of employer’s ownership status and the industry is employed. State-owned employers in public administration, education and health care are considered “budgetary public sector”, and state-owned employers in other industries are considered “state-owned enterprises”. The first term is chosen since the central government budget in Croatia in fact provides for wages of employees in public education, public health care and, of course, public administration. The wage function is re-estimated by using the same set of explanatory variables as previously but two public sector dummies, for budgetary public sector and for state-owned enterprises. The estimated coefficients for these dummies can be interpreted as the wage premium over the private sector. The result is presented in Figure 4.

Figure 4. **Public-private sector wage gap**



On average, the budgetary public sector pays higher wage premium over the private sector than state-owned enterprises do. A worker in the budgetary public sector can expect an hourly wage of almost 10% over the wage of a worker with the same observable characteristics but working in the private sector. However, there is a difference in the premium at various points of the conditional wage distribution. Budgetary public sector pays rather high premium at the lower tail of the distribution, and a negative one at the upper tail. In other words, in the budgetary public sector, low-paid workers are relatively better off compared to high-paid workers. For state-owned enterprises, the variation in premium along the distribution is smaller than for the budgetary public sector. At the 0.9 quantile, there is no statistically significant difference in conditional wages between workers in state-owned enterprises and workers in the private sector. State-owned enterprises managed to keep track in wages with the private sector for high-paid workers, and even to provide the premium for low- and middle- paid workers.

	OLS		Median regression	
	Coef.	Std. err.	Coef.	Std. err.
Industry (vs. agriculture)				
Mining	0.044	0.052	-0.044	0.075
Manufacturing	0.013	0.029	-0.037	0.047
Utilities	<b>0.158</b>	<b>0.033</b>	<b>0.128</b>	<b>0.044</b>
Construction	<b>0.116</b>	<b>0.033</b>	0.075	0.047
Retail&wholesale	0.012	0.030	-0.021	0.045
Hotels&restaurants	0.049	0.034	-0.005	0.054
Transport&comm.	<b>0.182</b>	<b>0.032</b>	<b>0.152</b>	<b>0.046</b>
Fin. intermediation	<b>0.267</b>	<b>0.038</b>	<b>0.238</b>	<b>0.049</b>
Real estate	0.045	0.039	0.003	0.051
Public admin.	<b>0.174</b>	<b>0.030</b>	<b>0.117</b>	<b>0.046</b>
Education	<i>0.054</i>	<i>0.030</i>	0.020	0.044
Health	<b>0.132</b>	<b>0.031</b>	<i>0.078</i>	<i>0.047</i>
Community services	<b>0.088</b>	<b>0.039</b>	0.054	0.049

Notes: Variables controlled for in the regressions are education, experience, gender, occupation, region, firm size, non-regular working hours, and gender. The standard errors for the least-squares estimates are computed using White-Huber method, while for median regression they are computed using the bootstrap method. Bold letters indicate significance at a 5%-level, whereas italics indicate significance at a 10%-level.

The interest in the public sector wage premium is sometimes more specific and directed towards differences among wages in public administration, education and health care. Therefore, we estimate a wage function that includes a set of industry dummies along with other explanatory variables such as education, experience, occupation, firm size, region and other factors, but excludes the public sector dummy. In that way we cannot explicitly estimate a public sector wage premium, but rather an industry-related premium. However, public administration, education and health care are industries dominated by state-owned institutions, meaning that any industry-related premium in these sectors can be interpreted, at least partially, as the public sector wage premium of a particular industry.

The coefficients for industry variables and associated standard errors estimated in OLS and median regressions are presented in Table 6. The results of other quantile regressions are not shown since they are similar to median regression. The omitted industry was agriculture, meaning that coefficients are to be interpreted in relation to it. The ordering of the industry-related wage differentials is of particular interest. The OLS estimate reveals that, after controlling for education, experience, occupation and other factors, the best-paid workers are occupied in the financial industry. Other “premium” industries are transport and communications, public administration, utilities and health care.

Interestingly, in the Croatian economy all these industries, besides financial one, can be considered “public”. While public administration and health care are directly dependent on the government budget, transport and utilities are industries dominated by state-owned enterprises in the field of public transport, postal service, energy, water and gas distribution. Obviously, employees of these state-dominated industries have higher wages than employees with comparable characteristics working in agriculture, manufacturing industry and retail trade. Comparable wages of employees in education show that they are the worst positioned among public sector industries. The same conclusion can be drawn from median regression results.

	No. of obs.		Premium
	Private	Public	
Elementary occ.	229	222	<b>0.086</b> <b>(0.034)</b>
Service&sales	578	224	<b>0.201</b> <b>(0.030)</b>
Clerk	321	359	<b>0.137</b> <b>(0.022)</b>
Technician	333	513	-0.038 (0.030)
Professional	139	345	-0.005 (0.037)

*Notes: Public sector wage premium was obtained as the coefficient on public sector dummy in earnings regression, estimated by OLS for each occupation separately. Variables controlled for in the regressions are education, experience, experience squared, region, firm size, non-regular working hours, and gender. Robust standard errors are reported in parentheses. Bold letters indicate significance at a 5%-level.*

An additional illustration of the public-private sector wage gap can be made with respect to occupations. To address this issue, we estimate wage equations separately for several occupations that are common in both the public and the private sector. The coefficient for the public sector dummy variable in each regression can be treated as a public sector wage premium. The resulting coefficients estimated by OLS and presented in Table 7 show that the public sector wage premium is most pronounced in medium-skill occupations. For a worker in services and sales, the wage premium for the public sector is around 20 percent. For clerks, the premium is about 14 percent. However, for high-skill occupations such technicians and professionals, the difference between public and private sector wages is statistically insignificant.

## 6 Returns to Education

The discussion that follows shifts the focus on education. Marginal effects of education on conditional wages that are discussed above should be interpreted in relation to the omitted education level i.e. unfinished primary school. However, one may wish to assess the effect of education between adjacent levels. For example, what is the effect on wages of the general secondary school graduation, as compared to holding a primary school degree. Having results from Table 3, one should calculate the difference in the marginal effects (i.e. coefficients) between two adjacent education levels. The mentioned example gives an effect of 15.7% in median regression, depicting an increase in the conditional wage at the median due to general secondary school graduation. This effect is sometimes called return to education. However, the most common interpretation of the return on education is in terms of the wage effect of one additional year of education. Therefore, calculation of the returns of education at different levels of education should be done by dividing the increase in the marginal effect of education between two adjacent education levels by the length of schooling between those levels. For example, the return to general secondary education at the  $\theta$ th quantile is defined as

$$(2) \quad R_{\theta, GenSec}^{ed} = \frac{\beta_{\theta, GenSec} - \beta_{\theta, Prim}}{s_{GenSec} - s_{Prim}}$$

where  $\beta_{\theta, GenSec}$  and  $\beta_{\theta, Prim}$  are the coefficients on general secondary education and primary education estimated for the  $\theta$ th quantile regression, and  $s_{GenSec}$  and  $s_{Prim}$  are years of schooling usually needed to complete general secondary and primary education. Analogous calculation can be performed for other education levels. As “usual” schooling time for accomplishing primary, vocational secondary, general secondary, 2-year college, college and postgraduate education we took 8, 11, 12, 14, 16, and 18.5 years, respectively. These figures are close to actual averages calculated from the sample.

Table 8 presents estimated returns on education. As can be seen, a return to additional year of education increases with the education level. This conclusion is robust to the choice of quantiles and holds also for the least squares estimate.<sup>17</sup> This finding can be a motivation for private investment in human capital in Croatia, since it obviously pays off more and more as one raises the education level.

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<sup>17</sup> There are only two deviations from the observed pattern, one at the 0.1 quantile for graduate education and the other at the 0.9 quantile for post-graduate education.

	OLS	Quantile				
		0.10	0.25	0.50	0.75	0.90
Voc. secondary (relative to the primary)	0.022	0.019	0.022	0.027	0.024	0.025
Gen. secondary (relative to the primary)	0.037	0.033	0.044	0.039	0.035	0.037
2-year college (rel. to the gen. secondary)	0.059	0.060	0.047	0.057	0.074	0.066
College graduate (rel. to the 2-year college)	0.065	0.026	0.046	0.058	0.095	0.109
Post-graduate (rel. to the coll. graduate)	0.091	0.060	0.088	0.075	0.102	0.083

*Note: Return to education is calculated as the increase in the marginal effect of education between two adjacent education levels divided by years of schooling usually performed between that levels. The result is based on regressions presented in Table 3. Further description is provided in the text.*

Psacharopoulos (1994) in his work on returns to education criticized the inclusion of too many variables in the earnings function, other than human capital variables, especially the estimation of earnings functions within occupations that results in artificial downward bias in the returns to education. Following this objection, Table 9 reports the return on education derived from the same earnings regressions as before, but without occupation dummies. It is not surprising that resulting returns on education are now higher because education and occupation are often closely related, for education provides the qualifications for more skill-demanding and higher-paying occupations. An additional year of schooling in post-secondary education (2-year college, college graduates and post-graduates) can increase wages by about 10 percent, as estimated by OLS.<sup>18</sup> Similar results are obtained by median regression estimates. Results for other quantiles are not shown since they are not significantly different from the median regression. A distinct difference in returns to education is seen between general secondary, and vocation secondary education in favor of the former. In addition to the observed effect, general secondary school degree in the Croatian education system allows one to continue education at higher schools, while vocational education does not. Evidently, general secondary education pays off more than vocation secondary education.

<sup>18</sup> *Observed effect is close to the average of the European and Middle East countries, and the average of upper middle income countries, as reported by Psacharopoulos (1994).*

	Overall		Private sector		State sector	
	OLS	Median	OLS	Median	OLS	Median
Voc. secondary (relative to the primary)	0.043	0.052	0.040	0.046	0.045	0.056
Gen. secondary (relative to the primary)	0.075	0.083	0.068	0.068	0.080	0.086
2-year college (rel. to the gen. secondary)	0.109	0.111	0.103	0.114	0.111	0.113
College graduate (rel. to the 2-year college)	0.103	0.081	0.126	0.144	0.090	0.069
Post-graduate (rel. to the coll. graduate)	0.101	0.092	0.216	0.178	0.086	0.086

Note: See Table 8, except that here results are based on regressions without occupation dummies as regressors.

Returns to education calculated for public and private sector separately reveal a distinct valuation of education by these two sectors. Graduate and post-graduate education is substantially more valued in the private sector, while secondary education pays off more if engaged in the public sector.<sup>19</sup> In the private sector, the return to additional year of schooling increases with the education level, while in the public sector education beyond a 2-year college decreases the yearly return. However, if we take into account completed college education (a 4-year college) and assess the return relative to the general secondary education, the return to college graduation is higher than return to secondary education, even in the public sector<sup>20</sup>.

## 7 Accounting for Wage Differentials

The relative importance of the different set of variables in explaining wage variations can be estimated by the variance decomposition technique. Starting with the estimates of wage function, and following Fields (2003), the log-variance of wage is decomposed as

$$(3) \quad s_j(\ln W) = \frac{\text{cov}[\beta_j X_j, \ln W]}{\sigma^2(\ln W)} = \frac{\beta_j * \sigma(X_j) * \text{cor}[X_j, \ln W]}{\sigma(\ln W)}$$

<sup>19</sup> Šošić (2004) reports on the average return to education in Croatia of 10.5% in 2001, which was lower in the public sector.

<sup>20</sup> The public sector return to additional year of schooling in college education, relative to the general secondary education is around 10% in OLS estimation, and around 9% in median regression.

where  $s_j(\ln W)$  denotes the share of the log-variance that is attributable to the  $j$ 'th explanatory factor. Note that  $R^2(\ln W)$  is the fraction of the log variance that is explained by all the  $X$ 's taken together. The fraction of the explained variance that is attributable to the  $j$ 'th factor can be calculated as  $s_j(\ln W)/R^2(\ln W)$ . The log variance decomposition is applicable only at the conditional mean, i.e. the least squares estimate.

Table 10. **Contribution of selected factors to log-wage inequality**

	Equation 1 (incl. occupation) contribution as a percentage of:		Equation 2 (excl. occupation) contribution as a percentage of:	
	Total variance	Explained variance	Total variance	Explained variance
Education	15.2	32.6	27.2	65.5
Experience	3.0	6.4	3.8	9.1
Gender	2.0	4.4	2.3	5.5
Ownership	2.9	6.3	3.5	8.5
Location	2.4	5.2	2.6	6.4
Occupation	18.8	40.4	-	-
Firm size	1.5	3.3	1.5	3.7
Other	0.6	1.3	0.6	1.4
Total explained (=R2)	46.6	100.0	41.6	100.0
Unexplained	53.4	-	58.4	-
Total	100.0	-	100.0	-

As can be seen from the first two columns of Table 10, education and occupation are prevailing factors explaining the differences in log hourly wages. The difference in education levels explains around 15% of wage variations, representing 1/3 of the inequality explained by the wage regression that includes occupation regressors. Occupation differences account for 19% of the total variance in wages and 40% of the explained variance. Other measurable factors are less important in explaining wage differentials. Experience, gender, ownership, location, and company size account each for less than 3% of the total variance of hourly wages.

A strong influence of occupations on wage inequality can be questioned by the objection that education is often a prerequisite for high paid occupations and therefore an ultimate source of observed inequality. The second wage equation that is estimated without occupation variables and used for the variance decomposition, shows a much stronger contribution of education. It seems that the contribution of occupation is now almost entirely attributed to education, since minor changes occurred in other observable



factors. Therefore, it can be concluded that education is the key factor in explaining wage variations in Croatia.

A comparison of these results to the variance decomposition of wage inequality in Bulgaria, Hungary, Macedonia and Poland in mid 1990s (Rutkowski, 2001) reveals that education in Croatia is a stronger contributor than elsewhere, but close to the result for Hungary. The wage gap between public and private sector in Croatia is responsible for a much higher portion of variance in wages than in above transition countries. The log variance decomposition for Croatia in 1998 (Bisogno, 2000) produced broadly consistent results with these in Table 10.

## 8 Concluding Remarks

This paper offers a detailed description of the conditional wage distribution in Croatia in 2003. The results of wage regressions point that wages are increasing with the education level, that there is a certain wage gap between males and females and that unpleasant work hours can increase wages of high paid workers, but not of those at the bottom part of the distribution. It appears also that larger firms provide higher wages and that there are notable regional differences in wages of otherwise comparable workers. However, the most striking findings are related to the public/private sector wage gap.

The analysis shows substantial public sector wage premium paid to the majority of its employees. The existent premium is robust to the definition of public sector used: public administration, state-owned enterprises, budgetary public sector, and wider enterprise-included public sector. The premium over private sector is highest for low-paid, low- to medium-skilled and female employees. It diminishes for highly educated males, especially those at the higher tail of the wage distribution. If looked by industries, it seems that education is the least privileged part of the public sector. Wages paid for workers in budgetary public sector are of special policy interest due to regular wage negotiations between the Government and unions, the fiscal implications of the wage agreements and the reform in the public administration system. In that respect, evidences from this study may be important for some policy decisions. A differentiated policy treatment might be needed for various groups within public sector if aimed to achieve more equitable returns to education and other worker's attributes across public sector, and between the public and private sector. The compressed wage structure in public

sector, especially at the upper end of the distribution might be released as to increase incentives for work and prevent migration of senior administration to private sector.

Further improvement of the study could be directed towards accounting for sample selection problem and analyzing in more details some specific elements of wage differentials (for example, returns to education, gender wage gap or wage discrimination in general). Adding the time dimension to the study should be the natural next step in the analysis.

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## Appendix

Variable	Mean	Std. dev.
Net monthly wage (in kunas)	3508	1905
Wage per hour (in kunas)	21.26	11.25
Log wage per hour	2.95	0.44
Education&other individual characteristics		
Unfinished primary	0.02	0.13
Primary	0.13	0.34
Vocational sec.	0.34	0.47
General sec.	0.31	0.46
2-year college	0.08	0.27
College graduate	0.12	0.32
Postgraduate	0.01	0.09
Years of schooling	11.83	2.49
Experience	16.88	10.56
Age	39.16	10.64
Immigrant	0.03	0.18
Female	0.46	0.50
Employer characteristics (size&sector)		
<10 empl.	0.19	0.39
10-50 empl.	0.25	0.44
50-200 empl.	0.25	0.43
>=200 empl.	0.31	0.46
Agriculture	0.03	0.18
Mining	0.01	0.09
Manufacturing	0.23	0.42
Utilities	0.03	0.16
Construction	0.09	0.29
Retail&wholesale	0.15	0.35
Hotels&restaurants	0.06	0.23
Transport&comm.	0.08	0.27
Fin. intermediation	0.02	0.15
Real estate	0.04	0.20
Public admin.	0.08	0.27
Education	0.07	0.26
Health	0.07	0.26
Community services	0.04	0.19
Public sector	0.45	0.50
Job characteristics (occupation&conditions)		
Elementary occupation	0.09	0.29
Plant&machine operator	0.13	0.34
Craftsman	0.16	0.37
Farming	0.01	0.09
Service&sales	0.17	0.37
Clerk	0.14	0.35
Technician	0.18	0.38
Professional	0.10	0.30
Management&admin.	0.01	0.12
Military	0.01	0.09
Non-regular hours	0.16	0.37
Region		
North	0.15	0.36
West	0.13	0.34
Central	0.36	0.48
East	0.17	0.37
South	0.19	0.39
Rural	0.39	0.49

Note: Means of indicator variables (such as educational attainment, firm size, sector of activity, occupation, region etc.) should be considered as proportions of total.

Data source: LFS 2003/11.

# Human Capital and Unemployment in Transition Economies: The Case of Kosova

Avdullah Hoti\*

## Abstract

The paper explores human capital issues in Kosova, a country characterised with high rate of unemployment and large-scale emigration. With the help of data from the Riinvest Labour Force and Household Survey (December 2002), we estimate the probability of unemployment for the population of working age, who are active in the labour force and reside in Kosova. Furthermore, we estimate also the probability of emigration for the population of working age. There seems to be some systematic patterns: (i) those who are unemployed are not randomly selected from the labour force; (ii) those who emigrate are not randomly selected from working age population. The empirical results show that the individuals residing in rural areas face higher probability of being unemployed. Consequently, they tend to emigrate more compared to those residing in urban areas. Second, males and married people face lower probability of being unemployed. But they also tend to emigrate more compared to their respective counterparts. Third, although the more educated persons face lower probability of being unemployed in Kosova, they tend to emigrate more than less educated individuals. These research findings might be used for developing policy proposals.

**Keywords:** transition, human capital, unemployment, emigration

**JEL Classification:** P2, P3, F22, J61, J62, R23

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# 1 Introduction

Growth and schooling are highly correlated and human capital, along with other factors, determines the economic growth (Bils and Klenow, 2000, Hanushek and Kimko, 2000). Moreover, an individual's human capital influences his/her productivity, and therefore earnings, and it explains to a great extent earning differentials among individuals. The human capital, as such, influences the probability of becoming and remaining unemployed. The study of the human capital accumulation and related issues are crucial for a successful transformation of former command economies of Central and Eastern Europe. In the early stages of transition, the opinion whereby the level of human capital in transition countries was thought to be quite high prevailed. Notwithstanding, using firm level data for transition countries, it was revealed that these countries stand worse in terms of the quality of the work force.

Kosova is one of the last countries to embark on the road of transition to a market economy. Unemployment is still high, though it has been decreasing. It is particularly high for young people and women. The labour market in Kosova has some distinctive characteristics, such as being a very young population and having a large-scale emigration. The effects of emigration on the labour market are of particular interest given its scale and the level of remittances. Though a noticeable progress has been achieved in reforming the education system in Kosova, much remains to be done. The development and reform of the education and training systems should reflect these developing labour market needs.

There seems to be a systematic pattern regarding the unemployed individuals and the emigrants as well. That is to say that the unemployed are not randomly selected from the labour force. Similarly, the emigrants are not randomly selected from the working age population either. If there was not a particular pattern, than we would not detect any significant relationship between one's unemployment or an emigrant status and some other characteristics such as the level of education , residence, gender, age etc. The fact that there are such relationships, points to the need for policy considerations to tackle these issues. This paper explores these patterns in Kosova, a country which is characterised by high unemployment and large-scale emigration.

The structure of the paper is as follows: in Section 2, we discuss the structural adjustment during the transition process and, in particular, we comment on the trend and pattern of the unemployment. In Section 3, we discuss the ongoing debate on the human

capital in transition economies. Here we review the literature that deals with the impact of human capital on economic growth and comment on the value of human capital in transition economies. In Section 4, we turn to Kosova describing briefly the transition process, the labour market and the emigration patterns. Due to the lack of studies, this paper provides a comprehensive study of issues related to human capital and the working of labour market in Kosova. We discuss these issues in the context of South-Eastern European countries. The data and methodology are described in Section 5. The data used in our analyses are from the Household and Labour Force Survey undertaken by the Riinvest Institute in December 2002, as well as the data and reports from the Kosova Education Centre. The probability of unemployment and the probability of emigration are estimated employing a Logit model. In Section 6 some concluding remarks are given. Research findings might be used for developing policy proposals.

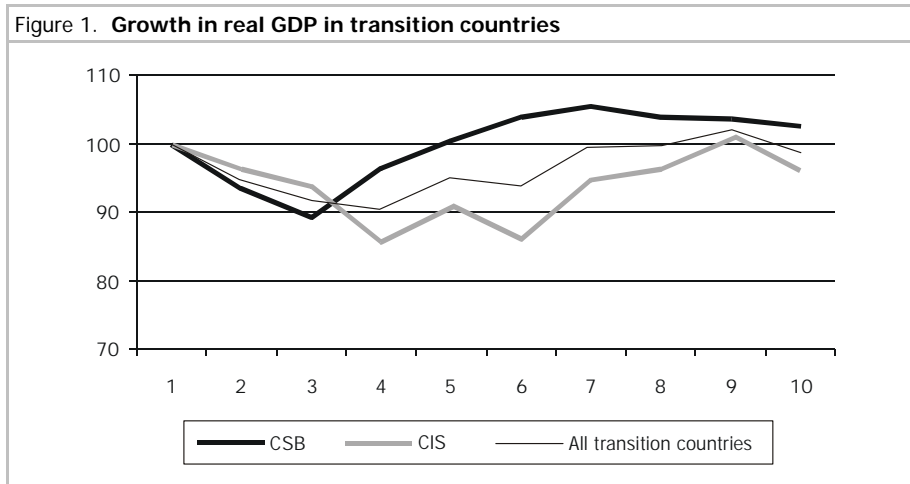
## 2 Structural Adjustment and Unemployment During the Transition

The transition process that started with the breakdown of the command economy in Central and Eastern European countries brought about deep changes in the life of people residing there. These changes were both unique and very profound. They are still going through the process of transforming economies after more than a decade that passed since the communist system was abandoned. Some of these countries have made significant progress, whereas some of them still lack the necessary steps for the foundations of a market economy. Recently, the output has recovered to the pre-transition level (at least in most of the Central European countries), but employment is still lagging behind. The unemployment rate remains high though it has been decreasing.

Transition from a command to a market economy is being shaped by two main mechanisms, i.e. reallocation and restructuring (Blanchard, 1997). First, as transition started the governments cut down subsidies and introduced hard budget constraints to state-owned firms. Consequently, there was a disruption in the production process in large industrial state enterprises and a gradual increase in the private sector. Therefore, the behaviour of output during the transition can be described as having a U-shape – a decline initially and a recovery later on (Figure 1). Prices were liberalised making it even harder for these firms to operate. New employment moved toward the growing sectors, a process called reallocation. Part of the decline in activity was due not so much to reallocation, but rather to de-organisation. In the pre-transition period, firms were



organised differently, around a central plan rather than markets: they had only one supplier for each of their inputs and one buyer (or a certain number) of output. As transition started, these bilateral relations were destroyed, leading to a disruption in the production process.



*Source: EBRD (1999). Years are not in calendar term, year 0 is the year before the transition process started and GDP in that year is equal to 100. This is important since not all countries started the transition process in the same year. In this way we can compare the behaviour of the GDP across countries during the transition.*

The second process that shapes transition is restructuring. It implies that some of those currently employed will lose their job either because of their obsolete human capital or because of the closure of some plants. Therefore, it is expected that under restructuring some employees will be laid off. On the other side, restructuring leads also to an increase in productivity of the remaining employees.

Full employment (zero unemployment), centrally set wages and overstaffing characterise the labour market in the pre-transition period. As the transition process started both supply and demand for labour were affected. Sectoral reallocation of labour was evident as a result of the shrinkage of some sectors (heavy industry) and the development of others (services and light manufacturing). Given these adjustments, full employment was no longer sustainable. Some six million people became unemployed in Central and Eastern Europe. Many withdrew from the labour force. (Boeri et al. 1998; Svejnar, 1999 etc.).

Table 3 provides the unemployment rates for the CE, SEE and the Baltic countries against time. The SEE countries had higher unemployment rate during most of the 1990s compared to the CE and Baltic countries.

Burda (1993) argues that unemployment is not just a by-product of transition; it is necessary for transformations. In his study, he gives three reasons to support this claim: (i) with unemployment, the bargaining power is biased toward employers; indeed, unemployment will provide a worker-disciplining device; (ii) unemployment may be necessary to control the growth of real wages; and (iii) unemployment is necessary to allow the emergence of the private sector. He contends that for a new job to be created other have to be destroyed and concludes that neither 'big-bang' nor 'go-slow' is the best approach.

<b>Countries</b>	<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>
<b>SEE (ave.)</b>	<b>9.75</b>	<b>11.1</b>	<b>18.5</b>	<b>19.8</b>	<b>17.7</b>	<b>17.7</b>	<b>10.4</b>	<b>16.4</b>	<b>17.3</b>	<b>13.1</b>	<b>19.7</b>	<b>19.62</b>
Albania	9.5	8.9	27.9	28.9	19.6	16.9	12.4	14.9	17.8	18.0	16.8	15.2
Bulgaria	1.7	11.1	15.3	16.4	12.8	11.1	12.5	13.7	12.2	14.1	17.9	17.3
Croatia	9.3	13.2	13.2	14.8	14.5	14.5	10.0	9.9	11.4	13.5	20.6	23.0
Macedonia	18.5	19.2	27.8	28.3	31.4	37.7	na	36.0	34.5	na	32.2	34.0
Romania	na	3.0	8.2	10.4	10.1	8.2	6.5	7.4	10.4	6.8	10.8	8.6
<b>The Baltic (ave.)</b>	<b>0.55</b>	<b>0.45</b>	<b>2.6</b>	<b>6.57</b>	<b>9.37</b>	<b>15.1</b>	<b>15.3</b>	<b>12.9</b>	<b>12.4</b>	<b>13.4</b>	<b>11.4</b>	<b>na</b>
Estonia	0.6	na	na	6.6	7.6	9.8	10.0	9.7	9.9	11.7	14.8	na
Latvia	0.5	0.6	3.9	8.7	16.7	18.1	19.4	14.8	14.0	14.5	8.4	na
Lithuania	na	0.3	1.3	4.4	3.8	17.5	16.4	14.1	13.3	14.1	11.1	na
<b>CE (ave.)</b>	<b>2.55</b>	<b>8.28</b>	<b>8.98</b>	<b>11.1</b>	<b>10.7</b>	<b>9.7</b>	<b>9.34</b>	<b>8.42</b>	<b>9.78</b>	<b>10.4</b>	<b>11.7</b>	<b>12.6</b>
Czech Rep.	0.7	4.1	2.6	3.5	3.2	2.9	3.5	5.2	7.5	8.7	8.8	9.0
Hungary	1.8	8.2	9.3	11.9	10.7	10.2	9.9	8.7	7.8	7.0	6.5	6.0
Poland	6.5	12.3	14.3	16.4	16.0	14.9	13.2	8.6	10.4	12.5	16.7	17.0
Slovakia	1.2	9.5	10.4	14.4	14.6	13.1	12.8	12.5	15.6	16.2	18.9	19.0
Slovenia	na	7.3	8.3	9.1	9.1	7.4	7.3	7.1	7.6	7.4	7.5	12.0

Source: 1990-98 OECD (2000); 1999-2000 KILM, ILO (2002); 2001 WIIW, Vienna (2002).

Boeri et al. (1998) show that the most vulnerable groups to become unemployed are those with low education. The unemployment rate for older workers is lower than the rate for young ones, because many older workers took early retirement and, therefore, withdrew from the labour force. Burda (1993) and Nesporova (1999, 2001) argue that one of the causes of unemployment during the transition is 'skill mismatching' – many skills have become obsolete due to changes in production, advanced technologies and

new forms of organisation. Therefore, the unemployment prevails since adjusting occupational distribution of unemployed workers takes time.

### 3 Human Capital and Transition Economies

The role of human capital in economic growth is widely recognised in economics literature. Hanushek and Kimko (2000) show that labour force quality has a consistent, stable, and strong relationship with economic growth. The macro effects of human capital have been analysed by regressing the economic growth on human capital, as well as on other variables. Bils and Klenow (2000) show that growth and schooling are highly correlated across countries. Using empirical data, they show that greater schooling enrolment in 1960 consistent with one more year of attainment is associated with 0.30% faster annual growth over 1960-1990. Moreover, human capital accumulation seen from an individual viewpoint explains to a great extent earning differentials among individuals in the labour market. Consequently, the level of human capital is important from both macro and micro aspect. Given these facts, governments throughout the world pay increasing attention to the quality of education delivered by schools.

As the Central and Eastern European (CEE) countries progress with their reforms toward market economies, the role that human capital has to play gains importance. While the progress toward the market economy in the early stages of transition depended on the willingness and commitment of governments to implement reforms, the long run adjustment of transition economies depends primarily on the ability of human capital to absorb and to exercise the knowledge that is necessary to compete internationally. Human capital that is able to adjust to technological changes and to the principles of market economy is a prerequisite to bring economic prosperity for the nation as a whole. Moreover, as Micklewright (1999) argues, the education system [i.e. human capital] is also vital to a wider process of social change that both underpins economic reforms and is needed in its own right, because transition involves the development of new nations. The twenty-seven countries in the region today (including former Soviet republics) were born from only eight countries that existed at the beginning of the 1990s.

In the early stages of transition, the opinion whereby the level of human capital in transition countries was thought to be quite high prevailed (Druska et al., 2001; Spagat, 2001). This opinion was grounded on simply comparing enrolment rates in educational institutions in transition countries to those in the developed countries. Duczynski (2001),

using the data set from Barro and Lee (1993) based on a research that evaluates the educational attainment internationally, shows that the average years of schooling in the population aged over 15 in transition countries is found to be 9.31, with a standard deviation of 1.1. In 21 developed countries the average is 8.7 and the standard deviation is 1.8. These data reveal two facts: (i) the transition countries have higher educational attainment (the average years of schooling is higher compared to the developed countries); and (ii) inequality in educational attainment among different groups in transition countries is lower compared to that in the developed countries. Micklewright (1999) shows that comparing enrolment rates (or, in this case, the average years of schooling) provides limited information, since it neglects the quality of education obtained by the learning actually achieved. Hanushek and Luque (2002) show that one academic year of schooling in the USA is not directly comparable to one academic year in, say, the developing or transition countries and that schools and tertiary educational institutions are far from being the only avenue for education. However, it is apparent that the stock of human capital inherited from the socialist period was high compared to other countries at similar levels of economic development. The point is whether the transition countries can maintain this positive element inherited from the previous system and make further improvements. As Micklewright (1999) contends, this should constitute a major priority for economic policy.

Education acquired during the previous system is not of the type required under the open market system, and much of the skills inherited were obsolete. Spagat (2002), making use of data from an EBRD report from 2000, concludes that firms in transition countries lag behind advanced industrialised countries in terms of the quality of their workforce. The lack of successful reforms and high unemployment mean that over time there will be a continuing loss of skills, leading to an even greater gap in the quality of workforce. The educational system under the communist regime was biased toward producing graduates with very narrow skills. Those who graduated from vocational schools were generally over-represented among the number of total graduates. When the transition started, it was revealed that the marketability of these types of skills was low, with diplomas from vocational schools often being very poorly rewarded (Boeri and Terrel, 2002, Orazem and Vodopivec, 1997). This was reflected, as Boeri and Terrell (2002) and Micklewright (1999) show, by a decline in enrolment in vocational and technical schools throughout the region, and a rise in enrolment in general secondary schools and in tertiary education. This is a reflection of a mix of demand and supply factors, ranging from enterprise-based schools closing down (i.e. where graduates from vocational schools were trained for

particular enterprises) to children opting for other types of skills or dropping out of the education system altogether (Micklewright, 1999).

To sum up, much of the human capital in the transition economies would have low market value, since it was acquired under communism when priorities were very different from what they are today. Nevertheless, the human capital in the transition countries has an 'intergenerational' value in terms of passing the inherited human capital across generations and creating better chances and choices for the young generation. Therefore, it is crucial to note that *“while a Russian rocket scientist might earn very low wages, he still can do much to facilitate his children’s human capital”* (Spagat, 2001).

## 4 Kosova Among Other South-East European Countries

The countries of South Eastern Europe, including Kosova, are described as latecomers on the stage of transition. Among them are: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Kosova, Macedonia, Romania, and Serbia and Montenegro. The transition process in these countries is described as a 'retard transition', since it was disrupted by conflicts throughout the 1990s. With the total GDP of US\$50 billion and 50 million people, this is the poorest region in Europe. The labour market in these countries has been affected substantially by recent conflicts and the resulting movements of people. The combined effect of industrial decline, privatisation and economic restructuring caused a dramatic reduction of opportunities for employment. Added the limited access to the capital market, the situation becomes even worse (Grootings, 2001). New employment has been driven mainly by self-employment, such as small businesses and farms. The informal sector's share in employment is not to be neglected either.

A double-digit unemployment rate has become an accepted reality, especially among the young and less-educated people. The concern is that unemployment seems to stabilise at high levels, though data on unemployment are not very reliable especially when the informal economy is taken into account. Participation rates have been affected by ageing of population in some countries (Croatia, Bulgaria etc.), and by a high birth rate in others (Albania and Kosova). To sum up, in terms of labour market developments, the SEE countries are experiencing what the CE countries went through in the early 1990s, but on a much more dramatic scale (Grootings, 2001).

Kosova has a unique recent history reflected in its current uncertain status (Adnett and Hoti, 2003). It is one of the last countries to embark on the road of transition to market economy (Hashi, 2001). The reason is twofold: first, the occupation by Serbia during the period 1989-1999, which started with the abolishment of the Kosova's Constitution in 1989. Kosovar experts and an ILO report claim that some 145,000 workers (managerial staff in enterprises, teachers and university professors) had been dismissed from their jobs. During this period, the Albanians in Kosova established their own institutions, including government at central and municipal levels, which functioned until 1999. The international isolation of Serbia and, together with that, of Kosova aggravated the economic situation furthermore. During the period 1990-1995, GDP contracted by 50%, fell to less than US\$400 per capita.

Second, the war in 1999 displaced some 800,000 people to the neighbouring countries and to the Western Europe. After the war, the reconstruction, stabilisation and transformation policies became the responsibility of the UN Mission to Kosova based on Resolution 1244. Some progress has been achieved in terms of establishing new institutions, though their competencies are limited. GDP is recovering and was increased by 11% and 6% in 2001 and 2002, respectively, reaching the level of more than US\$1,000 per capita. The reconstruction process absorbed a considerable number of unemployed people. Some 65,000 people are working in the newly established state institutions and in the public sector.

Given the trend toward the knowledge-based economy, the human capital embodied in the Kosovan population is the nation's most important economic asset. As in other countries, the success of the Kosovan education system in developing high levels of attainment in the key competences will be an important determinant of future national economic development. Equal access to a modern education system is also a major factor in promoting equity and social welfare, as well as raising the well-being of minority and disadvantaged groups.

#### 4.1 The Labour Market in Kosova

Activity rates in Kosova are very low by European standards, with only 58% of the resident population of working age out of 1,210,000 economically active (Riinvest, 2003). This is largely due to the low activity rate among women (just over 40%). Such low activity rate, in turn, reflects very high unemployment rate (49%). When adjustments

for seasonal factors and the existence of the informal sector are made, the estimated unemployment rate falls below 40%. Currently, these rates are approximately three times the rates of Albania and Bulgaria. The unemployment rate is especially high for women (estimated at 64%), with only the Czech Republic and Albania approaching this degree of a gender gap in unemployment rates in the CEECs. Kosova faces chronic youth unemployment, estimated at 72% for those aged between 15-24, and with over 40% of all unemployed coming from this age group this problem is more severe than in any other CEE country. The lack of job creation and the resulting strongly negative duration dependence of unemployment is reflected in Kosova by having the highest proportion of long-term unemployed (estimated at 83%), with this proportion even higher for women (Adnett 2003).

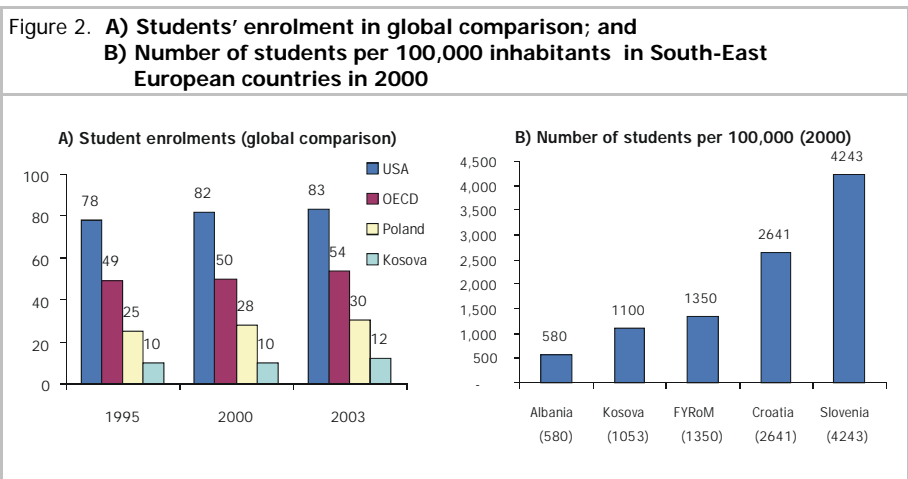
Out of the estimated 36% of the population aged between 15-64 who are employed, about two-thirds are now in the private sector. Agriculture accounts for nearly a quarter of total employment; other main sectors are wholesale/retail trades (12%), health and education (14%) and construction (7%), where manufacturing accounts for less than 4% of employment. There are over 300 state-owned enterprises employing approximately 30,000 workers with a further 30,000 on unpaid leave. Riinvest estimates that informal employment accounts for about a fifth of the total employment.

## 4.2 Education System in Kosova

Based on the data from the Riinvest Households and Labour Force Survey (December 2002), only 13% of the Kosovan population in the 25-64 age range hold higher education qualifications (18% of men and 8% of women), compared to 23% of men and 20% of women in the EU, 36% of men and 32% of women in Japan, and 37% of the US overall population. Such low percentage of people with higher education qualifications and an increasing demand in the labour market for these qualifications will put pressure on the education system in Kosova to increase its capacities.

The education system in Kosova is undergoing a reform involving every level of the system. Reforms are being undertaken in a number of key areas, with various international bodies acting as lead agents. Apart from the curricula, the reform involves the organisation of education as well as the institutions. The new 5+4+3 educational structure (primary, lower secondary and upper secondary education, respectively) is being introduced, with additional 3+2 for higher education (university and postgraduate

respectively). Less is known for the participation rate in education. According to the data from the Riinvest Labour Force and Households Survey (December 2002), the participation rate in secondary education is around 70% of the relevant cohort. Due to the growing importance of higher education for economic development, policies that target increasing participation in education in general, and in secondary and higher education (HE) in particular, are urgently needed. For the sake of comparison, the enrolment in higher education institutions in Kosova in 2003 was around 10-12%, whereas in a post-communist country such as Poland it was 30% (in the USA 80% and in the OECD countries 54%, (see *Part A*, Figure 2 below). There are roughly 1,000 students per 100,000 inhabitants enrolled in higher education in Kosova (Riinvest 2004), compared to 1,350 students in Macedonia and 4,243 in Slovenia (see *Part B*, Figure 2 below). Both of these countries have similar populations to Kosova's. Due to the fact that the majority of new jobs require a higher education degree, it is even more important to increase the number of students. The increase of enrolment in higher education should be given priority if it is to raise the competitiveness of the Kosovan economy.



Source: CEPES/UNESCO, Bucharest, Romania, 2002 (mimeo).

The majority of the new jobs created in Kosova during the last four years have been created in the sector of small and medium sized enterprises (SMEs), for which the entrepreneurship skills are essential. Consequently, an education system that equips the new graduates with such skills ensures faster employment, and economic growth.



Kosova has now a 5 + 4 +3 system of primary and secondary schooling from the age of 6. Recent structural changes have been introduced with the objective of making the Kosovan education system compatible with education systems in the EU and of other developed countries. Nearly a quarter of the Kosova's population is participating in education. In the 2002/2003 school year there were 973 primary schools with 315,089 students enrolled and 20,352 teachers. In that year there were 140 secondary schools (in 72.5% of these schools the teaching is provided in Albanian, in 22% in Serbian, in 4.5% in more than one language, and in one secondary school in Turkish which makes 0.7%). The total number of students enrolled in the secondary education is 86,830 (55.1% are men). The University of Prishtina had 23,175 students enrolled in 2002/2003. There are also some private providers of higher education, but they are still in the initial stage of development.

Several previous reports on the Kosovan education system describe the system and point out the key characteristics and weaknesses before the 2001 elections (OECD 2003a). In short, the system offered little pre-school provision, suffered from high pupil absenteeism in compulsory schooling, and low participation rate in post-compulsory secondary and tertiary education. Buildings and equipment were in poor condition, and low salaries of teachers and lecturers and the lack of in-service training resulted in multiple job-holding, and a slow and uneven implementation of modern curricula and teaching and learning methods. In the old system the evaluation and assessment was not carried out centrally, all the responsibility for these was devolved to schools. There was no standardisation of assessment to enable comparison between schools and teachers, respectively. The undergraduate studies lasted for a minimum of four years; only 1,600 students graduated in 1999/2000, a quarter of these in science and engineering. Such low graduation rate, together with high non-completion rates and a long average duration of studies have been persistent characteristics of the University of Prishtina. Tuition fees were introduced in 2002/2003 and a commitment was made to reform structures and curricula in line with the Bologna process.

The education in Kosova is mainly public, and participation in private education is still low. Secondary and primary education is financed through grants from the central budget, which are transferred to the municipalities; higher education is financed directly by the Kosovan budget and by students' contributions in the form of tuition fees. Private secondary education, such as private colleges licensed by the Ministry of Education, Science and Technology, are financed through private sources. Until now there have not been developed any mechanisms that would enable a broader portfolio of financial

sources for education, such as combined private and public financing, partnership forms and use of external financial sources. Education expenditure in the 2004 Kosova budget accounts for about 15% of the total budget expenditures. Table 3 shows how spending in education in Kosova has evolved during the period 2000-2004. Spending in education is presented in absolute figures and as percentages of the total public expenditure (Hoti et al., 2004).

**Table 2. Government expenditures in education in Kosova 2000-2004, (in '000 Euros)**

	2000	%	2001	%	2002	%	2003	%	2004	%
Preschool, primary and secondary	49,493	87.3	52,241	87.0	61,740	83.5	61,444	76.8	72,814	78.6
Special needs education institutions	642	0.2	469	0.8	816	1.1	956	1.2	1,112	1.2
Higher education	6,155	10.9	6,395	10.6	9,891	13.4	11,591	14.5	12,943	14.0
National University Library	140	0.2	242	0.4	265	0.4	1,125	1.4	1,385	1.5
Education administration	251	0.4	732	1.2	1,012	1.4	4,499	5.6	2,812	3.0
Teacher training					192	0.3	230	0.3	1,280	1.4
Curriculum Development					65	0.1	200	0.2	273	0.3
Total	56,681	100.0	60,079	100.0	73,981	100.0	80,043	100.0	92,620	100.0
Total Kosova Budget	285,600		288,200		383,708		556,900		619,000	
% of total budget	20%		21%		19%		14%		15%	

Source: MEF and Riinvest (2004).

### 4.3 Emigration in Kosova

Emigration and the following impacts, both economic and social, have been widely analysed. It is shown that decisions about emigration depend on: (i) the cost of emigration; (ii) relative wage levels at home and abroad; (iii) the level of, and eligibility criteria for, unemployment benefits and social assistance; (iv) the unemployment rate at home; and (v) the level of education of those tending to emigrate.

Restrictions on people's movement both within and across countries prevailed in almost all of the former socialist countries. In some countries, for example in Albania, every movement was strictly supervised and allowed only with a special permit. The 1974 Constitution of the former Yugoslavia introduced some elements of market economy, the reforms that made it thus different from other socialist countries. People were allowed, to

a considerable degree, to move freely and to choose their residence according to their preferences. Nonetheless, other constraints prevailed, such as financial and cultural ones, attitudes etc.

As a consequence of having young population and persistently high unemployment rate, Kosova has experienced both temporary and permanent mass emigration over the recent years, with approximately half a million Kosovars living abroad and whose remittances account for about a quarter of the national income. Emigration in Kosova took place during two distinctive time periods. The first one started in the 1980s and continued during the 1990s until the 1999 war, estimated at around 250,000 people. The second wave of emigrants consisted of massive emigration/movements of population; it started during the 1988 conflict and culminated during the open war in 1999.

The emigration in Kosova had a strong impact on two aspects. First, the emigration waves of the 1980s and 1990s had an impact on the population growth, which decreased from 46,000 persons per annum in the early 1980s to 36,000 in the 1990s. Second, in terms of the labour market and private sector development, the emigration can be thought of as having two effects: (i) it puts downward pressure on unemployment since it reduces the labour supply for a given level of labour demand and, assuming there is a fixed number of vacancies, those who remain in Kosova have a higher chance of getting a job; (ii) emigration induces private employment creation due to remittances that emigrants send back home not only in cash but also in the form of machinery. It is estimated that such remittances sent by emigrants working in Western European countries amount to around \$500 million per annum. This amount is approximately a quarter of Kosova's GDP and, given the lack of social benefits/assistance, remittances are an important source of income for families residing in Kosova as well.

## 5 Data and Methodology

### 5.1 Data and Some Descriptive Statistics

The data used in this analysis are from the Household and Labour Force Survey conducted in December 2002 by Riinvest Institute. The survey was run to provide data for the labour market in Kosova, as well as to provide some demographic and household expenditure data. The unit of observation in the survey was a household, but data were collected for each family member. In total, there are data for 8,552 individuals, of whom

some 4,937 are of working age and reside in Kosova (i.e. they are not emigrants), while 2,861 of latter group are in the labour force. Table 1 summarises the main characteristics of the labour force in Kosova in general as well as of the employed and the unemployed, in particular.

	<b>Labour force</b>	<b>Employed</b>	<b>Unemployed</b>
Employment status (%)	1	0.510	0.490
		(0.500)	(0.500)
Urban residence (%)	0.500	0.588	0.444
	(0.500)	(0.493)	(0.497)
Men (%)	0.639	0.745	0.532
	(0.480)	(0.436)	(0.499)
Age (average years)	33.519	38.082	29.659
	(11.561)	(11.126)	(10.411)
Age less or equal 30, (%)	0.481	0.310	0.624
	(0.500)	(0.463)	(0.485)
Married (%)	0.635	0.773	0.509
	(0.482)	(0.419)	(0.500)
Education (%)			
No education (%)	0.017	0.009	0.019
	(0.129)	(0.096)	(0.137)
Primary education only (%)	0.252	0.152	0.324
	(0.434)	(0.359)	(0.468)
Secondary education (%)	0.572	0.553	0.580
	(0.495)	(0.497)	(0.494)
College education (%)	0.073	0.135	0.034
	(0.261)	(0.342)	(0.182)
Higher education (%)	0.081	0.150	0.036
	(0.273)	(0.357)	(0.186)
Private business ownership (%)		0.490	
		(0.500)	
Working experience			
Working experience (up to 1 year) (%)		0.181	
		(0.385)	
Working experience (1 to 5 years) (%)		0.463	
		(0.499)	
Working experience (over 5 years) (%)		0.357	
		(0.479)	
Business sector			
Agriculture (%)		0.043	
		(0.202)	
Industry (%)		0.173	
		(0.379)	
Transport and services (%)		0.484	
		(0.500)	
Education and health (%)		0.200	
		(0.400)	
Other (%)		0.094	
		(0.291)	

*Note: Standard deviations in parentheses.*

The first observation derived from Table 2 is a high unemployment rate (49%). Unemployed individuals are concentrated in rural areas (56% of the total number of unemployed live in rural areas compared with just 45% of the employed). The unemployed are younger than the employed and, as discussed below, they are also less educated. Men are over-represented, both among the labour force and the employed, the former reflecting low female activity rate. Almost two-thirds of the unemployed are under the age of 31. Nearly half of those who are employed work in the private sector. Employment is concentrated in transport and services.

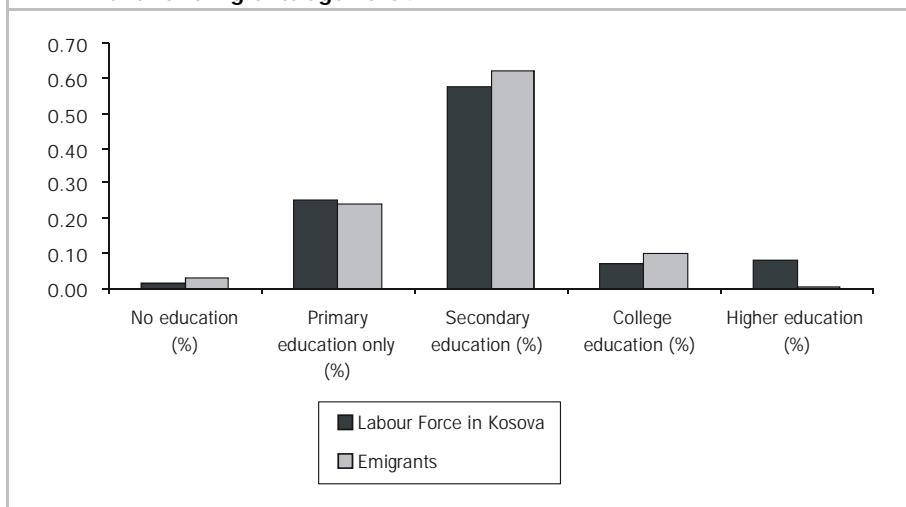
In Table 3 we present some descriptive statistics for all Kosovan emigrants residing in other countries, and for emigrants aged 16-64 (i.e. working age emigrants). From this we can get some insight about the nature and reasons for emigrating.

	<b>All emigrants</b>	<b>Emigrants aged 16-64</b>
Urban Resident (%)	0.37 (0.48)	0.38 (0.49)
Men (%)	0.66 (0.47)	0.70 (0.46)
Age (average years)	26.37 (13.69)	31.36 (9.45)
Married (%)	0.60 (0.49)	0.62 (0.49)
Education		
No education (%)		0.03 (0.17)
Primary education only (%)		0.24 (0.43)
Secondary education (%)		0.62 (0.49)
College education (%)		0.10 (0.30)
Higher education (%)		0.004 (0.07)

*Note: Standard deviations in parentheses.*

Just above one third of the Kosovan emigrants are from urban areas. This is an indication that people from rural areas are induced to emigrate more than those from urban areas, and higher unemployment rate in urban areas might be one of the explanations for this pattern. Another observation from Table 3 is that the average age of the working age emigrants is lower than that for the labour force in Kosova. If we look at education, we can notice that the emigrants are more educated than the labour force in Kosova (Figure 2), which indicates that the more educated persons tend to emigrate more.

Figure 3. **The education level for the labour force in Kosova and for emigrants age 16-64**



Source: Data from Riinvest Labour Force and Household Survey (2002).

## 5.2 Methodology

Our primary objective in this analysis is to explore what is happening to the human capital in the post-war Kosova. Due to the data limitations we cannot analyse many aspects of human capital formation and deterioration in Kosova. We have, in particular, explored the probability of being unemployed and emigrating. Our analysis, therefore, consists of two parts.

First, using the data for 2,861 working age individuals, who are active in the labour force (either employed or unemployed) and reside in Kosova, we estimated the probability of being unemployed. We employed a Logit specification, which is expressed as the odds ratio in favour of being unemployed (i.e. the ratio of the probability that a person in the labour force will be unemployed to the probability that that person will not be unemployed). The dependent variable is the probability of one being unemployed and the independent variables are: residence (urban/rural), gender, age, marital status and level of education. Due to data limitation we could not discriminate between types of education (vocational, general etc). This would have allowed us to see whether there is any difference in one's employment status depending on whether he/she has finished a vocational or general-type of education. Our first model is presented below.

$$(1) \quad P(U)_i = \beta_1 + \beta_2 \text{Resid}_i + \beta_3 \text{Gender}_i + \beta_4 \text{Age}_i + \beta_5 \text{Ageless31}_i + \beta_6 \text{Married}_i + \beta_7 \text{NoEdu}_i + \beta_8 \text{SecEd}_i + \beta_9 \text{UniEd}_i + \beta_{10} \text{PostUniEdu}_i + u_i$$

where the  $i$  subscript stands for an individual, while other variables are defined as follows:

Resid	= 1 if living in urban areas, 0 if living in rural areas
Gender	= 1 if male, 0 if female
Age in years	
Ageless31	= 1 if age is less than 31, 0 if 31 and older
Married	= 1 if married, 0 otherwise
NoEdu	= 1 if the individual did not complete any education level, 0 otherwise
SecEd	= 1 if the individual has completed secondary education, 0 otherwise
UniEdu	= 1 if the individual has completed university education, 0 otherwise
PostUnivEdu	= 1 if the individual has completed post-university education, 0 otherwise

In the second part of our analysis we estimate the probability of emigration. The model is the same (Logit Model) and the independent variables are: residence (urban/rural), gender, age, marital status and level of education. The data used for this analysis consist of data for 2,301 individuals of working age (16-64), regardless whether they are in the labour force or not, of whom 456 are emigrants (19%).

$$(2) \quad P(E)_i = \beta_1 + \beta_2 \text{Resid}_i + \beta_3 \text{Gender}_i + \beta_4 \text{Age}_i + \beta_5 \text{Ageless31}_i + \beta_6 \text{Married}_i + \beta_7 \text{NoEdu}_i + \beta_8 \text{SecEd}_i + \beta_9 \text{Uni. \& post-uni. Ed}_i + u_i$$

where the  $i$  subscript stands for the individual, while other variables are defined as follows:

Resid	= 1 if living in urban areas, 0 if living in rural areas
Gender	= 1 if male, 0 if female
Age in years	
Ageless31	= 1 if age is less than 31, 0 if 31 and older
Married	= 1 if married, 0 otherwise
NoEdu	= 1 if the individual did not complete any education level, 0 otherwise
SecEd	= 1 if the individual has completed secondary education, 0 otherwise
Uni. & post-uni. Ed	= 1 if the individual has completed university or post-university education, 0 otherwise

Schooling in both models is measured by the level of education completed and, as showed above, we cannot distinguish between different types of schooling. It would be expected that those with vocational education face higher probability of being unemployed compared to those with general education qualifications. The omitted category for education in both models is primary education. Note that in the second model we have combined both university and post-university types of education.

## 6 Empirical Findings

Prior to the assessment, we expected that those who are less educated, reside in rural areas and are young face higher probability of becoming unemployed. Regression results for Equation (1) are presented in Table 4 below. In addition, Equation (1) is estimated for all persons in the labour force who reside in Kosovo (column 1) and for men and women separately (column 2 and 3, respectively).

All coefficients in column 1 have the asterisk sign and all the coefficients except those in 'age less than 31' and 'no education' are not significant. Based on these results, it can be said that the probability of being unemployed is lower if a person is an urban resident, and a married male. This probability decreases also with age and with the level of education. These results are consistent with other statistics whereby the unemployed are concentrated in rural areas, among females, youth and less educated individuals.

The regression results presented in column 2 and column 3 for men and women respectively show mainly the same pattern as those in column 1, except that the coefficient on urban residence for women is not significant and has the wrong sign.

In general, all coefficients in three columns show consistency that the probability of unemployment is lower for urban residents, for men and for married individuals. It decreases with age and with the level of education.



**Table 5. Probability of being unemployed using logit maximum likelihood estimation**

Regressors	Dependent variables		
	Incidence of unemployment (all)	Incidence of unemployment (men)	Incidence of unemployment (women)
	1	2	3
Constant	3.17* (10.20)	2.37* (6.33)	3.27* (5.95)
Urban resident	-0.27* (-3.18)	-0.44* (-4.22)	0.10 (0.65)
Male	-0.80* (-9.06)		
Age	-0.05* (-6.96)	-0.04* (-5.28)	-0.06* (-4.51)
Age less than 31	-0.12 (-0.79)	-0.16 (-0.86)	-0.09 (-0.37)
Married	-0.48* (-4.70)	-0.66* (-4.82)	-0.28** (-1.74)
No education	-0.17 (-0.51)	-0.30 (-0.63)	-0.04 (-0.09)
Secondary	-0.62* (-6.13)	-0.54* (-4.25)	-0.84* (-4.86)
Uni. Education	-1.41* (-7.19)	-1.39* (-5.20)	-1.54* (-5.18)
Post-Uni. Educ.	-1.59* (-8.25)	-1.33* (-5.39)	-2.01* (-6.61)
Sample size	2861	1829	1032
Goodness of fit	0.692	0.690	0.696
Pseudo-R <sup>2</sup>	0.145	0.123	0.110

Note: t-statistics in parentheses; \* significant at 5% level of significance; \*\* significant at 10% level of significance.

The second part of our analysis consists of estimating the probability of being an emigrant from Equation (2). The results from a Logit Maximum Likelihood Estimation are presented in Table 5. All coefficients have the asterisk sign, though not all of them are significant. From the regression results, the following observations can be made: (i) urban residents are less likely to emigrate than rural residents; (ii) men are more likely to emigrate than women; (iii) the probability of emigration decreases with age, but there is no significant difference in the probability of emigration between those aged under 31 and those of 31 and above; (iv) married people are more likely to emigrate; and (v) the probability of emigration increases with education.

<b>Regressors</b>	<b>Incidence of emigrating</b>
Constant	-1.45*
	(-3.86)
Urban resident	-0.38*
	(-3.40)
Men	0.82*
	(6.83)
Age	-0.03*
	(-3.41)
Age less than 31	0.04
	(0.19)
Married	0.50*
	(3.59)
No education	0.30*
	(0.91)
Secondary	0.47*
	(3.60)
Uni. & post-uni. education	0.33**
	(1.658)
Sample size	2,301
Goodness of fit	0.806
Pseudo-R-Squared	0.053

Note: t-statistics in parentheses; \* significant at 5% level of significance; \*\* significant at 10% level of significance.

## 6 Conclusions

In this paper we have analysed the human capital, unemployment and emigration in Kosovo. Two issues were analysed in particular. First, with the help of the data from the Riinvest Labour Force and Household Survey (December 2002), we estimated the probability of unemployment for those who are of working age, who are active in the labour force and reside in Kosovo. Empirical findings show that the probability of unemployment is lower for urban residents, for men and for married people. It also decreases with age and with the level of education. From these results we can show that the human capital of women, young and less educated individuals is deteriorating. Unless necessary steps are taken to reintegrate these people into the employment world, they will become a burden to the society.

In the second part we have explored the probability of emigration. The empirical results show that the probability of emigration is lower for urban residents compared to rural residents and that men and married people tend to emigrate more. On the other side, it is

also shown that more educated people have higher propensity to emigrate. This is primarily due to the fact their chances of finding a better job and life abroad are higher along with lower emigration costs (included are searching costs). These results point to the issue of “the brain drain”, which is becoming a real concern for some of the transition countries. In Albania, nearly 1,000 academics who emigrated during the 1990s created a vacuum in the academic life there. Although in Kosova this phenomenon is still not strong, there are signs that as time passes it will become a real concern. More educated people constitute the most productive part of the society and their emigration has a strong impact on domestic economy. From this point of view, the government should create better environment for the highly-educated people in order to stimulate them to stay and to work in their home country.

The debate over the right emigration policy is still going on. It seems that this debate is balanced stating both positive and negative aspects of emigration. Given the high unemployment rate in Kosova, emigration is playing an important part in financing the consumption expenditure of the families in Kosova, as well as financing investment expenditure by the private sector. We did not explore the latter issue and this might be an interesting topic for another research.

If we reconcile the results from two regression equations than some interesting relationships can be found. Firstly, the individuals residing in rural areas face higher probability of unemployment. Consequently, they tend to emigrate more compared to those residing in urban areas. Secondly, men and married people face lower probability of unemployment. But they also tend to emigrate more compared to their respective counterparts. There is no straightforward explanation for this, although one might say that emigration is also a function of the family size (i.e. individuals from larger families - married people - tend to emigrate more). Thirdly, although more educated individuals face lower probability of unemployment in Kosova, they tend to emigrate more than less educated individuals.

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# **Financial Sector, Inflation and Monetary Policy**



# Deposit Interest Rates, Asset Risk and Bank Failure in Croatia

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## Abstract

During the 1980's and 1990's, financial liberalization became an almost universally-accepted policy prescription. Large numbers of countries eased licensing, deregulated interest rates and dismantled systems of directed lending. However, banking system crises, first in the southern cone of Latin America in the early 1980's and later in the U.S., Scandinavian countries and a large set of emerging market economies, raised questions about the links between financial liberalization and instability. In particular, Hellman, Murdoch and Stiglitz (2000) question the wisdom of complete deregulation of deposit interest rates, arguing that this can facilitate "purchasing market share" to fund "gambling."

The transition countries of Central and Eastern Europe provide an interesting laboratory to test these arguments. Starting in the early 1990's, these countries rapidly liberalized their banking markets, removing restrictions on entry, asset composition and interest rates. For this reason, the experience of such countries may help confirm whether the U.S. experience of the 1980's was typical.

In this paper, we examine the experience of Croatia, which liberalized its banking regulations in the early 1990's. After the end of the wars surrounding the break-up of former Yugoslavia, Croatia experienced rapid growth in the number of banks, strong deposit growth and substantial increases in deposit interest rates in the period 1995-98. This buoyant period was punctuated by the failures of numerous medium-sized banks in 1998 and 1999.

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Our argument is that high deposit interest rates helped fund the expansion of risk-loving banks, and had important negative external effects on healthy banks, thus making a strong contribution to the banking crisis of 1998-99. We proceed in two steps. First, using panel regression techniques, we show that banks were able to increase deposit growth, and thus fund rapid expansion, by raising interest rates in the pre-crisis period. We also show that the interest-elasticity of deposits completely vanished during the banking crisis.

Second, we provide a set of predictive models of bank failures. These models show that deposit interest rates were one of the most significant variables predicting bank failures. High risk banks—the ones that eventually failed—often offered higher deposit interest rates than low risk banks.

Having shown that high deposit interest rates were a source of funding for risky banks, and that high deposit interest rates are correlated with eventual failure, we end the paper with a discussion of policy implications.

**Keywords:** interest rate regulation, banking crisis, bank failure models, financial liberalization

**JEL Classification:** G21, G28

# 1 Introduction

During the 1980's and 1990's, financial liberalization became an almost universally-accepted policy prescription. Large numbers of countries eased licensing, deregulated interest rates and dismantled systems of directed lending. However, banking system crises, first in the southern cone of Latin America in the early 1980's (Diaz-Alejandro, 1985), and later in the U.S., (White, 1991; Kane, 1989) Scandinavian countries (Nyberg and Vihriala, 1994; Vihriala, 1996) and a large set of emerging market economies, raised questions about the links between financial liberalization and instability (for cross-country econometric evidence see Demirguc-Kunt and Detriagache, 1998; 1999). While there are strong arguments and some evidence to argue that financial liberalization is beneficial in the long-term (Allen and Gale, 2003; Ranciere, Tornell and Westermann, 2003) there is much controversy about the medium-term costs and the optimal approach to regulation under liberalized conditions.

A crucial component of financial liberalization is the liberalization of interest rate setting. With the lifting of Regulation Q in 1980 in the United States, intellectual fashion moved against the regulation of deposit interest rates. However, in the decade that followed the lifting of regulation Q, the U.S. experience provided considerable anecdotal evidence about the negative effects of unlimited freedom to set deposit interest rates. Some aggressive banks used high deposit interest rates to fund their risky lending strategies. And the high deposit interest rates of these banks created a negative externality by forcing less risk-loving banks to raise their deposit rates to retain deposits, thus squeezing bank profits and creating a secondary impulse for less risky banks to actually increase the riskiness of their portfolio. Despite this, deregulation of deposit interest rates became a standard element of the financial liberalization package adopted by large numbers of countries.

Keeley (1990) argues that the increase in risk-taking following deregulation was the result of the combination of unrestricted competition with fixed-premium deposit insurance. Increased competition erodes franchise value. Under fixed-premium deposit insurance, this increases the attractiveness of added risk, since greater probability of failure is not reflected in higher premia and thus does not increase the extent of losses suffered by the owner under failure. At the same time, added risk implies higher earnings under favorable outcomes, and thus increases the bank's capital conditional upon survival. Keeley demonstrates that banks with greater market power maintain higher market-value capital-asset ratios and enjoyed lower interest rates on large, uninsured

certificates of deposit. Reversing this, the erosion of franchise value caused by deregulation would lead to higher deposit interest rates.

Hellman, Murdoch and Stiglitz (2000) provide a theoretical argument to show that, in an environment with only capital adequacy regulation and no regulation of interest rates, banks may have an incentive to bid up deposit interest rates so as to gain the funding to “gamble” (increase asset risk). Only a combination of capital adequacy regulation and deposit interest rate limitations can implement the Pareto-optimal allocation under all circumstances. Capital adequacy regulation alone tends to fail when competition is strong, i.e. precisely in deregulated banking systems. Hellman et al consider systems with and without deposit insurance, but they only consider fixed-premium insurance, and acknowledge that “sophisticated fee schemes can be used to reduce moral hazard”.

This leaves open the question of whether the levying of risk-adjusted deposit insurance premia could eliminate incentives to excessive risk-taking. Chan, Greenbaum and Thakor (1992) argue that both incentive and information problems make fairly-priced deposit insurance unfeasible. This question has been hotly debated since then, but the thrust of the literature seems to lean against the feasibility of completely eliminating risk-taking via risk-adjusted deposit insurance premia (see, for example, Flannery, 1991; John and John, 1991; Crane, 1995; Kupiec and O’Brien, 1997; and Freixas and Rochet, 1998; Galac, 2004 provides an overview). Based on this, we hold that risk-adjusted premia, although possibly desirable, cannot be a panacea that wholly eliminates the problem of “market-stealing” increases of deposit interest rates to fund “gambling.”

Taken together, all this points to a connection between “excessive” competition in the deposit market and suboptimal increases in risk taking. The transition countries of Central and Eastern Europe provide an interesting laboratory to test these arguments. Starting in the early 1990’s, these countries rapidly liberalized their banking markets, removing restrictions on entry, asset composition and interest rates. For this reason, the experience of such countries may help confirm whether the U.S. experience of the 1980’s was typical.

In this paper, we examine the experience of Croatia, which enacted rather liberal regulations regarding entry, asset composition and interest rates in the early 1990’s. After the end of the wars surrounding the break-up of former Yugoslavia, Croatia experienced rapid growth in the number of banks, strong deposit growth and substantial

increases in deposit interest rates in the period 1995-98. This buoyant period was punctuated by the failures of numerous medium-sized banks in 1998 and 1999.

Our argument is that high deposit interest rates helped fund the expansion of risk-loving banks, and had important negative external effects on healthy banks, thus making a strong contribution to the banking crisis of 1998-99. We proceed in two steps. First, using panel regression techniques, we provide evidence to show that banks were able to increase deposit growth, and thus fund rapid expansion, by raising interest rates in the pre-crisis period. We show that the interest-elasticity of deposits was positive and significant, so that “market-stealing” behavior a la Hellman et al was feasible. We also show that the interest-elasticity of deposits completely vanished during the banking crisis as a flight to quality occurred.

Second, we provide a set of predictive models of bank failures. These models show that high deposit interest rates were one of the most significant variables predicting bank failures. That is, high risk banks – the ones that eventually failed – often offered higher deposit interest rates than low risk banks.

Having shown that high deposit interest rates were a source of funding for risky banks, and that high deposit interest rates are correlated with eventual failure, we end the paper with a discussion of policy implications. We argue that some form of market-conforming regulations to prevent “market-stealing” would be an appropriate safeguard.

The paper proceeds as follows. Section 2 provides a brief overview of the liberalization of the banking market in Croatia in the 1990’s and the dynamics of growth and crisis. Section 3 offers an econometric analysis of deposit growth. Section 4 presents models of failure and elucidates the role of deposit interest rates in failures. Section 5 provides a discussion of policy options and conclusions.

## 2 Liberalization, Growth and Crisis in the Croatian Banking Sector

The liberalization of the banking system in Croatia started while Croatia was still part of the former socialist Yugoslavia in 1989-90. A new banking law was enacted, allowing relatively free entry, and interest rates were deregulated. Bank supervision was established, but its effectiveness in the early years was limited.

Liberalization took place under conditions of war, accompanied by high inflation and sharp declines in output. A macroeconomic stabilization program implemented in October 1993 succeeded in bringing inflation under control, and real GDP growth began in 1994. Decisive military actions in May and August 1995, and the signing of the Dayton Peace Agreement in neighboring Bosnia and Herzegovina in November 1995 and the Erdut Agreement in late 1996 ended the period of conflict and brought about a sharp decline in political risk.

The number of banks grew rapidly, even during the war, rising from 22 in 1991 to some 61 in 1997. In addition, by 1997, 36 savings banks, with limited licenses, were also operating. Deposits began growing strongly in 1995. Growth came partly as a result of the return of deposits placed in foreign banks by Croatian citizens during the war. In addition, growing confidence in the banking system began to attract deposits held “in mattresses”.

Table 1. **Banking and macroeconomic overview**

	1990	1995	1996	1997	1998	1999	2000	2001	2002	2003
Number of banks	22	54	58	60	60	53	46	44	46	42
Foreign banks	0	1	5	7	10	13	20	24	23	19
Foreign bank assets share	0	1.0	1.0	4.0	6.7	39.9	84.1	89.3	90.2	91.0
Real GDP growth, %		6.8	6.0	6.8	2.5	-0.9	2.9	4.4	5.2	4.3
Inflation, %		3.8	3.4	3.8	5.4	4.4	7.4	2.3	1.9	1.7

1996 in particular witnessed a substantial increase in deposit interest rates at some banks. Interest rates on domestic currency deposits rose dramatically in late 1995 and early 1996 (see Figure 1). However, it should be noted that these deposits accounted for a very small portion of the total. Interest rates on fx deposits, the bulk of deposits, rose substantially later in the year. A number of banks offered interest rates on deposits in Deutschmarks that exceed comparable rates in Germany by some 800 to 1000 basis points (see Kraft, 1999 for details).

Deposits grew explosively in this period, with annual growth rates exceeding 50% through most of 1996 and all of 1997 (see Figure 2). Both kuna and fx deposits grew rapidly.

Figure 1. Average bank deposit interest rates

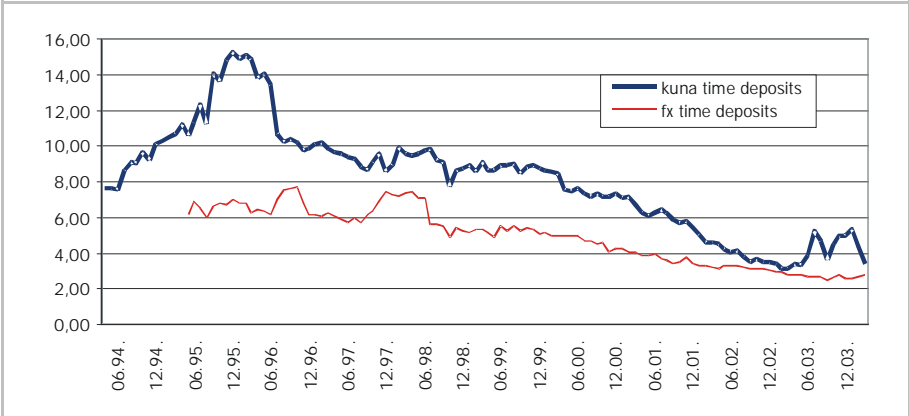


Figure 2. Rate of growth of non-transactions deposits, % yoy



At the same time, lending surged, reaching a peak growth rate of 44% in 1997. Such rapid growth suggested the presence of increased risk taking, and indeed, in 1998, several bank failures occurred. The failures continued into 1999, with a total of 16 banks accounting for approximately 20% of 1997 total banking assets failing in 1998-99. Deposit growth came to a halt, and aggregate deposits actually fell during the height of the crisis in February-May 1999. During the crisis, there were signs of a reallocation of deposits towards the foreign banks, as some domestic banks experienced substantial withdrawals.

The crisis was overcome through a combination of bankruptcies, lender-of-last resort actions by the central bank, and a turnaround in the macroeconomic situation starting in

the second half of 1999. The sale of four banks that had been seized by the government to foreign strategic partners in late 1999 and early 2000 helped further consolidate the situation.

### 3 Econometric Analysis of Deposit Growth

The brief background sketched out in section 2 suggests that risk-loving banks used increases in deposit interest rates in the expansionary period of 1995-97 to fund rapid lending growth. However, once bank failures began, a flight to quality occurred, in which interest rates were no longer the decisive factor in deposit allocation.

To test whether this picture is accurate, in this section we build a panel model of depositor behavior and test it on the Croatian data. Our dependent variable is the quarterly rate of growth of deposits at individual banks. Depositors' decision to make deposits in a particular bank should be affected by the interest rate offered by the bank relative to interest rates offered by other banks. For this reason, we use the difference between the interest rate of the individual bank at a given time from the average for all banks at this time, rather than simply the interest rate of the individual bank.

Also, we focus on one particular interest rate, the interest rate of foreign currency time deposits. We do this for two reasons. First, by using a narrow category of deposits, we make sure that shifts in deposit composition do not contaminate the interest rate series. Second, foreign exchange time deposits are overwhelmingly the largest category of deposits, and thus it makes sense that savers would choose to make deposits on the basis of this interest rate (if interest rates are crucial to their choice of bank).

In addition, bank characteristics may affect depositor perceptions. However, it should be noted that disclosure about bank performance was fairly limited in Croatia in the 1990's. Banks were required to publish audited annual reports, and banks offers of interest rates and other deposit conditions were also public knowledge. However, banks were not required to provide any higher frequency information about themselves, and the Croatian National Bank, the regulatory institution, did not publish any further bank data. Central bank analysts did publish two overviews of bank performance during 1997, one of which used peer group data (Kraft and George, 1997) and the other of which pointed out the dangers of rapid growth and singled out a set of rapidly-growing banks (Šonje, 1997).



A crucial element in depositor behavior towards bank risk is the existence of deposit insurance. A Law on Deposit Insurance was passed in 1994 (Government Gazette 44, 3, June 1994). However, enabling legislation was only passed much later, providing for the collection of the first insurance premia in mid-1997 and the introduction of limited insurance (full coverage of all household savings deposits up to 30,000 HRK, and 75% of the amount of deposits between 30,000 and 50,000 HRK) was announced for January 1, 1998. Thus, while insurance was not in place in 1996 and 1997, it was expected in the immediate future.

Furthermore, the experience of the early 1990's could easily have lead savers to believe that the government would not tolerate bank failures. The second, third, fourth and fifth largest banks in the country were clearly insolvent as of 1995, and were taken over and recapitalized by the government in 1995 and 1996. This, and the rather politicized banking environment, could well have created expectations either that banks would not be allowed to fail, or that an implicit government guarantee was available. Only in March 1999, when four banks were sent to bankruptcy, did it become entirely clear that failures would happen and that deposit insurance coverage was limited.

Given this situation of a perception of strong government guarantees, one would expect that depositors would be relatively indifferent to bank risk in allocating their deposits. However, it still seems important to control for bank characteristics in modeling deposit allocation. For one thing, bank size could impact on the convenience of making deposits and on name recognition. For another, even if a relatively limited number of depositors chose banks on the basis of perceived soundness, indicators of solvency would be relevant. We therefore include Tier 1 capital to asset ratios as a way of seeing whether this very broad indicator of soundness affected depositors' behavior, with the caveat that depositors would only have had the previous year's end-year figure to work with. However, capital asset ratios change slowly in quarterly data.

We intentionally avoid using asset quality data as an indicator of bank soundness for two reasons. First, such data was not available at all to the public, since it was not disclosed in annual reports or in central bank publications. Second, the data before 1999 was clearly unreliable. In several bank failures, asset quality was found to be very poor upon failure, but previous call reports indicate minimal problems. Bank supervisors had been unable to ensure accurate reporting in many cases.

A last bank characteristic variable is a dummy variable for foreign banks. Casual empiricism suggests that foreign banks enjoyed reputational advantages over domestic banks that allowed them to gather deposits more rapidly.

In addition, we control for macroeconomic conditions that would shift the rate of growth of deposits from quarter to quarter. We use the rate of growth of real GDP and inflation to pick up changes in income and activity.

Finally, we use dummy variables for the period before, during and after the banking crisis. These dummies are interacted with the interest rate differential term to allow us to pick up the changes, if any, in deposit interest elasticity over the three periods.

Before proceeding to describe the regressions, it should be noted that we are testing the interest elasticity of deposits and not the relationship between perceived bank risk and interest rates on uninsured bank liabilities. The latter relationship is indicative of the potential level of market discipline. Martinez Peria and Schmukler (2000) have analyzed this effect for a set of Latin American countries, and Ellis and Flannery (1992), Brewer and Monschean (1994) and Keeley (1990) have analyzed this effect for U.S. banks. We argue that interest rate differentials at Croatian banks in the pre-crisis period were mainly generated by aggressive banks' desire to grow rapidly, and not by depositors' "punishing" perceived risk-takers. However, to test for such "market-discipline" behavior, we have included the bank characteristic variables, log total assets and Tier 1 capital ratio, in our specification. Given the low credibility of deposit insurance in Croatia, we cannot a priori dismiss the hypothesis that depositors "punished" risky banks with higher deposit interest rates even after the introduction of deposit insurance in the beginning of 1998.

The regressions are run on quarterly data spanning the third quarter of 1996 and the third quarter of 2003 using pooled least squares. The bank-by-bank data are taken from Croatian National Bank call reports, while the macroeconomic data are taken from the CNB Bulletin and the Bulletin of the Central Bureau of Statistics. Interest rate variables are contemporaneous, but the bank characteristics variables are lagged one quarter. This effectively means using the value at the end of the previous quarter, immediately before the start of the current quarter.

The results are shown in Table 2 below. Column 1 shows the results without macroeconomic control variables, and Column 2 shows the results with macroeconomic control variables.

	(1)	(2)
Constant	0.205 (2.74)**	0.213 (2.83)**
Interest differential	0.032 (3.70)**	0.032 (3.81)**
Interest differential x Crisis dummy	-0.062 (5.78)**	-0.062 (5.78)**
Interest differential x Post-crisis dummy	-0.038 (3.86)**	-0.037 (3.82)**
Deposit growth (-1)	0.105 (2.17)**	0.104 (2.14)*
Foreign bank dummy	0.071 (3.77)**	0.072 (3.76)**
Log total assets (-1)	-0.004 (0.85)	-0.004 (0.83)
Tier 1 capital/assets (-1)	-0.011 (0.24)	-0.008 (0.17)
Crisis dummy	-0.054 (2.12)*	-0.057 (2.21)*
Post-crisis dummy	-0.057 (2.72)**	-0.060 (2.87)**
Euro-effect dummy	0.100 (3.29)**	0.096 (2.71)**
Real GDP growth		0.091 (0.99)
Retail price inflation		-0.870 (1.00)
Adjusted R-squared	0.173	0.167
F-statistic	25.81	21.796
(probability)	0.000	0.000

Note: Number of cross-sections: 29. Total observations: 1243. \*\* Significant at 1%, \* significant at 5%, + significant at 10%.

The most important message is this: the interest-elasticity of deposits is positive during the rapid expansion period, and then actually becomes negative during the crisis period. This negative value is confirmed by a Wald test, which shows that the estimated value - 0.019, and the probability of this value being equal to 0 is  $p=0.0005$ . Furthermore, after the crisis, the interest-elasticity rises relative to the crisis period but the point estimate remains slightly negative. A Wald test shows that we cannot reject the hypothesis that the post-crisis elasticity is zero ( $p = 0.2596$ ).

To complete the picture, note that the dummy for foreign banks is significant for the whole period, indicating that foreign banks showed more rapid deposit growth. We tested for changes in the foreign bank effect by interacting the foreign bank dummy with the crisis and post-crisis dummies (results not shown). During the crisis period, the

foreign bank dummy seems to rise, but the interacted crisis-foreign bank dummy is not significant at conventional levels ( $t=1.29$ ). However, this is not the whole story, since foreign banks offered lower deposit interest rates than domestic ones (Galac and Kraft, 2000). The significant negative interest-elasticity during the crisis period thus implies an even larger differential between deposit growth at foreign banks and that at domestic banks during the crisis period.

The interaction of the foreign bank dummy with the post-crisis dummy was highly insignificant, suggesting that there was no change in the foreign bank effect after the crisis was over.

Thus, the story of a sharp shift from a situation in which deposits had a high positive interest elasticity to one in which high deposit interest rates were taken as a sign of heightened risk is confirmed. In addition, we can note that both the log total assets and capital-adequacy ratio variables proved insignificant, further adding to the argument that depositors did not perceive differences in bank risk as important in their deposit allocations before the crisis.

At the same time, the zero interest elasticity of deposits in the post-crisis period suggests that depositors remained concerned that high deposit rates might signal greater risk. Furthermore, this zero elasticity suggests that deposit insurance was not considered credible. This is hardly surprising, since deposit insurance payouts were extremely slow during the 1998-99 bank failures. In some cases, the period between the blocking of the bank's accounts and the payment of insurance was almost two and half years. Even if interest were paid on deposit liabilities, liquidity-constrained depositors would certainly not be indifferent to failure in such a situation.

We also tested for changes in depositors' risk-perceptions by interacting the dummies for the crisis and post-crisis period with the bank characteristic variables, log total assets and tier 1 capital ratio (results not shown). The interacted variables also were insignificant. It would be hasty, however, to conclude from this that Croatian depositors did not "punish" banks perceived to be risk in the crisis and post-crisis periods. Rather, a more plausible interpretation of the findings would be that Croatian depositors presumed foreign banks to be less risky throughout the whole period, and that they perceived banks offering high interest rates to be risky during the crisis and to an extent after it. The continued perception by at least some depositors that high deposit interest rates are a sign of risk could help explain the estimated zero interest elasticity in the post-crisis period.

## 4 Deposit Interest Rates and the Causes of Bank Failures

Now that we have shown that banks were able to gain increased access to funding by raising deposit interest rates, we can examine whether there was a connection between high deposit interest rates and bank failure. Most research suggests that bank failures occur as a result of credit boom and bust cycles (see Logan, 2000), recklessness and fraud, and poor management. All other frequently cited reasons can be classified as belonging to the latter category (see Honohan, 1997).

Furthermore, bank failures are rare events. This makes it hard to study their causes and consequences using econometric techniques. Actually, they appear in clusters during times of political or economic instability or transition, and then they are reasonably referred to as a "banking crisis" (Hardy, 1998). This is why most empirical studies examining causes of bank failures are cross-section analyses of pre-banking crisis bank characteristics that can be reasonably conjectured to have caused the failures during the crisis.

The empirical literature on leading indicators of bank failures suggests that leading indicators can be roughly categorized into five classes: CAMELS grades, international agencies' ratings, market prices of bank stocks and subordinated debt, (standard) balance-sheet and income statements financial ratios, and other (non-standard) measures of bank risk and financial strength.

Regarding the first two classes, there is increasing evidence that traditional CAMELS grades and especially international credit ratings have limited bank failure prediction capabilities in emerging market countries. (Rojas-Suarez, 2001). Furthermore, there is some empirical evidence on the weakness of market prices in predicting bank failures not only in the less developed financial systems such as South-East Asian (Bongini et al., 2001), but also in the most developed banking systems with deep and liquid markets such as that of the US (Gilbert et al., 2001). This evidence contests the logical expectation that CAMELS grades, international agencies' ratings, and market price risk premia - all containing implicit assessments of the probability of a bank's failure by the most informed market participants - should be closely correlated with the probability of bank failure.

In the case of Croatia, this discussion is somewhat academic due to lack of data. Only one Croatian bank had been rated by an international agency prior to 1998, and only a few banks have ever had their stocks or bonds listed on the market. Also, there is no market for CD's. Furthermore, even though the interbank market is active in Croatia, it is concentrated on trading in very short term instruments whose prices carry little information on individual banks' risk premia. Finally, the Croatian National Bank, which supervises commercial banks, had not introduced CAMELS grades prior to the banking failures studied here.

The remaining two classes of potential explanatory variables for our bank failure prediction model are standard balance sheet and income statement ratios and other non-standard indicators of banks' financial condition and risk profile. Among them, the ones most commonly found in empirical studies<sup>1</sup> can further be categorized according to specific risks or strengths that they measure or proxy (see Appendix Table 1). We included most of these indicators in our initial analysis, and added some additional ones to measure or proxy specific risks faced by Croatian banks of the mid-90's (for more information see the detailed discussions of these risks in Kraft, 1999; Šonje and Vujčić, 1999; and Jankov, 2000).

We compiled a list of 38 potential explanatory variables for bank failure prediction, including 33 ratios, 2 interval values, and 3 dummies. The three dummies are: new (founded after 1989), foreign (founded as a foreign subsidiary), and "too big to fail" (by our own expert judgment). Two interval-type variables, eventually to be used for control purposes, are total assets and total off-balance sheet assets. The remaining 33 "ratios" include standard financial ratios for banks, such as return-on-average-assets and Basel-type capital adequacy ratios, but also a number of less standard measures and "quasi-ratios" (see Appendix Table 2).

Choice of the dependent variable required making several expert judgments. The first decision was whether to include both distressed and failed banks. Since the definition of distress is intrinsically subjective, and in practice often based on perceived levels of the very variables that are included in the candidate explanatory variables list, we chose to consider only effectively failed banks, i.e. those banks that eventually entered into a bankruptcy or a liquidation process (14 banks) or had been taken into state receivership

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<sup>1</sup> See for example Logan (2000), Gonzalez-Hermosillo (1999), Hanousek (1999) and Rojas-Suarez (2001).

and rehabilitated at taxpayers' expense (2 banks). Exceptionally, we also consider one bank as failed that does not formally meet these criteria, but is known to have been insolvent in 1999-2000.<sup>2</sup>

A second, related decision was to extend the time horizon for failure of bankrupt and liquidated banks, since most actually entered into bankruptcy or liquidation only after the 1998-99 crisis period, due to the unusually slow legal process of bank closure in Croatia. To be precise, we labeled as failed all banks operating at the beginning of 1998 that ceased operations before 2003 due to observable effects of the banking crisis.

Since all of the failed banks were in operation by 1996, and all but one were in operation by 1995, all of the failed banks are included in our analysis. Two foreign owned subsidiaries that only started their operations in 1997 and the one foreign branch established were excluded from the analysis, since their operations were unusual enough to produce extreme outliers on most candidate variables. This resulted in a sample of 17 failed and 40 surviving banks. Also, since not all candidate variables were measured in all three years of interest, and some banks started operating during this period, not all variables that are measured in all three years have measurements on all banks for all years.

To develop bank failure prediction models, we began by running normality tests on the candidate explanatory variables. Ex-ante, such ratio variables are expected to be highly non-normal. We used nonparametric methods to select those variables that had statistically significant discriminatory power in separating failed from survived banks. Then, considering the binary nature of the dependent variable, we examined various specifications of logistic (logit) regression models combining the variables from this reduced set, and selected the best model for each year separately, based on statistical properties and parsimony.

We used the Kolmogorov-Smirnov test for normality with Lilliefors' significance correction, and the Shapiro-Wilk test for variables on which there were fewer than 51 observations (see Appendix Table 3). The tests found that normality could not be rejected at the five percent significance level for only 5 of 35 variables tested. Even

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<sup>2</sup> *The bank was found to be insolvent by central bank examiners. A central bank administrator was appointed, and the announcement of his appointment led to a bank run. The bank was temporarily closed, and then recapitalized by government payment of back interest on certain government securities held by this bank and others. Later the bank was sold.*

among these variables, this result held true in two years for only 2 variables, and it did not hold for any variable for all three years. Therefore, we concluded that by and large the explanatory variable data set contains variables that are non-normally distributed, and as such require the use of nonparametric techniques in further analysis.

To select variables with statistically significant discriminatory power for bank failure prediction we used the Mann-Whitney U-test (see Table 4 in the Appendix) for the difference in medians between the group of failed banks and the group of survived banks. At the ten percent (two-tailed) significance level, the test found four variables that were statistically significant in every year in which they were measured. It found an additional three variables that were statistically significant in two out of three years, and seven variables that were significant in only one of three years. The seven variables and their group medians with respect to the dependent variable are shown in Table 3.

Year	Group	DR	LIQ	CAR	RLAR	LR	OHER	CM
y=1995	F=0	3.9	0.1			24.5	47.8	103.1
	F=1	6.4	-0.1			26.4	52.6	99.3
	Total	4.4	0.0			24.9	50.2	101.0
Mann Whitney U Test p		0.0001	0.0035			0.1330	0.2755	0.4294
y=1996	F=0	3.2	12.7	35.4	3.8	21.6	52.7	95.4
	F=1	7.4	-13.3	20.2	10.2	26.2	49.9	86.4
	Total	4.4	8.2	31.2	5.5	22.7	50.6	95.1
Mann Whitney U Test p		0.0000	0.0009	0.0126	0.0533	0.0143	0.0752	0.0494
y=1997	F=0	3.0	13.2	26.8	2.9	15.0	55.9	74.2
	F=1	5.8	-2.3	15.2	11.5	18.7	43.4	57.0
	Total	3.5	8.4	24.4	3.6	16.2	50.9	72.6
Mann Whitney U Test p		0.0001	0.0002	0.0024	0.0455	0.0066	0.0396	0.0347

DR represents the annual average of monthly volume weighted average deposit rates on new or renewed foreign currency denominated deposits. LIQ is the annual average of daily ratios of non-borrowed excess reserves to required reserve deposit base. CAR (capital adequacy ratio) is just a year-end standard Basel I type regulatory capital to risk weighted assets ratio. RLAR is a year end risky loans to total assets ratio, where risky loans are defined as large and very large loans as well as total exposure to connected parties. Computed analogously to DR, the LR variable represents the loan rate on domestic currency denominated new loans. The only income statement indicator among the selected variables, OHER is the year-end proportion of overhead expenses in total



expenses. Finally, the only balance-sheet variable in the selected group, CM (currency mismatch indicator) is the ratio of total foreign currency assets and foreign currency deposits.

Before analyzing the possible causal relationships between the bank characteristics measured by the selected variables and bank failures, it is surprisingly informative to examine some of the standard bank analysis ratios that did not make it to that list. For instance, in 1996 both the median ratio of (reported) impaired claims to total assets and the median ratio of (reported) nonperforming assets to total assets are actually lower for failed banks than for survived banks. In 1997 this relationship is reversed, but even then, the two ratios are statistically highly insignificant in both years. Similarly, we find the standard measures of profitability also statistically highly insignificant in 1995 and in 1997. At a same time the medians of these ratios, return on average assets (ROA) and on average equity (ROE), are indeed (slightly) lower for the failed banks in those two years, as expected. Surprisingly, both variables are statistically significant in 1996, the only year for which the medians are noticeably different.

On the one hand, these results could indicate that the failed banks split into two camps – banks that reported (more realistic) low profits and banks that reported (unrealistically) high profits, compared to the overall median. If this is correct, then they also point towards overvaluation of asset quality by failed banks as a cause for overestimation of profits. On the other hand, the results could imply that the distribution of profitability measures is similar across the failed and across the survived banks (except in 1996), which would point to factors other than profitability (or asset quality) as responsible for the bank failures.

Another group of standard bank analysis variables that is omitted from the final selection are measures of growth. Unlike the profitability and asset quality measures, all three growth measures from the initial variable set were only mildly insignificant in most years, and two of them were significant in one of three years. However, contrary to expectations, the median credit growth for the failed banks is lower than for the survived banks in 1997, the only year for which the credit growth variable showed discriminatory power. By contrast, the median off-balance sheet asset growth is, as expected, much higher for failed than for survived banks in the only significant year, 1995. Finally, the

total balance sheet growth variable has no predictive ability in any period. These results suggest that there is no simple relationship between bank growth and bank failure.<sup>3</sup>

Having eliminated simple explanations of 1998-99 bank failures in Croatia, one must turn to the selected seven variables: DR, LIQ, CAR, RLAR, LR, OHER and CM. Representing the features most closely associated with the observed bank failures, these variables also offer hope of explaining why "natural" candidate predictors of bank failures - low profitability, high levels of bad assets, and rapid growth – are not useful for explaining 1998-99 bank failures in Croatia. Looking back to Table 3 it is easy to see that the first four variables all have the expected relative values in all years. Thus, the failed banks as a group have higher deposit rates, lower non-borrowed excess reserves, lower capital adequacy and higher levels of risky loans. They also have higher loan rates in all three years, which is consistent with the anecdotal evidence that these banks attracted riskier clients and at the same time mispriced their risk. This contrasts with the more prevalent cross-country finding that low spreads are strongly associated with bank failures (Rojas-Suarez, 2001), perhaps because sudden appearance of fierce competition for deposits raises deposit rates, thus squeezing the margins and causing failures of the internally most inefficient banks.

The remaining two variables, OHER and CM, are both insignificant in 1995, and in 1996-97 their relative values are difficult to interpret. It is not clear whether the fact that the failed banks had a lower proportion of overhead expenses in total expenses indicates that their failure is in some way connected with a lower quality of employees and infrastructure. It is perhaps more likely that this result simply mirrors a higher proportion of interest expenses in total expenses at those banks, pointing to inefficient liability management. Even more confusing is the lower coverage of foreign currency denominated deposits with foreign currency assets at the failed banks. This result could reasonably be directly related to bank failure only if conditions existed that prevented banks from transforming domestic currency assets into foreign currency cash in order to meet higher demand for savings deposits during the crisis. Since this was not the case, it is possible that this variable indirectly measures some other risky behavioral pattern of the failed banks, for instance lower holdings of liquid reserves that are often held in the form of foreign currency deposits at foreign banks.

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<sup>3</sup> *For a more detailed discussion of this issue, see Kraft and Jankov (2004).*

Returning to the first four variables, each highly significant and with expected and persistent sign, it is worthwhile to try to interpret possible causal relationships between them and bank failure. The most likely explanation of the causality between high deposit rates and bank failures has already been suggested: aggressive banks used high deposit rates to fund their excessively risky business strategies, which eventually led them to failure. The negative relationship between the narrow measure of liquidity (provided by the non-borrowed reserves ratio) and the failure variable can be explained by a temporary failure of the domestic money market during the early stages of the banking crisis, or in a wider context, by the poor liquidity of all economic agents preceding the 1999 recession (Šonje, Faulend and Šošić, 2001) that made it difficult for illiquid banks to raise funds in those times of need. Alternatively, it can be explained by the generally accepted notion that, for banks, chronic illiquidity is almost always a sign of (hidden) insolvency (De Juan, 1996). For chronically illiquid banks, failure is just a question of "when".

It is worth mentioning that deposit rates and narrow liquidity are by far the most significant predictors of bank failure in our sample, with Mann Whitney U test significance levels well below one percent. The other two important variables are capital adequacy and risky loans, neither of them measured in 1995. Nevertheless, significant expected relationships with the failure variable in 1996 and 1997, and trivial interpretation makes these variables equals with the measures of deposit rates and liquidity.

Further confirmation of an unusually strong connection between deposit rates and bank failures in Croatia comes from the best logit model selection process that was performed separately for each of the three years in the sample. All variables found significant by the Mann Whitney U test for a particular year were considered for inclusion in the final model. All intermediate models were estimated using the approximate proportion of the number of failed banks in the sample (30-35%, depending on the year) as the logit model cutoff probability, emphasizing the importance of correctly predicting as many failed banks as possible. All models were estimated with the constant included, and only those with stable parameters, i.e. with the 95-percent confidence interval for the estimated odds-ratio not including the unity, were considered in the final step of the selection process.

Before the final step in the selection process, both forward and backward automatic selection procedures were performed to select several non-nested alternative

specifications with good statistical properties. The automatic procedures were based on the significance of the increase/decrease of the -2LL (log-likelihood) statistic when going from one nested model to another. Variables whose addition resulted in a significant reduction in the -2LL statistic at the 5 percent level were added to the model, and those whose deletion did not result in a significant increase in the -2LL statistic were dropped from the specification. Finally, for choosing between two non-nested models with similar in-sample classification results, the more parsimonious model was chosen, or in the case of a tie, the one with less influential observations or outliers. The best models by year are presented in Table 4.

Table 4. The "best" logit specifications									
Y=1995									
	Cut = 0.35	B	S.E.	Wald	df	Sig.	Exp(B)	95.0% C.I. for EXP(B)	
								Lower	Upper
	DR95	1.13	0.363	9.72	1.00	0.00	3.1	1.5	6.30
	Constant	-6.24	1.827	11.68	1.00	0.00	0.0		
* Total obs. = 57, missing = 12; Total outliers = 1, missclassified = 1; Total error = 24.4%, for failed = 33.3%, for survived = 20%									
Y=1996									
	Cut = 0.3	B	S.E.	Wald	df	Sig.	Exp(B)	95.0% C.I. for EXP(B)	
								Lower	Upper
	CAR96	-0.05	0.025	3.94	1.00	0.05	1.0	0.9	1.00
	DR96	1.00	0.293	11.75	1.00	0.00	2.7	1.5	4.84
	Constant	-4.38	1.459	9.01	1.00	0.00	0.0		
* Total obs. = 57, missing = 5; Total outliers = 1, missclassified = 1; Total error = 17.3%, for failed = 11.8%, for survived = 20%									
Y=1997									
	Cut = 0.3	B	S.E.	Wald	df	Sig.	Exp(B)	95.0% C.I. for EXP(B)	
								Lower	Upper
	DR97	0.57	0.191	8.79	1.00	0.00	1.8	1.2	2.56
	RLAR97	0.06	0.032	3.55	1.00	0.06	1.1	1.0	1.13
	Constant	-3.85	1.040	13.68	1.00	0.00	0.0		
* Total obs. = 57, missing = 3; Total outliers = 3, missclassified = 3; Total error = 20.4%, for failed = 17.6%, for survived = 21.6%									

The DR variable entered the best model in each of the three years. More importantly, only two other variables contributed to the model fit when added to the DR variable: the CAR variable in 1996 and the RLAR variable in 1997. The second best individual predictor of bank failure, variable LIQ did not enter any of the best models due to its high degree of correlation with the DR variable in each year. This relationship has been already documented and interpreted in earlier studies (Kraft 1999). Furthermore, the DR variable is highly correlated with most of the other variables in most of the years, except for the CAR and RLAR variables. But, CAR and RLAR themselves are highly

correlated, which explains why only one of them enters into a single model (see Appendix Table 5).

Furthermore, it seems that deposit rate variable DR is not only the best individual predictor of 1998-99 failures of Croatian banks, but it is a better predictor than all viable combinations of other good individual predictors. To test this we repeated the logit model selection process, this time without the DR among the variables considered. The comparison of the model specification containing only the DR variable, and the specification containing the best model not containing the DR variable, for each year separately, shows that the DR model is superior to all non-nested alternatives, as is evident from Table 5 (actually, the best model for 1997 has a lower -2LL statistic, but it lacks parsimony, it has two more outliers, and it is only better in identifying survived banks, so it can be considered inferior to a simple DR model). Though seemingly extreme, this result is not unprecedented, but rather it is strikingly similar to a similar finding from a study of bank failures during mid-nineties in the Czech Republic (Hanousek, 1999).

Variables in the model	No. of obs.		Outliers		Class. error, %			-2LL
	Total	Missing	Total	Miscl.	Total	for Failed	for Survived	
<b>Y=1995</b>								
DR	45	12	1	1	24.4	33.3	20.0	33.62
LIQ	48	9	1	1	31.3	43.8	25.0	52.62
<b>Y=1996</b>								
DR	52	5	2	2	19.2	23.5	17.1	40.20
ROA, LR	52	5	2	2	25.0	23.5	25.7	45.45
<b>Y=1997</b>								
DR	54	3	3	3	24.1	23.5	24.3	53.64
LR, OHAR, RLAR, CAR	56	1	5	3	19.6	23.5	17.9	44.89

In the last step, we verified that the DR variable measures a unique characteristic of bank behavior in the 1995-97 period, by reestimating the DR model for each year and for each of the five control variables (balance sheet size BS, off-balance sheet size OBS, foreign subsidiary dummy FOR, too-big-to-fail dummy TBTF, and new bank dummy NEW). As expected, including any of the size variables in the regressions was fruitless. Their individual Wald statistics were highly insignificant, while the overall model fit did not

change. Also, all interactions between the DR variable and the three dummies were highly insignificant, as were the main effects of the dummies in those regressions.

These findings strongly suggest that high bank deposit rates in the 1995-97 period are the most powerful predictors of bank failures during the 1998-99 banking crisis in Croatia. Moreover, their individual predictive power cannot be exceeded even by a carefully chosen combination of other strong individual predictors of bank failure. Also, no other strong individual predictor can significantly contribute to the predictions based solely on deposit rate levels. Finally, there are no interactions between deposit rates and other important measurable qualitative bank characteristics that can further contribute to bank failure predictions.

## 5 Conclusions

The findings in this paper lead us to the following conclusions:

- 1) “Market-stealing” via high deposit interest rates can be an effective strategy in banking markets characterized by substantial competition. In Croatia, depositors appear to have been relatively slow to link high deposit rates with increased portfolio risk. We suggest that this was due to perceptions of an implicit government guarantee, along with depositor inexperience. We would stress that such circumstances are common in newly-liberalized financial markets and are unlikely to have been unique to Croatia.
- 2) Gaining credibility for deposit insurance after a bank crisis can be difficult. In the Croatian case, where long delays in deposit insurance payout caused substantial problems for depositors, it is clear that credibility has not been fully restored even four years after the bank crisis, as is suggested by zero interest elasticity of deposits.
- 3) Foreign banks from advanced countries enjoy a reputational advantage that allows them to raise deposits despite offering lower interest rates. They were perceived by Croatian depositors as “safe havens” during the 1998-99 banking crisis. This, of course, is one of the reasons for the rapid expansion of foreign banks’ market share in Croatia and almost all of the transition countries.

- 4) The link between high deposit interest rates and portfolio risk predicted by theory is confirmed in Croatia. Although deposit interest rates are not the only predictor of failure, they are in fact the best predictor of failure in the Croatian case.
- 5) Our findings therefore lend strong support to the Hellman-Murdock-Stiglitz argument for deposit interest rate control. The Croatian case confirms the effectiveness of “market-stealing” and the links between this and risk-taking.
- 6) At the same time, the Croatian case shows the inability of newly created supervisory authorities to effectively limit risk-taking. Deposit interest rate limitations are much easier to implement than sophisticated supervisory assessments of portfolio risk, and thus seem to be a theoretically justified and practically feasible means to limit the dangers of financial liberalization without preventing reforming countries from enjoying the benefits.

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# Appendix

Table 1. <b>Typical leading indicators in bank failure prediction research</b>
<b>Credit risk indicators:</b> <ul style="list-style-type: none"><li>• loan growth, provisions to assets ratio, balance sheet growth, classified to total assets, non-performing loans to total loans</li></ul>
<b>Liquidity risk indicators:</b> <ul style="list-style-type: none"><li>• short term assets to short term liabilities, inter-bank loans to total liabilities, loans to deposits, loans to assets</li></ul>
<b>Concentration risk indicators:</b> <ul style="list-style-type: none"><li>• large exposures to total assets, large deposits to total deposits, sectoral loan shares, net interest income to total income</li></ul>
<b>Capital strenght:</b> <ul style="list-style-type: none"><li>• total assets, capital adequacy ratio, capital to assets, return on assets, return on equity</li></ul>
<b>Efficiency:</b> <ul style="list-style-type: none"><li>• net-interest margin, interest rate spreads, overhead expenses to assets</li></ul>
<b>Other strengths and hazards:</b> <ul style="list-style-type: none"><li>• age, «too big to fail» dummy, strong «parent» dummy, «foreign» dummy, deposits rates, loan rates, insider loans to assets</li></ul>

Table 2. Definition of variables				
Type	No. Code	Description	Measured risk	Expected sign
Dependent	FNAR	Narrow failure indicator – bankrupt, liquidated, rehabilitated	----	----
Dummy	1 NEW	Founded after 1989 indicator	Control	+
	2 FOR	Founded as foreign daughter indicator	Control	-
	3 TBTF	Too big to fail by expert judgement indicator	Control	-
Interval	4 BS	Total balance sheet size	Control	-
	5 OBS	Total size of off-balance sheet items	Control	+
Ratio	6 CAR	Basel 1 capital adequacy ratio	Capital strength	-
	7 RLAR	Very risky loans/total BS assets	Risk-aversion	+
	8 RIAR	Very risky investments/total BS assets	Risk-aversion	+
	9 ROBAR	Uncollateralized off-bs assets/total BS assets	Risk-aversion	+
	10 RMBAR	Mortgage backed BS&OBS claims/total BS assets	Risk-aversion	+
	11 NPAR	Non-performing BS&OBS assets/total BS assets	Asset quality	+
	12 IMPAR	Imapired BS&OBS assets/total BS assets	Asset quality	+
	13 CM	Foreign currency assets/fc deposits	Foreign exchange	-
	14 MM	Short term assets/st deposits	Liquidity	-
	15 SDI	1 – Sum (sector ass. square)/Total ass. square	Sectoral	-
	16 NCSSR	Non-core sources/sources	Liquidity	+
	17 FAAR	Fixed assets/assets	Liquidity	+
	18 PIAR	Permanent investment/assets	Liquidity	+
	19 AARER	Accruals&arrears/revenues&expenses	Liquidity	+
	20 ROA	Return on end-year assets	Profitability	-
	21 ROE	Return on end-year equity	Profitability	-
	22 PAR	Provisions/assets	Asset quality	+/-
	23 PCR	Provisions/equity	Asset quality	+/-
	24 LTIAR	Long-term investment/assets	Liquidity	+
	25 LDR	Loans/deposits	Liquidity	+
	26 DLR	Deposit placements/loan sources	Liquidity	+
	27 MGPPR	Money & gov. paper/core sources	Liquidity	-
	28 NIM	Net interest margin	Efficiency	-
	29 OHAR	Overhead exp./assets	Efficiency	+
	30 OHER	Overhead exp./expenses	Efficiency	+
	31 OBBR	Off-bs assets/bs assets	Control	+/-
	32 BSAG	Annual balance sheet growth rate	Growth	+
	33 OBSAG	Annual off-balance sheet growth rate	Growth	+
	34 LR	Interest rate on credits in national currency, ann. avg.	Adverse selection	+
	35 DR	Deposit rate on foreign currency savings, ann. avg.	Moral hazard	+
	36 SPR	LR-DR	Efficiency	-
	37 LIQ	Non-borrowed excess reserves/req. res. deposit base	Liquidity	-
	38 CRAG	Annual loan growth rate	Growth	+

**Table 3. Median descriptives for initial predictors**

	Median statistics						Tests of Normality* (Pooled)		
	N	Total	N	F=0	N	F=1	Statistics	df	Sig.
NIM95	51	14.03	35	13.96	16	15.64	0.10	51.00	0.200
OHAR96	57	9.32	40	9.02	17	9.57	0.07	57.00	0.200
OHER95	52	50.24	36	47.78	16	52.56	0.09	52.00	0.200
OHER96	57	50.60	40	52.75	17	49.92	0.06	57.00	0.200
DR96	52	4.38	35	3.25	17	7.38	0.11	52.00	0.154
MBAR96	57	25.04	40	23.40	17	31.40	0.11	57.00	0.087
DR97	54	3.51	37	2.98	17	5.78	0.12	54.00	0.066
PAR95	52	7.47	36	8.76	16	4.88	0.12	52.00	0.044
LR96	54	22.74	37	21.56	17	26.21	0.13	54.00	0.035
SPR97	54	12.17	37	12.04	17	14.00	0.13	54.00	0.029
MGPPR95	51	20.89	35	19.64	16	21.60	0.13	51.00	0.026
LR97	56	16.17	39	14.97	17	18.66	0.13	56.00	0.024
MBAR97	57	26.78	40	27.88	17	21.52	0.13	57.00	0.022
SPR96	52	18.38	35	18.31	17	18.45	0.14	52.00	0.013
SDI96	57	56.31	40	54.09	17	61.09	0.13	57.00	0.012
BS94	48	245,573	32	313,404	16	188,477	0.39	48.00	0.010
OBS94	48	41,187	32	47,763	16	31,251	0.33	48.00	0.010
CM95	50	100.96	34	103.11	16	99.35	0.45	50.00	0.010
DLR95	44	131.22	29	124.00	15	138.44	0.42	44.00	0.010
DLR96	46	118.87	30	111.86	16	150.13	0.75	46.00	0.010
BSAG95	48	15.90	32	12.93	16	42.95	0.54	48.00	0.010
OBSAG95	48	95.79	32	65.82	16	214.96	0.50	48.00	0.010
DR95	47	4.40	32	3.95	15	6.44	0.91	47.00	0.010
SPR95	48	20.24	33	20.20	15	20.93	0.77	48.00	0.010
CRAG95	48	21.58	32	19.23	16	44.98	0.58	48.00	0.010
PAR96	57	5.87	40	6.57	17	4.60	0.14	57.00	0.010
OBBR96	56	26.08	39	29.08	17	18.83	0.14	56.00	0.008
IMPAR97	57	7.38	40	7.09	17	10.20	0.14	57.00	0.005
SDI97	57	62.87	40	64.27	17	58.43	0.15	57.00	0.003
ROBAR97	57	7.48	40	7.04	17	12.38	0.15	57.00	0.003
FAAR95	52	4.92	36	4.92	16	4.63	0.16	52.00	0.003
IMPAR96	57	8.50	40	9.26	17	7.21	0.15	57.00	0.003
NCSSR97	57	8.01	40	6.83	17	10.57	0.15	57.00	0.002
OBBR95	52	25.07	36	27.32	16	22.67	0.16	52.00	0.002
PAR97	57	4.80	40	4.60	17	4.80	0.16	57.00	0.001
MGPPR96	55	24.46	38	29.62	17	19.47	0.16	55.00	0.001
RIAR96	57	7.82	40	8.18	17	7.00	0.16	57.00	0.001
RIAR97	57	7.45	40	6.87	17	7.51	0.16	57.00	0.001
MGPPR97	57	16.56	40	16.56	17	16.24	0.17	57.00	0.000
OHAR95	52	9.30	36	9.13	16	10.12	0.17	52.00	0.000
OHAR97	57	7.32	40	6.95	17	8.22	0.18	57.00	0.000
FAAR96	57	5.65	40	6.06	17	5.07	0.18	57.00	0.000
FAAR97	57	5.09	40	5.02	17	5.09	0.18	57.00	0.000
AARER97	57	25.39	40	24.27	17	28.68	0.18	57.00	0.000
NPAR96	57	3.10	40	3.18	17	2.72	0.18	57.00	0.000
ROA95	52	1.29	36	1.29	16	1.28	0.20	52.00	0.000
OBBR97	57	30.66	40	29.55	17	30.95	0.19	57.00	0.000
CAR97	57	24.38	40	26.79	17	15.16	0.19	57.00	0.000
ROBAR96	57	6.81	40	6.56	17	6.82	0.20	57.00	0.000
ROE95	52	5.26	36	5.26	16	4.67	0.21	52.00	0.000
PCR97	57	25.56	40	22.93	17	28.31	0.20	57.00	0.000
PCR96	57	24.09	40	25.57	17	22.97	0.20	57.00	0.000
ROE96	57	4.09	40	5.06	17	1.32	0.21	57.00	0.000
PCR95	52	31.35	36	45.69	16	18.54	0.22	52.00	0.000
OHER97	57	50.88	40	55.92	17	43.40	0.21	57.00	0.000

Table 3. continued									
	Median statistics						Tests of Normality* (Pooled)		
	N	Total	N	F=0	N	F=1	Statistics	df	Sig.
CAR96	57	31.17	40	35.37	17	20.18	0.21	57.00	0.000
SDI95	52	55.41	36	55.07	16	59.02	0.23	52.00	0.000
NIM96	55	12.08	38	13.03	17	10.58	0.23	55.00	0.000
LR95	51	24.90	35	24.50	16	26.40	0.24	51.00	0.000
NCSSR95	52	9.41	36	8.91	16	10.96	0.24	52.00	0.000
ROA96	57	1.01	40	1.30	17	0.20	0.23	57.00	0.000
BSAG97	57	28.36	40	28.56	17	28.36	0.24	57.00	0.000
MM97	57	107.43	40	111.76	17	100.83	0.24	57.00	0.000
CRAG96	52	33.24	36	29.24	16	53.11	0.25	52.00	0.000
BSAG96	52	21.76	36	17.22	16	34.71	0.26	52.00	0.000
LIQ97	57	8.39	40	13.23	17	-2.35	0.25	57.00	0.000
LIQ95	51	0.03	35	0.08	16	-0.10	0.26	51.00	0.000
PIAR95	52	0.69	36	0.59	16	1.35	0.26	52.00	0.000
NPAR97	57	3.56	40	2.76	17	4.12	0.25	57.00	0.000
OBSAG96	51	25.84	35	26.30	16	24.61	0.27	51.00	0.000
RLAR96	57	5.52	40	3.81	17	10.22	0.27	57.00	0.000
LIQ96	54	8.18	37	12.73	17	-13.27	0.28	54.00	0.000
PIAR97	57	0.53	40	0.43	17	1.60	0.27	57.00	0.000
NIM97	57	9.53	40	9.74	17	8.36	0.27	57.00	0.000
LTIAR95	52	1.08	36	9.48	16	0.06	0.28	52.00	0.000
CM96	54	95.08	37	95.37	17	86.44	0.28	54.00	0.000
AARER95	52	27.17	36	27.17	16	27.12	0.29	52.00	0.000
LTIAR96	57	0.07	40	1.33	17	0.01	0.28	57.00	0.000
PIAR96	57	1.27	40	0.65	17	2.09	0.28	57.00	0.000
NCSSR96	57	8.58	40	7.66	17	9.72	0.29	57.00	0.000
LDR97	57	89.72	40	92.65	17	89.15	0.29	57.00	0.000
LTIAR97	57	0.20	40	0.59	17	0.00	0.30	57.00	0.000
MM95	51	122.81	35	124.63	16	115.37	0.32	51.00	0.000
ROE97	57	6.99	40	7.20	17	6.30	0.31	57.00	0.000
ROA97	57	1.46	40	1.47	17	1.40	0.31	57.00	0.000
RLAR97	57	3.61	40	2.91	17	11.52	0.31	57.00	0.000
DLR97	52	86.36	35	73.60	17	88.37	0.33	52.00	0.000
MM96	55	115.55	38	116.58	17	112.45	0.32	55.00	0.000
LDR96	55	78.42	38	75.25	17	85.52	0.32	55.00	0.000
AARER96	57	25.26	40	23.67	17	25.64	0.32	57.00	0.000
BS97	57	483,398	40	471,783	17	528,424	0.33	57.00	0.000
CM97	56	72.57	39	74.15	17	57.03	0.35	56.00	0.000
BS96	57	397,932	40	366,306	17	463,360	0.35	57.00	0.000
BS95	52	320,517	36	322,598	16	320,171	0.37	52.00	0.000
OBS97	56	182,435	39	136,373	17	228,946	0.39	56.00	0.000
OBS96	57	98,492	40	93,492	17	129,509	0.40	57.00	0.000
OBS95	52	76,421	36	69,706	16	93,469	0.42	52.00	0.000
CRAG97	57	70.67	40	72.57	17	55.47	0.41	57.00	0.000
LDR95	51	74.28	35	72.06	16	75.09	0.43	51.00	0.000
OBSAG97	55	47.25	38	45.28	17	57.24	0.51	55.00	0.000

\* Kolmogorov-Smirnov w/ Lilliefors Significance Correction, i. e. Shapiro – Wilk for  $N < 51$

**Table 4. Mann Whitney U-test results for initial predictors**

<b>Year (2 x 1-sided p-value)</b>					
<b>Variable</b>	<b>94</b>	<b>95</b>	<b>96</b>	<b>97</b>	<b>Total</b>
DR		0.000	0.000	0.000	0.0
LIQ		0.003	0.001	0.000	0.0
CAR			0.013	0.002	0.0
RLAR			0.053	0.045	0.1
LR		0.133	0.014	0.007	0.2
OHER		0.276	0.075	0.040	0.4
CM		0.429	0.049	0.035	0.5
PIAR		0.253	0.179	0.116	0.5
CRAG		0.143	0.383	0.060	0.6
ROBAR			0.364	0.320	0.7
MBAR			0.443	0.250	0.7
BSAG		0.131	0.204	0.530	0.9
MM		0.320	0.259	0.287	0.9
SDI		0.416	0.320	0.191	0.9
LTIAR		0.440	0.332	0.215	1.0
OHAR		0.500	0.496	0.072	1.1
ROA		0.606	0.020	0.453	1.1
AARER		0.322	0.475	0.329	1.1
NPAR			0.541	0.760	1.3
MGPPR		0.792	0.202	0.364	1.4
PAR		0.108	0.303	0.958	1.4
IMPAR			0.577	0.855	1.4
NCSSR		0.905	0.530	0.078	1.5
NIM		0.855	0.051	0.625	1.5
OBSAG		0.069	0.745	0.729	1.5
PCR		0.226	0.794	0.542	1.6
SPR		0.815	0.495	0.407	1.7
RIAR			0.917	0.821	1.7
DLR		0.259	0.653	0.930	1.8
ROE		0.984	0.057	0.875	1.9
LDR		0.776	0.799	0.519	2.1
OBBR		0.428	0.866	0.931	2.2
FAAR		0.706	0.807	0.986	2.5
OBS	0.168	0.751	0.794	0.979	2.7
BS	0.304	0.937	0.650	0.903	2.8
<b>Total</b>	<b>0.472</b>	<b>12.586</b>	<b>13.461</b>	<b>15.213</b>	<b>41.7</b>

**Table 5. Correlations among final predictors**

Y = 1997

CRAG	LIQ	DR	LR	OHER	OHAR	NCSSR	CM	RLAR	CAR	
1.00	0.34	-0.09	-0.29	0.06	-0.05	-0.09	-0.20	-0.28	0.25	CRAG
	0.01	0.52	0.03	0.63	0.69	0.49	0.14	0.03	0.06	
	1.00	-0.42	-0.38	0.39	-0.02	-0.20	0.23	-0.34	0.55	LIQ
		0.00	0.00	0.00	0.89	0.13	0.09	0.01	0.00	
		1.00	0.55	-0.49	0.15	0.30	-0.47	-0.04	-0.18	DR
			0.00	0.00	0.28	0.03	0.00	0.77	0.19	
			1.00	-0.18	0.10	0.25	0.10	0.07	-0.11	LR
				0.19	0.46	0.07	0.45	0.58	0.43	
				1.00	0.30	-0.19	0.52	-0.11	0.48	OHER
					0.02	0.15	0.00	0.43	0.00	
					1.00	0.09	-0.07	0.06	0.13	OHAR
						0.49	0.61	0.68	0.32	
						1.00	-0.04	0.13	-0.06	NCSSR
							0.78	0.33	0.67	
							1.00	0.07	0.32	CM
								0.60	0.02	
								1.00	-0.44	RLAR
									0.00	
									1.00	CAR

Y = 1996

LIQ96	DR96	LR96	OHER96	NIM96	ROE96	ROA96	CM96	RLAR96	CAR96	
1.00	-0.31	-0.24	0.37	0.12	0.12	0.26	0.38	-0.28	0.63	LIQ96
	0.03	0.08	0.01	0.39	0.40	0.06	0.00	0.04	0.00	
	1.00	0.51	-0.43	-0.10	0.08	-0.04	-0.28	0.05	-0.08	DR96
		0.00	0.00	0.49	0.56	0.81	0.05	0.74	0.56	
		1.00	-0.19	0.28	0.17	0.17	0.07	0.12	-0.16	LR96
			0.16	0.04	0.22	0.21	0.61	0.38	0.26	
			1.00	0.04	-0.29	-0.14	0.30	0.00	0.51	OHER96
				0.79	0.03	0.30	0.03	0.98	0.00	
				1.00	0.29	0.41	0.44	-0.15	0.09	NIM96
					0.03	0.00	0.00	0.28	0.52	
					1.00	0.91	0.12	-0.53	0.00	ROE96
						0.00	0.37	0.00	0.99	
						1.00	0.21	-0.52	0.18	ROA96
							0.13	0.00	0.17	
							1.00	-0.10	0.44	CM96
								0.48	0.00	
								1.00	-0.39	RLAR96
									0.00	
									1.00	CAR96

Y = 1995

LIQ95	DR95	OBSAG95	
1.00	-0.30	0.14	LIQ95
	0.04	0.35	
	1.00	0.00	DR95
		0.98	
		1.00	OBSAG95

Note: \* Shaded areas mark correlations significant at the 10-percent (2-tailed) significance level.



# Household Wealth in New Europe: Towards the EU

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Fabio Mucci\*\*

## Abstract

The process of real convergence generates important challenges and opportunities for old, new and perspective EU members. While much has been said concerning convergence in terms of per capita GDP in PPS, a new way to look at the process of equalisation in standards of living of the population in an enlarged Europe, is to focus on individuals' wealth accumulation and indebtedness choices. In order to investigate these issues, this paper analyses aggregate household wealth accumulation as well as savings' allocation choices in the New Europe presenting more updated and detailed figures for financial assets compared to national published accounts. With the objective of explaining the main trends in recent years and the differences across countries, we also investigate the determinants of household wealth and liabilities accumulation as well portfolio allocation choices, focusing on macroeconomic variables, financial markets developments and households' specific characteristics. We find out that the build-up of financial wealth in the New Europe is and will continue to be mainly a product of economic growth and income levels. However, with increasing convergence in income, we expect on the one side increasing share of the population becoming able to save, on the other, increasing households demand for consumption and investment, leading to a non increasing saving propensity of individuals throughout the region. We also investigate households' financial investment choices, by distinguishing among risk-less and risky assets. In view of macroeconomic stabilisation and more or less gradual EMU convergence, as well as full integration in the EU financial market, we expect individuals in the region to gradually shift towards a relatively more diversified portfolio, adding to their basket more sophisticated products.

**Keywords:** household wealth, savings, convergence, Central and Eastern Europe

**JEL Classification:** D31, E21, O16

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# 1 Introduction

One of the main challenges of the EU integration process is to guarantee real convergence, which means, among other things, equalisation in standards of living of the population. A number of studies have focused on time for convergence in terms of per capita GDP in PPS, with estimates ranging from 5 to 30 years, according to single country development.

If the gap in terms of per capita GDP is huge, another area where differences between EU15 and “New Europe countries”<sup>1</sup> are particularly relevant is related to wealth accumulation and saving choices of individuals. The most significant figure is probably the following: while in the region wealth is only 47% of GDP, in the EU15 the ratio is 170%, thus revealing a poor capitalization record. Differences in terms of portfolio allocation choices are also significant.

In order to further investigate these issues, this paper analyses aggregate household wealth accumulation as well as savings’ allocation choices in the New Europe. Difficulties in making such kind of analysis refer to the fact that the information necessary for such a measure and its “sectoral” allocation in a fast developing region like the New Europe, is usually available with considerable delay.

We present new figures for financial assets, with a more detailed classification with respect to standard Eurostat figures and with an update to 2003. We also provide comparisons with other industrialized nations (par. 2 and 3).

Leveraging on these new collected figures, we investigate the determinants of household wealth and liabilities accumulation, focusing on macroeconomic variables, financial markets developments and households’ specific characteristics (par. 4). The latter class of variables is particularly significant, as it shows a strong divergence in saving and indebtedness attitudes of individuals, according to their income group.

We also analyse the determinants of portfolio allocation choices of individuals and we aggregate individuals’ risk/return choices (par 5). In par. 6, we investigate the experience of Italy and other EU15 countries in the last decade provides some interesting insight for

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<sup>1</sup> *The present research focuses on New Europe Countries, including EU new members, plus other candidate or EU approaching countries (i.e. Bulgaria, Romania, Croatia and Turkey). Due to lack of data, Slovenia has been excluded from the analysis.*

future developments. In particular, in view of macroeconomic stabilisation and more or less gradual EMU convergence, as well as full integration in the EU financial market, we expect individuals in the region to gradually shift towards a relatively more diversified portfolio, adding to their basket more sophisticated products.

## 2 Data Description

Wealth of individuals is usually measured using financial account data, collected by National Statistical Offices or by the Central Bank. In the New Europe countries, however such data are not always available or they are available or they are collected with a considerable delay, that, given the fast pace of development of the financial sector, generates considerable problems.

To overcome those limitations, efforts have been directed towards collection of the data from Supervisory Authorities and Central Banks in an attempt of analysing personal financial wealth using a nomenclature and methodology as near as possible to the official European ones (ESA95). Using such kind of approach allows us to focus specifically on resident household (sector S.14 in the European definition) financial holdings<sup>2</sup> with further breakdowns in order to account for different financial instruments and/or risk categories and all figures updated to 2003. The detailed classification we used for financial assets has the primary goal to better specify the level of risk actually borne by the individual household. Thus, in case of mutual funds, we wanted to identify the relevance of equity-heavy funds and those invested primarily in bonds. When it comes to pension funds, we introduced the distinction between defined-contribution schemes, where the contributors bears the management risk, and defined-benefit funds, where is the company that accepts this risk.

Apart from some adjustments due to difficulties in gathering information and the aforementioned further breakdowns, our classification of financial instruments strictly resembles the current one prevailing in the European System Accounts. Financial wealth is thus defined as the sum of currency (mainly local currency with an estimate for FX included only for Hungary and Croatia), bank deposits including housing savings, securities other than shares, quoted shares, mutual funds shares (including those funds

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<sup>2</sup> *Except for the Czech Republic where all figures refer to household in the broad sense (S.14 and S.15).*

domiciled abroad and promoted by national providers), insurance technical reserves and pension funds (second and third pillar). One should note that unquoted shares, other equity and other accounts receivable have been excluded for all countries, meaning an underestimation of household financial holdings.<sup>3</sup> These aggregate usually suffer of serious problems also in national published accounts, with the breakdown sometimes not provided and when it is, barely plausible.

As far as concerns financial liabilities, our definition refer to loans granted by monetary and financial institutions including mortgage, consumer and other forms of lending excluding leasing contracts (except for the case of Bulgaria). Consumer credit is however underestimated, given that lending from non-bank financial institutions is only marginally covered. It should be noticed also that in all countries all transaction in other accounts payable where there are timing difference between transactions and the corresponding payments have been excluded for homogeneity.

### 3 Household Financial Wealth in the New Europe Countries

Aggregate household financial wealth in the New Europe is equal to € 335 bln, which is approximately only 2% of the EU15 level. Even more importantly, the average per capita wealth of individuals is equal to €1,897, which means only 47% of the annual per capita GDP (around €4,000). If one considers that at the EU15 level per capita wealth is equal to roughly €42,000 (170% of per capita GDP) the low savings capitalisation records in the New Europe emerge.

This is likely to be a consequence of historical reasons, rather than of current trends. Despite high involuntary savings<sup>4</sup> during the planned era (Denizer, Wolf 1998 and 2000a), indeed, real assets values erosion and the reforming shock substantially depleted households financial wealth. Accumulation has gradually evolved since then, in line with economic recovery and the development of the financial sector.

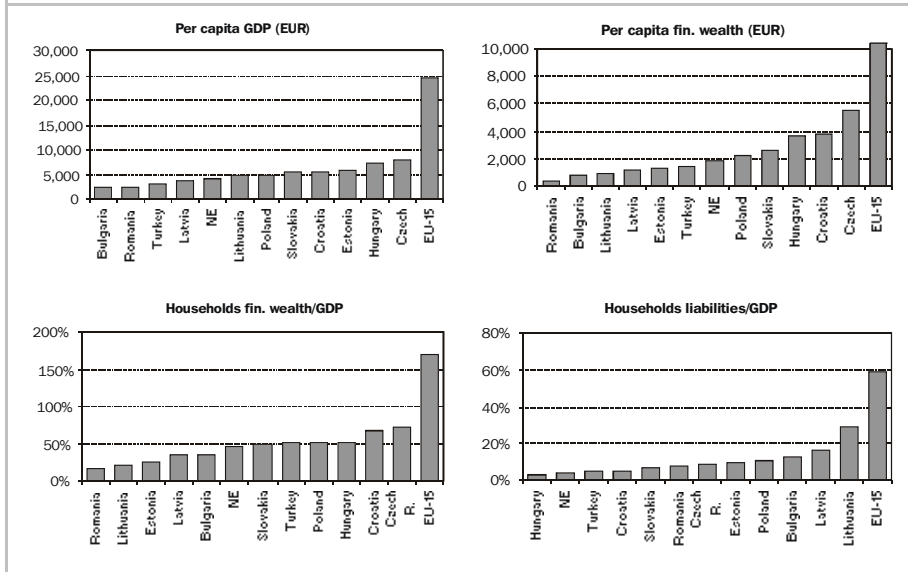
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<sup>3</sup> *It should also be noted, that the estimate of shares held by individuals is the most difficult calculation to be performed in investigating total wealth. In our analysis, we generally have only a rough estimate of quoted shares, while the unquoted component is excluded (with the only exception of the Czech Republic and Latvia).*

<sup>4</sup> *Involuntary saving as a consequence of consumption constraint, determined by rationing.*

By contrast, in the EU 15 countries trends are typical of more mature economies. Asset growth has been impressive, especially from 1995 to 2000, due to the combination of savings flows and market return effects.

**Table 1. Main economic indicators (2003)**



Note: data for EU-15 are as of 2002 and refer to a proxy including Italy, France, Germany, Spain, The Netherlands and UK.

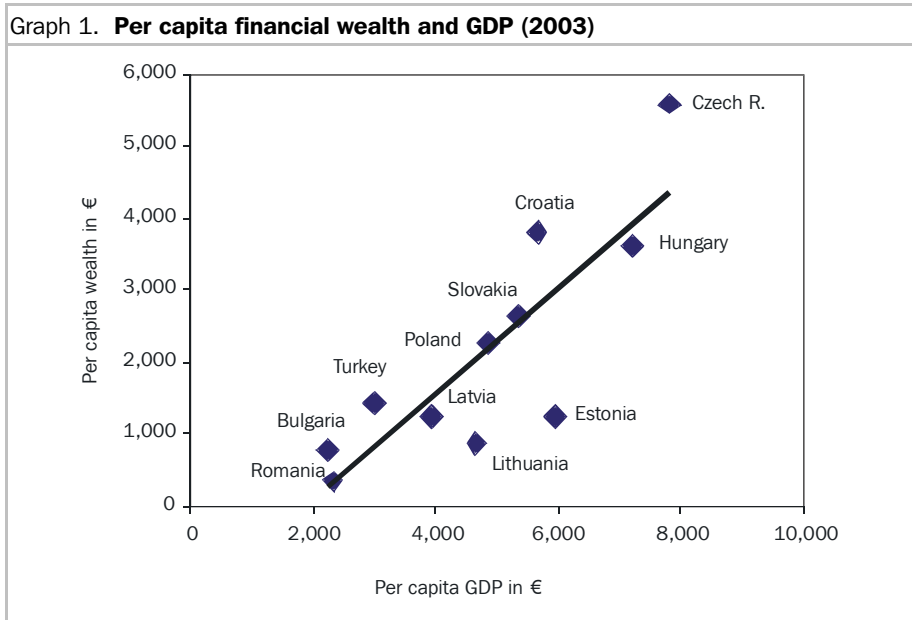
Source: PFA Database (UniCredit New Europe Research Network, OEE, Pioneer), based on data from National Central Banks and Financial Supervisory Authorities and Statistical Offices.

Considering relative figures, Central European countries emerge with a ratio of financial assets over GDP above or close to 50% (table 1). Other countries lag behind: Bulgaria and Romania with a ratio still close to 20-30% and the Baltic countries, with a low level of recorded financial wealth penetration, to a large extent explained by the decision to exclude, for homogeneity reasons, unquoted shares and other equities from the analysis.

Cross-country disparities are a result of several factors, ranging from traditional and historical patterns (different kinds of socialism implemented in different countries), divergences in the kind, speed and success of the transition process and current macroeconomic and financial sector developments. Generally speaking, those countries which started the process earlier and from a better position have been able to benefit from a longer period of wealth accumulation fuelled by strong economic growth, price stabilisation and increasing overall stability.

A slightly different pattern concerns Turkey, where individuals continue to hold a large share of their wealth in the form of non-financial assets (particularly gold). If such holdings were included, the ratio of wealth over GDP for Turkey would equal 81%. Instability of the macroeconomic environment and repeated financial crises, indeed, suggested in the country a prudent approach towards financial holdings, while recent successes can be the stimulus for further financial deepening.

A ranking among countries in both per capita wealth and per capita income confirms the existence of a strong direct relationship between the level of country development and accumulated wealth of individuals. This is a first indication that in the New Europe wealth accumulation is to a large extent a matter of earning capacity, while heritage does not have a significant role.



The financial penetration gap envisaged on the asset side between New Europe countries and the EU15 is even reinforced on the liability side, given the very recent start from scratch of a retail lending market throughout the whole region. The average liabilities over GDP in the New Europe is equal to 9%, compared to 59% of the EU15 level. Croatia, Hungary, Poland and Estonia emerge, as a consequence of a one or two years advantage in the lending boom process, compared to other regional players.

By focusing on individuals' indebtedness, measured as the ratio of financial liabilities to financial wealth, it is interesting to note that Croatia and Estonia are even exceeding the average level of financial liabilities over wealth of the EU15 countries, which is now equal to 35%. This should not be perceived however as a worrying signal. Increasing indebtedness, indeed, is part of structural development of the financial sector.

Different levels of indebtedness of individuals in different countries suggest the need of focusing on net financial assets as a further indicator of households wealth. This is an important correction, as it might be the case that, with a growing lending market, individuals continue to accumulate assets, only by increasing their debt stock.

A first immediate result is that in terms of net wealth over GDP the gap between the New Europe and EU15 is reduced. By comparing New Europe countries, the overall framework does not change much, with the central European ones, plus Turkey, leading the ranking and inter-country disparities being partially reabsorbed.

Table 2 presents main figures in terms of flows, focusing on the saving ratio of households, originating from official national accounts and the change in wealth and liabilities (the difference of which represents change in net financial position of individuals). The first indicator is thus saving – i.e. the difference between disposable income and consumption, while the second is net change in individuals' exposure towards the financial sector.

Notwithstanding the substantial heterogeneity and variability of household saving ratios, the data suggest some important similarities within groups of NE countries, with a positive relation between income levels, saving attitudes and wealth. Such relationship is however likely to lose strength over time, with consumption appetite increasing in high income countries.

Central European economies (Hungary, Poland, Slovakia, Croatia and the Czech Republic) present substantially higher gross saving ratios, being almost in line with saving ratios currently prevailing in the EU15. In the Czech Republic, Croatia and Poland we also measure relevant changes in net financial wealth. This means that individuals' savings are actually transferred into financial wealth accumulation. In Slovakia and Hungary, instead, a low or even negative delta in net financial stocks signals that a substantial part of the saving effort is directed outside the financial sector, towards real assets.

**Table 2. Wealth accumulation and indebtedness (2003)**

	BULGARIA	CROATIA	CZECH R.	HUNGARY	POLAND	ROMANIA	SLOVAKIA	TURKEY	ESTONIA	LITHUANIA	LATVIA
Gross saving ratio % <sup>(1)</sup>	n.s.	12.1	5.6	12.2	10.3	5.5	6.7	n.a.	2.4	3.1	2.2
Change in Hous. Wealth as % of GDP <sup>(2)</sup>	5.7	8.1	7.1	5.9	4.7	3.1	2.5	9.6	4.4	2.4	3.1
Change in Hous. Liabilities as % of GDP <sup>(2)</sup>	3.3	6.3	2.2	6.3	1.5	2.9	2.0	1.2	3.2	1.4	1.6
Net change Hous. Wealth as % of GDP <sup>(2)</sup>	2.4	1.8	4.9	-0.4	3.2	0.2	0.5	8.4	1.2	1.0	1.5

*Note: <sup>(1)</sup>Data are as of 2001 for Hungary, Estonia and Latvia; as of 2000 for Romania and Lithuania; <sup>(2)</sup>Data as of 2001 for Estonia and Latvia; as of 2002 for Lithuania.*

*Source: PFA database and <sup>(1)</sup>National Accounts except for Croatia where data are estimated by Zagrebicka Banka Research.*

Turkey is showing a relatively high net financial wealth accumulation, with a strong increase in financial assets, matched by only marginal developments on the liability side. The other countries traditionally show a lower gross saving attitude.

In Bulgaria and Romania, given the low average income, a large share of the population cannot afford strong saving patterns, while the accumulation effort is mainly a privilege of the higher income classes.

The households saving rate in the Baltic countries is low in an international perspective. It seems that individuals are already focusing on consumption expansion, leveraging on expectations of future income growth, rather than addressing precautionary savings.

## 4 Wealth, Indebtedness and Saving Choices: Main Determinants

To better understand the rationale of the differing regional patterns in terms of financial assets and liabilities, we focused on the analysis of determinants of households' wealth accumulation and indebtedness at the regional level. Identifying such determinants represents a key step in order to evaluate future developments in this area and on financial systems overall.



There are only a few empirical studies on the determinant of individuals' savings in the transition economies, partly due to the unavailability (until recently) of adequate data<sup>5</sup>.

Among those, there are two World Bank studies by Denizer and Wolf (2000a and 2000b). The first, analyses the determinants of savings during the initial period of transition (until 1995, using IMF estimates of savings) stating that substantial similarities exist between saving patterns in transition and market economies. However, it reports one remarkable exception finding a negative link between domestic savings and GDP growth for its sample of 21 transition economies in Central Europe, the Baltics and the former Soviet Union. In contrast, the second work, devoted to more narrow aspect of household saving behaviour and based on survey data for Bulgaria, Hungary and Poland, finds out that income has a positive influence on household saving.

Other studies, that are based on large international data sets including both industrialised and emerging economies, explain trends in domestic and private savings mainly through growth and age structure (Edwards, 1995; Loayza et al., 1999; Loayza et al., 2000). On this perspective, a recent contribution by Schrooten and Stephan (2003) finds support for the hypothesis that private savings in EU candidate countries are driven by the same determinants as at the EU level. In particular, in both groups of countries, saving behaviour shows a certain degree of persistence, being positively related to changes in per capita income growth and to the performance of domestic financial markets, while being negatively influenced by the dependency ratio and the relaxation of international borrowing constraints.

By using country-level data for a sample of 11 New Europe countries in the 2000-2003 period, we ran several panel regressions in order to identify the main determinants of household wealth and indebtedness (measured as financial wealth over GDP and total liabilities over GDP) and of individual wealth accumulation choices (measured as change in gross financial wealth over GDP). We investigate the relevance of a number of potential determinants, which can be grouped in terms of macroeconomic indicators, investors' specific characteristics and attitude, as well as financial development. We further extend our analysis also on the determinants of individual wealth accumulation mainly focusing on factors driving demand for deposits and mutual funds shares.

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<sup>5</sup> Among the others see Borensztein and Montiel (1991), Conway (1995) and Denizer and Wolf (1998).

The model estimated is:

$$(1) \quad W_{it} = \alpha_0 + \alpha I_{it} + \beta F_{it} + \gamma X_{it} + \varepsilon_{it}$$

where:

- $W_{it}$  is the independent variable (either households' financial wealth over GDP, change in financial wealth over GDP or households' liabilities over GDP) for country  $i$  at time  $t$ ;
- $I_{it}$  are investors' type variable for country  $i$  at time  $t$ ;
- $F_{it}$  is a financial market variable for country  $i$  at time  $t$ ;
- and  $X_{it}$  are macroeconomic variable for country  $i$  at time  $t$ . Further,  $\alpha_0$  is a constant, and  $\alpha$ ,  $\beta$  and  $\gamma$  are coefficients, while  $\varepsilon_{it}$  is an error term.

The estimation is by feasible Generalized Least Squares applied to panel data with correction for heteroskedasticity and panel specific AR(1) autocorrelation.

In general, the model appears to be quite successful in explaining the variation in the dependent variable and most of the estimated coefficients have the expected signs. The only variable whose direction of impact is indeterminate, the real interest rate has a statistically and negative coefficient in the equation for the determinants of households' wealth (Table 3). This result however might reflect distortions in saving behaviour caused by the endemic incidence of negative real interest rates in the transition economies.

## 4.1 Empirical Estimation

The first regression investigates the determinants of individuals' wealth, as measured by the ratio between households' wealth and GDP. Among the variables which summarise the individuals' characteristics ( $I_{it}$ ) we included:

- per capita GDP (pcgdp) to account for differences in the level of income between countries;
- a measure of the share of population in poor income classes (below \$10.000 in PPP) to account for differences on the distributional side;
- and the stock of financial wealth lagged one period (fingdp) to correct for the impact of past accumulated wealth.

The level of inflation (infla) and real interest rate on deposits (realrate) have been used to control for the specificity of the macroeconomic environment. Finally, the ratio between M2 and GDP have been included to account for the impact of financial markets development on wealth.

**Table 3. Determinants of households' wealth**

<b>FINGDP</b>	<b>Coefficient</b>	<b>Std. err.</b>	<b>z</b>	<b>P&gt;z</b>
Pcgdp	0.0008053	0.0004115	1.96	0.050
Infla	-0.0523997	0.0282751	-1.85	0.064
Realrate	-0.3757938	0.1303815	-2.88	0.004
dependency	-3.356694	1.029337	-3.26	0.001
distribution	-12.08725	4.857263	-2.49	0.013
m2gdp	0.0745523	0.0318517	2.34	0.019
fingdp_1	0.7694837	0.05062	15.20	0.000

One immediate result (table 3) is that the current level of wealth over GDP is a positive function of past wealth (figdp\_1) and current income (pcgdp), meaning that the rich/high income people, can save more. Moreover, a negative relationship with the variable measuring distribution of income (distribution) suggests that individuals in the poorest income classes cannot afford saving. Also a positive relation with share of working population over the total (dependency) is detected. In transition countries, the working age population is now holding the largest amount of wealth, while the old age population has not been able to accumulate wealth in the past. All those results suggest that wealth of individuals throughout the region is not widespread, but is still strongly concentrated in the hands of those classes which have, more than others, profited from the transition process.

Similar results are confirmed when considering changes in financial assets (table 4). Again, past wealth, as well as income distribution, age and education of individuals affect their saving choices. Moreover, a positive relationship with interest rates (nomrate) and economic growth (gdpgrowth) is detected, while the share of obligatory social insurance contribution (contribution) has a negative impact on saving, in that it reduces the amount of disposable income of individuals.

<b>DFINGDP</b>	<b>Coefficient</b>	<b>Std. err.</b>	<b>z</b>	<b>P&gt;z</b>
fingdp_1	0.1548243	0.0037842	40.91	0.000
gdpgrowth	0.6694922	0.0603146	11.10	0.000
Nomrate	0.1137354	0.0184941	6.15	0.000
dependency	-1.6669980	0.3230576	-5.16	0.000
contribution	-0.1979993	0.0221073	-8.96	0.000
distribution	-2.3203910	0.9511225	-2.44	0.015
education	0.0278331	0.0074577	3.73	0.000
Spread	0.4050061	0.0455180	8.90	0.000

By focusing on liabilities of individuals, a similar scenario emerges (table 5), with a strong selection on the side of banks for the best clients (income distribution and age patterns are important determinants of credit allocation). Cost of debt (nomrate) appears to strongly influence credit demand, with both the level of interest rates and the recent trend being significant determinants. A further variable to take into consideration is the relevance of household expenditures as a percentage of GDP (consgdp), meaning that the recent credit boom is financing an increase in consumption demand by households. This appears as a rational behaviour, once the real convergence process to EU standards is assumed and individuals internalise their future higher spending patterns.

<b>DFINGDP</b>	<b>Coefficient</b>	<b>Std. err.</b>	<b>z</b>	<b>P&gt;z</b>
Spread	-1.1595262	0.1035925	-1.54	0.124
Consgdp	0.2967492	0.0786329	3.77	0.000
M2gdp	0.0675383	0.0343367	1.97	0.049
dependency	-4.937807	1.62485	-3.04	0.002
Nomrate	-0.1436353	0.0563376	-2.55	0.011
Drate	-0.0946097	0.0551709	-1.71	0.086
distribution	-23.77084	7.435876	-3.20	0.001

The above analyses suggest an interesting environment in the New Europe.

Contrary to the experience of most EU15, being rich is a matter of income flows rather than of past accumulation. Heritage still does not represent a significant inter-generational transfer.

Differences among income classes also reflect on saving and accumulation options. In particular, some segments of the population are still unable to save, with income largely

passed towards final consumption or investment (i.e. house purchase, etc). Also, to a large extent, the low income share of the population is excluded from the lending market.

Given expected convergence towards the EU and resulting increase in individual income, we expect in the forthcoming years a significant number of new households to become customers of the financial sector, both as lenders and as savers.

With an increasing percentage of the population able to save, we would expect a hike in the saving propensity of households at the country level and stronger net financial assets accumulation. However, increasing income also means higher consumption and expenditure appetite, as testified by the current behaviour of high income share of the population in the region.

On balance, we can not say whether the first or the second effect will prevail and thus if saving propensity and financial asset accumulation will remain increase or decline. Most probably, a stable/negative trend could be forecasted.

	BULGARIA	CROATIA	CZECH R.	HUNGARY	POLAND	ROMANIA	SLOVAKIA	TURKEY	EU <sup>(1)</sup>
Currency	32.8	17.2	12.0	13.3	12.0	14.9	15.8	5.1	2.1
Deposits	58.7	71.2	53.3	47.8	51.8	63.2	64.7	55.4	35.4
LC Deposits	24.5	12.7	36.5	41.8	43.0	34.8	48.4	25.1	n.a.
FX Deposits	34.1	56.0	4.0	6.0	8.8	28.4	9.2	30.4	n.a.
Housing savings	0.0	2.5	12.8	0.0	0.0	0.0	7.1	0.0	-
Securities other than shares	0.6	0.1	0.8	11.4	4.7	8.3	0.0 <sup>(2)</sup>	17.6	9.4
Quoted shares	1.2	3.9	13.2	1.6	2.8	9.5	0.0 <sup>(2)</sup>	5.2	4.9
Mutual funds	0.1	1.1	8.4	6.9	7.3	0.2	6.9	11.1	10.6
Open-end	0.1	1.0	5.8	0.0	7.3	0.1	6.6	11.0	n.a.
Close-end	0.0	0.1	0.0	0.0	0.0	0.1	0.3	0.0	n.a.
Investment funds	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	n.a.
Foreign funds	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	n.a.
Insurance technical reserves	2.4	2.9	8.2	8.4	10.3	3.9	10.5	2.4	24.5
Claims on life insurance reserves	0.6	2.9	6.5	7.3	7.5	2.8	8.1	1.5	22.4
Claims on non-life insurance reserves	1.7	0.0	1.7	1.1	2.8	1.0	2.4	0.9	2.1
Pension funds	4.3	3.6	4.2	10.5	10.9	0.0	2.1	3.2	13.1
Defined-benefit funds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.0
Defined-contribution funds	4.3	3.6	4.2	10.5	10.9	0.0	2.1	3.2	2.1

Source: PFA Database. Note: <sup>(1)</sup> Proxy for the EU aggregate including Germany, The Netherlands, France, UK, Italy and Spain. <sup>(2)</sup> A proxy – assets allocated in securities are of negligible volume and prevalingly low liquidity.

Even a decline, however, would not necessarily have a negative impact on the macroeconomic environment and on real convergence perspectives. As long as FDI is financing the widening CA deficits and fiscal consolidation leads to increases in Government savings, indeed, we can expect high and sustainable growth.

This will revert also in higher income of individuals and higher volumes of savings, as well as continuing strong demand for indebtedness. Obviously, this means an increasing penetration of financial products and a demand side push for financial sector development.

## 5 Portfolio Composition of Financial Wealth

The portfolio composition of financial wealth of individuals among different forms of savings is a function of:

- the macroeconomic environment,
- the level of development of financial markets and availability of products,
- the level of wealth of individuals and their risk propensity, as well as the need for precautionary saving,
- the institutional framework in terms of pension reforms, health insurance, etc.
- the relative value of assets and prospective returns.

Given the above, we are not surprised in detecting a substantially different pattern in terms of portfolio allocation between the EU15 and NE countries, the latter being still strongly focused on more traditional products. Expected changes in the above mentioned fundamentals are likely however to push towards a higher diversification.

By comparing the New Europe countries, some stylised factors immediately emerge.

As far as currency is concerned, our data, in most cases do not allow to split for households and non financial corporations, thus causing a general overstatement of the relevant value. Moreover, we have included only in Croatia and in Hungary an estimate for holdings in foreign currency.

Traditionally, all over the region, currency relevance has been a function of relatively low banking penetration, when measured in terms of number of individuals holding a

current account. However, in order to explain an increasing, rather than a declining trend in the last few years, we have to consider the strong demand for transactions, as a consequence of consumption expenses growth, not fully matched by increases in the use of electronic means.

Bulgaria stands out for a relatively high weight of currency holdings. Such preference for liquidity in the country can be explained by considering the relevance of cash as a form of payment and the large share of grey economy<sup>6</sup>. On the other hand, Turkey has a relatively low share of wealth in currency, given the high inflationary environment and the lack, in our figures, of the FX component.

Bank deposits still represent the most relevant form of savings for individuals, accounting for 50% or more of total financial wealth in all markets. Financial markets in the region tend to be banking based, with capital markets playing only a limited role both in terms of collection of savings and in terms of financing. The relatively more developed financial markets are those for the Czech Republic, Poland and Hungary and it comes as no surprise that those countries are the ones showing a lower share of saving in traditional banking deposits. Croatia and Slovakia stand out as strongly bank-based systems, with 65/70% of financial wealth kept in this form. In both countries, the government bond market is not significant, while the corporate sector is still not strong enough to support autonomous development of the equity and the private bond market. Irrespectively of demand, indeed, there is a supply problem still hindering diversification of individuals investments.

The share of foreign exchange deposits continues to be relevant in Croatia , Bulgaria and Turkey, and to a lower extent, in Romania. While the first two countries have a stable currency (Bulgaria running a successful currency board and Croatia an informal exchange rate stabilisation), Turkey and Romania are pursuing a policy of real appreciation of the currency, against a USD/Euro basket. Being all countries still far away from EMU convergence, we do not expect a substantial change in the currency mix.

Finally, it is interesting to note the relevance of building societies as a form of savings in both the Czech Republic and Slovakia, where they account for 7 to 13% of financial wealth of individuals. This form of savings, strongly linked to future mortgage contracts,

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<sup>6</sup> *Some studies have shown that Bulgaria, in addition to Estonia, emerge in the region for a relative high weight of grey economy with an estimate close to 36% of GDP in 2000/2001. For details, see Schneider (2002).*

however, is gradually losing relevance, with the development of a direct banking mortgage market and the end of specific treatments for those institutions, as part of the EU accession process.

To further understand the determinants of traditional deposits demand (compared to other intermediated assets), we have decided to expand the analysis presented in the previous paragraph. A simple panel regression (table 7) shows that individuals stick to deposits (depoia) when interest rates (drate) are higher and thus a good remuneration from the investment is guaranteed. Still, they strongly feel the pressure of alternative forms of savings (thus a negative relation with returns in stock markets – yield – is detected). Traditional deposits are preferred by the low income part of the population (a positive relation with percentage of the population in low income classes is detected), being perceived as safer products, but also as a liquid instrument, which can be associated to transaction services (a positive relation with consumption expenditure over GDP – consgdp -is found).

<b>DEPOIA</b>	<b>Coefficient</b>	<b>Std. err.</b>	<b>z</b>	<b>P&gt;z</b>
pcgdp	-0.0012083	0.0009966	-1.21	0.225
gdpgrowth	1.066214	0.458186	2.33	0.020
consgdp	0.4830092	0.222601	2.17	0.030
realrate	-0.3899753	0.4252184	-0.92	0.359
infla	-0.0908936	0.0946645	-0.96	0.337
yield	-0.0278079	0.0105106	-2.65	0.008
drate	0.4858929	0.2792154	1.74	0.082
distribution	60.66912	22.67691	2.68	0.007

Given the above, we can thus expect demand for bank deposits in the region to gradually decrease, leading to an increase in portfolio diversification.

First signals of such trend are already present. The growth of the mutual funds market in the region is indeed mirroring, with a few years lag, the development in other EU countries in the last decade. In these countries a switch away from traditional bank deposits has been recorded as a consequence of the reduction of interest rates and the increase in individuals' appetite for more developed financial products, with a sudden increase in AuM.



Mutual funds represent 9 to 11% of intermediated financial assets<sup>7</sup> held by individuals in the Czech Republic, Poland, Hungary and almost 8% in Slovakia, with a substantial growth path in the last year. In Turkey, the share of mutual funds in total intermediated assets is even higher, close to 15% in 2003.

The relevance of investment funds as savings instruments is growing fast also in those countries where the market is still small, supported by macro-trends and demand/supply ones. The ongoing process is such that not every product will benefit, neither will every supplier be able to keep and/or capture market share as clients are going through the learning process: gradually 'asset management products' will be understood and, more importantly appreciated at least among younger generations. Clients will be able to distinguish between suppliers and between funds. Elements such as track record and performance will become more and more relevant, especially in countries like Bulgaria and Romania where frustration with, and distrust in, 'investment funds companies' as a results of past collapses has induced individuals to be more cautious towards these products.

By focusing on the determinants of preferences for mutual funds some interesting results emerge (table 8). While in some developed financial markets mutual funds tend to be a mass product, in the New Europe region, a strong correlation is observed between average wealth, percentage of population in higher income classes and relative weight of mutual funds on total financial assets.

Demand for mutual funds is also associated to higher propensity of individuals to risk, which is measured as the share of risky assets (mainly equity) in individuals' portfolios. This is not however yet reflected in a shift of mutual funds towards a more risky composition.

Finally, preference for mutual funds increases when interest rates on traditional deposits decrease, while a high bank mark down (difference between interbank rate and deposit rate, which means high margins for the banks and higher costs for the client), leads to shift of preferences away from deposit instruments.

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<sup>7</sup> *Our definition of intermediated financial assets includes bank deposits, mutual funds shares, insurance technical reserves and pension funds assets.*

**Table 8. Determinants of mutual funds' demand**

<b>MUTUALIA</b>	<b>Coefficient</b>	<b>Std. err.</b>	<b>z</b>	<b>P&gt;z</b>
Pcgdp	0.0010018	0.0005258	1.91	0.057
Risk	0.0819855	0.0459009	1.79	0.074
distribution	-19.72801	10.48603	-1.88	0.060
nomrate	-0.2639881	0.0944061	-2.80	0.005
differential	0.4375116	0.1667978	2.62	0.009

All in all, we can expect that macroeconomic stabilisation, a decrease in interest rates and development in financial markets integration will accelerate the ongoing switch from traditional deposits towards AUM, already perceived as more innovative and advanced financial products.

The relevance of equity markets and securities as a form of investment is quite limited all over the region, with some exceptions, mainly related to the structural features of the economy.

Securities other than shares are a relatively more interesting form of saving for individuals in Turkey (where they account for 18% of individuals' wealth), Hungary (11%), Romania (roughly 8%) and Poland (5% of wealth). These four countries feature a relatively strong Government bond market, as a consequence of past and present financing needs of the authorities and continue to have interest rates above the regional average. The corporate bond market, instead, is still quite underdeveloped .

The level of development of equity markets in different countries and the relative relevance of shares as a saving instrument for individuals is mostly a consequence of the privatisation process adopted throughout the region. Countries which adopted a voucher scheme privatisation - mainly the Czech Republic and Romania - tend to show a sizable role for equity investments; it is less common in those countries which focused on a mixed approach – like Poland – based on both coupon privatisation and foreign direct investments or fully dependent on foreign direct investment – as in the case of Hungary .

In the forthcoming period, individuals' preferences for share-holdings are likely to be strictly determined by expected return and risk, with the EU accession/convergence process, integration of financial markets at the cross-border level (thus leading to an increase in supply of financial products) and decreasing return of alternative products likely to play a significant role.

One point to mention is that from our analysis we had to exclude figures concerning unquoted shares, as we could not find reliable estimates for most of the countries considered. Such shares account for roughly 30% of financial wealth in Hungary and 45% in the Baltic countries and represent an important form of indirect investment, particularly due to the relevance of small and medium enterprises in the local economies. A similar correction has been done also for EU15 data.

The choice to invest in insurance products or in pension funds is a function of precautionary attitude of individuals and institutional features, such as the level and quality of state protection, as well as the pension legislation and the fiscal treatment.

As far as insurance is concerned, on the one side, the level and the quality of state protection is negatively related to need of insurance, on the other, insurance policies are usually a benefit for workers, thus meaning a direct relationship between economic growth and insurance market development. We can distinguish two groups of countries in the region: Central East European ones, where reserves for insurance account for 8-10% of total individuals' financial wealth, and other countries, with an incidence going from 2 to 4%.

Investment in pension funds is strongly influenced by the specificities of pension reform. Even more than in the EU15, most New Europe countries have already passed radical reforms in the pension area, by switching from a first pillar to a multi-pillar funded system. Such reform is already implemented in Poland, Hungary, Croatia, Bulgaria and in the Baltic countries, while new laws have been recently passed or are in the process of being passed in the remaining ones. In Turkey, a second pillar pension system is in place as a substitute for first pillar for those categories which were not covered in the basic system and plans to transform the first pillar are still not in place.

Accumulation of assets in mandatory second pillar is thus a function of time (system inception) and specific features of the reform (i.e. mandatory contribution by employer and employee, possibility of switching from old to new pension scheme, etc). The participation in fully funded pillars is indeed already high in those countries where 2nd mandatory pillar has been introduced as first – like in Poland and Hungary with 67% and 54% participation ratio respectively and in Croatia. Expectation for further rises in the near future concern those countries where second pillar started recently – as in the case of Slovakia and Lithuania – or is supposed to start in the near future –Romania and Czech Republic.

Being mandatory, accumulation of wealth for the second pillar should not be considered as an autonomous investment choice by the individuals. Despite that, it can impact the propensity for long term investment in other products, in that individuals feel that they are already covering the long-term precautionary need.

On the contrary, as far as the voluntary third pillar is concerned, the accumulation of resources is fully dependent on the individual attitude towards precautionary savings and the level of average contribution. In particular, the evaluation of current and prospective life-styles, and more specifically tax treatment, are playing a major role in determining the decision to participate or not in the system. In the Czech Republic, as an example, participation is unusually high, mainly as a consequence of very attractive state subsidies. In Poland, the TEE tax system – coupled with other macro-based factors – constrained growth in the sector.

## 6 Investment Risk Profile – Behaviour of Individuals in New Europe and Lessons from EU15

	CZECH R.	HUNGARY	POLAND	SLOVAKIA	CROATIA	BULGARIA	ROMANIA	TURKEY
Portfolio structure								
Risk Free Inst	68.2	63.0	66.1	83.3	87.2	91.6	78.3	65.2
Bonds	16.8	34.9	30.9	14.6	8.5	7.2	12.1	29.2
Equities	15.0	2.1	3.0	2.1	4.3	1.2	9.6	5.6
Returns								
Risk Free Inst.	1.4	6.5	3.3	1.3	-	1.3	-	37
Bonds <sup>(1)</sup>	2.0	7.4	5.1	5.9	-	-	-	38
Equities	30	13	28	24	-	68	-	18
Volatility								
Risk Free Inst	0.1	0.1	0.3	0.1	-	0.0	-	1.5
Bonds	0.6	0.5	0.7	0.6	-	-	-	6.6
Equities	6.4	6.8	8.2	5.8	-	11.5	-	14.9
Sharpe Index <sup>(2)</sup>								
Bonds	1.05	1.56	2.72	7.96	-	-	-	0.2
Equities	4.41	0.97	2.97	3.82	-	5.82	-	-1.3

Note: <sup>(1)</sup>Bond index returns as from ELMI, the JPM index on local currency bonds, providing for a conversion returns in local currency. <sup>(2)</sup>Sharpe index is measured as (return on asset *i* – return on risk free assets)/Standard deviation asset.

As a final step, by focusing on individuals' asset allocation choices, we compare the risk/return choice in the New Europe and at the EU15 level. By considering the experience of Italy and other EU15 countries in the last decade, and in view of the expected macroeconomic stabilisation and EMU convergence process, we believe we can gain some insight for future developments.

A caveat: one should remember that the exercise is somehow arbitrary given the small time period examined (2000-2003).

Moreover, on the demand side, the exercise assumes strong flexibility of individuals in their investment choices. The experience of more advanced financial countries shows that this is obviously not always the case. In the New Europe countries, however, reactivity of individuals to market conditions tends to be relatively high.

The equilibrium level is also influenced by the supply side, with supply of financial products continuing to be an important constraint, which could be at least partially relaxed in the future, in view of integration of EU financial markets.

## 6.1 Current Trends in New Europe

A simplified version of households' investment portfolio has been considered. In particular, available saving instruments have been aggregated in three different groups, with some adjustments in order to take into account peculiarities in New Europe countries. The three types of investment considered are:

- risk free activities (holdings in local currency, deposits, short term bonds and money market funds)
- bonds/securities (including government bonds and other bonds, bond funds, real estate funds and pension funds, life insurance )
- equities (including equity, equity funds, balanced funds).

Table 9 presents the portfolio structure, returns (in 2003) and volatility of returns (in the 2000-2003 period) of these various instruments, for a sub-sample of countries in the region.

Generally speaking, the strong relevance of risk free and bond products is striking. This is a natural pattern in the early stage of development of financial markets, given the high level of interest rates on the short term instruments and high risk of equities.

A synthetic index of the return/risk matching for investors is provided by the Sharpe index, i.e. the incremental return that can be obtained by investing in riskier instruments in terms of its units of risk. The higher the value the better the return/risk trade-off.

We decided to show only 2003 data, as they represent the current stage of development of financial sectors, although again we do realize that looking at only one year can prove highly misleading. Considering previous years, the scenario would point to the relevance of macroeconomic stabilisation and financial sector development in shaping individuals' choices, with risk free assets representing the best choice in terms of risk return in the early years of transition and other products gradually picking up.

Only in the Czech Republic, and to a lesser extent in Poland, the Sharpe index in 2003 suggests the rationality of a relative preference for equity products. In the Czech Republic the combination of a significant share of equity investments as a result of the past coupon privatization process and the positive stock market performance in the last two years, in an environment of low interest rates, have jointly been successful in attracting individuals' investors towards more risky assets. In Poland, the gap in terms of Sharpe index is very close. On the one side still relatively high interest rates suggest the rationale for traditional products, on the other, positive results in the stock market suggest a gradual shift towards equities. The fact that equity markets are relatively well developed in the two countries obviously plays a role.

In Slovakia and Hungary, the bond market still has to be preferred, given high guaranteed returns. In Slovakia, moreover, low size of the equity market generates a substantially higher volatility and risk of returns. In Turkey, the current macroeconomic environment is still allowing a significant return even in the risk free categories. This leads to a very low Sharpe index for bond products and even a negative one for equity markets.

On the overall, we highlight a fast developing scenario, strongly based on fundamentals. We can thus expect changes in macroeconomic or financial sector determinants to rapidly affect individuals' choices, leading to increasing portfolio diversification.

## 6.2 The Experience of Past Convergence Processes: the Italian Case

As already mentioned, we now focus on the Italian experience for the last decade. In view of the expected macroeconomic stabilisation and EMU convergence process for most New Europe countries, we believe we can gain some insight for future developments.

Italy has gone through a convergence process with a strong decrease in the risk premium on its bonds. From 1995 to 2000, the share of bonds in individuals' portfolios decreased from 31% of the total to 20%. As interests rate decreased the relative long term value of equities has increased, with their weight, in individuals portfolios going from 14 to 27%.

The mutual fund industry and, more broadly on the asset management industry played a significant role in the process. Mutual funds started in Italy in 1985 and have had an impressive growth, encompassing, since the very start, equity as well as balanced and bond funds. To date they account for approximately 15% of household assets. In the initial phase, similarly as now in New Europe, there were strong restrictions as far as mutual fund international diversification was concerned. As these regulations were lifted at the end of the eighties and as the market matured, the industry started to focus on fund specialization. Soon the Italian mutual fund market was able to cover a very wide spectrum of alternatives.

As already mentioned, convergence coincided with the need for Italian households to rebalance their portfolios towards a more diversified composition and, correspondingly, for the Italian banking and insurance industry to improve its servicing capabilities. In this context, mutual funds proved to be a very powerful instrument, as shown by the strong growth in assets in the later part of the 1990ies.

From a regulatory point of view the trend towards greater liberalization was not limited to international diversification. Gradually management companies were allowed to broaden their scope and to manage assets other than mutual funds such as segregated accounts and pension funds. The possibility of establishing non-ucit funds, such as hedge funds and funds of funds, was also introduced in the late nineties thus putting the Italian market virtually at a par with leading international financial markets and, in some instances, as for example for domestic hedge funds and absolute return products, at the forefront of financial innovation.

The Italian asset management industry has in less than 15 years, changed the structure of the Italian financial system. The key differentiating factors are part of a “best practice” virtuous circle that is based on competitiveness, transparency of governance processes and communication, ability to deliver efficient portfolio solutions, strong administrative and operational capabilities, economies of scale and of scope.

What can we learn for the New Europe?

First a comparison with Italy has elements of interest both in terms of similarities and of differences.

While macroeconomic trends are likely to be relatively similar, the end of the Italian convergence has coincided with the equity market bubble and this has made the transition bumpier. From this point of view the New Europe countries may be in a better position, because they enter the world of portfolio diversification in a context that is less characterised by “irrational exuberance”.

Another advantage for New Europe could arise from the fact that these countries have directly “jumped” into a phase where institutional investors have a role. As we have shown in our study on Household Wealth in the National Accounts of Europe, the United States and Japan (PGAM Research February 2003) it appears that institutional investors act as stabilizers with respect to the natural tendency of retail investors to have a pro-cyclical behaviour in equity markets, with the risk of “buying high and selling low”.

Another very relevant difference is that, for the historical reasons mentioned, the level of financial wealth is quite substantially lower in those countries than in Italy. So while switch effects have been a main driver in the EU 15 we may expect accumulation effects to be more important in the New Europe countries.

As a final point, it should be noted that the EU financial sector per se has been subject to a strong transformation process, aimed at increasing efficiency and integration. The New Europe countries are thus joining in an already different and progressively more integrated market, and will be able to jump-start into the latest “state of the art” products.



## 6.3 Lessons for the New Europe Countries

The experience of past macroeconomic convergence processes provides useful suggestions in terms of possible future developments in individuals' portfolio allocation choices in the New Europe.

The analysis of returns and volatility associated to each instrument, based on the Sharpe ratio, has shown how in those NE countries where the convergence process is relatively ahead, a rationality for the preference for alternative and more risky products exists.

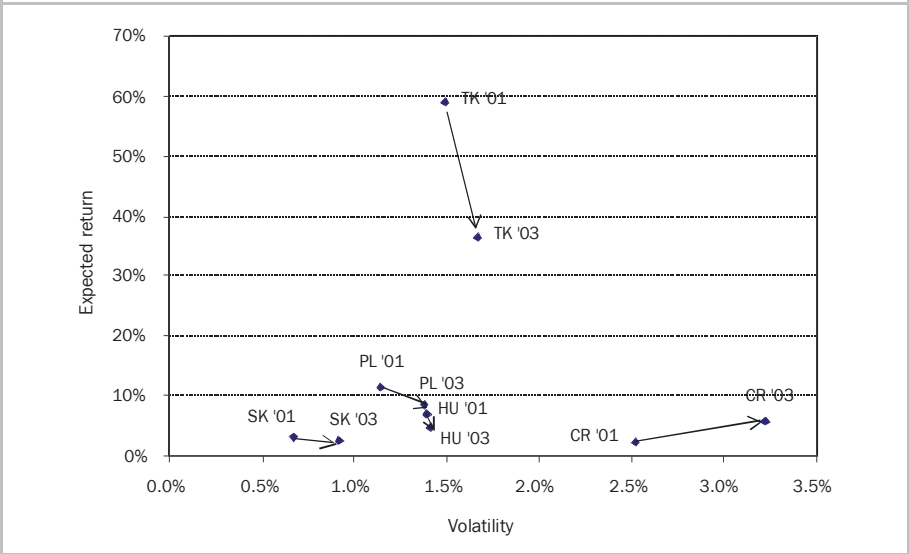
Using tools derived from the modern portfolio theory we try to push further the analysis, focusing on a mean-variance approach. Essentially, the lowering of short-term interest rates and the appearance of a truly risk free rate tends to favour portfolio rebalancing towards a more equilibrated mix.

The usual caveat about the limited time-period examined should be borne in mind as far as the empirical verification is concerned. Given the aforementioned selection of asset classes – risk-free, bond and equity – and the average returns and historical volatility associated to each instruments, we sketched comparative “efficient frontiers”.

The evolution in the portfolio allocation choices of individuals between 2001 and 2003 is presented in graph 2. For the sake of clarity, we decided just to present the evolutionary path of the portfolio allocation chosen.

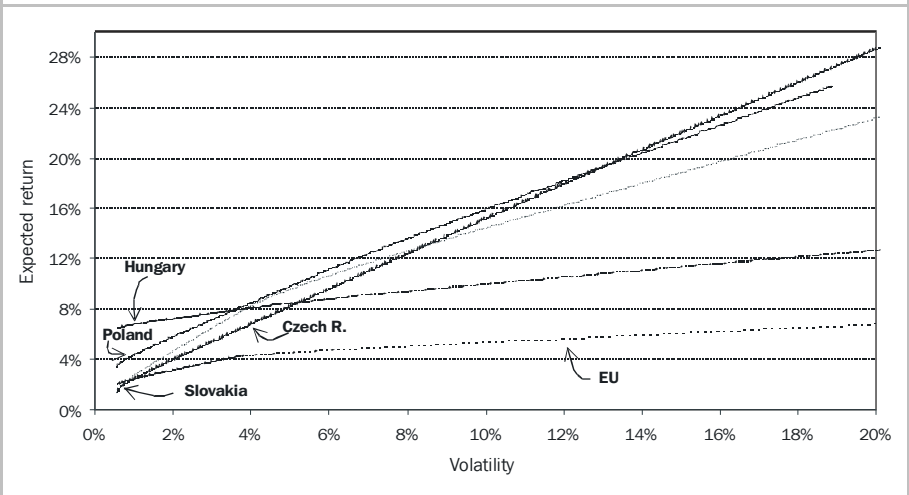
The results confirm the intuition provided by the Sharpe index analysis. The trend is towards lower returns, which is consistent with interest rate convergence. The generally higher volatility could be explained partly by the fact that the volatility of bonds in the earlier period may not have been fully reflected in the risk premium, partly because of switches to equity instruments, partly to “noise”. The Czech Republic, where macroeconomic convergence is largely achieved and risk free rates are low, is a special case. In this country a very positive equity market performance in the last two years allowed individuals to increase their returns.

**Graph 2. Portfolio allocation evolutionary path – 2001 vs. 2003**



In Graph 3 we have highlighted what we can call “biased” efficient frontiers: before convergence high short-term rates and high rates on bank deposits may not appear to domestic investors as risky as they appear to foreign ones. The “efficient frontier” has therefore an upward bias with apparently (and often ex-post effectively) superior risk/returns characteristics. With convergence lower risk and lower return instruments prevail together with an “unbiased” and lower risk/return frontier.

**Graph 3. “Biased” efficient frontiers and convergence**



Thus, with full macroeconomic convergence, the efficient frontier for New Europe countries will finally coincide with the markets at the EU level. Only a fully integrated market can guarantee potential for broad diversification, allowing investments in the liquid global equity markets, along with international bonds and money market instruments.

## 7 Concluding Remarks

The in-depth analysis of household wealth in New Europe confirms the existence of a strong gap in terms of wealth accumulation with EU-15 countries and significant disparities across the region. This is a consequence of both historical reasons and different patterns in the transition process among countries.

In the New Europe “being rich” seems to be more a matter of flows rather than of stocks, meaning that the rich are those earning high incomes, thus being able to save and accumulate, while the relevance of “heritage” still seems to be low. Moreover, low income groups are still unable to save, being substantially excluded from the financial market.

Overall, we expect in the next decade the stock of individuals’ wealth to increase, thus increasing even more growth opportunities for the financial sector.

In terms of individual portfolio allocation choices, we foresee a gradual shift of preferences towards more risky and sophisticated products. Macroeconomic stabilisation and integration in the EU financial markets are gradually reducing return opportunities biased by high risk premia and individuals have to increase diversification to at least partially compensate for lower returns. We expect in the forthcoming years the efficient frontiers for the New Europe to finally coincide with the that of the EU15.

Overall, forthcoming developments of the financial sector infrastructure in the New Europe will be characterised by a more or less straightforward shift towards market oriented systems. Banks will however continue to play a leading role, while strong discontinuities are possible in the process, in view of differences in the regulatory and legal framework, and in particular in the key area of pension reform.

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# Monetary Policy in Real-Time Situations: The Relevance of Simple Instrument Rules

Heinz Glück\* and  
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*There is a long tradition of Austrian, or neo-Austrian, economics within which the scope for policy action is limited on the grounds that the knowledge base of policymakers is insufficient,...*

*(Sheila Dow, 2002)*

## Abstract

Policy formulation, evaluation and interpretation by means of simple policy rules, as for instance the popular Taylor rule, have attracted much attention in recent years. Such rules have not only been viewed as guidelines to (the transparency of) policy decisions, but also as benchmarks for predicting future policy and as a tool to judge whether current or past policy has been appropriately set. Furthermore, they have an important role in inflation targeting.

It has been pointed out, however, that results will be misleading, if policy reaction functions, whose parameters are estimated on the basis of “final” data, are used for understanding how policymakers react in real-time situations (Orphanides, 2001). The problem is aggravated by the fact that in monetary policy the necessity to take into

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account long lags leaves the policymaker with rather long-term forecasts for the variables entering his reaction function.

In order to obtain a better understanding of these real-time data issues we evaluate accuracy and efficiency of OECD's forecasts for the G7 countries, paying attention to ex-post data revisions. Apart from a rather disappointing forecast performance over horizons of more than one year, we identify significant biases in the forecasts and a rather different behavior among countries as to data revisions. We find significant differences between Taylor rules estimated over revised data as compared to those estimated over real-time data that are still subject to later revisions.

Further, we suggest methods to correct forecast data for some of these defects, thus enabling a policymaker to use more efficiently the information set available at a certain moment of time. We propose procedures to control for distorting influences on the rule's data input and show that policy errors can be reduced. Generally, however, our results support scepticism against the use of simple instrumental rules in practical monetary policy, mainly because they imply large policy errors if they are based on unadjusted real-time input data.

**Keywords:** monetary policy rules, economic forecasting, OECD, real-time data

**JEL Classification:** C53, E52

# 1 Introduction

In approaching the European Union (EU) and, in further course, the Economic and Monetary Union (EMU), considerations concerning the conduct of monetary policy and exchange rate policy are important issues. There are numerous papers dealing with exchange rate strategies which could be useful for preparing the ground for convergence and final entrance into the Exchange Rate Mechanism (ERM II).

Monetary policy will have to support these endeavours by designing and implementing a framework which should be conducive for the fulfillment of the well-known Maastricht criteria, most of all the inflation criterion. In this context, the currently very much advocated strategy of inflation targeting is a policy option. Some of the new member states of the EU, namely Poland, the Czech Republic and Hungary, follow policies of this kind.

Inflation targeting – sometimes also inflation-forecast targeting – is to be regarded as an approach to the conduct of monetary policy that focuses on a clearly defined target for the inflation rate which has to be hit or not exceeded. In following such a strategy, an important role is assigned to quantitative projections of the economy's future evolution, and there is a strong commitment to a high degree of transparency and communication as to the goals, the decisions and the principles guiding this policy (Woodford, 2004).

Inflation targeting is closely related to the concept of “monetary policy rules”, and research on such rules has strongly intensified over the last years. In its simplest form, as for instance the well-known Taylor rule, the monetary policy instrument (mostly a short-term interest rate under the control of the central bank) is a function of a small subset of information relating to the economy's current (and future) situation (mainly the evolution of inflation and output). Rules of this kind have been termed “simple instrument rules”.

For different reasons, these simple instrument rules have come under critique recently. Svensson (2003) has judged them as “inadequate as a description of real-world inflation targeting” and even their use as mere guidelines as “incomplete and too vague to be operational”. It has become clear that there seems to exist a gap between the academic discussion and the current practice of central banking where the opinion prevails that a mechanical application of instrument rules is not appropriate and that some amount of discretion has to be retained.

Moreover, as monetary policy operates on long and variable lags, current policy decisions are made on the basis of assumptions and forecasts about the state of the economy in the future rather than on the basis of the actual state. When current policies are chosen, policymakers are uncertain about the state of the economy which is to prevail at the time the planned policy is expected to impact.

Thus, the literature on policy rules and, especially, on forecast-based rules, brought the problem of forecast quality and reliability to the forefront. Some authors found that such forecast-based rules seemed to be able to control better for current and future inflation (Batini and Haldane, 1999). Ex post, however, forecasts might turn out to be quite wrong, most likely if also forecasts for national account data enter the rule (as in the case of flexible inflation targeting), implying policy error and welfare losses.

In this context, Orphanides (2001) has pointed out that: “The discussion (on monetary policy rules),....., often does not place proper emphasis on the informational problem associated with some of the advocated policy rules.” Taking into account that the policymaker when making a decision has at his disposal only forecast values for the arguments entering his reaction function, Orphanides argues that the weights attached to these arguments when estimated by means of “realised” or revised data could be rather misleading. A voluminous literature on “real-time issues” was elicited by this observation, and there is an ongoing debate about its implications. Thus far, the evidence on whether it really matters if a central bank uses real-time data or final data is not yet clear. Orphanides (2001) finds that revisions of recommendations tend to be “very large” comparing results from these two data sets, whereas Adema (2003) for “quasi-real time” data as well as Bernanke and Boivin (2000) and others cannot find much difference.

In this paper we want to concentrate on a problem which we feel has been somewhat neglected in this context, namely: Is the quality of forecasts for the aggregates in question sufficiently reliable to base rules and monetary decisions with possibly far-reaching consequences on it? We will show that this is not the case and together with the additional fact of frequent and significant data revisions this implies high uncertainty concerning the parameters to be used in such rules, thus increasing potential policy error.

One has to be aware that there exists a complex set of errors and mistakes which threaten to be incurred if monetary policy rules whose parameter values are obtained from estimation over “final” data from the past are applied to real-time decisions. Generally, at least three sources of potential mistakes can be observed:



- Forecast uncertainty: The policymaker wishing to influence some future outcome in an optimal sense has, as mentioned, at his disposal only forecasts for the period in question. These forecasts may be wrong and the mistake usually is the larger the longer the forecast horizon is. Thus, for the sensible application of a monetary policy rule, first of all it has to be asked what the forecast horizon will be starting from which the forecast performance shows some reliability.
- Forecast bias: Errors do not sum up to zero over time, but in many cases forecasts can be shown to be severely biased. If such biases can be identified, is it possible and does it make sense to correct for them in order to bring the policymaker's real-time decision closer to "reality"?
- Data revisions: In some cases – apart from the fact that significant revisions can be observed - there seem to exist systematic components in the revision process. Again, if identifiable, can these be incorporated into some correction mechanism?

Neglecting these problems may render simple instrument rules estimated over revised data practically irrelevant for real-time decisions and may lead to an interest rate setting consistently too high or too low with high costs incurred by such policy errors. By close examination of OECD forecasts<sup>1</sup> we try to obtain some estimates of the size and evolution of these mistakes by evaluating forecasts over longer periods, by calculating the forecast errors over changing forecast horizons, by investigating for biases, and by observing the ex-post data revisions. Thus, the policy error incurred by a "final-data Taylor rule" as compared to a "real-time Taylor rule" can be enumerated and procedures be developed to correct for these distortions.

The outline of the paper is as follows: In section 2 we explain the content of our data base and quantify forecast errors and biases. In section 3 we examine the difference between „real-time data" and „last reported data" Taylor rules and we experiment with different procedures to improve the information content of data available in the real-time situation. In section 4 we draw our conclusions.

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<sup>1</sup> See Glück, Schleicher and Catena (2000). We want to point out that it is not our intention to blame anybody for deficiencies of forecast quality. It is our intention here to learn from the observed problems and try to develop procedures to improve upon them.

## 2 Dynamics and Bias in Forecasting

There is a vast literature on the evaluation of forecast accuracy trying to discriminate between models based on their relative forecasting record. Although this seems to be potentially an objective criterion, considerable difficulties remain nonetheless.

The first difficulty inherent in such an exercise relates to the measurement of forecast quality. What should be the appropriate metric? As regards *quantitative* measures, there are many to choose from – absolute errors, root mean square errors, Theil's U, etc. Similarly, a number of *qualitative* measures are available. For instance, we might be interested in correctly predicting turning points. Alternatively, we might be more interested in the forecast 'story'. It is widely acknowledged that accurate short-run forecasts are better made by small time series or reduced form models than by structural relations. Such time series models, however, have limited economic content. Policy institutions, by contrast, typically value the economic content of a forecast since it facilitates internal and external communication and allows them to conceptualise risks and scenarios around the forecast.

Second, even if we assume that some suitable forecasting metric can be found, there still remains the question of how one interprets and makes use of that metric. For example, over which horizon do we judge performance? Results will inevitably differ at different forecast horizons. Moreover, ex-post data revisions will change those errors. Indeed, even if we can identify the best (ex-post) performer, there is no guarantee that this will extrapolate into the future. It should also be borne in mind that small forecast failure does not necessarily imply that the model is well-specified; the forecast error is a compound of different errors – specification (i.e. model) errors, errors in residual adjustment and errors in exogenous assumptions, and it is not clear how to disentangle these different aspects. For many projection exercises, the outcome is a combination of model and off-model judgment.

Recent papers<sup>2</sup>, however, conclude that more serious problems are involved in forecasting than the simple aspect of accuracy, namely bias, rationality and efficiency as well as the problem of data revisions. It is found that efficiency does not seem to be guaranteed, as shown for instance by Joutz and Stekler (2000) as well as by Loungani (2000), and obviously there are extended periods of bias towards systematic over- or

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<sup>2</sup> A more elaborate review of this literature was given in Glück, Schleicher and Catena (2000).

underestimation. Whereas Joutz and Stekler in their study of the Fed forecasts find that on average these were unbiased, Loungani (2000) in his investigation on private sector forecasts finds evidence of an upward bias. These results relate predominantly to GDP forecasts, but generally it can be supposed that they also apply to provisions of inflation.

In the following, we put special emphasis on the *dynamic* aspects of the forecasting and data revision processes and on biases as this will provide us with a data base appropriate to deal with some of the problems discussed above. For this purpose, as mentioned, we take under scrutiny the forecasts of the Organisation of Economic Cooperation and Development (OECD).

## 2.1 Data Base

Since the sixties, the OECD in its *Economic Outlook* has been publishing forecasts for some of its member countries. Projections for the major macroeconomic aggregates are published twice a year, one in June (mid-year forecast) and one in December (end-year forecast). Originally, the first forecast for a particular year was the mid-year forecast one year ahead. This has been extended in the late seventies to the end-year forecast two years ahead. Thus, for instance, the first forecast for 2006 is published in December 2004.

We analyze the gross domestic product (GDP) and consumer price forecasts, both in rates of change, for the G7 countries (USA, Japan, Germany, United Kingdom, France, Italy and Canada). The basic data for this study were taken from every published *Economic Outlook* since 1967. The evolution of forecasts for the particular years as well as the data revisions constitute the data base which is analyzed. That sums up to nine estimates (one two-year-ahead estimate, two one-year-ahead, two current year and two estimates each one year and two years after) for every country. These estimates are compared to the final data, where “final” still means preliminary and should better be termed “last reported” since many countries continue to revise data. The final data in this study are the last reported values for every year that were published in late 2003.

For several reasons, these forecasts are tempting for a thorough analysis. First, the forecasting process in these institutions obviously takes into account a lot of national and international information and political influence cannot be fully excluded. Second, the sequence of these forecasts provides a good documentation of the gradual revisions of

the forecasts, since five semi-annual revisions for the predictions of a particular year are available. Third, a very special feature of this data base is the documentation of the data revision process that follows afterwards which can be traced over four additional estimates (revisions) of the data for a particular year.

Some examples of this sequence of forecasts and data revisions are shown in Graphs 1 to 3 on the following page for the evolution of GDP rates and inflation rates from the OECD data set and, for comparison, from IMF. As a first impression we observe large adjustments in the GDP forecasts, but much more stability in the inflation predictions.

This data base offers the possibility to investigate

- if there is an improvement of forecasting accuracy over the sample period and in the data revision process<sup>3</sup>,
- if regularities in forecasts and data revisions can be used to adjust the preliminary data in order to obtain estimates that are closer to the final data and
- if there are major differences with respect to the quality of forecasts among the G7 countries.

## 2.2 Forecast and Revision Dynamics

Formally, we observe the evolution of the value for a variable  $y$  at time  $t$  for which information is available at time  $t-\tau$ . We talk about

*forecasts* if  $\tau = 0, 1, 2, \dots$

and about

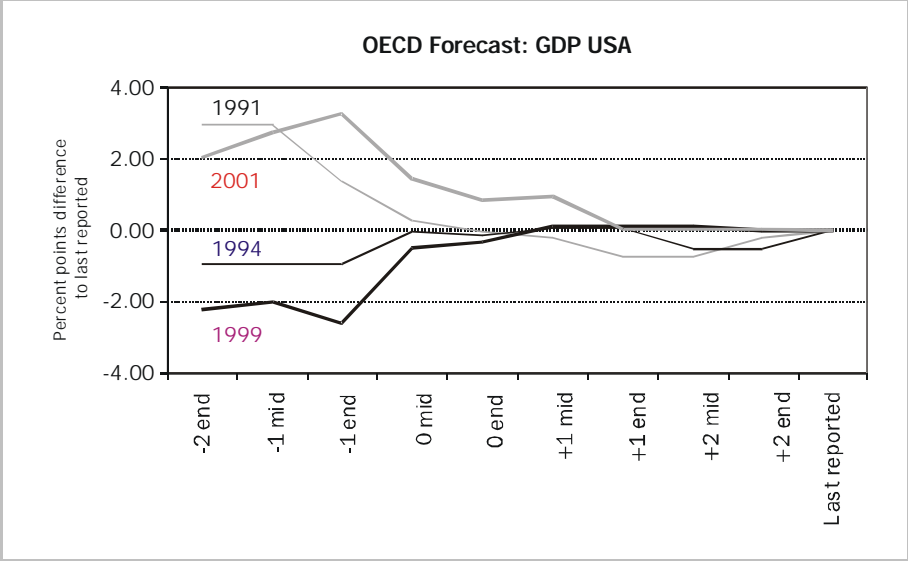
*data revisions* if  $\tau = -1, -2, \dots$

In the following we will treat both cases symmetrically and denote by estimate a particular variable  $y$  at time  $t$  based on information at  $t-\tau$  by  $y_{t|t-\tau}^e$ .

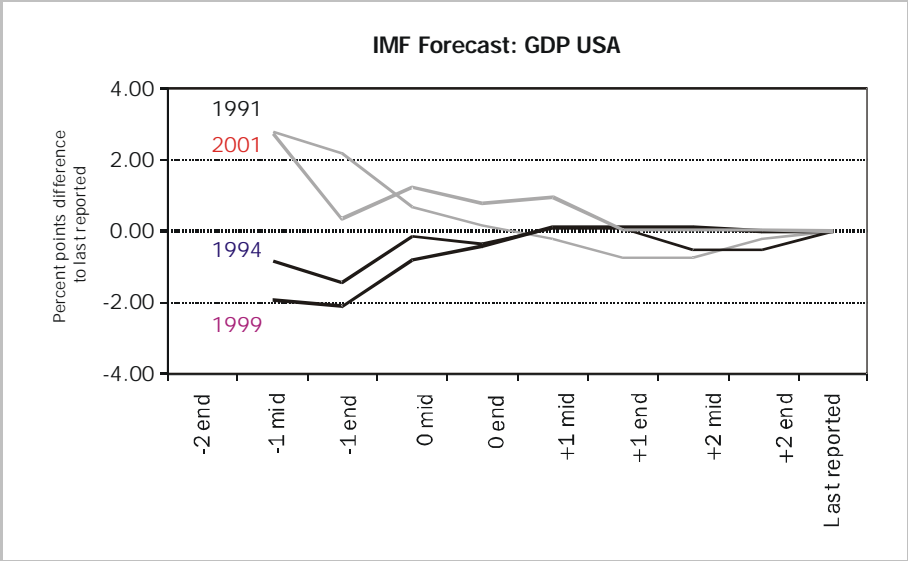
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<sup>3</sup> This was extensively analysed in Glück, Schleicher and Catena (2000). No improvement in forecast quality could be diagnosed.

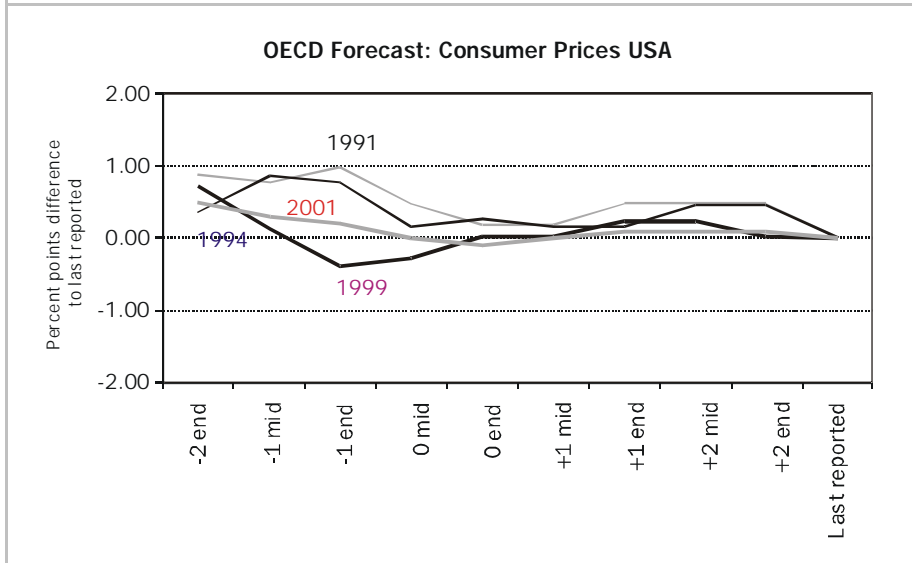
Graph 1. **OECD forecasts and data revisions: GDP USA**



Graph 2. **IMF forecasts and data revisions: GDP USA**



Graph 3. **OECD forecasts and data revisions: Consumer prices USA**



The relationship between the last reported value of variable  $y_t$  and the estimate made at different periods  $\tau$  before (forecast) or after period  $t$  (data revision)  $y_{t|t-\tau}^e$  and the corresponding estimation error  $e_{t|t-\tau}$  is

$$(1) \quad y_t = y_{t|t-\tau}^e + e_{t|t-\tau}, \quad \tau = -2, -1, 0, 1, 2.$$

Tables A.1 and A.2 in the Annex report the error analysis for relation (1). For rates of change of GDP and of consumer price deflators various vintages of estimates and last reported values are compared for the G7 countries, using the following country abbreviations: *United States* (USA), *Japan* (JPN), *Germany* (DEU), *United Kingdom* (GBR), *France* (FRA), *Italy* (ITA) and *Canada* (CAN). The rows in the tables refer to the dates when the corresponding estimates (predictions or data revisions) were published.

The general impression we get from Tables A.1 and A.2 corresponds to what we would expect as to forecast errors which improve with the age of an estimate. But it may not be that plausible that the data revision process continues with remarkably pronounced errors over more than two years after the date a forecast belongs to. From the beginning of the forecast sequence, the precision of inflation forecasts is higher than for GDP growth.

As to GDP, all countries seem to have a tendency towards starting with an overestimation, except the USA. More details will be revealed in the error model which we will present below. For the United States we discover a substantial and systematic underestimation both during the forecast as well as the data revision period. Quite the reverse holds true for Japan. This country's GDP is systematically overestimated (as indicated by negative average errors) in both periods. Compared to this, Germany and France show a very different error behavior: They start with an overestimation of the GDP growth rates but the errors quickly converge to zero and stay there. This means that both countries hardly revise their data afterwards<sup>4</sup>. Italy and the United Kingdom start out with overestimates in their first forecasts but keep underestimating during forecast and data revisions. A similar behavior is exhibited by Canada with a pronounced overestimation of its first forecast.

## 2.3 Error Model of Dated Estimates

Next, we investigate the relationship between dated estimates for forecasts and data revisions and the last reported values by specifying the following error model:

$$(2) \quad y_t = b_0 + b_1 y_{t-\tau}^e + u_{t-\tau} \quad \tau = -2, -1, 0, 1, 2$$

Thus we estimate the linear relationship between the final (last reported) series  $y_t$  and its dated estimates  $y_{t-\tau}^e$ , covering both forecasts (if  $\tau = 2, 1, 0$ ) and data revisions (if  $\tau = -1, -2$ ).

We use model (2) to test the joint hypothesis that the coefficients  $b_0$  and  $b_1$  do not differ significantly from 0 and 1, respectively, and that there is no serial correlation in the errors, as is required for efficiency and unbiasedness. In addition, we would expect that the sequence of these regressions shows convergence both with respect to the parameters  $b_0$  and  $b_1$ , the improvement of the overall fit (as reported by  $R^2$ ) and a lowering of serial correlation (indicated by the *DW* statistic). The results of these regressions for GDP forecasts are reported in Tables A.3 and A.4 in the Annex. A summary of these results expressed by the multiple coefficient of correlation is contained in Tables 1a and b.

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<sup>4</sup> *It remains open if this is to be interpreted as proof of an excellent quality of the data generating process or rather as neglect of information coming up later.*

Thus, the impression gained from visual inspection of Graphs 1 to 3 is confirmed by the error model: The forecast record for GDP growth rates is quite disappointing; the first two published forecasts contain hardly any relationship to the last reported values. There is convergence towards  $b_0 = 0$  and  $b_1 = 1$ , but only very late in the revision period and not in the forecasting phase.

Estimates for inflation rates, however, are much more accurate than estimates for GDP growth. The end-year inflation forecast two years ahead captures on average more than 50% of the variance of the last reported data. This means that inflation forecasts contain more useful information that can be incorporated into monetary policy rules. Thus, in the following we will concentrate mainly on the GDP forecasts, as they seem to be the source of larger potential errors than the inflation forecasts.

Date of estimate	R <sup>2</sup>						
	USA	JPN	DEU	GBR	FRA	ITA	CAN
2 ys. ahead (end)	0.000	0.012	0.050	0.108	0.287	0.100	0.185
1 y. ahead (mid)	0.191	0.071	0.000	0.068	0.035	0.000	0.110
1y. ahead (end)	0.587	0.584	0.428	0.408	0.516	0.416	0.423
Current year (mid)	0.804	0.779	0.769	0.853	0.747	0.627	0.734
Current year (end)	0.883	0.920	0.898	0.871	0.929	0.821	0.837
1 y. after (mid)	0.900	0.954	0.915	0.909	0.908	0.889	0.905
1 y. after (end)	0.947	0.950	0.919	0.919	0.936	0.898	0.914
2 ys. after (mid)	0.947	0.956	0.914	0.918	0.945	0.883	0.923

Source: Calculated from OECD Economic Outlook.

Date of estimate	R <sup>2</sup>						
	USA	JPN	DEU	GBR	FRA	ITA	CAN
2 ys. ahead (end)	0.525	0.731	0.707	0.711	0.579	0.575	0.683
1 y. ahead (mid)	0.780	0.750	0.537	0.649	0.930	0.941	0.894
1y. ahead (end)	0.850	0.865	0.760	0.884	0.956	0.939	0.936
Current year (mid)	0.987	0.931	0.915	0.906	0.984	0.983	0.962
Current year (end)	0.980	0.929	0.943	0.960	0.992	0.992	0.985
1 y. after (mid)	0.979	0.947	0.940	0.976	0.995	0.992	0.983
1 y. after (end)	0.977	0.945	0.936	0.981	0.994	0.994	0.982
2 ys. after (mid)	0.977	0.940	0.938	0.983	0.994	0.995	0.981

Source: Calculated from OECD Economic Outlook.



We conclude that since all estimates of one-year ahead forecast produced at the end of the preceding year show a significant relationship between estimated data and last reported data, this fact can be exploited for improving both the dated forecasts and the data revisions in order to obtain combined estimates that come closer to the final series. This will be done in the next section.

### 3 Overcoming Real-Time Data Problems in the Case of Taylor Rules

Given these data problems, a policymaker faces two options:

- to apply parameter values of instrument rules which are estimated from real-time data, or
- to correct real-time data for the known deficiencies like forecasting and revision errors and - if they can be identified - structural breaks and to re-estimate parameter values of instrument rules accordingly.

In this section we first evaluate the extent of parameter uncertainty caused by real-time issues in the case of Taylor rules and then develop operational procedures for overcoming the problem of dated information.

#### 3.1 The Impact of Dated Information on the Parameters of Taylor Rules

If characterised by simple instrument rules, to what extent does central bank behaviour seem different if observed in real-time situations or, alternatively, if extracted from an ex-post information set? Or, put differently, how would policy reactions change if parameter values gained from last reported data were applied instead of those from real-time data?

In order to investigate this, we estimate Taylor rules using forecast values as arguments. Thus, we regress the short-term interest rate of the current period on the forecasts made a certain time span ahead. As indicated, however, GDP forecasts over horizons of more than one year are of no predictive value; therefore, we estimate Taylor rules based on

one-year-ahead forecasts for GDP and inflation. In addition, we apply interest-rate smoothing by including the lagged interest rate, i.e. we regress

$$(3) \quad r_{t|t-1} = \alpha_0 + \alpha_1 p_{t|t-1}^e + \alpha_2 y_{t|t-1}^e + \alpha_3 r_{t-1} + u_{t|t-1}$$

with  $p_{t|t-1}^e$  being the inflation rate for year t forecast at time t-1,  $y_{t|t-1}^e$  being the forecast output gap for the next year (defined as the difference between smoothed GDP growth as a measure for potential GDP growth and forecast GDP growth). We use equation (3) to generate a forecast for the short-term interest rate  $r_{t|t-1}$  in period t by using the forecasts for GDP and inflation available in period (t-1) for period t<sup>5</sup>.

The results<sup>6</sup> of this analysis are summarized in Table 2a. It indicates that for all G7 countries current year's short-run interest rates are significantly related to inflation forecasts made at the end of the preceding year. The size of the estimated coefficients varies between 0.4 and 1.4. The impact of the same dated predictions for GDP gap on short-run interest rates is much weaker and only significant for Japan and United Kingdom.

Country	Inflation		GDP gap		Lagged dep. var.		Constant		R <sup>2</sup>	DW
	a <sub>1</sub>	t <sub>1</sub>	a <sub>2</sub>	t <sub>2</sub>	a <sub>3</sub>	t <sub>3</sub>	a <sub>4</sub>	t <sub>4</sub>		
USA	0.973	4.07	-0.377	1.33	0.406	2.66	0.697	0.82	0.847	0.97
Japan	0.796	4.79	-0.580	2.40	0.541	4.83	1.522	2.56	0.895	2.07
Germany	1.394	3.07	-0.302	0.88	0.321	1.45	0.676	0.67	0.709	1.45
United Kingdom	0.789	4.19	-1.078	2.90	0.604	3.75	-0.060	0.04	0.817	1.03
France	0.358	3.04	-0.102	0.24	0.656	4.07	1.229	1.17	0.870	1.72
Italy	0.520	3.83	-0.399	0.98	0.625	5.58	0.956	0.94	0.915	1.87
Canada	1.250	3.37	-0.111	0.19	-0.057	0.17	3.665	1.97	0.742	1.44

Source: Own calculations based on data from OECD Economic Outlook, 1980-2001.

<sup>5</sup> Given the high error in GDP forecasts, we do not invest more sophistication into the calculation of the output gap.

<sup>6</sup> Results for the countries participating in the EMU may be slightly distorted by the fact that they followed a common monetary policy as of 1999.

Country	Inflation		GDP gap		Lagged dep. var.		Constant		R <sup>2</sup>	DW
	a <sub>1</sub>	t <sub>1</sub>	a <sub>2</sub>	t <sub>2</sub>	a <sub>3</sub>	t <sub>3</sub>	a <sub>4</sub>	t <sub>4</sub>		
USA	0.874	7.42	-0.417	3.34	0.514	5.95	0.278	0.52	0.930	1.76
Japan	0.875	4.67	-0.380	2.26	0.481	3.83	1.548	2.88	0.883	2.28
Germany	0.949	5.02	-0.551	2.86	0.500	3.75	0.993	1.46	0.826	1.64
United Kingdom	0.610	4.81	-0.310	1.30	0.457	3.35	1.834	1.51	0.841	1.38
France	0.368	4.07	-0.146	0.53	0.649	5.32	1.210	1.46	0.895	1.63
Italy	0.362	5.07	-0.700	0.24	0.667	6.84	0.709	0.80	0.928	1.97
Canada	0.912	3.77	-0.132	0.44	0.229	0.85	2.650	1.64	0.782	1.74

Source: Own calculations based on data from OECD Economic Outlook, 1980-2001.

For comparison, the estimation results for the same Taylor rule specification, but with last reported values, are contained in Table 2b. We recognize that the significance of the inflation rate increases. As to the GDP gap, in contrast to the estimates based on predictions, the United States and Germany now show significant impacts, but the United Kingdom does not any more.

Compared to the final data rules, as reported in Table 2a, we recognize that in the real-time data rules of Table 2a the reaction to the inflation rate in most cases is somewhat stronger (though the difference is not always statistically significant), whereas for the real-time output gap the significance is reduced. The coefficients on the lagged interest rates suggest that the desire to keep the interest rate stable seems somewhat stronger than in the final data case.

These results seem to point in the direction that central banks in real-time react more actively to deviations in inflation from their targets than rules estimated over final data would suggest, whereas the reaction to deviations in output in most cases seems less significant than for final data.

Thus, it is confirmed that parameters of estimated Taylor rules are rather sensitive with respect to dated sample information. In addition, our investigations showed that there is evidence from CUSUM tests of structural changes.

### 3.2 Some Proposals to Handle Dated Information

What can be done? We are proposing a procedure which attempts to deal with a real-time policy decision environment that takes into account both the aspect of dated sample information and possible structural changes in the policy reaction behaviour.

As to the problem of dated sample information, we propose two types of sample strategies:

- The *unadjusted sample* only deals with last reported values but neglects the most recent four values because of the evidence of major data revisions.
- The *adjusted sample* also deals with last reported values but replaces the most recent four values by estimates from the measurement error model. This means that the preliminary values for these values are replaced by bias-corrected values.

As far as structural changes are concerned, we also employ two types of sample strategies:

- *Expanding samples* start with a first sample 1980-1990 and expand in annual increments to the final sample 1980-2000.
- *Moving samples* start with a first sample 1980-1990 and move in annual increments with 11 years sample sizes to the final sample 1990-2000.

For both types of samples, based on the estimated parameters, the one-period outside sample forecast for the short-term interest rate from 1991 to 2001 is estimated.

Thus we design four types of real-time simulations in which we apply the information sets that could have been used by policymakers when calculating adequate policy reactions for short-term interest rates from 1991 to 2001. The policy errors resulting from not using these corrected data, measured in means, variance and mean square errors (MSE) of the short-term interest rate are reported in Tables 3a and b.

The results seem to be quite revealing: In the case of expanding samples as reported in Table 3a, e.g. for the United States, interest rates were set too low over the period under consideration by about 30 basis points on average in the unadjusted sample. Adjusting the sample leads to a reduction of the policy error to about 8 basis points, though the variance increases.

In the case of moving samples as reported in Table 3b, we observe again a reduction of the short-term interest rate policy error from an underestimation of 84 basis points to an overestimation of 46 basis points, but a substantial reduction in variance that also reduces the mean square error.

With only two exceptions (USA and Italy) out of 14 simulations, instead of using unadjusted samples the switch to adjusted samples substantially improves the performance as reflected in the decline of the mean square error.

Switching to moving samples improves in eight out of 14 simulations the forecast performance. The reason for this improvement seems to be the handling of structural changes by moving fixed size samples instead of increasing samples.

**Table 3a. Real-time simulation of Taylor rules using expanding samples estimated with dated data values**

	Unadjusted Sample			Adjusted Sample		
	Mean	Variance	MSE	Mean	Variance	MSE
USA	0.330	1.065	<b>1.174</b>	0.080	3.300	<b>3.306</b>
Japan	-1.780	4.283	<b>7.451</b>	-1.097	1.527	<b>2.730</b>
Germany	-0.067	2.865	<b>2.869</b>	-0.615	1.060	<b>1.438</b>
United Kingdom	-2.392	6.674	<b>12.396</b>	-1.138	2.811	<b>4.106</b>
France	-0.841	4.816	<b>5.523</b>	-0.819	2.066	<b>2.737</b>
Italy	-1.491	3.455	<b>5.678</b>	-0.888	3.113	<b>3.902</b>
Canada	-0.987	3.672	<b>4.646</b>	-1.472	1.503	<b>3.670</b>

Source: Own calculations based on data from OECD Economic Outlook, sample starts 1980 and expands from 1991 to 2001.

**Table 3b. Real-time simulation of Taylor rules using moving samples estimated with dated data values**

	Unadjusted Sample			Adjusted Sample		
	Mean	Variance	MSE	Mean	Variance	MSE
USA	0.843	5.703	<b>6.414</b>	-0.458	2.965	<b>3.175</b>
Japan	0.730	1.482	<b>2.015</b>	-0.526	1.111	<b>1.388</b>
Germany	0.574	2.087	<b>2.416</b>	-0.603	0.536	<b>0.900</b>
United Kingdom	-0.559	8.516	<b>8.828</b>	0.022	7.422	<b>7.422</b>
France	0.239	7.898	<b>7.955</b>	-0.840	2.619	<b>3.325</b>
Italy	-1.398	3.059	<b>5.013</b>	-1.243	3.817	<b>5.362</b>
Canada	-0.406	9.827	<b>9.992</b>	-0.622	4.424	<b>4.811</b>

Source: Own calculations based on data from OECD Economic Outlook, moving 11 year sample start with 1980-1990 and move to 1991-2001.

Evidently, what might be regarded as the optimal strategy for handling these data problems, differs among countries. Therefore, we performed on the OECD data set a ranking of the four different sampling strategies for dealing with dated information in the context of Taylor-rule-based interest rate decisions. This ranking, using the mean square error as criterion, is shown in Table 4.

**Table 4. Ranking of sampling strategies**

	Ranking			
	1	2	3	4
USA	unadjusted expanding	adjusted moving	adjusted expanding	unadjusted moving
Japan	adjusted moving	unadjusted moving	adjusted expanding	unadjusted expanding
Germany	adjusted moving	adjusted expanding	unadjusted moving	unadjusted expanding
United Kingdom	adjusted expanding	adjusted moving	unadjusted moving	unadjusted expanding
France	adjusted expanding	adjusted moving	unadjusted expanding	unadjusted moving
Italy	adjusted expanding	unadjusted moving	adjusted moving	unadjusted expanding
Canada	adjusted expanding	adjusted moving	unadjusted expanding	unadjusted moving

*Source: Own calculations based on data from OECD Economic Outlook. Data are "adjusted" if they are modified according to the estimated error model, otherwise they are "unadjusted". Samples are "expanding" if the sample size increases or "moving" if the sample size is kept constant.*

## 4 Conclusions

We started from the general assertion that a useful monetary policy design should be founded on more realistic assumptions about what policymakers can know at the time when policy decisions have to be made.

Applied to simple instrument rules – if they are to be used as an operational and forward-looking device –, we analyze the reliability of the input information for such rules. We use OECD forecasts for inflation and GDP growth rates and investigate the forecasting performance for these variables. We diagnose a much better forecasting record for inflation rates compared to GDP growth rates, which for most countries are almost uninformative at the time a Taylor rule should sensibly be applied. Using this data set, we find clear differences between Taylor rules if estimated over revised ex-post data or over real-time data, and there is evidence that monetary policy seems to react more actively in real time than rules estimated over revised data suggest.

Since the OECD forecasts for GDP growth rates exhibit systematic errors, in a next step we attempted to correct for these forecast biases and checked to which extent this can lower the errors in interest rate policy setting. An ex-ante simulation for the years 1991 to 2001 supports the proposal that correcting for forecast errors and biases based on an error model can lower the resulting policy error in interest rate setting for most countries under consideration. In addition, we investigate to what extent structural changes in the policy reaction behaviour can be handled with moving instead of expanding samples.

Generally, our analysis supports critics and sceptics of the Taylor rule who argue that a mechanical application of this rule will not be appropriate and should at least be accompanied by a careful examination of a broad set of additional information (as is done, of course, in practice by most central banks).

Svensson (2003) presented a long list of what may be wrong with the Taylor rule. Our results additionally point out the fact that the informational basis – when applying such a rule, for instance, in the case of inflation targeting - needs careful examination. Limited forecast quality and significant data revisions recommend a more sophisticated handling of the dated information for which we present an operational procedure that has the potential of reducing the risk of severe policy errors.

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# Annex

Table A.1 Error analysis of GDP

	Means of errors of estimates									
	2 y. ahead		1 year ahead		current year		1 year after		2 years after	
	end	mid	end	mid	end	mid	end	mid	end	
USA	0.32	0.35	0.41	0.27	0.38	0.34	0.34	0.36	0.32	
JPN	-0.71	-0.25	-0.36	-0.07	-0.15	-0.30	-0.30	-0.35	0.04	
DEU	-0.76	-0.60	-0.10	0.06	0.07	0.04	-0.03	-0.04	0.05	
FRA	-0.72	-0.36	-0.14	-0.09	0.09	0.04	-0.01	-0.03	0.13	
ITA	-0.73	-0.49	0.13	0.28	0.53	0.44	0.49	0.49	0.08	
GBR	-0.15	0.36	0.28	0.60	0.61	0.55	0.41	0.36	0.21	
CAN	-0.65	-0.44	0.11	0.23	0.47	0.40	0.39	0.36		

Table A.1 continued

	Root mean square of errors of estimates									
	2 y. ahead		1 year ahead		current year		1 year after		2 years after	
	end	mid	end	mid	end	mid	end	mid	end	
USA	1.58	1.69	1.37	1.01	0.86	0.79	0.64	0.64	0.55	
JPN	2.12	1.98	2.24	1.69	1.21	1.08	1.12	0.96	0.66	
DEU	1.92	1.73	1.52	0.99	0.79	0.67	0.68	0.69	0.37	
FRA	1.77	1.54	1.22	1.00	0.75	0.63	0.53	0.51	0.40	
ITA	1.50	1.38	1.77	1.36	1.08	0.84	0.85	0.91	0.24	
GBR	1.30	1.43	1.49	0.94	0.93	0.80	0.68	0.66	0.47	
CAN	1.86	2.12	1.58	1.10	1.01	0.77	0.74	0.70		

Table A.1 continued

	Standard deviation of errors of estimates									
	2 y. ahead		1 year ahead		current year		1 year after		2 years after	
	end	mid	end	mid	end	mid	end	mid	end	
USA	1.60	1.62	1.47	0.85	0.77	0.70	0.49	0.48	0.47	
JPN	2.06	1.93	1.34	0.74	0.99	0.76	0.76	0.59	0.59	
DEU	1.82	1.73	1.41	0.91	0.72	0.57	0.55	0.54	0.48	
FRA	1.67	1.60	1.15	0.72	0.57	0.48	0.50	0.46	0.44	
ITA	1.27	1.22	0.84	0.67	0.47	0.26	0.27	0.23	0.23	
GBR	1.33	1.26	1.14	0.79	0.54	0.39	0.38	0.39	0.40	
CAN	1.79	1.87	1.76	1.19	0.74	0.58	0.48	0.48		

Table A.2 Error analysis of consumer prices

	Means of errors of estimates									
	2 y. ahead		1 year ahead		current year		1 year after		2 years after	
	end	mid	end	mid	end	mid	end	mid	end	
USA	-0.55	-0.63	-0.28	-0.07	0.03	0.09	0.01	-0.03	-0.10	
JPN	-0.53	-0.63	-0.36	-0.21	-0.06	0.03	0.01	0.02	-0.02	
DEU	-0.12	-0.24	-0.09	-0.11	-0.13	-0.12	-0.09	-0.09	-0.15	
FRA	0.00	-0.01	0.14	0.04	0.06	0.22	0.21	0.22	0.20	
ITA	0.88	0.64	0.92	0.40	0.31	0.21	0.20	0.19	0.21	
GBR	0.03	-0.03	-0.02	0.15	0.45	0.44	0.40	0.44	0.34	
CAN	-0.40	-0.34	-0.10	-0.07	0.09	0.12	0.09	0.09		

Table A.2 continued

	Root mean square of errors of estimates									
	2 y. ahead		1 year ahead		current year		1 year after		2 years after	
	end	mid	end	mid	end	mid	end	mid	end	
USA	1.01	1.01	1.01	0.31	0.37	0.37	0.37	0.37	0.38	
JPN	0.92	1.12	0.96	0.77	0.71	0.63	0.63	0.57	0.59	
DEU	0.80	1.01	0.91	0.60	0.54	0.48	0.48	0.40	0.41	
FRA	0.62	0.80	0.87	0.51	0.36	0.38	0.39	0.53	0.30	
ITA	1.45	1.16	1.67	0.84	0.58	0.47	0.48	0.42	0.35	
GBR	1.33	1.27	1.28	1.19	0.88	0.79	0.69	0.69	0.63	
CAN	1.23	1.12	1.02	0.84	0.67	0.57	0.58	0.44		

Table A.2 continued

	Standard deviation of errors of estimates									
	2 y. ahead		1 year ahead		current year		1 year after		2 years after	
	end	mid	end	mid	end	mid	end	mid	end	
USA	0.88	0.60	0.83	0.31	0.30	0.26	0.23	0.26	0.31	
JPN	0.70	0.79	0.80	0.63	0.51	0.51	0.50	0.52	0.52	
DEU	0.58	0.64	0.58	0.38	0.37	0.42	0.44	0.43	0.43	
FRA	0.65	0.55	0.54	0.32	0.32	0.25	0.27	0.21	0.19	
ITA	1.19	1.01	0.92	0.36	0.42	0.30	0.31	0.24	0.26	
GBR	1.38	1.37	0.97	1.13	0.88	0.79	0.66	0.64	0.64	
CAN	0.81	0.51	0.53	0.44	0.36	0.33	0.30	0.30		

Table A.3 Error model for GDP						
USA GDP						
Date of estimate	Estimated variable		Constant		R2	DW
	b <sub>1</sub>	t <sub>1</sub>	b <sub>0</sub>	t <sub>0</sub>		
2 ys. ahead (end)	-0.03	0.1	3.00	2.1	0.000	1.48
1 y. ahead (mid)	1.05	2.2	0.21	0.2	0.191	1.36
1y. ahead (end)	0.89	7.2	0.71	1.8	0.587	1.94
Current year (mid)	0.83	12.0	0.75	3.1	0.804	1.78
Current year (end)	0.85	16.3	0.78	4.3	0.883	1.74
1 y. after (mid)	0.87	17.5	0.69	4.0	0.900	1.48
1 y. after (end)	0.87	24.5	0.67	5.3	0.947	1.69
2 ys. after (mid)	0.89	24.3	0.65	5.0	0.947	1.74

Table A.3 continued						
JAPAN GDP						
Date of estimate	Estimated variable		Constant		R2	DW
	b <sub>1</sub>	t <sub>1</sub>	b <sub>0</sub>	t <sub>0</sub>		
2 ys. ahead (end)	0.17	0.4	1.44	1.3	0.012	1.03
1 y. ahead (mid)	0.41	1.3	1.37	1.4	0.071	1.09
1y. ahead (end)	0.83	7.1	0.39	0.6	0.584	1.78
Current year (mid)	0.83	11.1	0.63	1.6	0.779	1.87
Current year (end)	0.81	20.1	0.64	2.8	0.920	1.70
1 y. after (mid)	0.82	26.5	0.51	2.8	0.954	1.95
1 y. after (end)	0.81	25.5	0.53	2.8	0.950	1.91
2 ys. after (mid)	0.86	26.8	0.30	1.6	0.956	1.93

Table A.3 continued						
GERMANY GDP						
Date of estimate	Estimated variable		Constant		R2	DW
	b <sub>1</sub>	t <sub>1</sub>	b <sub>0</sub>	t <sub>0</sub>		
2 ys. ahead (end)	-0.78	0.9	3.89	1.6	0.050	1.26
1 y. ahead (mid)	-0.06	0.1	2.02	1.2	0.000	1.05
1y. ahead (end)	1.00	5.2	-0.09	0.5	0.428	1.64
Current year (mid)	0.88	10.7	0.33	1.4	0.769	1.94
Current year (end)	0.81	17.2	0.48	3.1	0.898	1.98
1 y. after (mid)	0.85	19.1	0.38	2.6	0.915	1.80
1 y. after (end)	0.84	19.5	0.35	2.5	0.919	1.71
2 ys. after (mid)	0.83	18.8	0.38	2.5	0.914	1.64

Table A.3 continued						
UNITED KINGDOM GDP						
Date of estimate	Estimated variable		Constant		R2	DW
	b <sub>1</sub>	t <sub>1</sub>	b <sub>0</sub>	t <sub>0</sub>		
2 ys. ahead (end)	0.93	1.3	0.01	0.0	0.108	1.22
1 y. ahead (mid)	0.59	1.2	1.28	1.1	0.068	0.86
1y. ahead (end)	0.82	5.0	0.67	1.6	0.408	1.45
Current year (mid)	1.04	14.3	0.53	3.0	0.853	1.84
Current year (end)	0.93	15.3	0.74	4.7	0.871	1.83
1 y. after (mid)	1.03	18.4	0.50	3.5	0.909	2.57
1 y. after (end)	1.02	19.7	0.36	2.6	0.919	2.96
2 ys. after (mid)	1.01	19.2	0.34	2.4	0.918	3.17

Table A.3 continued						
FRANCE GDP						
Date of estimate	Estimated variable		Constant		R2	DW
	b <sub>1</sub>	t <sub>1</sub>	b <sub>0</sub>	t <sub>0</sub>		
2 ys. ahead (end)	-1.78	2.5	6.67	3.4	0.287	1.14
1 y. ahead (mid)	-0.38	0.8	2.95	2.6	0.035	0.93
1y. ahead (end)	0.85	6.2	0.29	0.7	0.516	1.50
Current year (mid)	0.75	10.2	0.60	2.4	0.747	1.25
Current year (end)	0.86	21.1	0.38	2.8	0.929	1.21
1 y. after (mid)	0.81	18.3	0.55	3.6	0.908	1.45
1 y. after (end)	0.80	15.0	0.60	3.4	0.936	1.22
2 ys. after (mid)	0.85	22.8	0.37	2.8	0.945	0.91
2 ys. after (end)	0.93	10.1	0.26	1.3	0.879	1.12

Table A.3 continued						
ITALY GDP						
Date of estimate	Estimated variable		Constant		R2	DW
	b <sub>1</sub>	t <sub>1</sub>	b <sub>0</sub>	t <sub>0</sub>		
2 ys. ahead (end)	-1.06	1.3	4.46	2.2	0.100	1.21
1 y. ahead (mid)	-0.02	0.1	1.88	2.0	0.000	1.16
1y. ahead (end)	0.69	5.1	0.95	2.1	0.416	1.42
Current year (mid)	0.88	7.7	0.57	1.6	0.627	1.74
Current year (end)	0.88	12.7	0.76	3.5	0.821	1.61
1 y. after (mid)	0.97	16.5	0.49	2.6	0.889	1.12
1 y. after (end)	0.95	17.3	0.58	3.3	0.898	1.20
2 ys. after (mid)	0.89	15.8	0.75	4.0	0.883	1.39

Table A.3 continued						
CANADA GDP						
Date of estimate	Estimated variable		Constant		R2	DW
	b <sub>1</sub>	t <sub>1</sub>	b <sub>0</sub>	t <sub>0</sub>		
2 ys. ahead (end)	1.23	1.8	-1.39	0.6	0.185	1.22
1 y. ahead (mid)	0.92	1.6	-0.18	0.1	0.110	1.24
1y. ahead (end)	1.10	5.1	-0.21	0.3	0.423	2.09
Current year (mid)	1.03	9.8	0.12	0.3	0.734	1.75
Current year (end)	0.87	13.4	0.84	3.6	0.837	1.38
1 y. after (mid)	0.93	18.0	0.60	3.2	0.905	1.31
1 y. after (end)	0.94	19.0	0.58	3.2	0.914	1.34
2 ys. after (mid)	0.94	19.9	0.55	3.1	0.923	1.32

Table A.4 Error model for consumer prices						
USA Consumer Prices						
Date of estimate	Estimated variable		Constant		R2	DW
	$b_1$	$t_1$	$b_0$	$t_0$		
2 ys. ahead (end)	0.65	3.9	0.47	0.9	0.525	1.25
1 y. ahead (mid)	0.67	8.6	0.51	1.7	0.780	1.65
1y. ahead (end)	0.93	11.7	-0.03	0.1	0.850	1.21
Current year (mid)	1.02	41.9	-0.16	1.5	0.987	1.63
Current year (end)	1.02	34.1	-0.07	0.5	0.980	1.48
1 y. after (mid)	1.06	33.2	-0.10	0.7	0.979	1.27
1 y. after (end)	1.06	32.2	-0.20	1.3	0.977	1.32
2 ys. after (mid)	1.06	31.3	-0.25	1.6	0.977	1.57

Table A.4 continued						
JAPAN Consumer Prices						
Date of estimate	Estimated variable		Constant		R2	DW
	$b_1$	$t_1$	$b_0$	$t_0$		
2 ys. ahead (end)	0.89	6.2	-0.46	2.3	0.731	1.20
1 y. ahead (mid)	0.74	8.0	-0.30	1.6	0.750	2.19
1y. ahead (end)	0.91	12.4	-0.23	1.2	0.865	2.82
Current year (mid)	0.94	18.0	-0.13	0.9	0.931	1.96
Current year (end)	1.07	17.7	-0.14	1.0	0.929	1.52
1 y. after (mid)	0.99	20.7	0.32	0.2	0.947	1.56
1 y. after (end)	1.04	20.4	-0.01	0.8	0.945	1.64
2 ys. after (mid)	1.02	19.0	0.01	0.1	0.940	1.68

Table A.4 continued						
GERMANY Consumer Prices						
Date of estimate	Estimated variable		Constant		R2	DW
	$b_1$	$t_1$	$b_0$	$t_0$		
2 ys. ahead (end)	1.03	5.8	-0.20	0.5	0.707	1.72
1 y. ahead (mid)	0.91	4.9	-0.06	0.1	0.537	1.52
1y. ahead (end)	1.19	8.9	-0.57	1.5	0.760	1.53
Current year (mid)	1.10	16.1	-0.37	1.9	0.915	1.72
Current year (end)	1.00	19.9	-0.14	0.9	0.943	1.94
1 y. after (mid)	0.98	19.3	-0.11	0.7	0.940	1.89
1 y. after (end)	0.97	18.7	-0.03	0.2	0.936	1.72
2 ys. after (mid)	0.97	18.7	-0.05	0.3	0.938	1.67

Table A.4 continued						
UNITED KINGDOM Consumer Prices						
Date of estimate	Estimated variable		Constant		R2	DW
	$b_1$	$t_1$	$b_0$	$t_0$		
2 ys. ahead (end)	1.65	5.9	-2.12	2.2	0.711	1.68
1 y. ahead (mid)	0.92	6.2	0.31	0.5	0.649	0.78
1y. ahead (end)	1.06	13.5	-0.33	0.7	0.884	1.06
Current year (mid)	0.92	15.2	0.52	1.3	0.906	1.66
Current year (end)	1.03	24.1	0.29	1.1	0.960	1.28
1 y. after (mid)	1.02	31.1	0.30	1.4	0.976	1.77
1 y. after (end)	0.99	35.0	0.41	2.2	0.981	1.93
2 ys. after (mid)	0.99	36.3	0.47	2.5	0.983	1.47

Table A.4 continued						
FRANCE Consumer Prices						
Date of estimate	Estimated variable		Constant		R2	DW
	$b_1$	$t_1$	$b_0$	$t_0$		
2 ys. ahead (end)	1.23	4.4	-0.44	0.8	0.579	1.17
1 y. ahead (mid)	0.91	16.7	0.28	1.2	0.930	2.31
1y. ahead (end)	1.04	22.8	-0.58	0.2	0.956	1.98
Current year (mid)	0.98	39.0	0.12	0.8	0.984	2.41
Current year (end)	0.99	55.7	0.79	0.7	0.992	1.69
1 y. after (mid)	0.99	0.2	0.24	2.6	0.995	1.82
1 y. after (end)	1.01	62.5	0.12	1.2	0.994	1.23
2 ys. after (mid)	1.01	64.1	0.12	1.2	0.994	1.31

Table A.4 continued						
ITALY Consumer Prices						
Date of estimate	Estimated variable		Constant		R2	DW
	$b_1$	$t_1$	$b_0$	$t_0$		
2 ys. ahead (end)	0.94	4.4	1.09	1.4	0.575	1.48
1 y. ahead (mid)	0.94	18.3	0.96	2.8	0.941	2.33
1y. ahead (end)	1.09	19.2	0.37	0.8	0.939	0.86
Current year (mid)	0.96	37.0	0.69	2.9	0.983	2.52
Current year (end)	0.98	54.6	0.45	2.7	0.992	1.72
1 y. after (mid)	0.98	53.0	0.30	1.6	0.992	1.58
1 y. after (end)	0.99	63.5	0.21	1.3	0.994	1.74
2 ys. after (mid)	0.99	71.3	0.22	1.6	0.995	2.08

Table A.4 continued						
CANADA Consumer Prices						
Date of estimate	Estimated variable		Constant		R2	DW
	$b_1$	$t_1$	$b_0$	$t_0$		
2 ys. ahead (end)	0.69	5.5	0.40	1.1	0.683	1.26
1 y. ahead (mid)	0.83	13.3	0.24	0.9	0.894	1.45
1y. ahead (end)	1.04	18.7	-0.24	0.9	0.936	1.20
Current year (mid)	0.98	24.7	0.52	0.3	0.962	1.68
Current year (end)	0.97	39.7	0.20	1.6	0.985	2.18
1 y. after (mid)	0.96	37.0	0.34	2.4	0.983	1.78
1 y. after (end)	0.95	35.7	0.38	2.7	0.982	1.60
2 ys. after (mid)	0.95	34.7	0.38	2.5	0.981	1.51

# **External Balances, Capital Flows, Monetary and Exchange Rate Policies**



## Keynote Speech

# External Balances, Capital Flows, and Monetary and Exchange Rate Policies in Central and Eastern Europe

Dubravko Mihaljek\*

**Keywords:** private capital flows, determinants of capital flows, exchange rate policy, monetary policy, Maastricht criteria for EMU, ERM II, EU accession countries, convergence, Tošovský dilemma, emerging market economies

**JEL Classification:** E52, F31, F32, F36, F40, P33

## 1 Introduction

The theme of this session is broad enough to cover almost any topic in international macroeconomics of central and eastern European economies. This makes it impossible even to attempt to summarise the recent literature and policy developments in the area. So rather than embarking on a *tour d'horizon*, this contribution will take a closer look at only two sectors on the horizon: recent trends in global financial markets, and policy challenges arising from increased capital flows to central and eastern Europe.

As it turns out, increased capital flows are currently challenging policy makers in emerging market economies worldwide. A combination of strong global growth, low inflation and historically low interest rates has led to a significant increase in financial flows towards emerging markets. Although important, low returns on financial assets in industrial countries and ample liquidity in global financial markets are not the only forces underlying this shift. Many developing countries have pursued sound macroeconomic policies and implemented major structural reforms over the past decade, attracting large direct and portfolio investments in the process. Moreover, institutional

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investors from industrial countries seem to be changing their investment behaviour, with pension funds increasingly diversifying their assets towards emerging markets on a more permanent basis. These developments suggest that large capital flows might become a permanent feature of the policy environment in countries such as Croatia. The accession to the European Union and the requirement to liberalise capital flows – not least with respect to non-residents' investment in the real estate sector – further highlight the need for a thorough analysis of issues in this area.

Against this background, Section 2 traces in more detail the return of private capital flows to the emerging markets since 2000, and discusses some findings on the determinants and sustainability of recent capital inflows. Section 3 turns to challenges that capital flows pose for macroeconomic policies in EU accession countries. It discusses possible macroeconomic effects of capital flows in the run-up to the European Monetary Union (EMU) and examines different options for monetary and exchange rate policies. It also looks at empirical evidence on capital flows to the region and the countries in southern Europe that already joined EMU. It is shown that countries in central and eastern Europe have already been exposed to sizeable capital flows over the past decade without experiencing major instability. It is further argued that conditions prevailing currently in most accession countries are perhaps less conducive to speculative inflows than was the case prior to the accession of Greece, Italy, Ireland, Portugal and Spain. Inflation rates and interest rates have, with few exceptions, converged significantly during the past few years. Similarly, country risk premia have also come down markedly, so the remaining scope for volatile capital flows might be smaller than in the past.

## 2 Recent Trends in Global Capital Markets

Net private capital flows to the emerging market economies were estimated at about \$174 billion in 2003 (Table 1), the highest level recorded since the peak of nearly \$200 billion in 1996.<sup>1</sup> Both portfolio flows (equities and bonds) and other flows (commercial bank and other loans) were significantly higher than in 2002. Foreign direct investment (FDI), however, continued to decline, its share in total flows falling below 50% from over 70% on average during the 1990s. Asian economies attracted the bulk of the inflows last year, with China alone absorbing 60% of FDI in all emerging markets (close to 90%

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<sup>1</sup> *This section updates and extends parts of Chapter 3 of BIS (2004).*

of FDI flows to Asia). Brazil, China, India and Korea were important destinations for portfolio inflows, while countries in Latin America and central and eastern Europe (CEE) benefited from resumption in loan flows.

Recent data confirm that private capital flows to the emerging markets have remained strong in 2004. Gross issuance of emerging market bonds in international markets reached \$330 billion by mid-October, \$11 billion higher than for the whole of 2003. There has also been a revival in FDI inflows, which are projected to increase by about 10% this year after several years of decline, according to the latest *World Economic Outlook* (IMF, 2004). Central and eastern European countries have continued to attract large commercial bank inflows.

A notable recent development in international bond markets has been increased issuance by debtors with sub-investment grade ratings, including corporations, financial institutions and local governments from Russia, Turkey and Ukraine, and governments of many central and south American countries. This development reflects favourable financing conditions in global capital markets on the one hand, and large current account surpluses in many oil- and commodity-exporting countries on the other. The EMBI Global index has narrowed by 170 basis points over the past six months, approaching in early November the record low spreads of 370 points observed in January 2004. The compression of spreads was particularly marked for Brazilian, Czech, Hungarian, Russian and Turkish bonds. Many sovereign issuers have as a result pre-financed part of their external financing needs for 2005.

In net terms, aggregate flows to the emerging market economies are nevertheless projected to be smaller in 2004 than the previous year. However, this is the case not because of lower gross inflows, but because many emerging economies are using the “window of opportunity” in international financial markets to repay outstanding debt, and thus reduce the overall debt burden before the external financing conditions become more difficult.

Table 1. Net private capital flows to emerging market economies in billions of US dollars				
	Annual average 1990–2000	2001	2002	2003 <sup>1</sup>
Emerging market economies <sup>2</sup>				
Total flows	109	72	74	174
Direct investment	79	125	106	81
Portfolio investment <sup>3</sup>	45	-11	-28	34
Other private flows <sup>4</sup>	-15	-42	-4	61
Memo: Current account balance	-30	37	97	133
Change in reserves <sup>5</sup>	-48	-88	-175	-280
Asia <sup>6</sup>				
Total flows	35	31	41	111
Direct investment	35	42	47	45
Portfolio investment <sup>3</sup>	12	-12	-18	36
Other private flows <sup>4</sup>	-12	1	12	30
Memo: Current account balance	14	66	99	123
Change in reserves <sup>5</sup>	-37	-82	-151	-215
Latin America <sup>7</sup>				
Total flows	62	36	-3	16
Direct investment	34	59	34	24
Portfolio investment <sup>3</sup>	30	1	-13	-5
Other private flows <sup>4</sup>	-2	-24	-24	-1
Memo: Current account balance	-39	-47	-8	9
Change in reserves <sup>5</sup>	-11	3	0	-27
CEE <sup>8</sup>				
Total flows	12	5	36	47
Direct investment	10	24	25	12
Portfolio investment <sup>3</sup>	3	1	3	3
Other private flows <sup>4</sup>	-1	-19	8	32
Memo: Current account balance	-5	18	6	1
Excluding Russia	-14	-16	-23	-35
Change in reserves <sup>5</sup>	0	-9	-24	-38

Notes: <sup>1</sup>Estimates of capital flows based on national balance of payments data and Institute of International Finance. <sup>2</sup>Comprises the economies in Asia, Latin America and CEE listed below and South Africa. <sup>3</sup>Debt and equity assets and liabilities. <sup>4</sup>Includes net flows intermediated by commercial banks and other private sector agents (not including financial derivatives). <sup>5</sup>A negative value indicates an increase in reserves. <sup>6</sup>China, India, Indonesia, Korea, Malaysia, the Philippines, Taiwan and Thailand. <sup>7</sup>Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. <sup>8</sup>Bulgaria, the Czech Republic, Croatia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russia, Slovakia, Slovenia and Turkey. Sources: Central banks; IMF; Institute of International Finance.

The return of capital inflows over the past few years has been accompanied by a widening of current account surpluses in Asia, a reversal of the large deficits in Latin America, and smaller surpluses in central and eastern Europe (Table 1). In 2003, for instance, the three key emerging market regions all recorded aggregate current account surpluses. One should note, however, that the current account surplus of the CEE region is entirely due to Russia: without Russia, the region is running large and rapidly rising

current account deficits, reaching \$35 billion in 2003 and projected to increase to \$43 billion in the latest Consensus Forecasts (Table 1).

Against this background, it is interesting to note how quickly the external positions of countries in the region have changed. The paper prepared for this session by Buturac, Lovrinčević and Teodorović (2004) studies the change in the structure of merchandise trade in Croatia and six other central and eastern European countries. With the exception of Croatia and Romania, these countries showed until 2001 positive changes in both the structure of merchandise trade and the level of foreign trade balances. While improvements in trade structures have in all likelihood continued, rapid credit expansion has led to a sharp acceleration in imports in the Czech Republic and Hungary since 2001. Hungary, for instance, is expected to record a current account deficit of over 9% of GDP in 2004, compared with a deficit of 3.2% of GDP in 2001.

The concurrent increase in private capital inflows and current account surpluses raises the question of the uses of capital inflows. Investment rates have been on average constant over the past three years. However, there has been a massive increase of \$540 billion in foreign exchange reserves since 2001 (Table 1), suggesting that a significant part of the inflows boosted official reserves.

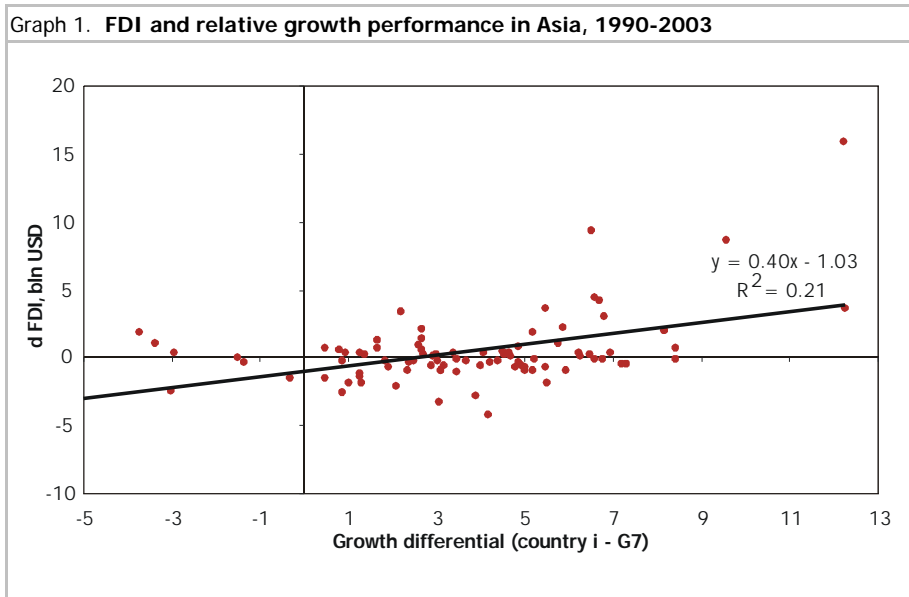
## Determinants and Sustainability of Recent Capital Inflows

The return of capital inflows and the compression of bond spreads raise questions about sustainability of these developments. To the extent that they reflect macroeconomic and structural improvements – that is, better fundamentals attracting the flows to the emerging markets (the “pull” factors) – higher inflows and favourable external financing conditions could last. But to the extent that they reflect low industrial country interest rates, buoyant global liquidity and investors’ willingness to undertake riskier investments (the “push” factors), any change in these conditions in the industrial countries could renew concerns about emerging market vulnerabilities.

Other than relative growth performance, which has an effect on all capital inflows, empirical evidence is mixed on the relative importance of “pull” and “push” factors in influencing the recent capital flows to the emerging market economies.

The factors driving **foreign direct investment** seem to be independent of those influencing portfolio and loan flows. For instance, flows of FDI to Latin America

declined between 2001 and 2003 largely as a result of the crisis in Argentina and slower growth in Brazil and Mexico.<sup>2</sup> In contrast, FDI continued to flow to the Asian emerging economies, especially China, reflecting better growth performance and structural improvements. The regression line in Graph 1 shows, for instance, that a 1 percentage point faster growth of an Asian emerging economy relative to the average for G7 countries increased net FDI inflows to that economy by \$400 million per year during 1990–2003.<sup>3</sup>



Faster growth and structural improvements also benefited the economies in CEE, but after averaging 3–6% of GDP per year since 1995, cumulative FDI in CEE had reached such high levels that it became difficult to absorb further increases. Moreover, privatisations of state-owned assets, in particular sales of commercial banks to foreign-owned institutions, had been largely completed by 2002. Reflecting these factors, FDI inflows to CEE fell sharply last year. The slower progress of privatisations in recent years has also held back FDI in many Latin American countries.

<sup>2</sup> Crisis related events in Latin America may also have magnified previously latent risks of investing in emerging market countries, in particular risks to FDI stemming from a possible abrogation of private contracts.

<sup>3</sup> Graph 1 includes annual observations for China, India, Indonesia, Korea, Malaysia, the Philippines, Taiwan and Thailand.

Detailed studies, including recent reports by the Committee on the Global Financial System (2003) and the Capital Markets Consultative Group (2003), have established a positive relationship between FDI inflows and other country and sector specific factors. Over the past decade, FDI flows have shifted towards countries with large domestic markets (including in the financial and services sectors) and those that participate in free trade agreements or regional trade integration schemes. To date, this shift has benefited Brazil, China, Mexico and EU accession countries in CEE, and it might well benefit India in the future.

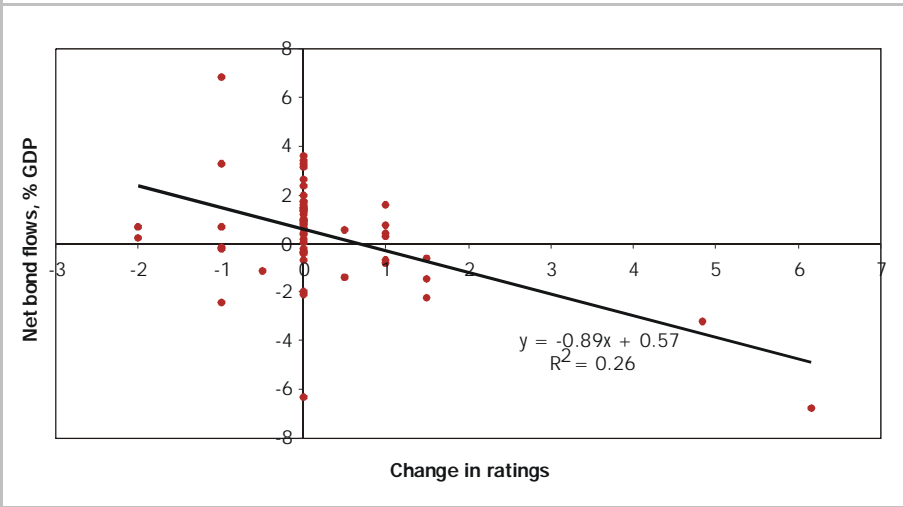
**Portfolio flows**, comprising bond and equity flows, have been much less stable and subject to greater influence from global factors than FDI flows. The decline in bond and equity flows during 2001 and 2002 thus reflected not only conditions in the real economy (lower growth in industrial countries, crises in Argentina and Turkey, and weaker global growth prospects), but also financial market factors such as the fallout from the bursting of the technology and telecoms bubbles and increased risk aversion on the part of industrial country investors. Similarly, the surge in portfolio flows to the emerging markets in 2003 has resulted from a combination of factors. Among the country specific factors were improved credit ratings in many emerging market economies, as well as rising commodity prices and the prospect that emerging markets would benefit from strengthening global growth. These effects were particularly in evidence in Latin American countries. The regression line in Graph 2 suggests, for instance, that a one-notch upgrade in sovereign credit ratings in a Latin America economy is associated with an increase in net bond flows to that economy of about 0.9% of GDP a year.<sup>4</sup>

Yet favourable liquidity conditions in international capital markets have also played an important role. Very low policy interest rates in the main industrial countries encouraged investors to search for yield in the emerging markets, where bond returns and short term real interest rates were higher than in industrial countries. In addition, factors such as a low dispersion of spreads among differently rated emerging market bonds point to a greater “risk appetite” among industrial country investors.

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<sup>4</sup> *Graph 2 includes annual observations for Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela.*

Graph 2. **Bond flows and credit ratings in Latin America, 1990-2003**



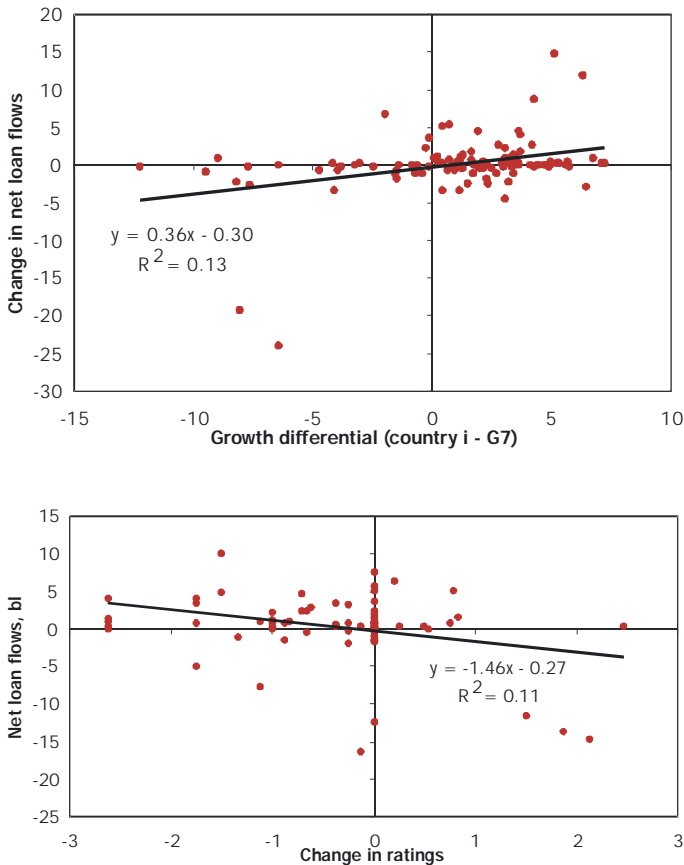
Note: Positive change denotes a lowering of the rating, negative change an increase in the rating.

**Other private capital flows** (trade credit and loans by commercial banks and non-bank financial institutions) turned positive in net terms last year for the first time since the mid-1990s. As in the case of portfolio flows, economies with relatively faster growth and improved credit ratings attracted larger loan inflows. These effects were particularly in evidence in central and eastern Europe. The regression line in Graph 3, upper panel, indicates that a 1 percentage point faster growth in a CEE economy relative to the average for G7 countries is associated with an annual increase in net loan inflows of \$360 million. Similarly, the regression line in the lower panel of Graph 3 indicates that a one-notch improvement in the sovereign credit rating is on average associated with \$1.5 billion in loans by commercial banks and non-bank financial institutions to that CEE economy.<sup>5</sup>

<sup>5</sup> Countries included in Graph 3 are Bulgaria, the Czech Republic, Croatia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russia, Slovakia, Slovenia and Turkey.



Graph 3. **Net loan flows, relative growth performance and credit ratings in central and eastern Europe, 1994-2003**



*Note: Positive change denotes a lowering of the rating, negative change an increase in the rating.*

The shift in the composition of capital flows towards more volatile portfolio and loan flows raises the question of vulnerabilities to possible reversals. In January and May 2004, perceptions that US rates might rise sharply triggered a sudden widening of emerging market bond spreads. A second vulnerability relates to the improvement in debt dynamics in countries with debt denominated in or linked to foreign currencies (eg, Brazil and Turkey). To a significant extent, this improvement was due to exchange rate appreciation, which might be only temporary. The third vulnerability, particularly relevant to central and eastern European countries, is large fiscal deficits. As discussed in the next section, financial market volatility in Hungary in 2003 showed that positive market sentiment can be quickly reversed if the fiscal outlook does not improve.

At the same time, several factors moderate such risks. The growth has strengthened and broadened globally over the past two years, with commodity prices rising strongly. These trends are not expected to be sharply reversed in 2005. As noted above, the favourable external financing environment has enabled many countries to meet a part of their financing needs for 2005. Some highly indebted countries, including Brazil, Mexico and Turkey, have taken advantage of the favourable market conditions to improve their debt profiles by lowering borrowing costs, extending maturities and reducing the share of short term external debt and debt indexed to short term interest rates and exchange rates. Low inflation, increased reserve holdings and the earlier shift to floating exchange rates have also reduced vulnerabilities. Brazil, Turkey and some other countries have in addition maintained tight fiscal policies and continued to implement structural reforms.

Nevertheless, some countries, in particular in central and eastern Europe, have loosened their fiscal stance and slackened the pace of adjustment, or have seen a significant expansion of private sector credit. As argued below, underlying vulnerabilities masked by the ready access to financing are likely to become more apparent in these countries as the external financing environment turns less favourable.

### 3 Capital Flows to EU Accession Countries

Discussions on capital flows to EU accession countries have in the past mainly dealt with foreign direct investment inflows, addressing issues such as the determinants of inflows and their effects on the real sector. Other types of flows – equity, bond and bank- and non-bank loan flows – have been analysed considerably less.<sup>6</sup> Likewise, the question of challenges that capital flows pose for macroeconomic policies in the region have until recently not been extensively analysed.

A good example of the former group of studies is the paper prepared for this conference by Lovrinčević, Mikulić and Marić (2004), who analyse the effects of different types of inflows on domestic investment in central and eastern Europe. They find that “other” inflows have the largest effect on domestic investment, followed by FDI inflows, while portfolio inflows do not seem to have any significant impact. More precisely, an increase in the share of other flows by 1% of GDP is found to raise the share of domestic

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<sup>6</sup> *On the determinants of bank lending to emerging market economies see Jeanneau and Micu (2002).*

investment by 0.33 percentage points; the impact of FDI inflows is 0.24 percentage points.

The relative sizes of these estimates should not come as a surprise. As noted above, “other” flows consist mainly of trade credit and loans extended by non-resident commercial banks and non-bank financial institutions. Trade credit is to a large extent used for imports of investment goods, which in the case of Croatia account for about 30% of total imports. And the bulk of domestic fixed investment in central and eastern Europe is traditionally financed by domestic and foreign bank loans. On the other hand, most FDI inflows have been associated with privatisations of existing companies rather than greenfield investments. Thus, it is not surprising that the estimated impact of FDI inflows on domestic investment is smaller than that of loan flows. And regarding portfolio inflows, non-residents’ purchases of equities in regional equity markets have been very low (with the exception of Poland) and therefore could not contribute too much to domestic capital formation. Likewise, funds raised through bond issuance have been mostly used by governments to finance large budget deficits – which are in most cases not the result of public investments – rather than by corporations for the purpose of investment.

Turning to the literature on challenges that capital flows pose for macroeconomic policies, one important issue is the so-called Tošovský dilemma. Another major research area has been conditions under which accession countries are expected to join the European Monetary Union (EMU). A third area, which has yet to be researched, is empirical evidence on capital flows in the run-up to membership in EMU. These three issues are examined in the remainder of this paper.

## The Tošovský Dilemma

The Tošovský dilemma, named after former Czech prime minister and long-time governor of the Czech National Bank Josef Tošovský, stems from two stylised facts that are intrinsic to the economies that are rapidly catching up with the more developed economies in an environment of free capital flows.<sup>7</sup>

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<sup>7</sup> *This section is based on Mihaljek (2004a).*

First, the pre-inflow rate of return on investment in the catching-up economies is much higher than in the mature economies of EMU, reflecting imbalances in initial stocks of capital and a relatively rich endowment of skilled labour in CEE.<sup>8</sup> This differential could induce large inflows of long-term capital, for instance in the form of foreign direct investment.

Second, in the catching-up economies there is a tendency for inflation to be higher than in mature economies. This may reflect macroeconomic policies that are too lax (especially fiscal policy). But it may also reflect important real factors related to the transition process, in particular the tendency for prices of non-tradable goods to rise faster than the prices of tradables as real wages rise in the wake of rising productivity (the so-called Balassa-Samuelson effect; see Mihaljek and Klau, 2004). In countries with fixed exchange rates, these same forces have also manifested themselves in (CPI-based) real exchange rate appreciation, while in countries with floating exchange rates they have manifested themselves partly in nominal exchange rate appreciation and partly in higher inflation. Given this inflation differential and the associated tendency of real exchange rates to appreciate, nominal interest rates in accession countries have tended to be higher than in the euro area. Such nominal interest rate differentials, although narrowing, remain sufficiently large to attract short term capital inflows.

Consequently, the monetary authorities face a dilemma. If they set real interest rates low enough in an attempt to limit the short-term inflows (which seek to exploit nominal interest rate differential), large inflows seeking to exploit a high return on capital might nevertheless occur.<sup>9</sup> Ex post, there might be a massive imbalance between investment and saving and a large current account deficit. If, by contrast, the authorities attempt to correct this imbalance by keeping domestic interest rates high, large arbitraging inflows would be stimulated. While various fundamental and institutional factors may slow this process, it is not likely that these frictions would be sufficiently large to afford the accession countries any significant interest rate autonomy. In both cases, capital inflows would undermine efforts to control inflation and contain large current account deficits, even if countries followed prudent macroeconomic policies.

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<sup>8</sup> *Lipschitz et al. (2002) estimate the marginal product of capital to be 8½ times higher in the accession countries than in Germany, and on this basis calculate potential capital inflows at close to 5 times their initial (pre-inflow) GDP.*

<sup>9</sup> *For example, if the real interest rate in Germany is 2½% and the Czech koruna is expected to appreciate on average by 5% a year in real terms, then from the point of view of international arbitrage flows (and ignoring the risk premia), the equilibrium real interest rate in the Czech Republic should be -2½%.*

It is important to realise that this dilemma is independent of the exchange rate regime. Because the mechanisms motivating capital inflows are real rather than monetary, the only question is whether a real appreciation takes place through nominal appreciation or through inflation. Under a fixed regime (or a fixed but adjustable peg), capital inflows will reduce interest rates and increase investment relative to domestic saving. If inflation rises, external competitiveness would decline. While the monetary impact of inflows might be sterilised, sterilisation would likely be incomplete and would involve some costs, as the central bank would be buying low-yielding foreign assets while issuing higher-yielding domestic liabilities. Under a floating regime, capital inflows would lead the exchange rate to appreciate, again causing a loss of competitiveness and generating a current account deficit.

One should also bear in mind that capital inflows can suddenly reverse when conditions change – if, for instance, ambitious strategies to reduce budget deficits in the run-up to ERM II were to go off-track, or if inflation control were to weaken. International investors might become uncertain even if underlying policies remain sound. In such conditions, an external shock, contagion from other markets, or political uncertainties might trigger a rush for the exit, potentially leading to the negative effects of the “sudden stops” in capital flows, ie, sharp devaluation, output contraction and fiscal sustainability problems.

Capital inflows might also give rise to or worsen pre-existing currency mismatches in the financial system. As a result of the inflows, banks could acquire liabilities denominated in euros and grant loans in local currency, thus exposing their balance sheets to exchange rate risk. Hedging that risk is costly in accession countries’ shallow financial markets. Banks may be - and frequently are - requested to balance their foreign positions by prudential regulations. Nonetheless, if the banks grant loans in euros, they may simply replace foreign exchange risk by credit risk, as their customers – in particular households and companies producing non-tradable goods and services – may not be earning foreign currency. Croatia and some other CEE countries are already exposed to large currency mismatches as a result of historical circumstances, such as large foreign currency deposits remitted by expatriate workers in western Europe, or currency substitution induced by long periods of macroeconomic instability in the past. Because of such currency mismatches, banking and financial systems are highly vulnerable to volatile exchange rate movements. Furthermore, debt in central and eastern Europe is already skewed towards foreign rather than domestic liabilities, which may give rise to debt sustainability problems.

## Options for Monetary and Exchange Rate Policies

What is the relevance of the Tošovský dilemma for the choice of exchange rate regimes in the new member states and EU accession countries such as Croatia?<sup>10</sup>

All accession countries are expected to become members of EMU and hence to participate in ERM II, for which they can apply at any time after joining the EU. ERM II is an exchange rate arrangement with fixed but adjustable central parities against the euro and a “normal” fluctuation band of  $\pm 15\%$  around these parities. The timing of entry into ERM II is important because it influences the timing of EMU assessment and thereby the timing of the adoption of the euro. The accession countries will be able to keep their existing exchange rate regimes upon entry to the EU. But they will have to treat their exchange rate policy as a matter of common concern, a requirement aimed at preventing competitive devaluations. Moreover, the accession countries will have to fully liberalise capital flows and comply with certain provisions of the Stability and Growth Pact, in particular, avoiding excessive fiscal deficits. Upon entry to ERM II, countries with floating or managed exchange rate regimes will have to modify their regimes because exchange rates in ERM II are allowed to fluctuate only within a  $\pm 15\%$  band around a fixed central parity vis-à-vis the euro.

In view of the challenges for monetary and exchange rate policies that the Tošovský dilemma and large capital flows in general may pose in ERM II, academics and policy makers have proposed several alternatives to this “official roadmap” to the euro area. Generally, it has been argued that mechanisms that allow joining EMU earlier than foreseen in the official roadmap would reduce the currency mismatch problem, the need for exchange market interventions, and the risk of capital flow reversals. The Balassa-Samuelson effect could be accommodated through higher inflation without affecting significantly the euro area inflation. It has to be recognised, however, that early EMU membership might not eliminate the volatility and inflationary effects of excessive capital inflows. Unsustainable booms might be followed by rising inflation. Risk taking by banks and financial institutions could become excessive even in the absence of currency mismatches.

Leaving aside the fact that the new member states had to liberalise most capital restrictions (with the exception of those on real estate transactions), one proposed

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<sup>10</sup> *This section draws on Mihaljek (2004b).*

modification that could make ERM II more robust would be allowing countries to retain certain capital controls until they join EMU. The accession countries could, for instance, retain or introduce price-based controls on short-term capital inflows similar to those used in Chile and Spain in the past. While even well designed capital controls do not offer unlimited protection against speculative attacks, they may provide some valuable breathing space that could make the difference between a managed depreciation and a currency collapse (Wyplosz, 2002). Capital controls could also lead to more realistic risk premia on accession countries' debt, signalling to investors that, even though these countries are candidates for EMU, their structural characteristics – in particular, the large saving-investment imbalance – justify higher domestic interest rates than in the euro area.

One could argue, however, that countries facing large capital inflows that wish to avoid undue currency appreciation or problems associated with sterilisation of these inflows (including excessive credit expansion and foreign reserves accumulation) should ease controls on capital outflows rather than strengthen controls on capital inflows. The easing of outward foreign exchange controls would also promote a less distorted environment for financial investments, in particular of institutional investors such as pension funds, which are often restricted to holding mainly domestic assets.<sup>11</sup> Because of underdeveloped debt markets, in most new member states this restriction implies that pension funds are more or less forced to hold government bonds.

Under a more radical set of proposals, accession countries would be allowed to retain their current exchange rate regimes (thus bypassing ERM II) and enter EMU at a mutually agreed parity as soon as they fulfilled the Maastricht criteria (Buiter and Grafe, 2002; Wyplosz, 2002). Proponents of this route argue that a free float or a currency board would be less susceptible to speculative attacks than ERM II. Moreover, countries with a currency board arrangement could satisfy the Maastricht criteria relatively quickly and be admitted to EMU in less than two years. At the same time, a floating exchange rate regime offers an easier way to deal with the capital inflow problem than ERM II, and it sends a signal to economic agents that currency mismatches are dangerous. Potential weaknesses are that floating requires deep exchange and financial markets and

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<sup>11</sup> For instance, South Africa eliminated in October 2004 all restrictions on the size of new foreign investments that South African companies can make abroad. Local companies will also be allowed to retain foreign dividends offshore. Restrictions will remain on individuals, however, and institutional investors will still be subject to prudential limits on foreign assets or the foreign currency share of their portfolios.

that currency boards may not be flexible enough to accommodate strong Balassa-Samuelson effects. Moreover, as argued above, neither a free float nor a currency board resolves the Tošovský dilemma.

The most far-reaching proposal is to let the countries in central and eastern Europe adopt the euro unilaterally. While this regime was originally formulated for EU accession countries, recently it has attracted attention as a possible long-term solution for non-accession countries in southeast Europe (Albania, Bosnia and Herzegovina, Macedonia, Serbia and Montenegro).<sup>12</sup> Proponents of this view also claim that unilateral euroisation might reduce political influence over credit allocation in the domestic banking system, which has traditionally been one of the main sources of financial vulnerability. Unilateral euroisation would entail nearly the same benefits as membership in the euro area, the main exception being representation on ECB governing bodies. But it is not without costs. First, the central bank would have to use foreign reserves to retire the domestic currency from circulation. Second, it would lose the seigniorage revenue obtained by issuing domestic currency. Third, the central bank's role as a lender of last resort to domestic financial institutions would be limited by the size of foreign reserves remaining after the retirement of domestic currency. But the biggest danger might be that the "wrong" conversion parity is chosen. In other words, unilateral euroisation cannot entirely eliminate the risk of a future regime change, nor can the monetary authority automatically adopt the credibility of the euro (Nuti, 2002).

A small but influential group of economists continues to argue strongly against the official "roadmap".<sup>13</sup> However, by the time the new member states had joined the EU the majority of policy makers and academic economists seem to have accepted the notion that the accession countries will have to fulfil the Maastricht criteria as they stand. As a result, the attention in the literature over the past year has gradually shifted towards the design of macroeconomic policies for yet another transition period – that preceding membership in EMU (see De Grauwe and Schnabl, 2003) – as well as towards empirical issues such as equilibrium exchange rates for entry to ERM II and the related question of the Balassa-Samuelson effect (see Austrian National Bank, 2003).

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<sup>12</sup> For the original proposal, see Bratkowski and Rostowski (2000, 2002) and Rostowski (2002). On euroisation for southeast European countries, see Gros (2002). See also Buiter and Grafe (2002) on the adoption of the euro as a parallel currency.

<sup>13</sup> See eg Begg et al (2003), Buiter (2004), Buiter and Grafe (2004) and Eichengreen (2003).



## Official Views

EU institutions have rejected proposals for retention of capital controls in ERM II and for early adoption of the euro. Slovenia, for instance, tried to negotiate an exemption to by-pass ERM II, arguing that factual stability of the exchange rate before EU entry should satisfy the Maastricht exchange rate criterion (Lavrač, 2002). But the EU considered this incompatible with the *acquis*.

With respect to unilateral euroisation, the European Commission has argued that:

“any unilateral adoption of the single currency by means of ‘euroisation’ would run counter to the underlying economic reasoning of EMU in the Treaty, which foresees the eventual adoption of the euro as the endpoint of a structured convergence process within a multilateral framework. Therefore, unilateral ‘euroisation’ would not be a way to circumvent the stages foreseen by the Treaty for the adoption of the euro” (European Commission, 2001; p. 21).

This position has been challenged by Nuti (2002), who points out that the Treaty does not prevent a country or a political entity from adopting the euro as its domestic currency. It seems, therefore, that underlying the concern about unilateral euroisation seems to be the fear that, by fixing the conversion rate of the domestic currency against the euro unilaterally, countries could gain an unfair advantage vis-à-vis incumbent members and EMU candidates.

The ECB has clarified its position on exchange rate issues relating to the accession countries in a policy statement issued in December 2003 (ECB, 2003). The main points of this position are summarised in the left-hand column of Table 2.

During 2004, the European Central Bank has further clarified its position on certain operational aspects of ERM II. ECB officials acknowledged that a conflict between an inflation target and exchange rate stability objective might arise in ERM II (Papademos, 2004). Should this happen, central banks would be advised to give priority to the inflation target. Moreover, the new member states were advised not to seek to join ERM II until they have made substantial progress towards fulfilling the Maastricht criteria. Issing (2004) noted that: “If participation in ERM II occurs too early, maintaining simultaneously price stability and exchange rate stability could become extremely difficult, and at times impossible”. This view reflects the finding that the ECB strategy was chosen taking into account the specific features of the euro area, which are likely not

to be present currently in the new member states. The choice of a monetary strategy in the transition towards the adoption of the euro should thus depend on the individual countries' specific features during the transition period. Since monetary aggregates are unstable in the face of rapid changes in these countries' financial structure, a prominent role for monetary aggregates specified in the euro area may not be ideal for the new member states. In addition, since most of the new member states are small open economies relative to the large and more closed euro area, their domestic aggregates are likely to be less stable. In these circumstances, inflation targeting probably represents the optimal monetary policy framework for the countries that adopted it (Issing, 2004).

While these statements signal a slight shift in the official policy thinking, which until recently highlighted the advantages of ERM II, perspectives on some other issues continue to differ between EU institutions and the new member states (Table 2, right-hand column). One concern expressed by several central banks in the context of discussions on ERM II is the interpretation of the exchange rate stability criterion. The bands of ERM II are fairly wide:  $\pm 15\%$  around the central parity against the euro, which itself can be adjusted. However, the ECB's framework statement (ECB, 2003) envisages that the assessment of exchange rate stability will focus on the exchange rate being "close to the central rate while also taking into account factors that may have led to an appreciation" (the issue of "severe tensions" is dealt with separately). How close is "close to the central rate" has not been explicitly revealed, although statements by some EU officials and past experience suggest that this is probably meant to be a band of  $\pm 2\frac{1}{2}\%$  around the central parity. Papademos (2004) confirmed that the ECB's assessment of exchange rate stability in ERM II will focus on the exchange rate being "close to the central parity", and that deviations from the parity will not be treated symmetrically: factors that may have led to an appreciation will be taken into account, but apparently not those that may have led to depreciation.

Likewise, there has been no official questioning of the rationale for the definition of the Maastricht inflation criterion – the average inflation rate in three member countries of the EU with lowest inflation, rather than the average inflation in EMU. In 2003, for instance, had they been members of EU the Czech Republic, Lithuania and Poland would have been the three EU member states with the lowest inflation, setting the benchmark for the

Maastricht inflation criterion that eight of the 12 current EMU members would not have met.<sup>14</sup>

Table 2. **Perspectives on ERM II**<sup>1</sup>

European institutions' perspective	New member states' perspective
The roles of ERM II are to help participating states orient their policies to stability and to foster convergence. By requiring consistent economic policies, ERM II could help provide a more stable macroeconomic environment and act as a catalyst for structural reforms.	Any disciplinary impact of ERM II in addition to the Maastricht criteria for the euro adoption and the multilateral surveillance under the Stability and Growth Pact might be negligible.
ERM II, with its announced central parity, would provide guidance to participants in foreign exchange markets and act as a testing phase for both the central rate and the sustainability of convergence in general.	ERM II is an intermediate exchange rate regime that puts policy makers in a dilemma between their inflation target and exchange rate objective and creates risks of speculative attacks (case of Hungary in 2003).
The standard fluctuation band of $\pm 15\%$ would leave sufficient room for exchange rates to adjust to structural changes in the economy and various shocks. If the accumulation of shocks or fundamental changes substantially modify the equilibrium level of the exchange rate, ERM II allows for adjustments of the central parity.	The standard fluctuation band plus the possibility of upward realignments might signal that the exchange rate could appreciate by 15% or more. Efforts to stabilise the exchange rate within the band in the face of speculative attacks could further increase exchange rate volatility.
ERM II provides a mechanism for anchoring inflation expectations and speeding up disinflation. This is important for central Europe's small open economies where the exchange rate plays a more important role in the monetary transmission mechanism than interest rates.	Current monetary arrangements ranging from currency boards to free floats with inflation targeting are credible: inflation rates are already mostly low; policy rates and long-term bond rates have converged toward euro area levels; expectations of low inflation are well-ingrained.
Unlike other intermediate regimes, ERM II entails ultimate exit into the euro area, thus making the system more resilient than other intermediate regimes.	Acceding countries are either ready to adopt the euro, in which case ERM II is not needed; or they are not, in which case ERM II is not a sufficiently safe policy framework.
Limiting the duration of ERM II membership to two years may not be an optimal choice for all accession countries in view of the varying degrees of their convergence.	Most new member states view ERM II as a "waiting room" for EMU and intend to enter it once the conditions enabling them to adopt the euro within two years are established.

Notes: <sup>1</sup> The official positions of European institutions and new member states are considerably more nuanced than the perspectives summarised in this table. For official positions, see the sources below.

Sources: ECB (2003); European Parliament (1999); Backé and Thimann (2004); Noyer (1999); Padoa-Schioppa (2002); and country policy statements on central bank and government websites.

Most new member states have for their part already announced their intentions regarding participation in ERM II and joining the EMU (Table 3).

- The Baltic countries intend to keep their currency board arrangements in ERM II. Estonia and Lithuania joined the mechanism on 27 June 2004 and Latvia is expected to

<sup>14</sup> Average inflation in the Czech Republic, Lithuania and Poland in 2003 was 0.5%. Adding a 1½ percentage point margin would have given an inflation criterion of 2%. In 2003, only Austria, Belgium, Finland and Germany had inflation below 2%.

enter ERM II in early 2005. Estonia and Lithuania set their central parities against the euro at the same exchange rates at which their currencies traded against the euro under currency boards. Both countries also adopted zero fluctuation margins as a unilateral commitment and placed no additional obligation on the ECB to intervene in the foreign exchange markets to defend the central parities. Since the Maastricht criteria for these countries are more or less fulfilled, they have considered themselves virtually in EMU even in the past; as a result, they want to minimise the length of their stay in ERM II.

	<b>Present exchange rate regime</b>	<b>Euro target date</b>	<b>ERM II participation</b>
Bulgaria	Currency board with euro	2009	Immediately upon EU accession in 2007; keep currency board
Croatia	Managed float, euro as reference	Not stated	Immediately upon EU accession
Cyprus	Peg to the euro, with $\pm 15\%$ fluctuation bands	2007	Join ERM II early by keeping the current exchange rate framework
Czech Republic	Managed float with inflation targeting (2–4% by end-2005)	2009/2010	Participate no longer than two years; insist on $\pm 15\%$ margins
Estonia	Currency board with euro	2007	Joined ERM II in June 2004, central parity same as currency board rate, zero fluctuation margins
Hungary	Peg to euro with wide band ( $\pm 15\%$ around a central parity)	2010	Postpone ERM II participation until markets consider the fiscal path credible and sustainable
Latvia	Peg to SDR	2008	Early 2005; currency pegged to the euro in December 2004 at the prevailing market rate; will keep narrow $\pm 1\%$ band
Lithuania	Currency board with euro	Mid-2006	Joined ERM II in June 2004, central parity same as currency board rate, zero fluctuation margins
Poland	Float	2008/2009	Participate no longer than two years; insist on $\pm 15\%$ margins
Malta	Peg to a basket of euro (70%), US dollar and pound sterling	2008	Prepare for ERM II in 2005; participate no longer than two years
Romania	Managed float, euro as reference	Not stated	Not stated
Slovakia	Managed float, with inflation targeting	2007	Switch to inflation targeting within ERM II in 2005/06. Participate in ERM II no longer than two years
Slovenia	Managed float, euro as reference	2007	Joined ERM II in June 2004, central parity equal to market rate, normal fluctuation margins

Sources: Policy statements on central bank and government websites; European Commission; European Central Bank.

- Slovenia also joined ERM II in June 2004 and intends to adopt the euro in 2007. The tolar will trade at the normal fluctuation margins of  $\pm 15\%$  around a central parity, which was set at the tolar/euro exchange rate prevailing on the last business day before entering ERM II. The Slovenian authorities noted in the past that waiting longer than necessary in ERM II could prove to be more of a burden than an incentive for the economy. The central bank projects inflation to be cut below 3% by mid-2005, thus clearing the main Maastricht hurdle for Slovenia.
- Other new EU member states and candidates (Bulgaria, Croatia, Romania, Slovakia and Turkey) have over the past year either announced or slightly modified their strategies for the adoption of the euro (Table 3).
- One potentially more significant policy shift took place in Hungary, which originally had considered the earliest possible entry into ERM II with the intention to stay inside the mechanism for as long as necessary to meet the Maastricht criteria (National Bank of Hungary, 2003). This approach reflected the view that without the incentive of membership in the euro area, fiscal reforms in Hungary would not advance. However, the authorities recently expressed doubts about the rationale for joining ERM II early, noting that a prerequisite for joining ERM II was that markets considered the fiscal path credible and sustainable (Jarai, 2004). This seems to reflect both experience with turbulence in Hungary's foreign exchange and bond markets in 2003 (discussed below), and the emergence of a consensus that ERM II should not be regarded as a tool to impose fiscal discipline – the risk of speculative attacks in countries that enter the mechanism with weak fiscal positions seems to be very high. The target date for joining EMU is currently set for 2010 (Government of Hungary, 2004). If conditions turn out to be more favourable and inflation falls more rapidly than currently envisaged (ie, to 3% per annum in 2008), the adoption of the euro could take place in 2009.
- The Polish authorities take the view that membership in ERM II should be confined to two years preceding adoption of the euro. As Poland has gone through all exchange rate regimes and is currently focusing on direct inflation targeting, the central bank does not see the need to anchor inflation expectations through the exchange rate. If fiscal adjustment proceeds as planned, Poland could join EMU in 2008 or 2009.
- The Czech Republic has indicated that it will not seek an early entry into ERM II. The authorities view ERM II merely as the gateway to the euro area, and intend to enter the

mechanism only after they have established the conditions that will enable the Czech Republic to adopt the euro in the minimum time required (ie, two years after joining the ERM II) (Czech Government and the Czech National Bank, 2003; Czech National Bank, 2003). Based on existing fiscal plans, this would imply membership in the euro area in 2009 or 2010.

In summary, the official position remains firmly anchored in the Treaty principles, but allows for a certain degree of flexibility (eg, on exchange rate strategies, adjustment of central parity, assessment of exchange rate stability) to be used in appropriate circumstances, taking into account the specific situation of each individual country and the principle of equal treatment. Regarding country positions, all accession countries with the exception of Hungary aim to participate in ERM II no longer than the minimum required period of two years. The key issue determining the timing of entry to EMU in the Czech Republic, Hungary, Poland and Slovakia is the timetable for the reduction of budget deficits. In Slovenia, the key issue is lowering inflation. In the Baltic countries, where fiscal deficits and inflation are already low, no major obstacles for an early adoption of the euro are foreseen.

## Empirical Evidence on Capital Flows in the Run-Up to ERM II

How likely are scenarios under which capital flows could affect the operation of ERM II? To address this question, this section first analyses Hungary's experience with speculative attacks in 2003 (Box 1), and then compares empirical evidence on capital flows to central and eastern Europe with the flows to the southern European countries as they prepared to join EMU in the 1990s.

On the basis of Hungary's experience, some observers concluded that all countries in CEE would be susceptible to such attacks once they entered ERM II. With potentially very large amounts of foreign capital flowing into and out of these economies, it might be difficult to keep currencies within the  $\pm 15\%$  band and control inflation at the same time. Moreover, frequent and large adjustments of interest rates to respond to these external pressures could destabilise the economies domestically (Begg et al., 2003).

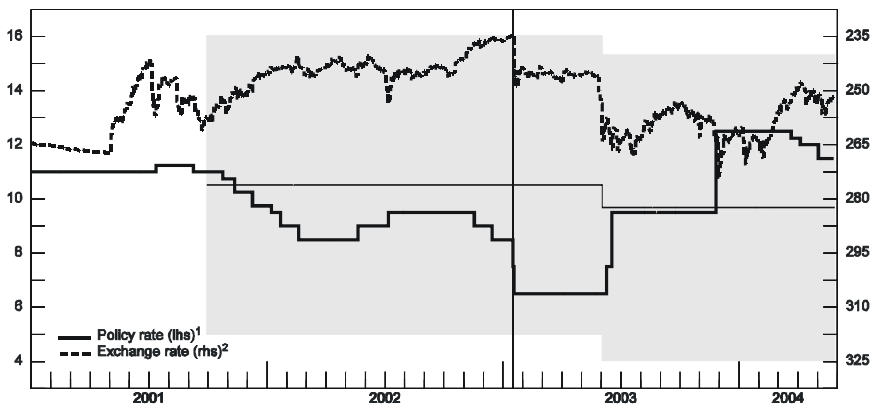
Upon closer examination, however, Hungary's experience does not support these arguments. The speculative attack in January was partly due to the misinterpretation of

institutional arrangements by the speculators: the National Bank of Hungary needs legal consent from the government before amending any aspect of the exchange rate arrangement. The attacks in June and November can be more clearly linked to policy mistakes rather than any defect of the exchange rate arrangement per se. In particular, the lack of decisive action on the fiscal front, difficulties in communicating the reasons for the adjustment of the central parity, and the use of a narrower target range have confused investors, denting their confidence in medium-term prospects for the economy. The real lesson of this experience is that regardless of the exchange rate regime, markets are likely to punish inconsistent policies eventually.

**Box 1. Turbulence in Hungary’s currency and domestic bond markets in 2003**

Since October 2001, Hungary has operated a fixed parity regime against the euro, in which the forint can move within a band of  $\pm 15\%$  each side of the central parity. On the domestic side, this regime has been complemented with inflation targeting. The forint had traded on the strong side of the parity throughout 2002, reaching the upper limit of the band in late 2002 and early 2003 (Graph 4). As the fiscal deficit widened to almost 10% of GDP and public sector wages were raised by 50% over two years, speculators bet that the central bank would revalue the central parity or even perhaps allow the forint to float in order to meet its inflation target. Short-term inflows estimated at some €4–5 billion (equivalent to 7–8% of annual GDP) entered Hungary within only a few hours on 15–16 January 2003. To deter inflows, the National Bank cut policy rates by 200 basis points within two days, introduced a quantitative restriction on short-term deposits, and intervened heavily in the foreign exchange market.

Graph 4. Interest rate and exchange rate in Hungary



Note: The shaded area represents the  $\pm 15\%$  band around the central parity (thin line).

<sup>1</sup> In percentages. <sup>2</sup> Forint per euro (inverted scale); a decline indicates a depreciation.

Sources: Bloomberg; national data.

**Box 1. continued**

On 4 June 2003, the central bank, at the initiative of the government, reluctantly devalued the central parity by 2¼%. This adjustment was intended to increase the external competitiveness and guarantee that the exchange rate would not appreciate beyond the 15% upper bound. The government also announced a small fiscal package. Subsequently the authorities disclosed that they would prefer the exchange rate to stay within a “preferred” target range of 250–260 forints per euro. This was some 10% above the central parity but within the wider existing band of 240–325 forints. However, the financial markets interpreted this move as a sign of underlying weakness and the forint was soon under strong downward pressure, forcing the central bank to raise interest rates by 300 basis points to stop the slide.

In late November the forint came under renewed pressure as the high budget deficit and the rapid expansion of household borrowing raised the current account deficit, weakening the confidence of long-term investors. In addition, many short-term investors who suffered losses as a result of the January attack apparently sold forint denominated bonds to cover their losses before the end of the year. To help stabilise the forint, the central bank again raised interest rates by 300 basis points (to 12½%). At the same time, the government announced a more restrictive budget for 2004 (including a trimming of the subsidies on housing loans, which had helped fuel credit growth) and abandoned the policy of announcing a preferred range for the forint, which has apparently served as a target for speculators. These measures have subsequently calmed the foreign exchange and bond markets.

What is the empirical evidence on capital flows to other central and eastern European countries, as well as the southern European countries in the period before they joined EMU?

Increased capital flows were also observed in Greece, Italy, Portugal and Spain in the run-up to the adoption of the euro. In the case of Greece, these flows were for the most part “hot money” seeking to take advantage of the higher yields offered by Greek government bonds, which reflected higher inflation and interest rate differentials at the time. As convergence toward EMU started to reduce the country risk premium, the yields began to narrow, offering further capital gains (Hochreiter and Tavlas, 2003).

In the case of Portugal, capital inflows were not channelled to the government bond markets as fiscal deficits were more or less under control. Instead, growing financial integration had led to a demand boom on the eve of EMU membership, so the authorities had to use strong prudential regulation to control credit expansion.

A key consideration in this context is that countries in central and eastern Europe have already experienced capital flows on a larger scale than Greece, Ireland, Italy, Portugal and Spain before they joined EMU. Table 4 and Graph 5 show that, with the exception of Slovenia, net private capital flows have been significantly higher in the accession



countries during 1995–2003 than in Ireland, Italy, Portugal and Spain during 1994–99 (in Greece, during 1996–2000). For instance, net private capital flows in Croatia were equivalent to 12% of GDP on average during 1995–2003, compared with less than 4½% of GDP in Greece and Portugal. Net private capital flows in the Czech Republic, Estonia, Latvia and Slovakia averaged between 8½–10½% of GDP over this period, double the average for the five current EMU members.

Table 4. **Net private capital flows to central European and selected euro area countries<sup>1</sup>**

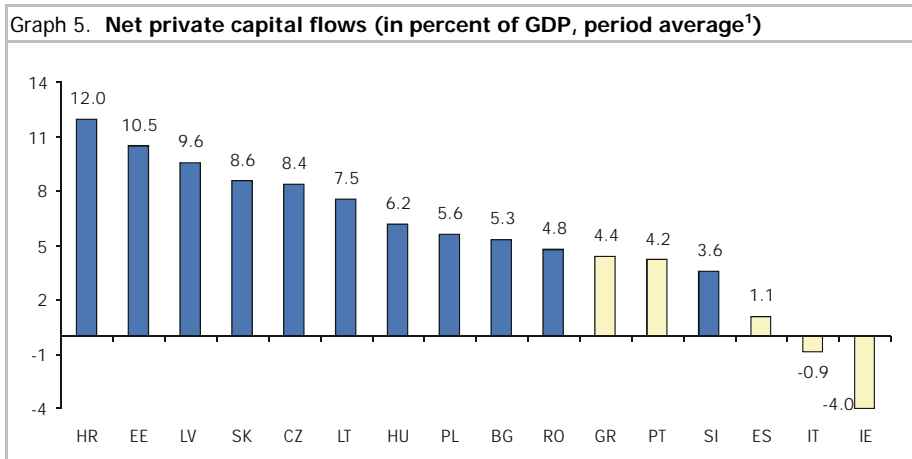
	Level (% of GDP)					Standard deviation				
	Total	FDI	Debt	Equity	Loan	Total	FDI	Debt	Equity	Loan
Bulgaria	5.3	4.9	-0.7	0.0	1.1	7.1	2.5	1.0	0.2	5.1
Croatia	12.0	4.3	2.1	0.0	5.5	3.5	2.6	2.0	0.1	3.9
Czech R.	8.4	6.9	-0.5	0.5	1.6	4.6	4.1	1.4	1.5	4.4
Estonia	10.5	5.5	0.3	1.4	3.4	4.4	2.9	2.7	1.7	3.9
Hungary	6.2	4.0	1.4	0.6	0.3	4.9	2.9	2.8	1.2	3.3
Latvia	9.6	5.3	-2.0	0.0	6.3	2.4	2.1	3.3	0.9	2.5
Lithuania	7.5	3.8	1.2	0.2	2.2	2.4	2.1	1.6	0.3	1.9
Poland	5.6	3.3	0.8	0.2	1.4	1.4	1.1	0.7	0.4	1.4
Romania	4.8	2.6	0.2	0.1	1.9	2.0	1.2	1.0	0.2	1.7
Slovakia	8.6	4.9	1.0	0.3	2.3	3.7	5.4	2.2	0.4	4.6
Slovenia	3.6	1.6	0.8	0.0	1.3	2.2	2.5	1.1	0.2	2.0
Average	7.5	4.3	0.4	0.3	2.5	3.5	2.7	1.8	0.6	3.2
Greece	4.4	0.2	2.7	-0.3	1.9	4.2	0.7	3.6	1.1	2.8
Ireland	-4.0	4.4	-12.6	6.6	-2.4	3.3	4.8	17.4	10.5	3.2
Italy	-0.9	-0.4	2.1	-1.1	-1.5	0.6	0.3	1.5	2.4	2.0
Spain	1.1	-0.8	-0.8	-0.3	3.1	2.7	1.9	3.1	0.7	4.8
Portugal	4.2	0.0	-0.8	0.7	4.4	2.6	0.9	2.8	1.4	2.7
Average	1.0	0.7	-1.9	1.1	1.1	2.7	1.7	5.7	3.2	3.1

Note: <sup>1</sup>Average net flows over 1995–2003 (accession countries) and 1994–99 (EMU members; except Greece, 1996–2000).

Sources: IMF; author's estimates.

Also relevant for the debate on the Maastricht criteria is the finding that the variability of FDI flows has been higher in central and eastern Europe than in five current members of EMU, while that of loan flows has been equally high on average (Table 4 and Graph 6). The fact that FDI inflows have been mostly related to the sales of state-owned enterprises and that most firms have by now been privatised, suggests that volatility of FDI is not likely to be higher in the future.

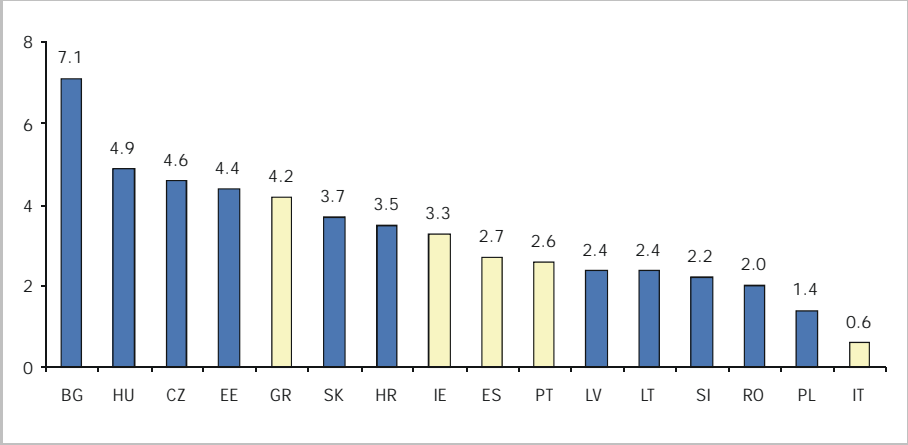
Regarding cross-border loan flows, the situation varies from country to country. As shown in Graph 7 (lower right-hand panel), the Baltic states, Croatia and Slovakia have already experienced very large loan flows. There is also some evidence of increased borrowing by foreign-owned banks in CEE from their head offices in EU countries to finance domestic credit expansion. However, this type of flows is less likely to persist over a longer period because the resulting increase in indebtedness relatively quickly triggers a self-correcting adjustment. Other determinants of loan flows – interest rate differentials and demand for credit – will, of course, also change and influence the size and direction of flows. But in countries whose financial systems are still not well integrated with EU (eg, Bulgaria and Slovenia), loan flows are likely to increase over the medium term.



*Note:* <sup>1</sup>For accession countries, 1995–2003; for EMU members, 1994–99 (except Greece, 1996–2000).  
*Sources:* IMF; author's estimates.

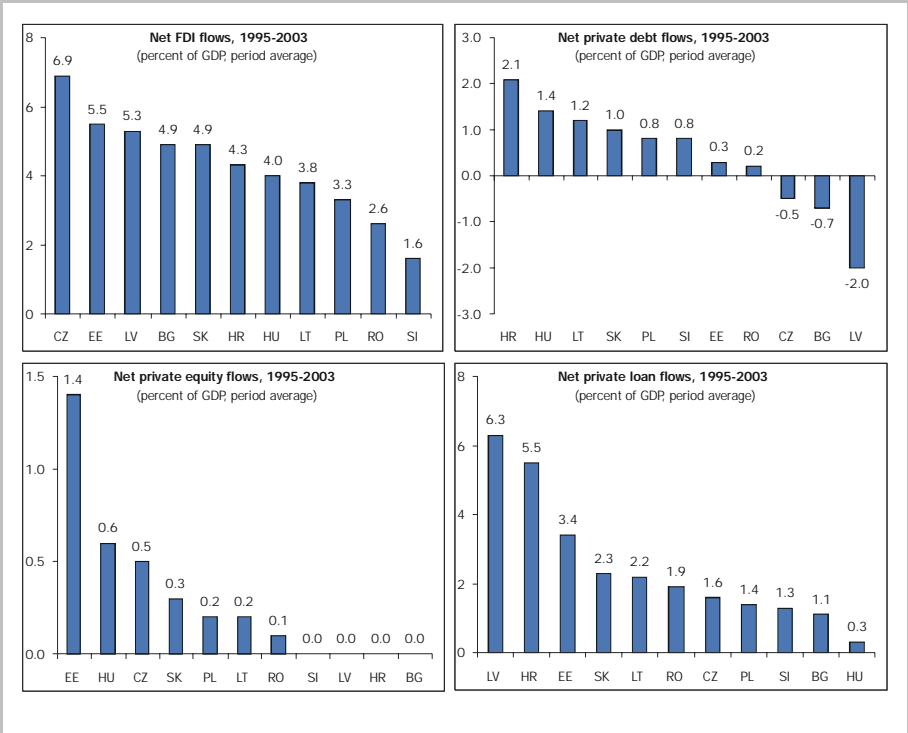
The level and variability of equity and debt flows have been significantly lower in most new member states. This reflects a lower level of financial market development in the region relative to the four southern European countries, and lower stocks of public sector debt. Again, there are large differences across countries. Net equity flows to Estonia, the Czech Republic and Hungary were on average higher and no less volatile than those to Greece, Portugal and Spain (Graph 7, lower left-hand panel). Likewise, net debt flows to Croatia were comparable to those in Greece and Italy (Graph 7, upper right-hand panel). Developments in 2003 and 2004 indicate that the composition of capital inflows is changing in many countries in the region towards equity and debt flows, so it is reasonable to expect that portfolio flows in the region will become more volatile in the future.

**Graph 6. Volatility of net private capital flows  
(standard deviation of flows as a percentage of GDP<sup>1</sup>)**



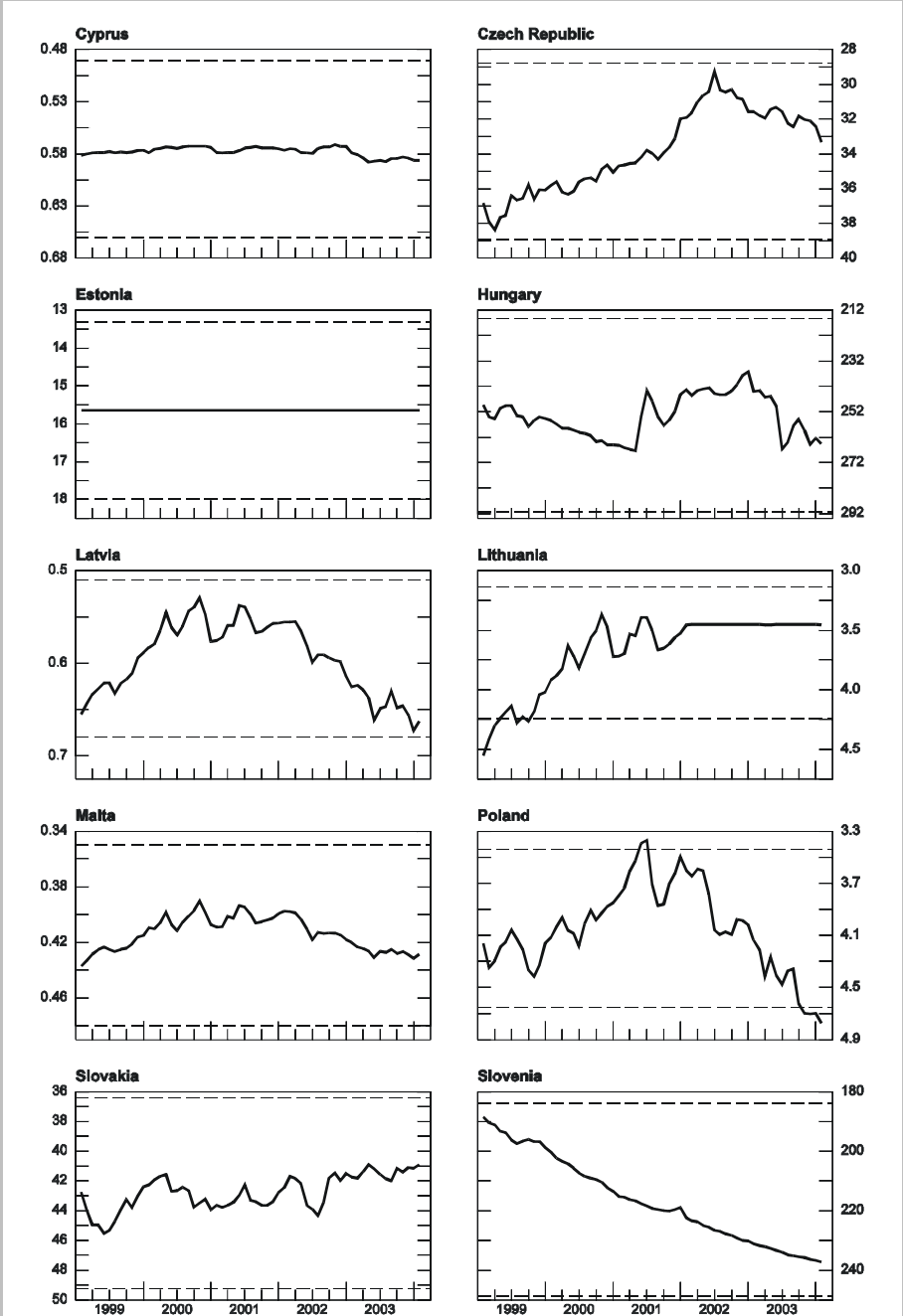
Note: <sup>1</sup>For accession countries, 1995–2003; for EMU members, 1994–99 (except Greece, 1996–2000).  
Sources: IMF; author's estimates.

**Graph 7. Composition of private capital flows in central and eastern Europe**



Sources: IMF; author's estimates.

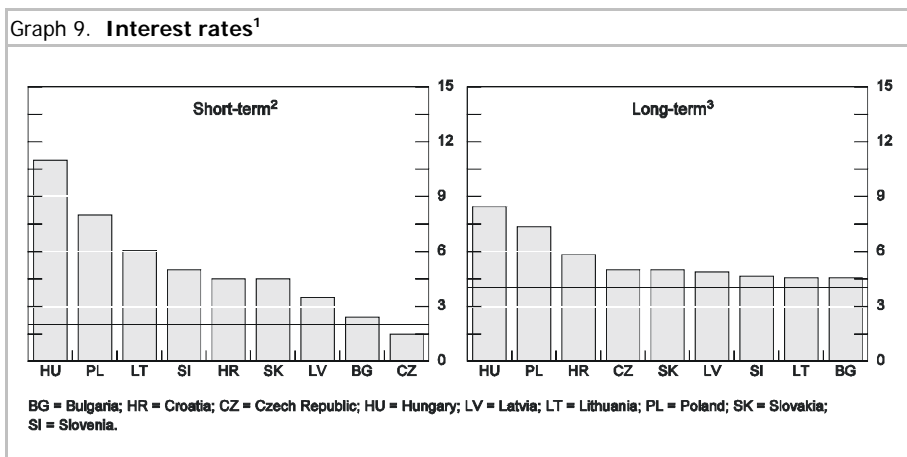
Graph 8. National currency per euro including +/-15% bands from average value<sup>1</sup> (inverted scales)



Note: <sup>1</sup> Average calculated over the period January 1999 to January 2004.  
Sources: National data; ECB.

Despite large capital flows and a number of external and domestic shocks that have affected accession countries over the past few years, nominal exchange rates against the euro have not been excessively volatile. As Graph 8 shows, if central parities had been defined as the average daily exchange rate of domestic currency against the euro during 1999–2003, only the Lithuanian litas and the Polish zloty would have exceeded the normal fluctuation margins of  $\pm 15\%$  around these parities: the litas during 1999 (the lower bound), and the zloty briefly in 2001 (the upper bound) and since late 2003 (the lower bound). One should recognise that on these occasions the central banks of Lithuania and Poland did not intervene, whereas in ERM II they would be involved, together with ECB (and possibly other central banks), in interventions at the margin. This provides at least some assurance that exchange rate volatility in ERM II might not be as high as is often feared.

It remains to be seen whether in the run-up to the adoption of the euro, in an environment of completely free capital flows, there could be significant profit opportunities, giving rise to short-term, potentially reversible, capital flows looking for more attractive returns. Although one cannot rule out this scenario, the fact that nominal convergence has progressed significantly in the acceding countries suggests that the remaining scope for such flows could be smaller than during the previous wave of monetary integration. In particular, Graph 9 shows that, by August 2004, both long-term bond rates and short-term policy rates have already converged to a considerable extent.



Notes: <sup>1</sup>In percent; data for August 2004 or latest available. <sup>2</sup>Central bank policy rates; the horizontal line refers to the euro area rate. <sup>3</sup>5 to 10-year domestic currency government bonds; the horizontal line refers to the 10-year German benchmark bond.  
Sources: ECB; national data.

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# Comparison of the Structure and Development of International Trade Within the Framework of EU Enlargement: the Case of Croatia

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## Abstract

This paper analyses the change in the trade structure of Croatia and six selected transition countries of Central and Eastern Europe. The characteristic of the process is the growth of intra-industry specialisation of individual countries and the growth in the share of products with higher value-added. We used correlation analysis to test the relationship between the specialisation in intra-industry trade (TO index), the structure of trade (RCA) and the level of foreign direct investment (FDI). Empirical results show that Croatia is an exception in the group of observed countries. Namely, although Croatia has a relatively high level of FDI per capita, it has not recorded a significant improvement in the structure of international trade and sector specialisation. The reason lies in the structure of FDI that was oriented on the non-tradable sector, and the buying of domestic markets, and the absence of FDI in the tradable sector. The structure of Croatian trade has an increasingly similar export structure with the countries with much lower levels of GDP per capita. Croatia is considerably behind in the improvement of the international trade structure relative to the analysed transition countries of Central and Eastern Europe.

**Keywords:** transition economies, trade structure, comparative advantage, trade specialization

**JEL Classification:** F14, F15

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# 1 Introduction

The last 10 years of transition in the developing countries of Southeastern and Central Europe have witnessed an abundance of very interesting and significant economic events. A number of countries have already become an integral part of the EU through the first stage of expansion, while in the next few years it is expected that countries of South-eastern Europe will join as well. Transition countries face the challenge of more active inclusion in the European integration process, and one of the key factors in this path is the improvement in the structure of trade and in the competitiveness of the economy. This paper analyses the change in the structure of international trade of goods, occurring during the process of transition. The analysis comprises in part of the countries which have already become full members of the European Union as of the first of May of 2004 (the Czech Republic, Hungary, Poland, Slovakia and Slovenia), as well as Romania and Croatia which are expected to become members in the upcoming period.

The basic hypothesis of this paper is that the greater openness of an economy and the increase of trade with the European Union are expected to result in a positive change in the structure of trade and the growth in specialisation for transition economies. This means that there should be growth in the share of research-oriented goods in the structure of foreign trade relative to that of raw material and labour intensive goods, as well as growth in the specialisation of each country in intra-industry trade.

The purpose of this paper is to analyse the change in the structure of trade in Croatia and selected transition economies, as well as to explain the noted similarities and differences in the dynamics and direction of movements in comparative advantages and in specialisation of international trade. The analysis uses indicators that offer information about the comparative advantages of each group of products, the openness of the economy, as well as horizontal integration and specialisation in production and trade.

The degree of integration in the international goods market and the level of specialisation were analysed by applying the Trade Overlapping Index (TO). The absolute and relative Revealed Comparative Advantage (RCA) indicators were used for analysing the change in the structure of trade of observed countries and whether these countries are complementary or competitive.

This paper, through the application of the correlation analysis, tests the influence of foreign direct investment (FDI) on the change in comparative advantages and on the level

of specialisation in the international markets of Croatia and the selected transition countries.

The paper is divided into three parts. The first part is a description of the research methodology. The results of empirical research of interdependent levels of FDI, levels of specialisation and changes in comparative advantages are shown in the second part. The third section outlines a synthesis of the results from the first and second part of the paper.

## 2 Methodology

For the purpose of analysing the structure of trade for Croatia and selected transition countries, products that are subject to international trade are classified into appropriate product groups. The level of intensity of the use of productive factors necessary for the production of the products is used as the criteria for classifying goods. Products are classified into the following five groups:

- Raw material-intensive goods (SITC<sup>1</sup> groups: 0, 21, 22, 23, 24, 25, 27, 28, 29, 32, 33, 34, 4, 56),
- Labour-intensive goods (SITC groups: 26, 61, 63, 64, 65, 66, 69, 81, 82, 83, 84, 85, 89),
- Capital-intensive goods (SITC groups: 1, 35, 53, 55, 62, 67, 68, 78),
- Easy to imitate research-oriented goods (SITC groups: 51, 52, 54, 58, 59, 75, 76),
- Difficult to imitate research-oriented goods (SITC groups: 57, 71, 72, 73, 74, 77, 79, 87, 88).

The classifications of products mentioned above, as well as the division into five groups of products are often used in the analysis of the international trade of goods. Detailed classifications in above mentioned product groups are in the appendix.

The economic analysis of the movements in the structure of international trade of the selected transition economies is calculated using the following indicators:

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<sup>1</sup> *SITC (Standard International Trade Classification) is the standard international trade classification of products used in international trade.*

- The share of exports and imports in gross domestic product and the relative deficit,
- “Revealed Comparative Advantage” (RCA indicator), absolute and relative,
- “Trade Overlap” (TO indicator), according to product group and in aggregate.

The methodology for calculating the RCA indicator was originally developed by Bela Balassa (1965). Later, numerous derivations originated from this indicator. The RCA indicator is useful for the purposes of comparing comparative advantage for individual product groups.

The TO indicator shows the level of integration of the economy of each country in inter and intra-industry trade. The methodologies and calculations of TO indicators were developed and applied by Finger and de Rosa (1979)<sup>2</sup>.

In the analysis of the structure of trade of Croatia and selected transition economies data is sourced from: The International Trade Statistics Yearbook, United Nations, New York, 2003, Countries in Transition, The Vienna Institute for International Economic Studies, Vienna, CD-ROM, 2003, and the COMEXT database.

### 3 Empirical Analysis

#### 3.1 The Openness of an Economy and the Balance of Trade of Croatia and Selected Transition Countries

The periods of transition were characterised by a process of accelerated opening and integration of transition countries. Therefore, in this introductory part of the empirical analysis, basic indicators and trends in international trade and rising trade openness are presented. Although there are numerous indicators for the degree of openness in an economy, one of the most often used is the share of trade in gross domestic product (GDP) because of its simplicity, accessibility and comparability.

Table 1 shows changes in shares of exports and imports in GDP of the selected countries. It is evident that, besides Poland and Romania, Croatia has a lower level of openness measured by the total share of trade in GDP, than in other analysed transition country. Out of all the small countries observed (Slovenia, Czech Republic, Slovakia, and Croatia) Croatia's economy is the least open. This is a consequence of the stagnation of Croatian exports over the course of

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<sup>2</sup> *Details about index specializations in intra-industry trade of transition countries see, for example, in Kaminski and Ng. (2001).*

the observed period in which the share of exports in GDP was considerably lower compared with the other analysed countries.

In all analysed countries, trade rose rapidly relative to the rate of growth in GDP, which has resulted in the considerable growth in the share of trade in GDP. Also, all the countries experienced stronger growth of imports in relation to exports so that the share of imports in GDP in 2001 in all observed countries grew in comparison to the share of exports.

**Table 1. The share of exports and imports in GDP of Croatia and observed transition countries in the period from 1992 to 2001**

<b>The share of exports in GDP (in %)</b>							
	Croatia	Czech Republic	Hungary	Poland	Romania	Slovenia	Slovakia
1992	-	36.8*	28.7	15.6	18.6	-	-
1995	24.0	41.7	29.1	18.0	22.3	44.4	44.8
1998	21.0	49.7	48.9	22.2	19.8	46.2	48.7
1999	21.5	48.8	52.1	21.5	23.9	42.6	49.8
2000	24.0	56.5	60.3	24.9	28.1	46.1	60.4
2001	23.9	58.4	58.8	28.4	28.3	47.4	61.7
<b>The share of imports in GDP (%)</b>							
	Croatia	Czech Republic	Hungary	Poland	Romania	Slovenia	Slovakia
1992	-	36.3*	29.7	18.8	24.7	-	-
1995	39.9	48.6	35.0	22.8	29.0	50.6	45.8
1998	38.8	53.6	54.6	37.0	28.3	51.6	59.4
1999	39.1	52.5	58.3	36.1	29.2	50.2	55.2
2000	42.8	62.7	68.9	38.4	35.4	53.3	64.9
2001	46.3	63.8	65.0	39.5	38.7	51.9	72.2

*\*Note: 1993 figures are used.*

*Source: International Trade Statistics Yearbook, United Nations, New York, 2003, The Vienna Institute for International Economic Studies, Vienna, CD-ROM, 2003.*

The most intensive growth in the share of exports in GDP occurred in Hungary: it rose by 30.1% from 1992 to 2001. Out of the analysed transition countries the country with the lowest share of exports in GDP in 2001 was Croatia (23.9%), practically stagnating in the share of exports in GDP.

It is clear that the movements in exports and imports of goods determined corresponding movements in the balance of trade. Table 2 describes movements of relative deficits in the trade of Croatia and selected transition countries. Relative trade deficits are defined as  $\frac{x-m}{x+m}$ , where x is the value of exports, and m is the value of imports.

Compared with the other selected transition countries, Croatia realised by far the largest relative trade deficit during the period from 1995 until 2001 (Table 2).

**Table 2. Relative foreign trade deficits of Croatia and selected transition countries during the period from 1992 until 2001**

	Croatia	Czech Republic	Hungary	Poland	Romania	Slovenia	Slovakia
1992	1.5	-	-1.7	-9.4	-	4.2	-
1995	-24.9	-7.7	-9.2	-11.9	-13.0	-6.6	-1.1
1998	-29.7	-3.8	-5.5	-25.0	-17.6	-5.5	-9.9
1999	-29.0	-3.6	-5.7	-25.3	-10.0	-8.2	-5.1
2000	-28.0	-5.2	-6.6	-21.4	-11.5	-7.3	-3.6
2001	-32.0	-4.4	-5.0	-16.4	-15.5	-4.6	-7.8

*Source: The International Trade Statistics Yearbook, United Nations, New York, 2003, own calculations.*

This has to be considered with regards to the growth in the share of services exports in total exports of Croatia.<sup>3</sup> However, Croatia is characterised by consistent tendency of increases in its relative deficit that is not common to other transition countries. Out of the analysed transition countries, the Czech Republic, Hungary and Slovenia have in 2001 the lowest relative trade deficits. Common reasons for these movements will be discussed later in the paper. Following these countries are Slovakia, Poland and Romania which had in 2001 relative deficits at approximately the same level (about 16% of GDP). Furthermore, they reside at the level in which they were at the beginning of the transition period, although the reasons for the emergence of the deficits essentially differed.

### 3.2 “Revealed Comparative Advantage” - RCA Indicator for Comparative Advantage

Although the indicators we analysed above are important, the key question is what happens with the structure of trade. Namely, we can ask does an increase in the international trade correspond to an improvement in the structure of international trade. A positive change in the structure of trade implies a change in comparative advantages towards groups of products providing more value added and specialisation in intra-industry trade. This section analyses

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<sup>3</sup> See more details in: *Croatian Competitiveness Council in collaboration with the Institute for International Relations (2002).*

the question of a change in comparative advantages while the problem of trade specialisation is considered afterwards.<sup>4</sup>

The change in the structure of trade for Croatia and the selected transition countries are analysed by the RCA indicator. The RCA indicator is calculated by the formula:

$$RCA = \ln \left[ \frac{X_i}{M_i} \right] \times \left( \frac{\sum_{i=1}^n X_i}{\sum_{i=1}^n M_i} \right) \times 100$$

X is defined as the value of exports, while M is the value of imports. Index i is the product group classified according to (SITC).

A positive value of the absolute RCA indicator for an individual product group indicates that the country has a comparative advantage in the production in that group of products. Conversely, a negative sign for the absolute RCA indicator indicates that the country does not have a comparative advantage in the corresponding group of products.<sup>5</sup> An alternative for RCA indicators is the Lafay's RCA index. Compared to Balassa's RCA indicator, Lafay's index takes in regard the flows of goods trade inside each sector of the economy, gross domestic product as well as exports and imports for each group of products.<sup>6</sup>

Besides Balassa's RCA indicator and Lafay's index, the structure of exports can be analysed by using the CEP (Comparative Export Performance) indicator.<sup>7</sup>

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<sup>4</sup> *The concept of comparative advantage is distinct from competitiveness because of two reasons. First, competitiveness is related to the relative strength of a country for producing a given product while comparative advantage is to the relative strength of products for a given country. Second, competitiveness is also subject to macroeconomic fluctuations (exchange rate or wage policy), while comparative advantage is more structural.*

<sup>5</sup> *In analysing the structure of trade in transition countries using RCA indicators, see for example in Djankov and Hoekman (1997), Kaminski and Ng (2001), Yilmaz (2003), Gligorov and Vidović (2004).*

<sup>6</sup> *See more details about the use of Lafay's index in Lafay (1992).*

<sup>7</sup> *See more details about the use of CEP indicator in Donges (1982).*



### **3.2.1 Analysis of the Structure of Trade for Croatia and Selected Transition Countries by Applying the Absolute RCA Indicator**

In Croatia and selected transition countries, the absolute RCA indicator was calculated for the five product groups using Balassa's formula. The results are displayed in Table 3. Comparing the absolute RCA indicator for Croatia and selected transition countries shows that none of the countries had comparative advantages in the production and trade of raw material-intensive goods (RCA indicators were negative for all countries). Also, in all countries, this group of products was characterised by decreasing trends of RCA indicators, which means that the countries lost competitiveness in production and trade of this product group. Slovenia had the lowest RCA indicator for raw material intensive-goods in 2001 (-139.5), whilst Hungary had the highest (-2.95).

The Czech Republic, Romania, Slovenia and Slovakia have comparative advantages in the production and trade of labour-intensive goods (positive RCA), however with differing intensities. The largest values of absolute RCA indicator in 2001 for labour-intensive goods was for Slovenia (25.76) and for the Czech Republic (16.41). In all the analysed transition countries comparative advantages for labour-intensive goods decreased during the observed period.

Concerning capital-intensive goods, the Czech Republic and Slovakia had the largest RCA indicators. Slovenia also had a comparative advantage in the trade of capital-intensive goods. Croatia, Hungary and Poland did not have comparative advantages in the production and trade of capital-intensive goods. During the observed period, Croatia had the lowest RCA indicator for capital-intensive goods. In 2001, the absolute RCA indicator for Croatia was -90.45.

In Romania, there was a trend of a significant decrease in the RCA indicator for capital-intensive goods during the observed period. At the beginning of the transition period all the countries were characterised by a significant decline in the RCA indicator for capital-intensive goods. This can be understood considering the countries' need for technological restructuring at the beginning of transition.

Table 3. Absolute RCA indicator in the Republic of Croatia and in selected transition countries in the period from 1992 to 2001							
	Croatia	Czech Republic	Hungary	Poland	Romania	Slovenia	Slovakia
<b>Raw material-intensive goods</b>							
1992	8.90	-16.37*	16.85	-12.06	-66.58	-93.79	-
1995	-25.37	-32.70	3.88	-18.72	-50.59	-125.56	-57.61
1998	-22.15	-47.17	1.90	-21.74	-51.08	-120.16	-66.21
1999	-27.14	-46.70	-6.08	-28.94	-21.74	-119.84	-64.76
2000	-27.97	-64.61	-4.27	-43.82	-23.33	-138.79	-72.10
2001	-30.08	-66.57	-2.95	-39.06	-42.62	-139.54	-66.60
<b>Labour-intensive goods</b>							
1992	26.96	47.21*	12.94	1.37	25.90	80.01	-
1995	0.86	23.01	-13.49	5.90	17.75	43.07	51.22
1998	-14.43	17.06	-19.36	-6.55	4.67	48.84	1.68
1999	-8.47	17.48	-20.69	-5.74	6.79	20.36	11.12
2000	-13.61	16.97	-21.93	-1.76	6.55	24.62	14.37
2001	-18.91	16.41	-13.23	3.39	4.78	25.76	7.46
<b>Capital-intensive goods</b>							
1992	-16.43	50.59*	-9.74	22.77	45.15	33.75	-
1995	-84.37	9.31	-16.72	6.18	27.55	-4.00	45.59
1998	-84.40	23.51	-32.47	-29.40	4.45	1.25	24.86
1999	-90.55	25.92	-22.37	-27.94	9.70	-7.66	35.91
2000	-90.62	24.85	-18.16	-14.63	-2.40	1.41	48.47
2001	-90.45	25.29	-14.26	-14.18	-21.16	4.22	29.64
<b>Easy to imitate research-oriented goods</b>							
1992	-32.84	-81.53*	-37.13	-77.92	-105.81	-60.42	-
1995	-18.53	-80.48	-26.81	-96.49	-77.34	-50.26	-18.35
1998	-24.14	-75.68	7.73	-82.49	-107.03	-51.13	-47.62
1999	-31.64	-85.53	15.00	-89.96	-102.01	-56.23	-44.73
2000	-34.99	-68.13	23.46	-88.02	-59.98	-54.03	-41.41
2001	-42.66	-45.71	23.13	-89.24	-70.72	-43.17	-47.08
<b>Difficult to imitate research-oriented goods</b>							
1992	37.97	-43.87*	-33.05	-41.12	-43.15	19.40	-
1995	-39.48	-48.44	-30.05	-42.63	-64.10	-2.83	-31.29
1998	-22.68	-13.38	-11.45	-44.84	-50.67	0.52	-44.34
1999	-20.31	-12.56	-17.69	-41.36	-47.28	0.34	-31.50
2000	-15.16	-14.39	-25.30	-30.74	-58.01	3.77	-29.82
2001	-14.49	-16.96	-23.73	-20.82	-44.51	11.01	-34.26

Note: \* 1993 figures are used.

Source: The International Trade Statistics Yearbook, United Nations, New York, 2003, own calculations.

Except for Hungary, not one of the observed countries had comparative advantages in the production and trade of easy to imitate research-oriented goods. Although, it is important to note that in all countries except Poland, Slovakia, and Croatia, the RCA indicator for this product group improved during the observed period, which is exceptionally encouraging. The highest RCA indicator for easy to imitate research-oriented goods in 2001 was in Hungary (23.13), and the lowest in Poland (-89.34).

From the analysed countries only Slovenia had a comparative advantage in the production and trade of difficult to imitate research-oriented goods. The other transition countries had negative RCA indicators, but with a distinct trend of improvement in trade of this group of products. Croatia has a relatively good RCA indicator primarily because of the inclusion of shipbuilding industry in this category. During the observed period the lowest RCA indicators for this group of products were Slovakia and Romania.

In conclusion, compared with other analysed transition countries, Croatia is the only one without a comparative advantage in any group of products in 2001, partly explained by the prevalent structure of export services. The value of absolute RCA indicator for each product group during the observed period indicated that the structure of Croatian trade is moving in the expected direction, but significantly slower relative to countries which joined the European Union in 2004. The confirmation of an expected positive change in the structure of international trade for Croatia will be demonstrated in the following analysis of the relative RCA indicators.

### 3.2.2 The Analysis of the Trade Structure of Croatia and Selected Transition Countries by Applying the Relative RCA Indicator

The absolute RCA indicator forms a basis for only tentative conclusions about the dynamics and the desirability of changes in the trade structure therefore, for this sort of analysis, we use the relative RCA indicator. Empirical results are calculated for the relative RCA indicator by product groups for Croatia and for the selected transition countries in the period from 1992 to 2001, and are shown in Table 4.

Relative RCA indicator is calculated by using the formula:

$$RCA_{rel} = \frac{RCA_i - RCA_{uk}}{100} \quad i = 1, \dots, 5$$

where:

$RCA_{rel}$  is the relative RCA indicator,

$i$  denotes the group of products,

$RCA_i$  is the value of the absolute RCA indicator for an individual group of products,

$RCA_{uk}$  is the total RCA indicator.

Compared by product groups, Croatia is characterised by a distinctly low value of relative RCA indicator for capital-intensive goods. This is a result of considerably larger imports of this group of products in relation to exports. The deterioration of the relative RCA indicator for capital-intensive goods in the observed period can be attributed first of all to strong growth in the imports of road vehicles (personal automobiles), while the exports from that group during the observed period remained unchanged. Relative to other groups of products, Croatia has the largest value of relative RCA indicator for difficult to imitate research-oriented goods and for labour-intensive goods. The favourable relative RCA indicator for Croatia in difficult to imitate research oriented goods is primarily because of the considerably larger value of exports in other transport equipment (ships) relative to imports. This activity however, demands a very high level of subsidies.

Positive values of the relative RCA indicator for labour-intensive products for Croatia are very evident. The Czech Republic has the largest relative comparative advantage in the trade of capital-intensive goods. High values of relative RCA indicators in the Czech Republic for these groups of products are the results of significant investments and developments in the automobile industry during the observed period in which the value of exports of road vehicles in 2001 recorded a fivefold increase relative to 1993.

Hungary has considerably larger values of the relative RCA indicator for easy to imitate research-oriented goods compared with values of the same indicators in other product groups. The increase in the comparative advantage of Hungary in easy to imitate research-oriented goods results from the expansion of exports in telecommunication equipment, office machines and machines for automatic data processing during the observed period. The development of telecommunications and the production of office equipment evolved as a consequence of considerable investments of large multinational corporations in informational technology and telecommunications in Hungary.

Compared with other product groups, Poland has the largest relative comparative advantage in the trade of labour-intensive goods. Significantly low values of the relative RCA indicator were displayed by Poland in easy to imitate research-oriented goods, because of significant imports of telecommunication devices, office machines and chemical products. Consequence being that in 2001 in Poland, the value of imports of easy to imitate research-oriented goods was 3.5 times greater than exports.

	Croatia	Czech Republic	Hungary	Poland	Romania	Slovenia	Slovakia
<b>Raw material intensive products</b>							
1992	0.06	-0.18*	0.20	0.04	-0.45	-1.03	-
1995	0.05	-0.19	0.19	0.00	-0.30	-1.14	-0.55
1998	0.11	-0.40	0.12	0.09	-0.26	-1.10	-0.50
1999	0.06	-0.40	0.04	0.02	-0.05	-1.06	-0.56
2000	0.04	-0.55	0.07	-0.16	-0.05	-1.26	-0.65
2001	0.04	-0.58	0.06	-0.15	-0.20	-1.31	-0.53
<b>Labour intensive products</b>							
1992	0.24	0.46*	0.16	0.17	0.47	0.71	-
1995	0.31	0.36	0.02	0.25	0.38	0.55	0.53
1998	0.19	0.24	-0.09	0.24	0.30	0.59	0.18
1999	0.24	0.24	-0.11	0.25	0.23	0.34	0.20
2000	0.19	0.26	-0.10	0.26	0.25	0.37	0.21
2001	0.15	0.25	-0.04	0.27	0.28	0.34	0.21
<b>Capital intensive products</b>							
1992	-0.20	0.49*	-0.06	0.38	0.67	0.25	-
1995	-0.54	0.23	-0.01	0.25	0.48	0.08	0.48
1998	-0.51	0.31	-0.23	0.01	0.29	0.11	0.41
1999	-0.58	0.33	-0.12	0.03	0.26	0.06	0.45
2000	-0.58	0.34	-0.07	0.14	0.16	0.14	0.55
2001	-0.56	0.33	-0.05	0.10	0.02	0.13	0.43
<b>Easy to imitate research-oriented goods</b>							
1992	-0.36	-0.83*	-0.34	-0.62	-0.84	-0.70	-
1995	0.12	-0.67	-0.11	-0.78	-0.57	-0.39	-0.16
1998	0.09	-0.69	0.18	-0.52	-0.82	-0.41	-0.31
1999	0.01	-0.79	0.25	-0.59	-0.86	-0.42	-0.36
2000	-0.03	-0.59	0.35	-0.60	-0.42	-0.41	-0.35
2001	-0.08	-0.38	0.32	-0.65	-0.48	-0.35	-0.34
<b>Difficult to imitate research-oriented goods</b>							
1992	0.35	-0.45*	-0.30	-0.26	-0.22	0.10	-
1995	-0.09	-0.35	-0.15	-0.24	-0.44	0.09	-0.29
1998	0.11	-0.06	-0.02	-0.14	-0.26	0.10	-0.28
1999	0.13	-0.06	-0.08	-0.11	-0.31	0.14	-0.22
2000	0.17	-0.05	-0.14	-0.03	-0.40	0.16	-0.23
2001	0.20	-0.09	-0.15	0.03	-0.22	0.19	-0.21

Note: \* 1993 figures are used.

Source: *The International Trade Statistics Yearbook, United Nations, New York, 2003, own calculations.*

Romania has positive values of the relative RCA indicator only in labour-intensive goods. In terms of other product groups Romania has markedly low values of the relative RCA indicator, which indicates a structure of exports with low value-added.

Slovenia had positive values of the relative RCA indicator for labour-intensive goods, capital-intensive goods and difficult to imitate research-oriented goods. Significant comparative

advantages were calculated in Slovenia in the trade of labour-intensive goods and difficult to imitate research-oriented goods. The relative RCA indicator in labour-intensive products decreased during the observed period, while difficult to imitate research-oriented goods increased. The increase in the relative RCA indicator for difficult to imitate research-oriented goods arose as a consequence of the dynamic growth in exports of electronic machines, appliances and devices where the value of exports of this product group in 2001 ended twofold higher than 1992. Labour-intensive goods in the observed period came to a significant increase in exports of furniture.

Compared to other product groups, Slovakia demonstrated significant comparative advantages in the trade of capital intensive goods. Similarly in the Czech Republic, comparative advantages in this product group were the result of significant investments in the automobile industry and the expansion in exports of road vehicles as well as production in parts for the automobile industry.

Except for Croatia and Hungary, all of the analysed transition countries in 2001 had negative values of relative RCA indicators in raw material-intensive goods. Significant increases in imports of raw material relative to exports resulted in that Slovenia had a markedly lower relative RCA indicator in this product group relative to the other observed countries.

Hungary is the only one of the analysed transition countries with a negative relative RCA indicator for labour-intensive goods.

For easy to imitate research-oriented goods, Hungary had the only positive values of relative RCA indicators out of the analysed countries, and for difficult to imitate research-oriented goods only Croatia and Slovenia had positive values of relative RCA indicators.

Compared to other observed countries the largest relative RCA indicator in 2001 for capital-intensive goods was in the Czech Republic and Slovakia, and the lowest was in Croatia. The improvement in relative and absolute RCA indicators of capital-intensive goods in each of the analysed transition countries was the result of car industry development. Foreign direct investments by multinational corporations from the leading countries of the European Union, the US and individual Asian countries restructured the automobile industries of transition economies.

### 3.3 Similarities in the Structure of Croatian Trade Relative to that of Selected Transition Countries

The paper so far has analysed changes of absolute and relative RCA indicators according to individual product groups. However, we now move on to the question of similarities in the structure of trade, analysing whether Croatia has a complementary or competitive structure with the analysed transition countries. The analysis is made using the average deviation of the relative RCA indicator in Croatia compared to analysed transition country by product groups. The average deviation of the relative RCA indicator is calculated using the formula:

$$s = \sqrt{\frac{\sum_{i=1}^2 (x_a - x_b)_i^2}{N}}$$

where:

$s$  is the average deviation relative RCA indicator for Croatia compared to each analysed transition country, it can assume values of 1, 2; in which 1 denotes raw material goods and labour-intensive goods, while 2 is capital-intensive goods, easy to imitate and difficult to imitate research-oriented goods,

$x_a$  is the relative RCA indicator for Croatia

$x_b$  is the relative RCA indicator for an observed transition country

$N$  is the number of product groups. In our case  $N=2$ .

A large average deviation of relative RCA indicators indicates a greater difference in the structure of goods trade between two countries (the countries are complementary). Conversely, a low deviation of relative RCA indicators indicates a greater similarity in the structure of trade between two countries (the countries are competitive). An alternative measure for comparing the structures of international trade between countries is the Export Similarity indicator (ES)<sup>8</sup>.

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<sup>8</sup> *Export Similarities - ES indicator shows the level of similarities in the structure of exports between two countries. It is calculated using the following formula:*

$$ES(ab,c) = \sum_i \left[ EX_i(ac) - \frac{EX_i(ac) + EX_i(bc)}{2} \right]$$

*ES indicator is used for measuring the different structures of exports of country a and of country b in country c.  $EX_i(ac)$  describes a part of export products  $i$  of country a in country c in total exports of country a in country c. In this way the indicator is calculated assuming values in the interval from 0 to 1. The closer the ES indicator is to 1 the more similar the structure of exports between two countries. For details about the concept of the ES indicator see in Finger and Kreinen (1979).*

Empirical results calculated from the average deviation in relative RCA indicators of Croatia in relation to each analysed transition country are shown in Table 5.

	Hungary	Poland	Romania	Slovenia	Slovakia	Czech Republic
1995	0.20	0.20	0.21	0.71	0.46	0.25
1998	0.26	0.24	0.38	0.58	0.45	0.34
1999	0.43	0.16	0.34	0.74	0.51	0.33
2000	0.45	0.09	0.16	0.83	0.56	0.38
2001	0.42	0.07	0.18	0.86	0.44	0.44

*Source: International Trade Statistics Yearbook, United Nations, New York, 2003, own calculations.*

*The average deviation of relative RCA indicator of Croatia in relation to each analysed transition country indicates that Croatia has the most similar structure of trade with Poland and Romania (Table 5) - the least developed, in terms of GDP per capita, transition countries of those selected. Out of the analysed countries, Croatia has the largest difference in the structure of trade relative to Slovenia, the most developed country. During the observed period, from 1995 to 2001, Croatia became increasingly different in the structure of trade relative to the structure of the Czech Republic, Hungary and Slovenia, because these countries quickly changed their trade structure. Moreover, Croatia experienced decreasing differences in the structure of trade relative to Poland and Romania.*

### 3.4 Comparative Advantage, Specialisation and Foreign Direct Investment

At the very beginning of the transition process of Eastern European countries domestic national savings for investment were not sufficient for successful restructuring and competing on the international market. The creation of competitive products resulted in strong demand for appropriate management, know-how, as well as the application of high technology. Despite this, the development and the application of technology that the most developed countries had accomplished up until then created new possibilities for rapid economic growth of the transition countries. First of all this pertains to the fragmentation of the European as well as of the world production processes. Namely, large industrial



conglomerates organise production processes in a way that each phase of production is delegated to separate autonomous firm. That kind of production enabled individual firms in transition countries to reconstruct, turning from local markets and integrating themselves into the production chain of large multinational corporations.

Research in the field of international trade showed that the trade in product parts and intra-industry trade was the fastest growing segment in international trade. According to rough estimations, the trade in parts makes 30% of total international trade, for example see Aturupane, Djankov and Hoekman (1997), Kaminski (2001). The phenomenon of fragmentation in production processes that includes firms from various countries is resulting in the appearance of added flows within total trade. Namely, a large part of international trade has been taken over by trade within individual sectors. A larger portion of intra-industry trade in total trade of goods shows a larger integration of an economy in international trade. The most commonly used indicators for the measuring of the level of specialisation in intra-industry trade are the Trade Overlap Index (TO index) and the Grubel-Lloyd index<sup>9</sup>. On the subject of specialisation in transition countries that entered the EU in the first circle of integration see for example in Havlik, Landesmann and Stehrer (2001).

TO index measures the level of specialisation in the international trade of goods within a sector relative to the international trade of goods between different sectors of the economy. TO indicator in the broadest sense shows the degree of liberalisation and integration of the economy in the international market. It is calculated using the formula:

$$TO = 2 \frac{\sum_{i=1}^n \min(X_i, M_i)}{\sum_{i=1}^n (X_i + M_i)}$$

$X$  is defined as the value of goods exports, and  $M$  is the value of imports. The index  $i$  shows the group of products classified according to SITC, it ranges from 0 to 9<sup>10</sup>. The coefficient can vary from 0 to 1. The closer it is to 1, the higher degree of specialisation in intra-industry

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<sup>9</sup> Calculated using the formula:

$$GL = 1 - \frac{|x - m|}{x + m}$$

in which:  $GL$  = Grubel-Lloyd's index,  $x$ = the value of the export goods sector,  $m$ = the value of imports in the goods sector. About the use of  $GL$  index see for example in Hoekman and Djankov (1996), Dixon and Menon (1997), Kaminski and Ng (2001), Boromisa and Mikić (2002).

<sup>10</sup> For more detail analysis of trade specialization in intra-industry trade 3 digit level of data aggregation is required

trade<sup>11</sup>. Lower value of the coefficient shows that the country has a larger level of specialisation in trade between sectors. A larger level of trade within a sector means a larger integration of the country in the trade of goods with other countries. Empirical results of the calculation of total TO indicator for Croatia and for the selected transition countries in the period from 1992 to 2001 are shown in Table 6.

Table 6. **“Trade Overlap Index”, TO indicator for Croatia and selected transition countries in the period from 1992 to 2001**

	Croatia	Czech Republic	Hungary	Poland	Romania	Slovenia	Slovakia
1992	0.88	-	0.71	0.74	0.64	0.75	-
1995	0.72	0.64	0.74	0.79	0.69	0.78	0.69
1998	0.69	0.92	0.86	0.71	0.63	0.86	0.82
1999	0.69	0.92	0.88	0.74	0.64	0.84	0.85
2000	0.70	0.91	0.88	0.75	0.65	0.84	0.84
2001	0.66	0.91	0.88	0.79	0.62	0.87	0.84

Source: *The International Trade Statistics Yearbook, United Nations, New York, 2003, own calculations.*

As seen from the table it is obvious that the Czech Republic, Hungary and Slovenia show the largest level of specialisation in intra-industry trade. At the same time, the Czech Republic, Hungary, Poland, Slovakia and Slovenia show trends of growing integration in international flows of goods and specialisation. *In Croatia we observe a trend of decreasing TO indicators from the period 1992 to 2001, while in Romania the TO indicator stagnated. From the analysed transition countries, Romania and Croatia had the lowest values of the TO indicator in 2001, which coincides with the conclusion from the previous part of the paper about the greatest similarity in the structure of trade for these two countries.*

The value of the TO indicator for Croatia in 2001 indicates a low level of trade integration and specialisation. Croatia, despite being a small country, has a significantly lower TO indicator in relation to the analysed countries that joined the European Union in 2004. *This confirms the hypothesis that Croatia is lagging behind in the integration of its economic structures and specialisation in intra-industry trade in relation to the analysed transition countries that have joined the European Union in 2004.*

A comparison of TO indicator values (Table 6) with the average deviation of relative RCA indicators (Table 5) shows that Croatia has the largest similarity in the structure of trade with

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<sup>11</sup> *More about problems of data aggregation and aggregate trade imbalances when using different types of intra-industry indicators see Greenway and Milner (1986).*

countries that have slightly lower values of TO indicators. This leads to the conclusion that greater specialisation of a country in intra-industry trade and greater integration in the international flow of goods is correlated with a positive change in the structure of trade.

**Table 7: TO indicators for Croatia and selected transition countries by product group during the period from 1992 to 2001**

	Croatia	Czech Republic	Hungary	Poland	Romania	Slovakia	Slovenia
<b>Raw material-intensive goods</b>							
1992	0.79	0.53*	0.25	0.48	0.40	-	0.43
1995	0.60	0.45	0.33	0.50	0.43	0.52	0.34
1998	0.64	0.45	0.34	0.59	0.42	0.43	0.35
1999	0.57	0.43	0.32	0.53	0.50	0.47	0.34
2000	0.59	0.41	0.36	0.49	0.54	0.49	0.27
2001	0.59	0.41	0.33	0.53	0.47	0.48	0.30
<b>Labour-intensive goods</b>							
1992	0.69	0.60*	0.59	0.62	0.38	-	0.65
1995	0.71	0.65	0.61	0.54	0.39	0.68	0.73
1998	0.67	0.80	0.59	0.60	0.35	0.70	0.81
1999	0.69	0.80	0.58	0.60	0.35	0.70	0.80
2000	0.72	0.80	0.59	0.65	0.35	0.70	0.81
2001	0.66	0.81	0.65	0.68	0.35	0.71	0.81
<b>Capital-intensive goods</b>							
1992	0.59	0.67*	0.79	0.45	0.42	-	0.76
1995	0.36	0.82	0.76	0.66	0.46	0.60	0.85
1998	0.30	0.78	0.75	0.67	0.46	0.75	0.91
1999	0.28	0.77	0.83	0.68	0.51	0.70	0.86
2000	0.29	0.75	0.84	0.81	0.53	0.66	0.90
2001	0.25	0.75	0.83	0.82	0.57	0.74	0.89
<b>Easy to imitate research-oriented goods</b>							
1992	0.63	0.52*	0.70	0.45	0.36	-	0.53
1995	0.51	0.48	0.76	0.37	0.47	0.51	0.57
1998	0.71	0.55	0.83	0.35	0.33	0.65	0.56
1999	0.68	0.50	0.75	0.33	0.42	0.69	0.52
2000	0.69	0.58	0.78	0.37	0.62	0.70	0.54
2001	0.61	0.72	0.79	0.41	0.52	0.70	0.58
<b>Difficult to imitate research-oriented goods</b>							
1992	0.44	0.69*	0.66	0.49	0.68	-	0.77
1995	0.51	0.65	0.63	0.51	0.51	0.74	0.79
1998	0.64	0.90	0.62	0.47	0.52	0.72	0.80
1999	0.64	0.92	0.60	0.52	0.53	0.77	0.82
2000	0.62	0.92	0.61	0.67	0.51	0.82	0.82
2001	0.53	0.90	0.60	0.66	0.58	0.78	0.82

Note: \* 1993 figures are used.

Source: *The International Trade Statistics Yearbook, United Nations, New York, 2003, own calculations.*

The problem of a small TO indicator for Croatia is not only present at the level of aggregate values of exports and imports, but it is also explicitly present for all groups of products as shown in Table 7<sup>12</sup>.

*Comparing the TO indicator for Croatia by product groups indicates that Croatia has the highest specialisation in intra-industry trade for labour-intensive goods, and the lowest for capital-intensive goods (Table 7).*

Significantly low values of TO indicators for capital-intensive goods are primarily the results of considerably higher imports of road vehicles relative to exports during the observed period. Croatia experienced a decline in the level of specialisation in the trade of capital-intensive goods with significant growth in the value of imports of road vehicles, and at the same time stagnating exports.

### 3.5 Interdependence in the Level of Specialisation (TO Index), the Structure of Trade (RCA) and Foreign Direct Investment (FDI)

After we determined the movement of the TO index, the question arises as to whether the specialisation in intra-industry trade leads towards improvement of the RCA indicator or if these movements are independent. The purpose of the following analysis is to discover the relationship between the TO indicator and the total RCA indicator. The analysis of the strength in the correlation between the total RCA indicator and the TO indicator, is performed using Pearson's coefficient of linear correlation. Pearson's coefficient of linear correlation is covariant of standardised variables X and Y. It ranges between -1 and 1. As the coefficient approaches 0 the correlation is weaker and inversely, as it approaches 1 the correlation is stronger. It is calculated using the formula:

$$r = \frac{\sum_{i=1}^n x_i y_i - n\bar{x}\bar{y}}{n\sigma_x\sigma_y}$$

In our observation, empirical values of total RCA indicators are taken as variable x, while the values of TO indicators are defined with y.

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<sup>12</sup> For more detail analysis of trade specialization in intra-industry trade 3 digit level of data aggregation is required.

*Pearson's coefficient of linear correlation between total TO and the RCA indicator of analysed transition countries is 0.65. The value of Pearson's coefficient indicates that there is a statistically significant relationship between the integration of analysed transition countries in international flows of goods and the change in the structure of trade. The correlation is of a medium level. Also, the relationship is positive, which means that the increase in specialisation and intra-industry trade and the greater integration in the international market of goods have had a positive influence on the change in the structure of trade.*

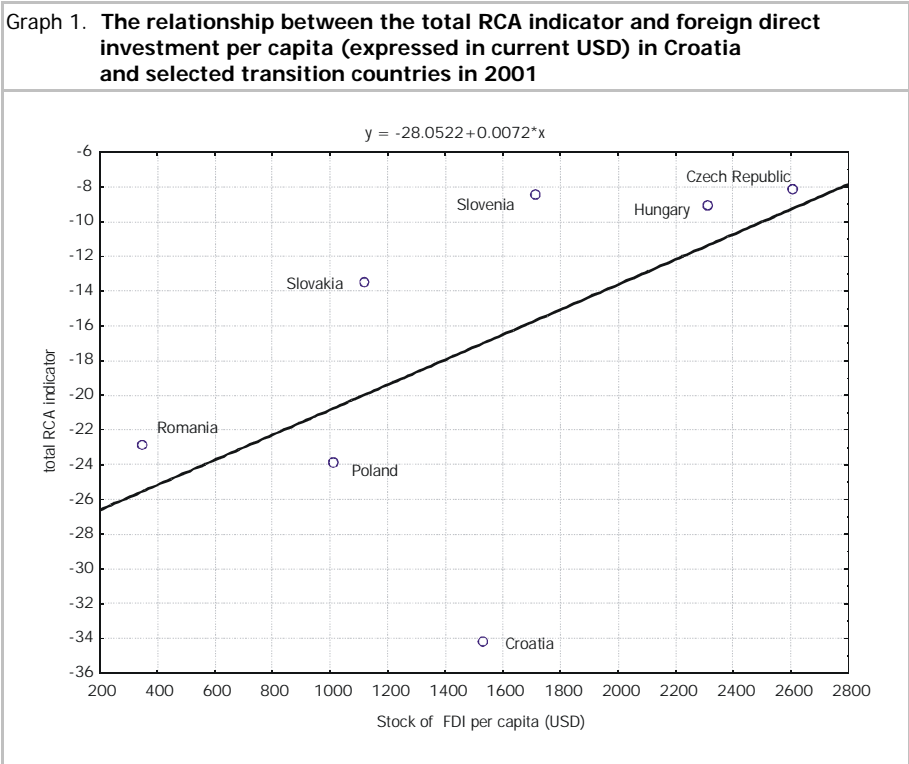
*The reason why Croatia lags behind in the improvement of its structure of trade relative to the analysed countries that joined the European Union in 2004, measured by the total RCA indicator, can be explained by the lower degree of specialisation of Croatia in intra-industry trade. On the other hand, it is expected that foreign direct investments are the main promoters of the change in comparative advantages of transition countries, and the strengthening of intra-industry trade. This is also confirmed by Pearson's coefficient of linear correlation between the total TO index and FDI per capita of analysed transition countries. The coefficient is 0.69, which indicates a statistically significant correlation between foreign direct investment (FDI) and the level of specialisation in intra-industry trade (TO) for the analysed countries. The correlation is of a medium level. The increase of foreign direct investment per capita had a positive effect on the growth in the integration of the economy of transition countries in the international market for goods. However, the findings are especially interesting if Croatia is left out from the sample of observed countries. Then the value of Pearson's coefficient amounts to 0.75 and indicates that the relationship between FDI and TO in Croatia is weak. In contrast with other analysed countries, Croatia experienced an increase of foreign direct investment but a decrease in the specialisation in intra-industry trade. The TO indicator decreased in the product groups of raw material-intensive, labour-intensive and capital-intensive goods. In the group of easy to imitate research-oriented goods, a change in the index of specialisation did not occur, while the TO increased for difficult to imitate research-oriented goods due to the growth in shipbuilding.*

*The same conclusion is drawn from Graph 1, which shows the correlation of FDI and the RCA indicator. The value of Pearson's coefficient of linear correlation between the total RCA indicator and foreign direct investment in selected transition countries amounts to 0.62, which indicates a positive correlation of a medium level. This means that foreign direct investment in the countries had a positive effect on the change in the structure of trade since with the increase in foreign direct investment came an improvement in the total RCA indicator. Croatia is a clear exception because for a given level of FDI per capita, a more significant change in the RCA indicator was expected.*

A comparison of the total RCA indicator across analysed countries shows that Hungary, the Czech Republic and Slovenia have the highest values for total RCA indicators, and Croatia

has the lowest. Of the analysed countries the highest direct investments per capita were in the Czech Republic and Hungary, and the lowest was in Romania.

Apart from Croatia and Slovenia, in all the analysed transition countries it is observed that countries with the higher values of foreign direct investments per capita have higher total RCA indicators (Graph 1). Although Slovenia has significantly lower foreign direct investment per capita in 2001 relative to the Czech Republic and Hungary, the total RCA indicator is almost at the same level as in those two countries. The highest deviation is for Croatia where there is no correlation between foreign direct investment and the change in the structure of trade. The growth of foreign direct investment in Croatia did not contribute to the improvement in the structure of trade, as was the case in other analysed transition countries.



Source: *The International Trade Statistics Yearbook, United Nations, New York, 2003, own calculations.*

It can be concluded from the analysis of the correlation in movements of FDI, RCA and the index of specialisation (TO) that Croatia is an exception in the group of observed countries. Namely, although relatively high growth in FDI per capita is noted during the observed period, those investments did not contribute to the growth in specialisation, or to a significant improvement in the RCA indicator. On the aggregate level it is evident in the character of FDI investments. Most investments were directed toward domestic markets i.e. monopoly or oligopoly positions. Also, a large portion of investments were directed into the non-tradable sector (banking, telecommunications) or investments for the domestic market in the manufacturing industry (for the process of reconstruction of the economy)<sup>13</sup>. FDI flows into the tradable sector were almost completely absent, which is why there is an atypical correlation between FDI, RCA and TO. It is important to mention that FDI did not flow into the tourist industry, which serves as a further explanation for the atypical correlation between foreign direct investment and the structure of trade. The lack of FDI for the tradable sector during the period of transition brought Croatia into the position of growing imbalances in international trade. Increasingly evident is the problem of growth in public debt and in total foreign debt. By the end of 2003 public debt reached 53% of GDP while total foreign debt was 83% of GDP. Therefore, in the coming period, a very intense effort needs to be made in creating the conditions that would influence the attraction of foreign direct investments to the tradable sector. Those conditions are: the strengthening of the integration processes, the judicial system reform, the acceleration of standardisation, the development of the infrastructure and the improvement in the quality of the labour force.

## 4 Conclusion

Despite the high level of data agregation, the obtained empirical results clearly indicate the key problems related to the structure of Croatian trade:

- High relative deficits in the trade of goods with foreign countries is continuously present, with the tendency to stagnate in the share of goods exports in GDP;
- The structure of trade is dominated by raw material-intensive goods and labour intensive goods relative to capital-intensive goods and research-oriented goods;

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<sup>13</sup> *Details about the structure and FDI sector distribution in transition countries, as well as its effects on the growth in the economy and on international trade see in Lovrinčević, Marić and Mikulić (2004). The same atypical relationship between FDI and international trade for Croatia is confirmed by using different techniques of analysis.*

- The share of raw material-intensive goods and labour-intensive goods relative to capital-intensive goods and research-oriented goods is larger in the structure of exports than in the structure of imports;
- The relative RCA indicator shows an advantage in the production of products of low value-added and more of a similarity in the structure of international trade with countries at much lower levels of GDP per capita (Romania and Poland);
- There is a low level of integration in the international market of goods, of intra-industry trade and of specialisation. Croatia has a considerably lower TO indicator than observed countries of Central and Eastern Europe;
- Differing from other analysed countries the direct relationship between FDI, RCA and the TO indicator is not evident for Croatia;
- Although it has a relatively high level of FDI per capita, Croatia has enormous difficulties with an absence of FDI in the tradable sector, and so far the FDI has been aimed at taking a monopoly or an oligopoly position in the domestic market.

Compared with the other selected transition countries, Croatia has the highest relative deficit, and the Czech Republic and Hungary the lowest.

Next to Poland and Romania, Croatia has a somewhat lower level in the openness of its economy measured by the share of trade in GDP relative to the other analysed transition countries. This is primarily the result of the stagnation of exports during the observed period in which the share of exports in GDP was considerably lower compared to other analysed countries.

Compared with other observed countries Czech Republic, Slovenia and Slovakia have comparative advantages in production and trade of capital-intensive goods. Hungary is the only one from the analysed countries that has a comparative advantage in the trade of easy to imitate research-oriented goods, while only Slovenia has a comparative advantage in difficult to imitate research-oriented goods.

When compared with analysed transition countries, Croatia has the most similar structure of trade with Poland and Romania, while at the same time it has the greatest difference in the structure of trade with Slovenia. During the observed period, there is an increasing difference in the structure of Croatian trade relative to the structure of trade of the Czech Republic, Hungary and Slovenia, while the difference in the structure of trade is decreasing in relation to Poland and Romania.



The Czech Republic, Hungary and Slovenia have the highest levels of integration in the international flow of goods and specialisation in intra-industry trade, as measured by the TO index. In comparison, the TO indicator for Croatia by product group shows that Croatia has the highest specialisation in intra-industry trade in labour-intensive goods, and the lowest in capital-intensive goods. The low level of the total TO indicator shows the low level of specialisation of Croatia in intra-industry trade, as well as the low levels of trade integration. The calculated relative RCA indicator shows the existence of relative advantages in the production of labour-intensive goods, difficult to imitate research-oriented goods (ships), as well as of raw material-intensive goods. Raw material-intensive goods, labour-intensive goods, and the low value-added that Croatia realises in the export of ships indicate the existence of relative advantage predominately in products with low value-added.

The results show that the trade structures of analysed countries were positively correlated with the level of specialisation in intra-industry trade (TO indicator). In other words, the increase in the trade integration of analysed countries had a positive effect on the improvement in the structure of trade.

Croatia shows the most similarity in the structure of trade with Poland and Romania, which, like Croatia, have lower levels of openness in their economies, as well as lower levels of specialisation in intra-industry trade (TO) relative to other analysed transition countries.

Except for Croatia, a higher level of foreign direct investment in selected transition countries had an explicitly positive effect on the change in the structure of trade and growth in specialisation in intra-industry trade.

Empirical results confirm the hypothesis that Croatia is significantly lagging behind in the improvement of its structure of international trade relative to analysed transition countries of Central and Eastern Europe. This shows the importance of accelerating structural reforms in Croatia.

# Appendix

Classification of Products by the Intensity of the Use of Factors of Production and the Standard International Trade Classification of Products (SITC)

## **Raw material-intensive goods:**

SITC 0 Food and live animals chiefly for food  
SITC 21 Hides, skins and furskins, raw  
SITC 22 Oil seeds and oleaginous fruit  
SITC 23 Crude rubber (including synthetic and reclaimed)  
SITC 24 Cork and wood  
SITC 25 Pulp and waste paper  
SITC 27 Crude fertiliser and crude minerals  
SITC 28 Metalliferous ores and metal scrap  
SITC 29 Crude animal and vegetable materials, nes  
SITC 32 Coal, coke and briquettes  
SITC 33 Petroleum, petroleum products and related materials  
SITC 34 Gas, natural and manufactured  
SITC 4 Animal and vegetable oils, fats and waxes  
SITC 56 Fertilisers, manufactured

## **Labour-intensive goods:**

SITC 26 Textile fibres (not wool tops) and their wastes (not in yarn)  
SITC 61 Leather, leather manufactures, nes, and dressed furskins  
SITC 63 Cork and wood, cork manufactures  
SITC 64 Paper, paperboard, and articles of pulp, of paper or of paperboard  
SITC 65 Textile yarn, fabrics, made-up articles, nes, and related products  
SITC 66 Non-metallic mineral manufactures, nes  
SITC 69 Manufactures of metals, nes  
SITC 81 Prefabricated buildings; sanitary, plumbing, heating and lighting fixtures and fittings, nes  
SITC 82 Furniture and parts thereof  
SITC 83 Travel goods, handbags and similar containers  
SITC 84 Articles of apparel and clothing accessories  
SITC 85 Footwear  
SITC 89 Miscellaneous manufactured articles, nes

**Capital- intensive goods:**

SITC 1 Beverages and tobacco

SITC 35 Electric current

SITC 53 Dyeing, tanning and colouring materials

SITC 55 Oils and perfume materials; toilet and cleansing preparations

SITC 62 Rubber manufactures, nes

SITC 67 Iron and steel

SITC 68 Non-ferrous metals

SITC 78 Road vehicles

**Easy to imitate research oriented goods:**

SITC 51 Organic chemicals

SITC 52 Inorganic chemicals

SITC 54 Medicinal and pharmaceutical products

SITC 58 Artificial resins and plastic materials, and cellulose esters etc

SITC 59 Chemical materials and products, nes

SITC 75 Office machines and automatic data processing equipment

SITC 76 Telecommunications, sound recording and reproducing equipment

**Difficult to imitate research-oriented goods:**

SITC 57 Plastics in primary forms

SITC 71 Power generating machinery and equipment

SITC 72 Machinery specialised for particular industries

SITC 73 Metalworking machinery

SITC 74 General industrial machinery and equipment, nes, and parts of, nes

SITC 77 Electric machinery, apparatus and appliances, nes, and parts, nes

SITC 79 Other transport equipment

SITC 87 Professional, scientific, controlling instruments, nes, parts

SITC 88 Photographic equipment and supplies, optical goods, watches, etc

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# Capital Flows to Transition Economies: Implications for Investment

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## Abstract

At the beginning of the 1990's, transition countries started with trade liberalization, which, coupled with capital and financial integration paved the way for foreign capital inflows and outflows. The magnitude and sequence of this capital account liberalization was not the same throughout the transition countries. Two thirds of total capital inflows to transition countries (excluding the ex Soviet countries) concentrated in only three of them, the Czech Republic, Poland and Hungary. Capital inflows can have positive impacts on the developing (transition) countries. Most importantly, capital inflows can directly enhance economic growth by increasing level and efficiency of investments and through the development of the domestic financial sector. Access to foreign capital can also smooth consumption, improve risk management between domestic and foreign investors and deepen integration with international financial markets. This paper focuses on some of these positive effects. We analyze the implications of capital inflows into transition countries on domestic investment. For that purpose, we conducted regression analysis on panel data on a sample of 11 transition countries (Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, the Slovak Republic and Slovenia). We used the instrumental variables method, due to the endogenous nature of capital inflows. Our findings indicate a positive relation between capital inflows and the level of domestic investment. Other foreign investments (mainly foreign loans) have the highest impact on domestic investment. Foreign direct investments (FDI) have a positive and significant influence on domestic investment, while foreign portfolio investments have no significant impact on domestic investment activity.

**Keywords:** transition economies, capital inflows, domestic investment, panel data analysis

**JEL Classification:** C33, F21

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## Introduction

At the beginning of the 1990s, the countries of Central and Eastern Europe began the transition process from a centrally managed system toward a market economy. A large number of structural and institutional reforms occurred simultaneously, while the price and market liberalization substantially increased the openness of national economies. These processes of liberalization, in conjunction with the beginning of privatization, contributed the most to the foreign capital inflow in transition economies.

This paper analyzes the positive aspects of the inflows of foreign capital in transition economies with an emphasis on the relationship between foreign capital inflows and domestic investment activities in transition economies. The following hypothesis is put forth, stating that during the period of 1993-2002, in 11 of the selected Central and Eastern European countries foreign capital stimulated domestic investments (a "crowding in" effect). Moreover, the study then continues to analyze the impact of individual categories of foreign capital inflows including foreign direct investments, portfolio investments and other foreign investments, on domestic investments in transition economies.

This paper contains five parts. After the introduction, the first part gives a short methodological framework, which lists the basic categories of foreign investment. The second part shows the findings of other authors who analyzed the influence of foreign capital inflows on recipient countries. In the third and fourth part the emphasis is placed on transition economies. The development of international investments in these countries is shown first, followed by the results of the regression analysis testing the basic hypothesis. Concluding remarks as well as the list of references and appendices are given at the end.

## 1 Methodological Framework

An international flow of capital is formed when the resident of a country invests capital in another country by using different types of investments. Investments could be in the form of a loan to the resident of another country, the purchase of securities of a company or country, or a share in a non-residential company. From this definition it can be seen that there are several categories of international investments. According to IMF

definition, foreign investments can be divided into foreign direct investments, foreign portfolio investments and other foreign investments.<sup>1</sup>

All of the transactions within individual categories of international investments are recorded in the balance of payments, specifically in the financial account of the balance of payments. The rules of bookkeeping and methodology for the composition of the balance of payments for all their members are stipulated by the IMF. The balance of payments data are sourced from the International Financial Statistics - IFS.

## 2 Empirical Literature About the Foreign Capital Inflows in Developing Countries

The issue of international flows of capital is often explored in economic theory. A large number of textbooks and papers are concerned with the theoretical aspects of international capital transactions. The empirical literature covering this theme is, however, relatively small compared to the theoretical, but still sufficient for a useful analysis and study. If individual categories of international capital flows are taken, one can easily notice more theoretical as well as empirical literature on the topic of foreign direct investments, while the impact of the inflow of foreign portfolio investments and other foreign investments are significantly less explored. This provided additional motive for exploring the influence of all categories of international capital flows in this paper.

The inflow of capital in developing countries is also a broadly analyzed theme. Theoretical and empirical literature on the subject of capital flows in developing countries during the 90s can be grouped into 4 basic categories, according to subject. The first category deals with the *reasons for international capital transactions* in developing countries.<sup>2</sup> In these studies authors were trying to find out whether the expansion of foreign capital inflows in developing countries was relatively more influenced by external factors ("push") or internal factors ("pull"). Examples of external factors are the interest rates differential or the business cycles of the US and EU, while internal factors include the intensification of the privatization processes, implemented structural reforms or successful stabilization programs in some of the developing countries.

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<sup>1</sup> IMF (1993).

<sup>2</sup> For example, Calvo, Leiderman, Reinhart (1996). *Determinants of foreign direct investments in transition economies* are dealt by Resmini (2000). That study places an emphasis on foreign direct investments in individual sectors of the manufacturing industry.



The second group of studies examines the *challenges for the creators of economic policy* brought on by the inflow of foreign capital. One of the most commonly analyzed theme is the well known "trilema" (impossible trinity)<sup>3</sup>, according to which the countries in the conditions of free flows of capital must decide between fixing the foreign exchange rate and retaining the independence of monetary policy. A large part of the literature from this category deals with restrictions and controls of capital transactions.

The third group of studies is concerned with the *characteristics of individual categories of foreign investments*. By comparing individual categories of international capital flows, conclusions are drawn concerning the characteristics and differences between foreign direct investments, foreign portfolio investments, and other foreign investments.<sup>4</sup> Furthermore, these studies explore the historical development of individual categories of international capital.

Finally, the fourth group of theoretical and empirical literature deals with the *effects of capital flows on domestic economies*. Generally, this topic explores the relationship between the flows of foreign savings and the domestic aggregates, such as economic growth, exports, national savings and domestic investments.

This paper falls into the fourth category, as it examines the influence of foreign capital on domestic investments. It attempts to provide an answer to the question of whether foreign capital in selected transition economies stimulated domestic investment activity (a "crowding in" effect) or displaced it (a "crowding out" effect).

These issues in particular were analyzed in the study of Bosworth and Collins (1999). The authors examined the effect of foreign capital inflows and each individual category on savings and investments in developing countries. The principal conclusion of the analysis was that foreign capital inflows in 58 countries of Latin America, East Asia and Africa during the period 1978-1995 stimulated the growth of domestic investments but also decreased national savings. The result of this influence of foreign capital inflows was a growth in the current account deficit of the observed countries.

This general conclusion shelters the specifics of individual forms of foreign capital. Namely, different categories of inflows have different effects on the domestic economy.

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<sup>3</sup> *Obstfeld (1998)*.

<sup>4</sup> *For example Fernandez-Arias and Hausmann (2000) examine the stability of each individual category of international investments.*

According to the results of the analysis, foreign direct investments stimulate domestic investments and national savings, while the influence on the current account was negligible. Portfolio foreign investments stimulate domestic investments, while the estimated affect on national savings was very small with an insignificant coefficient. Finally, other foreign investments stimulate domestic investments and at the same time decreased national savings, thus presenting the largest influence on the current account deficit.

Mody and Murshid (2004) in their analysis followed up on the work of Bosworth and Collins. They also examined the relationship between total foreign capital inflows and domestic investments in developing countries. In contrast to the previous analysis, the authors expanded the observed period until 1999. The results of the analysis confirmed the thesis that domestic investments could be stimulated through foreign capital inflows.

The authors divided the period of observation into two periods, the eighties and the nineties of the 20<sup>th</sup> century, followed by additional analysis. In that way they sought to examine the relationship between domestic investments and foreign capital inflows separately during the two periods. Their main conclusion was that over time, the relationship weakened. In other words, in the nineties the effect of stimulating domestic investments through foreign capital inflows in developing countries was relatively smaller than in the eighties, although there was still a positive relationship between the variables.

One more study, which empirically analyzed the influence of foreign capital on the domestic economy, was the paper by Borensztein, De Gregorio and Lee (1998). This study examined the influence of foreign direct investments on economic growth and domestic investments in 69 developing countries during the seventies and the eighties of the 20<sup>th</sup> century.

The results of these analyses show that the flow of foreign direct investments in developing countries is an important mechanism for technology transfer, which has a relatively larger influence on economic growth rather than on domestic investment activity. The conclusion is that encouraging technological development, and therefore overall efficiency, is the primary channel through which foreign direct investment influences economic growth. The increasing accumulation of capital (investment) has an influence on economic growth, but that effect is relatively smaller than the increase in efficiency.

The paper by Krkoska from 2001 was the empirical contribution to the topic of foreign capital inflows and their implications on domestic economic activity in transition countries. The author analyzed the influence of foreign capital inflows on domestic investment activity in 25 transition economies in the period 1989-2000. In contrast to previous studies, in his analysis Krkoska included domestic and foreign sources of financing investments.

The basic conclusion of the analysis was that foreign direct investments in the observed transition economies on average stimulated domestic investment activity. A positive significant relationship was also noted between domestic investments and domestic loans. However, the coefficient for that variable was less significant than the coefficient for the variable foreign direct investment. A positive significant relationship was also found for bond issues and other securities from domestic firms. Neither the variable nor the result could be fully classified as foreign portfolio investments since the buyer of those securities could not be unambiguously identified. Investors in this case could be foreign or domestic. Foreign loans (the category of other investments) were shown to be insignificant in the model, although they showed a positive relationship with domestic investments.

### 3 Flows of Foreign Capital in Transition Economies

There are numerous advantages foreign capital flows usually bring with. In the case of developing countries, and therefore of transition economies, foreign capital flows can directly increase economic activity of the country. Two of the most common channels for stimulating economic activity are by increasing total domestic investments and by increasing the quality and efficiency of investments. Increasing the efficiency of domestic investments relates to the transfer of technological innovations, called “know-how”, generally a characteristic of foreign direct investments. Foreign capital flows can increase economic activity of the country through the spillover effect<sup>5</sup>, whereby increasing investments and efficiencies of one industry causes other industries and units to improve and innovate as well.

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<sup>5</sup>*Concerning the spillover effect and other benefits of developing countries from the inclusion in international financial flows see in Prasad et al. (2003).*

Foreign capital flows can stimulate the development of the country's domestic financial sector and its integration in the international financial markets. This case in particular emphasizes the spillover effect, since the financial sector is connected with all other sectors of an economy. The integration in the international capital markets and the flow of foreign capital upgrades the risk management system between foreign and domestic investors. The other positive impacts that foreign capital flows on the recipient country are consumption smoothing, the increase in specialization of the country and its comparative advantages.

The necessary precondition for achieving positive effects of foreign capital inflows in a developing country is optimal liberalization sequencing. This international financial integration is connected to four steps necessary if the maximum positive effects of foreign capital inflows are to be realized. First of all, it is necessary to reduce the fiscal deficit of the country to a sustainable level, followed by price and foreign market liberalization. Next step is to liberalize and deregulate (re-regulate) the financial institutions thereby strengthening them, and finally liberalizing the capital and the financial account of the balance of payments.<sup>6</sup>

The stated order is very logical. In developing countries, a fiscal imbalance is a typical source of instability for the whole economy. For that reason it is necessary to remove the sources of imbalances in the public sector. After that, the price and market liberalization should enable increases in the efficiency of the real sector, in a way that removes the risks of further accumulation of losses and insolvency. The liberalization and deregulation of the domestic financial sector allows an increase of the efficiency and transparency in accumulating and placing savings.

Transition economies attempted following the theoretical model of liberalization. However, the liberalization process demands adjustments over the long-term period. At the very beginning of transition, countries were faced with large falls in output (high negative rates of growth), unemployment growth, high inflation and lower rates of national savings. Furthermore, it is noteworthy that the equipment and production processes were obsolete and there were generally low capital stocks in the economy. In that situation the flows of foreign capital were desirable as an impetus for the recovery to begin. These are primarily the most important reasons why transition countries did not

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<sup>6</sup> *McKinnon (1991)*.

gradually, one after another, follow the above mentioned steps of liberalization, but the steps were conducted in parallel only partially, at varying speeds and intensities.

In the initial stages, the inflow of foreign capital into transition economies has strictly been related to the initiated processes of privatization and liberalization of the balance of payments capital and financial account. Further inflows of capital depended on the success of the transition and on the implementation of structural and institutional reforms. Some of the previously analyzed motives had a large influence on attracting foreign capital. Higher earnings on capital, higher rates of economic growth<sup>7</sup>, new markets and possibilities of further expansion, lower labor costs and others are among the most important motives.

Taken individually, not all transition countries simultaneously began with attracting foreign capital. Hungary was the first to begin with the liberalization of the capital and financial balance of payments and the first to engage foreign capital into its privatization process. Poland and the Czech Republic followed suit. The other transition economies were somewhat more cautious towards foreign capital. The first significant penetration of foreign capital in all observed transition economies occurred in 1993, thus justifying the decision to base the analyses in this study on the period of 1993 to date.

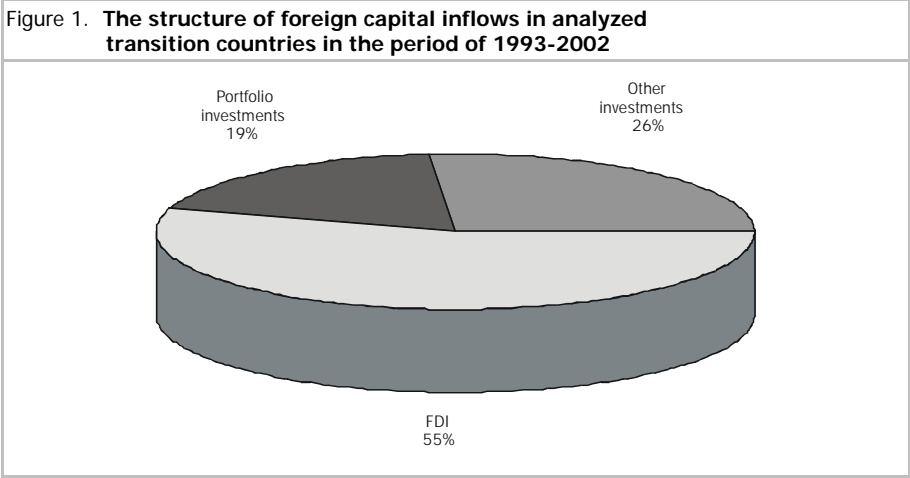
In the period of 1993-2002 in the selected transition economies it was recorded that total inflows of foreign capital were 236 billion USD. In the same time period outflows of capital amounted to 45 billion USD. The most often used form of foreign investments in transition economies was foreign direct investment, then other investments and finally portfolio investments (Figure 1).

The countries in focus were not only at the forefront according to the criteria of the first to attract foreign capital, but also according to the criteria of total inflows of foreign capital. Almost two thirds of total foreign capital was directed into those three countries (the Czech Republic 25%, Poland 23%, Hungary 14% - Figure 2). Poland was at the forefront in attracting foreign direct investments, Hungary in attracting foreign portfolio investments, while the Czech Republic lead in the category of other foreign investments. The order changes if the inflows of foreign capital are analyzed in per capita terms or as a percentage of country's gross domestic product. In this case, the most successful

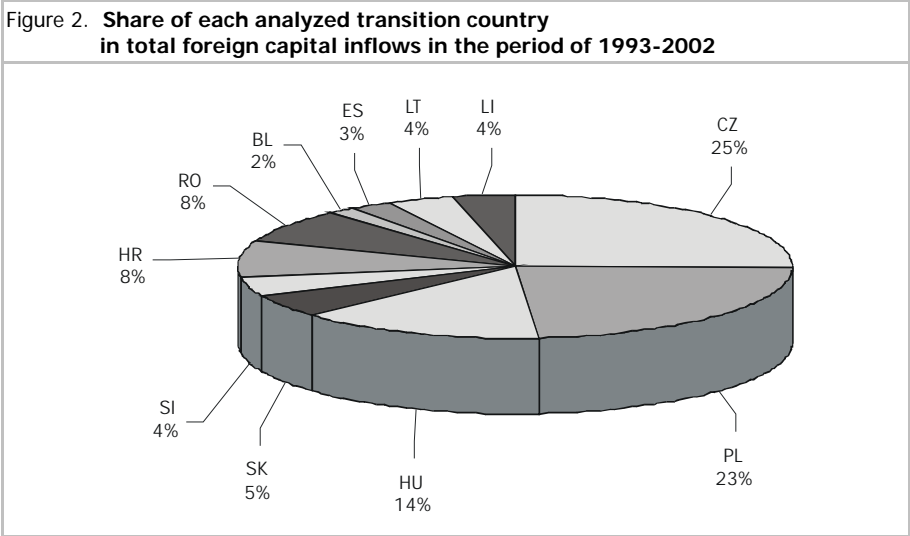
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<sup>7</sup> In the period 1993-2002 11 of the selected transition economies grew on average at a rate of 3.6 percent, while in the period 1995-2002 the rate of growth of the EU 15 was 2.2 percent.

country is the Czech Republic, followed by the smaller economies of Estonia, Slovenia, Latvia and Croatia (see Appendix 1, Table 3 and 4).



Source: IFS, authors' calculations.



Source: IFS, authors' calculations.

## 4 The Analysis of the Influence of Foreign Capital Inflows on Domestic Investments of the Transition Economies

Two separate estimations of the regression equation are made in this analysis. The first estimation is the relationship of total foreign capital inflows to domestic investments in transition economies, while the second examines the impacts of each individual category of total foreign capital inflows on domestic investments. Domestic investments (*INV*) are defined as the function of foreign capital inflows (*FORCAP*) and the rate of economic growth (*GDP*), and as a function of individual categories of foreign capital (*FDI*, *PORT*, *OTH*) and the rate of economic growth.

$$INV = f (FORCAP, GDP),$$

$$INV = f (FDI, PORT, OTH, GDP).$$

The analysis uses panel data of 11 transition economies during a 10-year period (1993-2002). The advantage of using panel analysis stems from the fact that such data is more oriented toward the observed units, rather than towards the observed time. It is stated that panel data is wide and short, meaning that a sufficient number of observed units are sampled while the observation time does not necessarily need to be long. Actually, the whole transition period is quite short, justifying the argument for using panel data analysis instead of time series analysis. Panel data allowed control of the country-specific effects (fixed effects)<sup>8</sup> when estimating the relationship between domestic investments and capital inflows. Fixed effects approach was used in this analysis since it captures specific characteristics of each individual transition country.

It should be taken into consideration that the limiting factor when analyzing transition economies is the availability of data. This is another reason why the analysis in this work was conducted for the period from 1993 onward, as new methodology for the calculation of the balance of payment was used from that point on.

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<sup>8</sup> Concerning panel data models and fixed effects approach see in Greene (2000).

#### 4.1 Influence of Total Foreign Capital Inflows on Domestic Investments

The regression equation of the analysis of the influence of total foreign capital inflows on domestic investments in transition economies in the period of 1993-2002 is the following

$$INV_{i,t} = \alpha_i + \beta_1 FORCAP_{i,t-1} + \beta_2 GDP_{i,t-1} + \varepsilon_{i,t}, i = 1, \dots, 11, t = 1, \dots, 10$$

where are:

$INV_{i,t}$  domestic investments of country  $i$  in year  $t$ , calculated as the share of gross fixed capital formation in gross domestic product, all in current prices,

$FORCAP_{i,t}$  total inflows of foreign capital in transition economy  $i$  in year  $t$  calculated as the share in gross domestic product,

$GDP_{i,t}$  the rate of growth of real gross domestic product of country  $i$  in year  $t$ .

When analyzing the influence of foreign capital inflows on domestic investments, it should be noted that a large part of foreign capital was probably attracted by successfully implemented or announced investment projects in transition economies. In that case the model would indicate the presence of endogeneity. This means that the model analyzes the dependence of the dependent variable on one or more independent variables. However, another model could be constructed wherein one of the independent variables from the initial model could be explained using the dependent variable from the initial model. In our case, another model could be constructed to analyze the influence of domestic investments on foreign capital inflows. Endogeneity in the model violates the basic assumptions of regression analysis, which is the absence of correlation between one or more independent variables and residuals.

Endogeneity in the model may lead to biased coefficient estimation. However the direction of this bias is unclear. For example, some measure of domestic economic policy can influence the increase of earnings on capital. Foreign investors will very quickly recognize the opportunity for realizing higher earnings on their investment, so there will be an increase in the inflow of foreign capital into that country. On the other hand, the increased earnings on invested assets will also help stimulating domestic



investments. In this way, a domestic factor (an instrument of monetary policy for example) influences the increase of investments as well as foreign capital inflows. This would tend to bias the coefficient on capital inflows in the investment equation upward. There could also be another situation in which domestic policy change increases the interest rate in a country. According to the classical theory of investment higher interest rates would mean decreasing investments. But, foreign investors would increase their investments with the aim of realizing higher interest rates, and therefore capital inflows would increase. This situation would also bias the regression coefficient, but this time downwards.

Therefore, at the very beginning of our analysis, it is important to examine the issue of endogeneity in the model. Endogeneity in the model is tested using Hausman's test. This test simultaneously examines and justifies the use of the method of instrumental variables as possible solution for endogeneity issue. The choice of instrumental variables is extremely important. The basic idea is to find a group of variables (instrumental variables) which are simultaneously correlated with "suspect" independent variable in the regression equation and uncorrelated with the residuals.

Instrumental variables are used enabling the removal of the correlation between independent variables and residuals. In the model, that would mean choosing and incorporating instrumental variables that would isolate external factors of foreign capital inflows in transition economies from the internal ones. In that way, it would be possible to carry out an analysis of the influence of foreign capital inflows, as exogenous variables, on domestic investment activity.

In the case of the analysis of foreign capital inflows on domestic investments of transition economies, instrumental variables can be divided into two groups. One would consist of instrumental variables that are the same for all countries, while the other would consist of those which were country specific.

The first group of variables is exclusively related to external factors of foreign capital inflows in transition economies. Since transition economies mostly rely on the European Union as the main source of foreign capital, instrumental variables from the first group are the rate of growth of real gross domestic product (*EUGDP*) and the real interest rate (*EUIR*) of the European Union. Both instrumental variables in the model have a time lag of one year ( $t-1$ ). Instrumental variables from the second group are the share of foreign debt in gross domestic product of transition economies (*FDEBT*) with a time lag of one

year, and domestic investment (*INV*). This last variable (*INV*) is actually a dependent variable in the model, with a time lag of one year (*t-1*).

Hausman's test was conducted according to the adjustable version, which was created by Davidson and MacKinnon<sup>9</sup>, and it contains two steps or two phases. After the initial model is formulated, the analysis conducted<sup>10</sup>, and the existence of endogeneity is assumed, then testing can begin. The first phase of the test is conducted according to what is called the auxiliary regression analysis, in which the "suspect" variable from the first model, total foreign capital inflows (*FORCAP*), is taken as the dependent variable. This means that the independent variable that is a potential cause of endogeneity in the first model becomes a dependent variable. The independent variables chosen are the remaining independent variables, the dependent variables with the time lag, and all of the instrumental variables from the initial model. The estimated coefficients have no meaningful economic interpretation. The only important result from the auxiliary regression is the residuals, which is named as a new variable (*RESID*). This new variable is then used in the second step of the analysis. See Appendix 2, Table 6.

The second phase of Hausman's test returns to the first regression model and it is supplemented with the new independent variable *RESID*. In this step, the primary interest is the obtained regression coefficient on the variable *RESID*. If the regression coefficient is significantly different from zero, the null hypothesis that both methods of analysis (with and without instrumental variables) were consistent can be rejected. This would prove the presence of endogeneity in the model and justify the use of instrumental variables. On the other hand if the regression coefficient on the variable *RESID* is not significantly different from zero then the null hypothesis is accepted, whereby it would not be important whether instrumental variables were included or not. The results of the second phase of Hausman's test are shown in Appendix 2, Table 7.

The regression coefficient on the variable *RESID* was found to be significantly different from zero, meaning that the null hypothesis could be rejected and the alternative hypothesis was accepted ( $p = 0.032$ ,  $t = 2.18$ ). In short, this means that the endogeneity in the model was proved and the use of the selected instrumental variables in the model was justified.

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<sup>9</sup> Davidson, MacKinnon (1993).

<sup>10</sup> The results of the dependence of domestic investments on foreign capital inflows, without using instrumental variables, are shown in Appendix 2., Table 5.

After having conducted Hausman’s test for endogeneity and including instrumental variables in the model, regression was run again. Because of the instrumental variables, we run two-stage least squares method of estimation (TSLS). The regression analysis results are presented in Table 1. Results confirm the initial hypothesis, which stipulated that foreign capital inflows in selected transition economies during the period of 1993-2002 on average stimulated domestic investments.

Table 1. <b>Analysis of the influence of foreign capital inflows on domestic investments of transition economies</b>				
Dependent Variable: INV				
Estimation Method: Two-Stage Least Squares				
Instrumental Variables: EUIR (-1), EUGDP (-1), FDEBT (-1), INV (-1)				
Sample: 1994-2002				
Included Observations: 11				
Total System (Unbalanced) Observations: 92				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
FORCAP (-1)	0.308743	0.066080	4.672291	0.0000
GDP (-1)	0.260668	0.075217	3.465548	0.0009
Fixed Effects				
_HR—C	17.49704	0.954777	18.32579	0.0000
_BL—C	13.91218	0.747645	18.60801	0.0000
_CZ—C	24.48876	1.140708	21.46803	0.0000
_ES—C	21.19468	1.279804	16.56088	0.0000
_LT—C	18.11732	1.317310	13.75327	0.0000
_LI—C	18.18900	1.013421	17.94813	0.0000
_HU—C	18.85851	0.933033	20.21206	0.0000
_PL—C	19.29800	0.828685	23.28750	0.0000
_RO—C	18.59037	0.881963	21.07840	0.0000
_SK—C	27.04722	0.964628	28.03901	0.0000
_SI—C	21.29432	0.876734	24.28825	0.0000

The formal interpretation of the regression coefficient is that during the observed period an increase of the share of foreign capital inflows in GDP by 1 percentage point, on average, caused an increase in the share of domestic investments in GDP by 0.31 percentage points. Empirical *t* statistics for the coefficient on the variable total foreign capital inflows (*FORCAP*) variable is 4.67, what proves its significance in the model. The regression coefficient on the *FORCAP* is somewhat lower than that from the study by Bosworth, Collins (0.52). However, it should be reemphasized that the two analyses differ in terms of the sample countries used and the observation periods.

Furthermore, it is also useful to compare the above results with the results of the analysis when the method of instrumental variables is not used (Appendix 2, Table 5). Analysis

without instrumental variables also confirms the initial hypothesis of a "crowding in" effect. However, the values of the regression coefficients were lower. The regression coefficient on the variable *FORCAP* was 0.21, with empirical *t* statistics 3.91. Thus, by using instrumental variables, the problem of endogeneity in the model is solved, and the results were shown to be improved.

The real rate of growth (*GDP*) was also shown to be significant in the model ( $t = 3.47$ ). The regression coefficient tells us that on average the real growth of 1 percentage point leads to an increase of the share of domestic investments in GDP by one quarter of a percentage point (0.26).

## 4.2 Influence of Different Categories of Foreign Capital Inflows on Domestic Investments

So far we have analyzed influence of total foreign capital inflow on domestic investments. In this part we conducted additional regression analysis in order to identify the influence of each individual category of foreign capital inflow on domestic investments. The regression equation of the analysis of inflows of each individual category of foreign capital on domestic investment is the following:

$$INV_{i,t} = \alpha_i + \beta_1 FDI_{i,t-1} + \beta_2 PORT_{i,t-1} + \beta_3 OTH_{i,t-1} + \beta_4 GDP_{i,t-1} + \varepsilon_{i,t}, i = 1, \dots, 11, t = 1, \dots, 10$$

where are:

$INV_{i,t}$  domestic investments of country *i* in year *t*, calculated as the share of gross fixed capital formation in gross domestic product, all in current prices,

$FDI_{i,t}$  total inflows of foreign direct investments in transition economy *i* in year *t*, expressed in its share in gross domestic product,

$PORT_{i,t}$  total inflows of foreign portfolio investments in transition economy *i* in year *t* expressed in its share in gross domestic product,

$OTH_{i,t}$  total inflows of other foreign investments in transition country *i* in year *t*, expressed in its share in gross domestic product,

$GDP_{i,t}$  the rate of growth of real gross domestic product of country *i* in year *t*.

Before the analysis we again conducted the Hausman's test. It is possible to test one potentially "suspect" variable at the time, so three tests of that kind were performed (for each category of foreign capital inflow). Endogeneity was confirmed for variable other foreign investments (*OTH*). This was enough justification for the inclusion of the instrumental variables in the initial model.

After including the same set of instrumental variables as before (EUGDP, EUIR, FDEBT, INV) with time lag (t-1) we run regression analysis again. Regression results are presented in Table 2.

Table 2. Analysis of the influence of inflows of individual categories of foreign capital on domestic investments of transition countries				
Dependent Variable: INV				
Estimation Method: Two-Stage Least Squares				
Instrumental Variables: EUIR (-1), EUGDP (-1), FDEBT (-1), INV (-1)				
Sample: 1994-2002				
Included Observations: 11				
Total System (Unbalanced) Observations: 87				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDI (-1)	0.237046	0.115399	2.054154	0.0436
PORT (-1)	0.036910	0.143349	0.257484	0.7975
OTH (-1)	0.332138	0.076085	4.365352	0.0000
GDP (-1)	0.223633	0.070308	3.180751	0.0022
Fixed Effects				
_HR—C	18.28117	0.923573	19.79397	0.0000
_BL—C	14.33630	0.846916	16.92766	0.0000
_CZ—C	25.42874	1.139756	22.31069	0.0000
_ES—C	22.31436	1.327936	16.80380	0.0000
_LT—C	19.51431	1.386926	14.07018	0.0000
_LI—C	18.88265	0.969923	19.46820	0.0000
_HU—C	20.21099	1.000004	20.21091	0.0000
_PL—C	20.39696	0.946891	21.54099	0.0000
_RO—C	18.86571	0.855319	22.05694	0.0000
_SK—C	27.92090	0.914634	30.52685	0.0000
_SI—C	22.13418	0.863811	25.62385	0.0000

According to the results variable with the most significant *t* statistics was other foreign investments (*OTH*),  $t = 4.37$ . Regression coefficient (0.33) tells us that on average one third of the inflows of other foreign investments were used in stimulating the domestic investment activities.

Taking into consideration the results of other empirical studies, a somewhat disappointing and unexpected result was the regression coefficient on the variable foreign direct investments (*FDI*). Foreign direct investments during the observed period also stimulated domestic investments of selected transition countries (0.24), but in the model they were only significant at the 5% level ( $p = 0.044$ ,  $t = 2.05$ ).

The results about the effect of portfolio investments were expected, especially considering the results of other empirical studies. Portfolio investments (*PORT*) had a small but positive relationship with domestic investments. This variable was shown to be insignificant in the model ( $p = 0.798$ ,  $t = 0.26$ ), but was kept, so that the differences between the individual categories of foreign capital could be observed. Variable real economic growth (*GDP*) is shown to be significant in this model as well as in the first analysis dealing with total capital inflows. Regression coefficient (0.22) and the empirical t statistics ( $t = 3.18$ ) are negligibly lower in comparison with the analysis of total capital inflows on domestic investments.

## 5 Conclusion

Transition countries beginning their processes of liberalization and privatization opened their doors to foreign capital inflows. In the 11 observed countries during the 10-year period from 1993 to 2002, the recorded annual inflow of foreign capital was approximately 23 billion USD. Two thirds of total foreign capital inflows were directed into only three countries, the Czech Republic, Poland and Hungary. The dominant category of foreign investments was foreign direct investments.

Out of numerous advantages that foreign capital can bring to recipient countries, this paper analyzes the impact of foreign capital on domestic investments.

The analysis uses panel data of 11 transition economies during a 10-year period (1993-2002). Fixed effects approach was used in this panel data analysis since it captures specific characteristics of each individual transition country. Two-stage least squares method was used since the Hausman's test detected the presence of endogeneity.

According to the result of the regression analysis the initial hypothesis is confirmed. It states that foreign capital inflows in transition economies have stimulated domestic investment activity. On average in all of the analyzed countries an increase of the share

of foreign capital inflows in GDP by 1 percentage point increased the share of domestic investments in GDP by 0.31 percentage points.

The regression analysis confirmed expected differences between the influences of each individual category of foreign capital inflows. According to the model, variable other foreign investments (0.33) demonstrated the most powerful relationship with variable domestic investments ( $p = 0.000$ ,  $t = 4.37$ ). Although in total, the most represented category of foreign capital, variable foreign direct investments (0.24) in the model was found to be significant only at 5% level of significance ( $p = 0.044$ ,  $t = 2.05$ ). The variable portfolio investments turned out not to be significant in the model ( $p = 0.798$ ,  $t = 0.26$ ) as numerous research confirmed before. That means that foreign portfolio investment transactions do not have a significant influence on domestic investment activity.

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## Appendix 1. Capital inflows in transition economies

	<b>FDI</b>	<b>Portfolio investments</b>	<b>Other investments</b>	<b>Total capital inflows</b>
Croatia	167	82	188	438
Bulgaria	55	-6	-1	49
Czech Rep.	289	100	256	648
Estonia	223	76	173	472
Hungary	216	143	18	334
Latvia	125	19	228	373
Lithuania	102	45	101	246
Poland	130	27	1	158
Romania	39	6	35	79
Slovak Rep.	98	75	121	293
Slovenia	187	92	240	518

Source: IFS, authors' calculations.

	<b>FDI</b>	<b>Portfolio investments</b>	<b>Other investments</b>	<b>Total capital inflows</b>
Croatia	3.8	1.8	4.0	9.6
Bulgaria	3.6	-0.3	-0.3	2.9
Czech Rep.	5.6	2.2	5.7	13.5
Estonia	7.6	2.3	6.3	16.2
Hungary	4.8	3.2	0.3	7.5
Latvia	5.2	0.6	9.6	15.5
Lithuania	3.4	1.5	4.7	9.5
Poland	3.4	0.7	-0.3	3.7
Romania	2.3	0.3	2.2	4.8
Slovak Rep.	2.7	2.2	3.3	8.3
Slovenia	2.0	1.1	2.7	5.8
Total	3.5	1.3	1.7	6.5

Source: IFS, authors' calculations.

## Appendix 2. Hausman's test of endogeneity

<b>Table 5. Analysis of the influence of foreign capital inflows on domestic investments of transition economies (without instrumental variables)</b>				
Dependent Variable: INV				
Estimation Method: Pooled Least Squares				
Sample: 1994-2002				
Included Observations: 11				
Total System (Unbalanced) Observations: 95				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
FORCAP (-1)	0.207822	0.053105	3.913454	0.0002
GDP (-1)	0.245716	0.065969	3.724742	0.0004
Fixed Effects				
_HR—C	18.48913			
_BL—C	14.18714			
_CZ—C	25.88388			
_ES—C	22.87349			
_LT—C	18.45770			
_LI—C	19.93525			
_HU—C	19.79283			
_PL—C	19.74979			
_RO—C	19.09083			
_SK—C	27.94586			
_SI—C	21.86833			
R Squared	0.801022	S. E. of regression		2.394037
Adjusted R Squared	0.771903	F-Statistic		330.1054

<b>Table 6. The first phase of Hausman's test of endogeneity in the model of the influence of total foreign capital inflows on domestic investments of transition economies</b>				
Dependent Variable: FORCAP				
Estimation Method: Pooled Least Squares				
Sample: 1994-2002				
Included Observations: 11				
Total System (Unbalanced) Observations: 91				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
FORCAP (-1)	0.084188	0.103979	0.809664	0.4207
GDP (-1)	0.126043	0.100451	1.254762	0.2135
INV (-1)	0.117813	0.212435	0.554583	0.5809
EUIR (-1)	-0.629149	0.310327	-2.027375	0.0462
EUGDP(-1)	0.115032	0.530632	0.216782	0.8290
FDEBT (-1)	-0.116194	0.038437	-3.022992	0.0034

**Table 7. The second phase of Hausman's test of endogeneity**

Dependent Variable: INV				
Estimation Method: Pooled Least Squares				
Sample: 1994-2002				
Included Observations: 11				
Total System (Unbalanced) Observations: 91				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
FORCAP (-1)	0.224811	0.048165	4.667543	0.0000
GDP (-1)	0.274777	0.063637	4.317854	0.0000
<b>RESID</b>	<b>0.117053</b>	<b>0.053668</b>	<b>2.181080</b>	<b>0.0322</b>

# **Innovation Management**

# Central and Eastern Europe in the EU Innovation System: Asset or Liability?

Slavo Radošević\*

## Abstract

During the 1990s the new EU member and candidate countries have experienced deep structural changes. These ranged from transformation in sectoral and industrial structure to changes in economic system. The issue is whether these changes have been sufficient to ensure catch-up in a period in which growth increasingly depends on the generation, use and diffusion of knowledge? Also, for the enlarged EU the emerging concern is whether the new member states (NMS) from central and eastern Europe (CEE) will be asset or liability in its objective to increase rate of productivity growth and base it on intensification of knowledge based activities. In a knowledge-based economy, growth depends essentially on a strong S&T system or the 'narrow NSI' and how that system is embedded within the wider economy.<sup>1</sup> This chapter aims to give a broader introduction into the issues of S&T, innovation and growth in CEECs. In the next section, we briefly review the role of S&T and innovation in growth of the CEECs during the transition period and we assess the effects of transition on restructuring of R&D system. In second part, we assess current innovation policies of the CEECs. Finally, we highlight the key issues that are important in future role of S&T and innovation in the CEECs, especially in view of Europeanization of S&T in these countries. Our conclusion is that a) we will see differentiation in the role of S&T and innovation in growth of individual CEECs, b) this role will be strongly shaped by the way CEECc countries managed the process of Europeanization of their R&D and innovation systems.

**Keywords:** innovation system, innovation policies, S&T system, Central and Eastern Europe

**JEL Classification:** O31, O38

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<sup>1</sup> *The NSI in a narrow sense embraces those institutions which are directly involved in R&D and the dissemination of the results of R&D. The NSI in a broad sense points out that the way in which enterprises conduct innovation is not simply a matter of R&D but is also dependent on the way in which markets operate and production is organised as well as on the legal and cultural norms of society (Freeman, 2005).*

# 1 S&T and Innovation in Growth of the CEECs During the Transition Period: Outcomes

Technology was not the major force driving recovery and growth in the CEECs during the 1990s (Havrylyshyn, 2001). First, research shows that recovery and growth have been unrelated to domestic technology and R&D. The sources of growth in CEECs have not so far been directly linked to R&D but to the acquisition of knowledge in the production process and through different forms of firm-based learning (Dyker and Radošević, 1999). The main capability acquired during this period has been production capability or the capability to produce in accordance with the standards of efficiency and quality required in export markets. The technology capability or the ability to generate change seems to be much less significant in explaining growth of these economies. Secondly, there has been significant productivity growth but little technological development, except in sectors with high levels of FDI. Given the abundance of idle capacity and the considerable potential for efficiency gains, the expansion of output during the transformation has been based mainly on non-investment sources of growth. As the Polish case shows, early expansion coupled with structural shifts and a decline in employment is likely to have been caused by unprecedented efficiency gains (Zukowski, 1998).

As Freeman (2005) points out, the crucial weakness of the narrow NSI under socialism was the failure to develop R&D at enterprise level. The post-socialist transformation of industry has not rectified this inherited problem. Examination of the restructuring process in six industrial sectors in CEECs shows that this restructuring did not involve domestic R&D (Bitzer and Hirschhausen, 1998). Big increases in productivity have not led to increased demand for local R&D. As innovation surveys shows imported technology, primary equipment, was the key mechanism of technology accumulation. In-house R&D departments were drastically cut back while the industrial institutes were not integrated into large enterprises. The 1990s were years of stagnation and the erosion of R&D capacities.

The major effects of transition on restructuring of R&D systems have been:

- Initially very strong downsizing of R&D funding and employment which was followed by stabilization since mid-1990s and then by recovery of R&D by the end of the 1990s and early 2000 (see evidence in this Report). During the 2000s there is emerging differentiation across countries in terms of relative R&D expenditures and employment.



- The overall reduction of gross expenditures for R&D has been accompanied by limited structural changes in R&D system in terms of shares of business, government and university R&D. Nevertheless, there have been gradual and varying increases in shares of university R&D and decreased role of Academy of Sciences.
- Among institutional sectors the sharpest decline in funding has been in sector of industrial R&D. Higher Education Sector experienced the lowest cutback while sector of industrial R&D has experienced the biggest. Industrial R&D has suffered the greatest absolute and in most countries also relative losses. Enterprise R&D has declined with break up of large enterprises, except in Hungary and Slovenia.
- There has been limited integration of industrial R&D organisations into manufacturing enterprises. There has been decline in revenues from contracts with industry and the shift towards academic research and relative share of applied research on average has declined.
- At levels of independent research institutes there has been reorientation towards non-R&D activities including standardization, testing, measurement, etc. This led to hybridisation of industrial R&D organisations. By this we mean that they operate as public funded R&D organisations as well as commercial organisations operating on market, especially in Romania and Poland. However, their R&D activities are too extensive for them to survive as private firm in a market economy without public subsidies and their commercial activities are now too significant for them to be considered solely as research centres (Kozłowski, 2004). In that respect, they are incoherent and transitory forms which do not further R&D capacity of economy;
- Introduction of competition principle in R&D systems varies across countries while diversification of funding has been driven by increasing sources from abroad. This has been accompanied by increasing internationalisation of R&D systems through increasing share of international co-publications.
- University education has expanded during the 1990s as returns to education have increased and unemployment of this category declined. However, all systems have difficulties to ensure quality and high education standards.
- Domestic and foreign patenting has significantly declined reflecting technology gap as well as changing focus of enterprises towards acquisition of imported technology. The structure of resident patenting has been changed reflecting past specialisation in mechanical technologies. Also, scientific specialisation has remained basically unchanged and highly specialised in areas around math, physics and chemistry. There has been modest shift towards life sciences.

- Structural analysis of manufacturing exports shows that Central European countries have become specialised in low value added segments of nominally high tech sectors while Eastern Europe (Romania and Bulgaria as well as Baltic states) are specialised around low tech sectors.

## 2 Assessing Current Innovation Policies of the CEECs

Although some of trends outlined in section 1 have not been very favourable, our comparative analysis of innovation capacities of the CEECs within the enlarged EU show that there is not 'East – West' division in terms of innovation capacities (see Radošević, 2004). Our analysis which is based on 25 indicators goes beyond R&D indicators and thus gives a broader picture of innovation capacities by focusing on indicators of absorptive capacity, knowledge generation, knowledge diffusion and demand for technology. Based on this broader conceptualisation of innovation we see the emergence of three-tier Europe. By this we mean that developed countries of central Europe (Slovenia, Estonia, Czech R., Hungary) are faring relatively well in terms of innovation capacities and are closer to the 'middle level' group of the EU than to the less developed CEECs (Romania, Bulgaria, Latvia, Lithuania, Slovakia). Also, EU15 is divergent in terms of innovation capacities so that we can distinguish between high tech Europe (Nordic countries, UK), medium level Europe (France, Germany, etc.) and less developed EU15 with Greece, Portugal and Spain. Less developed EU15 and less developed CEECs are closer to each other than to other groups of countries.

However, innovation capacities do not necessarily translate into growth and productivity. Nevertheless, the level of development of innovation policy is an important ingredient of potential growth and it is essential to evaluate whether innovation policies of the NMS from the CEE are up to the challenge that these countries faced with.

Analysis of current innovation policies of the CEECs shows several common features<sup>2</sup>:

- All CEECs policies aim to increase R&D/GDP under the influence of so called Barcelona target. However, they differ with respect to the levels of 'back-up' i.e. instruments which could ensure this objective.

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<sup>2</sup> Based on author's participation in the EC Trendchart project.

- All CEECs have made improvements though of very different degrees in their research policies. In particular, this applies to evaluation and selection mechanisms and administrative procedures.
- Since 1999, CEECs have 'discovered' of innovation policy be it in rhetorical terms (strategies) or in real policy instruments' terms. We can observe in all countries gradual process of awareness raising in this respect.
- None of the CEECs has in place systematic evaluation and monitoring practices in innovation policy. So, they all share strong 'evaluation gap' which is largely the result of low level of innovation management skills at academia and low level of administrative skills to run/monitor RTDI schemes in governmental agencies'.
- A current focus of these policies is on how to couple Structural Funds with objectives in innovation policy and how to improve coherence of innovation policies through implementation of Structural Funds.

However, there are also important differences across these countries' innovation policies. First, different countries face different challenges in terms of coherence and coordination with other policies. Hungary and Slovenia are the most aware of this challenge and are searching for their own solutions. In other countries, we observe improved R&D policy but there is further need to develop instruments of innovation policy (Czech R., Poland, Slovakia, Estonia). In other countries, there is a great need to develop both, R&D and innovation policy (Bulgaria, Romania, Latvia, Lithuania). Second, there are big differences across countries in terms of transnational learning i.e. actual schemes which are modelled or transferred from abroad. In this respect, we can distinguish between 'active learners' (Slovenia, Hungary, Estonia) and 'passive learners' (Romania, Bulgaria, Poland, Czech R., Slovakia, Latvia, Lithuania). Third, there is a gradual shift and big country differences in terms of the extent to which the innovation policy measures are focused on: promotion of R&D in the business sector or on research component (most of the CEECs). Only in Hungary and Slovenia we come across more direct innovation-focused measures. Finally, there are big differences among the CEECs in terms of maturity of innovation policy. Some CEECs are very often transferring mechanically 'the best practice' from abroad while only some of them (Hungary and Slovenia) have been spotting local deficiencies and have been adjusting the instruments accordingly.

### 3 Europeanization and Future of S&T in CEE<sup>3</sup>

The next 10-30 years of this century will be marked by increasing divergences in the S&T systems among CEECs, whose main driving forces will come from differences in 'broad NSI' but also from impacts on S&T systems in CEECs which we describe as the Europeanization of their S&T systems. Differences in 'broad NSI' will affect the main feature of their S&T system. In those CEECs that will see recovery and high growth rates, a revival of domestic demand for R&D and a strengthening of in-house R&D are to be expected. This may lead to substantial institutional transformation in S&T systems, which will be organized around enterprises' innovation activities. In countries with sluggish growth rates or stop-go growth, further marginalization of domestic R&D for domestic innovative activities is to be expected. This may be the case where additional EU funding may actually deepen the gaps between international pockets of excellence in R&D and domestic innovation activities.

In S&T, Europeanization means that the dynamics of EC research, technology and development (RTD) policy is likely to become part of the organizational logic of national S&T and innovation policies. CEECs have already become part of that dynamic as a result of pre-accession activities. In that respect, Europeanization can be seen as a major component of the forces driving the restructuring of their R&D systems. We assume that Europeanization will strengthen the restructuring component of their S&T systems and that, as a result, S&T systems in the CEECs may diverge further from each other. However, it is difficult to predict whether Europeanization by itself can solve the key weakness of their S&T system, which is the low level of demand for domestic R&D.

The studies carried out on innovation policy in the thirteen candidate countries concluded that none of the CCs could be considered to have a fully-fledged innovation policy (EC, 2002, 2003). EU accession is likely to push CEECs into developing innovation policy, including regional innovation policies, as one of the preconditions for the effective use of structural funds. Research and technology policy is likely to be expanded and modeled on EU arrangements and to be extended towards downstream activities such as knowledge diffusion, in particular through support for regional innovation policy. In R&D, EU support through Framework Programs will establish criteria of international excellence which will operate as reference points for the restructuring of domestic R&D groups and organizations. For example, EU support for

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*This section is based on Radošević (2004).*

centers of excellence, which is already being followed by domestic networking and selection, has this effect.

Europeanization can be expected to weaken the power of the central state in S&T policy and will enhance the power of regions in big CEECs like Poland and Romania. It will strengthen the innovation community, encourage new social associations and interest groups to participate in the process of developing RTD and structural policy to be supported by the EU. To judge from the Greek experience, it is likely that the policymaking process will become less bureaucratic and more transparent.

Whether all CEECs will exploit the opportunities created by Europeanization to modernize their S&T systems and integrate them into EU-wide S&T activities will depend on a variety of local factors. In some cases, Europeanization will elicit only passive responses or nominal conformance, with considerable derogation in practice. However, given the considerable opportunities that EU accession opens up for the CEECs, Europeanization can be expected to be the main instrument of modernization for CEECs. For this to be realized, Europeanization will have to involve not only top-down change but also bottom-up responses and strategies developed by firms, R&D organizations and regions. In S&T, Europeanization is already being perceived as modernization. S&T administrators from the CEE can now travel, exchange experiences and familiarize themselves with current developments in S&T and innovation policy in the EU. The domestic S&T policy community, like their counterparts in the southern EU countries, is likely to internalize the logic, norms, behavior and culture associated with integration (Featherstone and Kazamais, 2001, p. 17). However, whether we will see real or surrogate modernization of S&T systems through Europeanization will depend to a great extent on the structure and the role of national political elites as well as on the involvement of civil society in Europeanization.

We must be aware that Europeanization has limits and ambiguities. As the dynamic of EU RTD becomes part of the logic of national S&T policymaking, it is likely to impact strongly on the definition of policy priorities and may lead to the mechanical transfer of policy models that may not be the most relevant for the CEECs.

Experience of Europeanization in the southern EU countries shows that the strongest effects were on the definition of the relevant policy actions and mechanisms and of national priorities. In the case of the CEECs, this will be compounded by the great importance of funding streams from Framework Programs and, in future, structural

funds. This is likely to lead to a sort of myopia, in which the importance of local problems and the search for local solutions is downgraded. The autonomy of CEECs in S&T policy may remain a theoretical possibility only, since in practice the EU may exert considerable influence over goals, cost allocation and the resource mobilization.

The automatic transfer of EU policy mechanisms may often be irrelevant to local S&T or not constitute the most effective policy actions. For example, the transfer of the science park model without regard for local demand makes such programs highly dependent on foreign funding and barely sustainable. The transfer of policy models to support domestic clusters in conditions where there are no strong domestic organizations that can operate as 'network organizers' or in whose interest it is to develop linkages usually has limited effects, if any at all. While Europeanization will enhance and legitimize the innovation community, this may at the same time become just one more layer of bureaucracy or civil society without domestic roots, which are than perceived as alien to the domestic S&T community. Although we are quite optimistic regarding the positive effects of Europeanization on S&T in CEECs, this by itself is no panacea but rather a great opportunity for CEE CCs to modernize their S&T systems and integrate them into the emerging EU-wide innovation system.

## 4 Conclusions

The 'narrow' NSIs in CEECs are undergoing extensive functional, organizational and financial restructuring (see Meske, 2004 for evidence). However, despite these changes, the key weakness of the CEEC's S&T systems remains the failure to develop enterprise R&D. The weaknesses in 'narrow' NSI will become visible through inadequate in-house R&D, weak university - industry links and a lack of technological co-operation among enterprises. In order to grow, these economies will have to generate their own innovation dynamics in order to complement imported technologies. These innovation dynamics will have to be driven by local enterprises committed to R&D and innovation.

'Narrow' NSI cannot be ignored if CEECs are to continue to grow and restructure. It may be possible for a limited period, as was the case during the transformational crisis of the 1990s. However, it is unlikely that CEECs can continue their industrial upgrading without restructuring their 'narrow' NSI, which plays a very important role in the development of technological capability in any economy. Its role cannot be reduced to the direct provision of technical information to industry. Research systems have several

functions that are important for industrial upgrading, of which the provision of new and useful information is only one. Other functions include the creation of new instrumentation and methodologies, the provision of skills developed by engaging in research, participation in research networks, the resolution of complex technological problems and the establishment of spin-offs (Martin and Salter, 1996).

It is not yet clear what national systems of innovation are emerging in the CEECs. These systems are far from being fully formed and it would be more appropriate to search first for signs of the emergence of sectoral innovation systems. Sectoral innovation systems are groupings of enterprises and their related networks of public and private institutions that are involved in the development, diffusion and utilization of innovation. These systems will strongly shape the character of NSIs in CEE. Based on the current patterns of production networks in CEECs it seems that these systems will be very heterogeneous. In some countries, such as Hungary, NSI may be based more on foreign enterprises. In countries like Estonia, they may be formed around small enterprises. In other countries, the NSI could be dualistic in character, with subsectors of small and large firms being unrelated to each other or with weak links between domestic and foreign firms. In some cases, they may be based on a few strong regions which are the drivers of growth. In these cases, the NSI could be strongly shaped by a few regional systems of innovation. Alternatively, NSIs could be formed around one or two sectors in which the innovation process is developed on a collective basis, while in the rest of the economy the innovation links are very weak. For the time being, the innovation dynamic is strongest among foreign enterprises. Our conclusion is that this is the greatest strength but also, potentially, the greatest long-term weakness of the CEECs that have attracted large volumes of FDI. The way CEECs integrate into international production and innovation networks will strongly shape their NSI.

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# Innovation Policy in Croatia: the First 10 Years

Jadranka Švarc\*

## Abstract

The paper examines the development of innovation policy (IP) in Croatia during the 1994-2004 period and it does so from the R&D sector's point of view. The paper argues that Croatia has failed to make the necessary shift from the standard research and industrial policies towards an innovation policy which is seen as the new policy paradigm necessary for the structural adjustment of the national economy to the knowledge-based economic growth. To support the thesis, the convergence of the science and technology policies into the innovation policy is explained. Also, the chronology of the development of the innovation policy in Croatia is provided. The major shortcomings of the research system are described to illustrate the failings of that policy. The inadequate and fragmented national system of innovation (NSI) – being the direct outcome of the social factors such as the climate of “semi-modernism” which caused the lack of the social and political will for the change towards innovation-driven development – is seen as the main reason for this failure. The solution offered is to build social capability for the introduction of the pro-active innovation policy and related NSI.

**Keywords:** innovation policy, Croatia, knowledge-based economy, semi-modernism, social capability

**JEL Classification:** O38

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# 1 Introduction

Even if during the last 15 years, in the process of transition towards market economy, Croatia has had some significant results, it has, almost universally, been recognized that the exclusive orientation towards market regulation of economy, neo-liberal concept of *laissez faire*, privatization and macroeconomic stabilization has not produced the expected effects on economic growth.

Following the theory of the socio-economic roots of technology change and economic growth (OECD, 1992; Nelson and Winter, 1982; Dosi, 1982; Freeman, 1988a, Knack and Keefer, 1997; Knack, 1999; Perez, 1996), the main thesis of the paper is: Croatia's slow economic growth is related to the obsolete management of technology change and the related slow development of the new policy paradigm of economic growth – the innovation policy (IP). The innovation policy “has only recently emerged as an amalgam of science and technology and industrial policies” (OECD-EUROSTAT, 1997, p. 6). It is, in practice, focused on the creation of the national system of innovation (NSI) (Lundvall, 1992; Freeman, 1988) as the mechanism for the structural adjustment of the socio-economic structures and of the management of the national resources towards the emergence of the knowledge based economy (KBE) based on the appropriation of knowledge.

In contrast to the developed and fast growing countries which have, during the 1980s and the 1990s, introduced IP as a new way of socio-economic adaptation to the KBE, Croatia, pursuing the market economy, has simply applied some neo-liberal recipes to the old economic and social structures. Such twisted construction has dragged many aspects of social and economic life into the pre-industrial era and has produced a distorted version of post-socialist wild capitalism (Županov, 2001). Due to the social climate and the state of mind characterised by the state of semi-modernism (Županov, 2001), Croatia in general and the ruling elites in particular have been very slow in adapting to the new technological regime and have demonstrated very low level of the social assimilation of the changes in global economy and the related changes in growth management.

The innovation policy and the corresponding NSI which provide mechanisms and instruments for the strategic integration of science, industry and technology policies for the purpose of the capitalisation of knowledge, have, by the end of the 20<sup>th</sup> century, become the essence of the strategic development policies in many developed and fast growing countries, the EU included. Nevertheless, the idea of the integration of science

and innovation, as well as of the integration of science policy and industrial and technology policies, has, in Croatia, been poorly received and understood. From the socio-economic and cultural point of view, it has hardly been accepted at all. The last two decades of the 20th century spent in the majority of the developed countries in making the necessary shift from the standard research and industrial policies to the innovation policy, have, for Croatia, been lost. Although the Croatian Program for Innovative Technological Development (HITRA) launched in 2001 (MoST, 2002), marks the turning point towards innovation policy and NSI, the general environment is yet not stimulating enough to enable the appropriate development of NSI as a comprehensive system. Since the further development of HITRA strongly depends on the strength of the other parts of the system, the weakness of NSI threatens the future of HITRA, too.

To prove the thesis, the paper will explain the shift from the standard research and industrial policies to the innovation policy and will, then, provide the chronological review of the development of the innovation policy in Croatia together with its main failings.

## 2 The Shift from Science Policy to Innovation Policy

The notion and the scope of science policy has radically changed since the mid 1970s. Focused on the administrative regulation of science traditionally divided into three categories of basic, applied and development research mostly conducted and financed by the public sector or the State, it has, gradually, been replaced by the innovation policy oriented primarily towards innovation as a mechanism of utilization and capitalization of science and seen as a factor of economic growth.

The dramatic change from science to innovation policy is the result of the growing convergence of science with the broad field of innovation as well as of the convergence of science, industry and technology policies into the unique policy of development (Lemola, 2002, p. 1482).

These convergence processes were initiated by the several interrelated changes in analytical approach to the innovation as complex socio-economic phenomenon that occurred during the last three decades of the 20th century.

The new conceptualisation of innovation emerged within evolutionary economics pioneered by Nelson and Winter (1982) and Dosi (1982)<sup>1</sup>. In contrast to the mainstream neo-classical economy (Solow, 1957; Abramovitz, 1956) that emphasised the exogenous character of technology and the linear model of innovation, the evolutionary economics argues that innovation is endogenous to economy and society and that, therefore, it can not appear spontaneously and in a linear succession from R&D in some ideal market conditions.

Comparable to the “evolution of genes” in biology, technological innovation is the result of the long process of evolution of technology trajectories as well as of the evolutionary adaptation of companies to the market and socio-economic environment (Nelson and Winter, 1982, p. 9). The evolutionary economics and the numerous studies of innovation process led to the conclusion that technology does not appear as “manna from heaven” (Petit, 1995) which is beyond the reach of socio-economic agents (Lente, 1994). In result, the causality between technological innovation and socio-economic context was reversed while the linear model was abandoned as “primitive” (Abramovitz, 1989, p. 29). Instead, the interactive model of innovation presuming the emergence of innovations at any phase of innovative chain, not necessarily involving scientific research, was introduced.

Thanks to the evolutionary economics which has revealed the heterogeneous and pervasive nature of innovation, it has been widely accepted that managing innovation involves not only science and technology, but also the functionally interrelated sectors of finance, trade, management, industrial production, marketing as well as socio-cultural changes and public policies as their common integrator. Thus, the innovation policy is essentially oriented towards building an appropriate national system of innovation (NSI) (Lundvall 1988 and 1992; Freeman, 1988; Mowery and Oxley, 1995; OECD, 1997) – a concept which has had an astonishing take-up and still has the greatest impact on policy thinking (Mytelka, 2002, p. 1472).

The fundamental idea of NSI is that economic growth is not a spontaneous process, but rather a process constructed within specific socio-economic environment. Therefore, the production of innovation requires deliberate policy action, economic resources and social recognition. In other words, it is the result of the tentative action of a human being (or

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<sup>1</sup> *It was Dosi, among others, who elaborated on the interaction between the technology paradigms and trajectories and the socio-economic environment (1982), which lead some authors to note the Nelson-Winter-Dosi model of technology development (Belt and Rip, 1987, p. 135).*

enterprise) that responds to the economic (e.g. market demands, profit gains, administrative benefits) and social incentives (e.g. respectability, recognition, power).

Therefore, economic growth could be accelerated by creating proper socio-economic and institutional environment that stimulates the production of innovation above incentives provided by the mere market forces. Since this recognition has paved the way for the state interventions in terms of public support and deliberate policy actions in accelerating technology change, it makes the second and the most decisive change in analytical approach to innovation that has contributed to the innovation policy.

NSI is of the greatest importance for the development of the transition countries such as Croatia because of its fundamental assumption that the competitiveness of a nation does not depend on the scale of R&D but rather "(...) upon the way in which the available resources are managed and organised, both at the enterprise and at the national level" (OECD, 1992, p. 80). NSI could enable a country of rather limited resources to make very rapid progress and vice versa, inadequate NSI might waste abundant resources. The examples of Japan, Korea, Ireland or Finland are the living proof of it.

However, in the 1970s, the recognition of the interactive model coupled with the pressure of achieving national competitiveness, seriously shook the faith into the power of scientific achievement<sup>2</sup> as the driving force of economy and technology. The reliance on the science policy as the core of development strategies deteriorated. By the end of the 20<sup>th</sup> century many countries have reconsidered their strategic policies and have shifted from science to technological innovation as applied and commercially exploited knowledge. The academic community was distressed by the difficult question which, after the "golden age" of science during the 1950s and the 1960s (Lente, 1994, p. 302), government laboratories and universities had to face: If innovation does not originate from R&D, what, if any, is the use of academic research, science and university?<sup>3</sup>

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<sup>2</sup> *Innovation and technology in the neo-classical model appear according to the linear model of innovation where innovation is just the last phase of a chain beginning with research and development. Many governments, therefore, assumed scientific research to be an implicit factor for generating new technologies and supported it with lavish financial resources. In such a way the neo-classical theory made room for growing public interest and investments in science and education. The "golden age" of science during the 1950s and the 1960s when science was socially and economically accepted as a value per se promoted science policy to the position of the central policy of many a national development strategies.*

<sup>3</sup> *The numerous books and studies analyze the changing role of universities and public research stressing their loss of supremacy in R&D systems. The culmination of transformation is probably best outlined in the T. Kealey's (1996) astonishing book persuading us that public funding of science and technology is not only unnecessary but also counter-productive.*

The answer was given by the new growth theory formulated by Paul Romer (1989; 1990) whose endogenous model of sustainable long-term growth fed by new ideas implies public investments in R&D seen as a rational and acknowledged principle of accelerating technical change above pure market inventiveness. Although there is a direct link between the investment in research and the number of innovations, economic growth depends on technology change defined as “improved instructions for mixing together raw materials” (Romer, 1990, p. S72), which absolutely involves the capitalization of knowledge. Technology change is, however, considered endogenous since it “(...) arises in a large part because of intentional action taken by people who respond to market incentives” (Romer, 1990, p. S72). Since economic growth is seen as greatly affected by an institutional structure and state policy that induces innovation, the new growth theory makes the third factor that pinpoints the importance of the long-term, deliberate and committed innovation policy.

At the beginning of the 1990s the majority of the developed and fast growing countries began to support industrial innovation and new technologies by applying different measures and instruments. In addition to the direct support to companies and innovators, the emphasis was on stimulating cooperation between science and industry to integrate science and technology policies. Many governments started to fund and orchestrate large national cooperation programs for new technologies, primarily information technology, materials technology and biotechnology (Lemola, 2002). The innovation policy was born as a strategic integration of science, industrial and technology policies and as a powerful tool for the structural adjustment of national economies to the knowledge-based economy

### 3 Innovation Policy in Croatia: the First 10 Years

#### 3.1 The Social Roots of the Slow Development of Innovation Policy

In Croatia, the public policy was deeply influenced by the provincial spirit of semi-modernism. The term was coined by the Croatian sociologist Josip Županov (2001) to mark the mixture of modern and traditional elements in the Croatian society in the last decade of the 20<sup>th</sup> century.

This semi-modernism is driven by the domination of the so-called de-industrializing political elite and consists of the three mutually linked socio-economic processes that

frame the nature of the transition process. The first is *re-traditionalisation* – the process of de-secularization and the so called "moral and social renewal" back to the ethical values of the 19<sup>th</sup> century. The social type of "Gemeinschaft" which was believed to have disappeared during the migration and urbanisation was resurrected surprisingly successfully as a new normative integration. A kind of «Hobbesian incivility" and anomy was quite visibly at work, because the old business and political norms and values were destroyed while the new ones were based on de-industrialization as a second process that constitutes semi-modernism. *De-industrialization* is a process of the privatization of the previously state owned industrial companies according to the "empty shell model" meaning that the tycoons and corrupted managers suck out the company's substance. This privatization regularly ended in the devastation of company's fixed assets, competences in technology, skills and market competitiveness. It usually turned companies into empty shells dependent once again on the state support. The "political capitalism" hidden behind the "privatisation" allowed the new class of businessman who had no management skills to take over the firms with minimal investment. The so-called "rent-seekers", who earned themselves the rent by selling the property accumulated by the previous generations, swapped out the 'profit seekers' who, led by the profit maximization, are interested in technological accumulation and industrial development. The third process, *de-scientization*, is the natural consequence of the two previous processes and designates the marginalization of science by both the political and business elites that have induced the climate of anti-intellectualism and anti-academism. The infamous brain drain, the financial starvation of the research sector and the stagnation of scientific productivity and the general shrinkage of science base was, therefore, the inevitable outcome.

These three processes constitute Croatian socio-cultural and politically specific historical heritage that, helped by the general disorientation of population after the collapse of socialism, shape the state of mind and practical day-to-day governance. Although the failure of adaptation could definitely be ascribed to the painful process of "creative destruction" (Perez, 1996), the examples of other, less myopic countries, illustrate that different scenarios are possible in creating own future and welfare.

In Croatia, the suggestions involving common and deliberate action or a national policy involving state interventions in the long-term resources for growth such as ICT, technology accumulation, innovativeness and R&D, were rejected with disdain, because

they were seen as the relics of the socialist past of planned economy<sup>4</sup>. The rule of de-industrializing elite and the limited vision of Croatia as the “country of waiters and peasants” obstructed the other different visions of Croatian future that would take into account the need for structural adjustment of institutional and economic structures to new techno-economic paradigm. The innovation policy and NSI were, as accordingly, ignored.

### 3.2 The Development of Innovation Policy: the Chronology

Due to the influence of the neighbouring western countries (Germany and Italy in particular) as well as to the exposure to the foreign literature and international seminars, some among the Croatian administration at the Ministry of Science and Technology (MoST) together with a number of scholars from the academic community have, by the mid 1990s, discovered the modern methods of innovation policy and tried to apply them in Croatia. They have initiated the socio-economic and cultural changes of the rigid political and academic environment leading towards the idea of the Croatian NSI and paved the way for the innovation policy as a new growth paradigm. In the development of innovation policy in Croatia the three phases could be identified.

The first phase, from 1991 to 1993, begins with the collapse of the socialist regime. It was the period of standard R&D policy characterised by the deep political fractioning among intellectual elite and by the groups struggling for control and supremacy. The year 1994, the beginning of the second phase, is marked by the first attempts of transfer of advanced “western” methods and IP know-how to Croatia, while the beginning of the third phase is marked by the launch of the *Program of Innovative Technological Development* – HITRA at the beginning of 2001 (MoST, 2002). HITRA marks a turning point in science policy since it is the first program that created and implemented the IP measures, paving the way for the new paradigm of economic growth.

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<sup>4</sup> “Ironically, while “Western” states are more prepared to adopt state interventionist policies to foster innovation, post-socialist states regard intervention as a hangover from the past “ (Webster, 1996, p. 1).



## The First Phase: Centralized Science Policy (1991-1993)

During the first phase the science policy was centralized. It was governed by MoST, the main goal of which was to sweep away the old socialist ways of organizing science and to introduce new models designed in the image of those of the neighbouring “western” countries. Although many new organizational elements like public competitions for grants, the pyramidal organization of projects, young researchers schemes, etc. were introduced, the role of science didn't change much. It was still seen as the dominant factor of the national cultural heritage, while the connection to the national economic development was not recognized.

The state of mind was adapted to the maintenance of the traditional perception of science as an “ivory tower” of fundamental research reserved for the scientific elite. Such perception had both the positive and the negative influence on the science system. The positive impact was the preservation of the national knowledge base in terms of keeping alive academic community, their competences, equipment and skills – quite an important achievement in those turbulent times when the national economy was brought to ruins and when the science system was also at peril.

On the other hand, the elitist approach which ignored engineering, applied sciences and technologies has seriously slowed down the recognition of innovation as a driving force of economic growth and the science-industry cooperation as a development mechanism. The elitist approach as the dominant way of thinking (among natural scientists kept alive to the present day) together with the exhausted industry left at the mercy of the anti-intellectually disposed tycoons prevented the recognition of the research, innovation or education as the ways of the recovery from economic collapse. The “rent-seekers” supported by the political elite who perceived them as the pillars of the privatization and the prime agents of the planned restructuring to market economy hindered the convergence of the science and industry sectors as well as of science and technology policies towards the national system of innovation.

The obsolete linear model of the innovation process upon which the traditional approach to technology was based and which was largely accepted and exercised during the socialist period, was still very influential in Croatia. At the beginning of the 1990s, when many countries were introducing innovation policy as a new form of science management, both the scientific community struggling for its “academic freedom” and

the industrial business elites seeking “fast and vast” gains rejected the public research orientation towards market, industry and innovation.

Such a rigid scientific system seriously deteriorated by the end of the 20<sup>th</sup> century when the lack of academic autonomy and scientific dignity, budget cuts, the exclusion from the regional research networks, etc. finally brought the R&D sector to stagnation and lethargy causing the loss of the scientific excellence (Silobričić, 2000) and the general shrinkage of the science base<sup>5</sup>.

The second process of semi-modernism, the so called “de-industrialization” according to the “empty shell model” was the cause of the major failing of the innovation policy of that period: the devastation of the industrial research institutes, the so called “heart of the capitalist machine”. In Croatia, same as in other transition countries like Hungary, Poland, Romania, Bulgaria, etc., the political elite, pursuing the dominant “mantra” of liberal market economy, withdrew the state funding to the institutes and left them at the mercy of the market or to the care of their parent companies. The transformation of the socialist industrial research sector according to the model known as “shock without therapy” (Radošević, 1996) caused the heavy losses in technology accumulation and skills, the negative effects of which can, to their full extent, be seen today, when the absorptive capacities of companies appear as the fundamental prerequisite for research-based technology development.

#### The Second Phase: Building the Infrastructure (1994-2000)

The idea of innovation policy which goes beyond the mere organization of scientific research and which stresses the interaction of science and industry for the purpose of economic growth wasn't readily accepted by the public administration. The initial steps were taken in 1994 when MoST, developing the models of science-industry cooperation and financial support for innovative small and medium sized enterprises (SMEs), tried to

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*For example, according to some estimates, in 1989, Ruđer Bošković Institute, the leading Croatian scientific institution earned 40% of its revenue from the business sector and published 0.75% of a scientific paper per employee. In 1999, only 13% of revenue came from businesses while publishing activity is reduced to 0.68 % of a paper per employee (Pisk, 2001). Radošević (1996, p. 17) finds that, in socialism, the Croatian R&D system was a mixture of different activities. For example, in 1989, 52% of the total revenue of R&D system came from research, 37% from the production and 11% from the services rendered.*

apply the principles proven successful in Germany<sup>6</sup> (Lange and Švarc, 1994) and Italy.<sup>7</sup> To promote the idea, MoST organized in Istria in November 1994 the first international conference entitled "*Technology parks: European experience for Croatian development*" (Ružinski et al., 1994). The participation of more than 200 experts from every part of Croatia illustrates the scope of attention the topic aroused. This conference was a kick-off meeting for the dissemination of the idea of technology business incubation in Croatia.

As the IP measures resulting from the cooperation with Germany and Italy, same as everything else connected to IP, were, for Croatia, *terra incognita*, the first practical results came almost two years later when the first guidelines of the innovation policy were outlined within the National scientific and research program 1996-1998 (The Official Gazette 16/1996). In spite of the fact that these guidelines were firmly incorporated into the research policy, they formed the legal basis for MoST to implement two framework programs that have determined the future of the whole innovation system. The first program was oriented towards setting up of the national network of institutions for the development, transfer, implementation and financing of new technologies, while the second stressed the importance of government support measures for innovations and technology-based businesses.

The program of institutional technology infrastructure comprised the government support for the establishment of the business-innovation<sup>8</sup> and technology centres which were assigned the ambitious and important task of local economic development. They were understood as intermediaries between universities and industry as well as institutions that were to assist the companies in their start-up and expansion phases. Furthermore, the centres were expected to become the points of reference for the future international and regional aid-programs (like PHARE or INTERREG, etc.). These centres never received

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<sup>6</sup> *Projects were made within bilateral cooperation of MoST and the German Federal Ministry of Research, Science, Education and Technology using the expertise of FhG-ISI, Karlsruhe and VDI/VDE-IT, Berlin.*

<sup>7</sup> *The Business Innovation Centre Friuli-Venezia Giulia, Trieste according to the model experienced by SPI - Promozione e Sviluppo Imprenditoriale in Italy.*

<sup>8</sup> *Since at that time there was no other government or non-government body for supporting business incubation, MoST has naturally incorporated these activities under its umbrella. The Department for small entrepreneurship of the Ministry of Economy started with its activities little bit later and the demarcation line between responsibilities and scope of the work between the two ministries was drawn in 2001, when the Ministry of Crafts, Small and Medium Sized Enterprises was established as the separate Ministry (merged again into the Ministry of Economy in 2004).*

any funding from these aid-programs, even if, at the time, those funds were seriously reckoned with.

The implementation of the Program went quite well. From 1996 to 1998, in the major university centres (except Osijek) three technology centres were established and supported by MOST: Centre for Technology Transfer, Zagreb, 1996, Technology and Innovation Centre Rijeka, 1997, Technology Centre Split, 1997 (MoST, 2002).

The cooperation with Italy resulted in the establishment in 1998 of the Business Innovation Centre of Croatia – BICRO. It was a coordinating body of the technology network the primary aim of which was to create the financial models and instruments for the support of the innovative entrepreneurship. To fill the gap with the foreign special financial instruments such as venture capital (risk, seed capital, etc.) which did not (and still do not) exist in Croatia was an extremely important task.

Following this task BICRO has outlined its *Program for the establishment and the promotion of the production based on new technologies* with the aim to support 200 companies in 4 years (Program 200/4) by equity financing (Salamon, 1998). The criterion used for granting support to companies was scientific intensity. The companies were differentiated as knowledge-based companies, engineering and know-how companies. Even if the Program was quite avant-garde, it was approved by the Government in 1998 and it found its place in the budget plans. However, the planned financial resources were never actually allocated to it, and the Program never came into function.

Even if these centres were established by almost mechanical application of the western know-how to the “East” (which, by the way, received some serious criticism from some scholars<sup>9</sup>) from the point of view of the future development of the innovations system this was the most decisive phase. This phase has not only provided some precious experience and assimilated new ideas, but during it the basic “institutional infrastructure” was established. Also, a group of managers emerged forming the nucleus for creating national IP after 2000.

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<sup>9</sup> *Establishing of government-backed business and technology centers in Central and Eastern Europe was estimated as widespread but mostly unsuccessful attempts of building technology infrastructure (Dyker and Radošević, 1999, Webster, 1996).*

### The Third Phase: The First Step in Innovation Policy Measures (2001 - )

The last and not yet concluded phase of the development of the innovation policy is marked by the establishment of the separate Ministry for Crafts and Small and Medium Businesses (MOMSP) (recently merged with the Ministry of Economy) and by the launch of HITRA - the first government innovation policy program in 2001 (MoST, 2002). Both initiatives reflect the desire of the government elected in 2000 to give the impetus to innovation and entrepreneurship.

MOMPS played an important role in innovation policy in the sense of fostering entrepreneurship culture and upgrading technology capabilities of companies. A range of different programs for the provision of credit lines, technological upgrading of companies in the sense of the procurement of the new equipment, training managers, donating grants for innovators, etc. were developed and introduced into the policy agenda (Jurlina-Alibegović, 2002).

Trying not to interfere with the other ministries', especially not with MOMSP's responsibilities, MoST has confined its efforts to the companies and activities with higher value added and therefore involving cooperation with R&D sector. For that purpose, HITRA was transformed into a program especially tailored to encourage the science-industry cooperation and providing a framework for direct cooperation between entrepreneurs/industry and Croatian universities and research institutes. Within this framework HITRA maintains its central mission of restructuring R&D sector towards the requirements of KBE by reversing the share of the state and the business sector in R&D system. The predominance of business over public R&D is perceived as the most important aspect of structural adaptation and involves three main activities (Švarc, 2003):

- fostering science-industry cooperation,
- reviving industrial R&D and
- encouraging commercialization of the research results.

HITRA is a big step forward in innovation policy because it is public administration's first attempt to formulate the functionally related elements of innovation policy for the purpose of establishing Croatian national innovation system. The three constitutive parts were planned, as follows:

- 1) The creation of stimulating *policy measures*, mechanisms and programs;
- 2) The creation of technological *institutional infrastructure*;
- 3) The establishment of the *control mechanisms* for the innovation and technology policy.

The most substantial part of HITRA, the policy measures, consists of two complementary subprograms (Table 1). The first one, TEST, focuses on technology projects. Its aim is to finance the pre-commercial development of new products, processes and services in the public and private R&D sectors. The outcomes are to be commercialized through the second *sub-program RAZUM (Development of Knowledge-Based Companies)*, aimed at the provision of support to commercial entrepreneurial projects (start-up, development and expansion of companies) based on new technologies and/or cooperation with research institutes and universities.

Sub-Program	Type of projects	Targets of the policy measures
T E S T	"Simple" technology projects (TP)	Development of the commercially promising products, processes and services prior to their commercial use up to the stage of original solutions (prototype/pilot stage)
	"Complex" technology projects (STIRP)	Development of the multidisciplinary, cooperative research for launching new or developing the existing technological areas
	Nucleus (Jezgre)	Research and technological NUCLEUS aimed at concentration of R&D resources (experts, equipment, instruments) both from public and private sector to gain critical mass for technology and research based services.
RAZUM	Knowledge-based companies	Development of the Knowledge-Based Companies at start-up or expansion phase, aimed at commercialization of research by entrepreneurial projects

As the system developed and matured, it was planned for BICRO to be restructured to become an investment institution, close to the venture capital fund as was its original purpose. In 2001 some new centres were established: Technology innovation centre in Osijek, Research and Development centre for mariculture in Dubrovnik and Centre for production processes, Zagreb, 2001.

HITRA has envisaged the establishment of the Research and Development Technology Institute (ITP) as the centre of research and professional excellence in innovation policy, technology studies, technology foresight exercises and the creation and management of the specialized innovation programs. Program TEST was planned to be outsourced to ITP, like RAZUM is to BICRO.

In order to control the overall operation of HITRA, and the distribution and spending of budget resources in particular, as well as to create a space for inter-ministerial discussion on innovation policy issues, the Inter-ministerial Control Group was founded on December 6, 2001 (The Official Gazette of the RH, No.108/2001). The program has also envisaged The Ethical Committee, a body affiliated to the Ministry, to take care of the harmonization of moral criteria and public welfare with the new technologies and their commercial use.

HITRA has introduced a range of completely new instruments and organizational and institutional arrangements to science policy like the Technology Filed Council, the regulations on intellectual property rights (IPR), the new methods of evaluating and monitoring of projects, etc., which have paved the way for the innovation policy in Croatia (Table 2). In spite of these novelties, HITRA, due to its exclusive orientation to science-industry cooperation, is rather limited as a common ground for the establishment of the comprehensive NSI. Some important aspects of NSI were, from the political point of view, outside the competences of HITRA. For example, the commercialization of research results requires sound intellectual property protection policy, new financial support instruments, the involvement of business planning in research management, etc. To overcome these obstacles that threaten HITRA's further development, MoST used the opportunity to launch, by the end of 2001, the World Bank technical assistance project (TAL2) entitled "Science and Technology Project" (STP) aimed at designing comprehensive innovation system. The underlying idea was to use the World Bank's "brand name" to disseminate among political and intellectual elite the idea of NSI in order to secure its broader implementation.

TEST	RAZUM
Budget grants for developing prototypes, pilot plans, feasibility studies	Subsidies to companies for research and development (30% of the total project value)
Grants and subsidies of small and large scale equipment	Favourable commercial loans with the interest equalling the discount rate of the Croatian National Bank
Co-financing with private partner(s) of developing new technologies/innovations	Conditional loans in case of risk projects and particularly in case of academic entrepreneurship, i.e. spin-offs from the university
Arrangements of IPR among partners and introduction of business secret	Monitoring of the project realization
Re-payment of 21% of grants in case of commercialization	Assistance in business management, marketing, cooperation with R&D organizations, etc.
Public defence of the project, "on the spot control" of project realization	
Grants for feasibility studies for establishing market oriented research service centres (Nucleus) in private company or research institution	

STP did actually initiate the comprehensive framework for NSI that provides a new impetus to innovation policy, especially by starting the “White paper of Croatia”. The project is still under discussion and preparation. In addition, the separate project on the establishment of the system of the protection of the intellectual property rights in academic sector was also initiated within CARDS program and recently approved by the European Commission.

## 4 The Restructuring of R&D Sector: The Shortcomings

HITRA, STP and numerous other activities of different groups and local authorities during the last 10 years began the irreversible processes of convergence of science and technology policies towards innovation system and new policy paradigm.

Croatia still lags behind in implementation of IP and the related structural changes of research sector towards requirements of KBE. The innovation policy focused on the restructuring of R&D system towards the predominance of the business sector investments hasn't yet achieved its central goal. The four aspects of the current research and innovation system illustrate this:

- a) Weak industrial R&D sector and the low technology capabilities of companies
- b) Croatian research paradox
- c) Weak science-industry cooperation
- d) The lack of stimulating environment.

### A. Weak Industrial R&D Sector and the Low Technology capabilities of companies

The full effect of the negative impacts of the loss of the industrial research institutes and the centres of high-tech competence together with almost 15 years of not accumulating technological capabilities in companies, are seen today, when competition is ultimately based on technology and innovation.

While in the developed countries industry dominates the science system since it funds nearly 63%, performs about 72% of the total R&D (OECD, 2004, p. 10) and employs the majority of researchers and scientists, e.g. 50% in EU and 65% in OECD countries on average, the Croatian R&D system is still dominated by the public sector. State funds more than the half of research activities and employs the significant portion of



researchers - about 83% out of which 53% are affiliated to universities and 30% to public institutes. In contrast, business finances about 44% of total R&D and employs only 17% of researchers. It is obvious that the vast majority of R&D potentials heavily depends on the scarce budget resources, which amounts to only 0.55% of GDP (The Official Gazette, 2003).

The total investment of business sector in R&D is extremely low and amounts to 0.43% of GDP, while in the developed countries business sectors invest more than 1% of GDP and in the fast growing countries more than 2% of GDP. It is a valid argument for both the government and the industry to urgently join efforts in restructuring of R&D sector so that their current roles may be reversed.

Table 3. **R&D and innovation indicators for selected countries in 1999 (or the most recent available year)**

Indicators	Croatia	EU	OECD	Finland	Nordic countries	Poland	Hungary	Slovenia
The Global Competitiveness report								
- Rank of GDP per capita (2001)	44			14		38	30	25
- Rank of national competitiveness	58			2		51	29	28
- Rank of technology index	43			3		36	21	25
- Rank of innovation capacity	42			3		35	28	25
GERD	1.19	1.85	2.21	3.19	-	0.75	0.68	1.51
% of GERD performed by business	44.4	65.6	72.4	70.0	69.2	41.4	45.4	55.0
% of GERD performed HE and public labs	51.2	34.4	27.6	26.0	30.8	58.6	54.6	45.0
% of GERD financed by business	44.5	54.7	63.2	65.0	62.8	38.1	38.5	56.9
% of GERD financed by the State	52.7	36.0	29.8	30.0	30.0	58.5	53.2	56.9
BERD	0.43	1.20	1.54	2.18	-	0.31	0.28	0.84
Public expenditures on R&D as % of GDP (GOV+HE)	0.55	0.64	0.61	0.99	-	0.44	0.37	-
R&D expenditures per capita (USD)	70	415	500	-	690	60	90	220
Researchers in business sector (%)	17.3	49.8	64.9	-	50.5	18.3	25.9	34.8
Researchers in public sector (%)	82.7	50.2	35.1		49.5	81.7	74.1	63.6
Researchers per 1000 labour force	3.2	5.2	6.1		8.1	3.3	5.7	8.9
PhD in science and technology (aged 25-34)	0.17	0.55	0.47 (USA)	0.97	-	-	-	-

Source: Radas (2003): *Strategy of Development, "Croatia in 21<sup>st</sup> century - Science"*, (Official Gazette, 108/2003), *The Global Competitiveness Report, 2002-2003*, *Annual Competitiveness Report of Croatia, 2002*, NVK, 2003.

## B. Croatian Research Paradox

However, the total investment in R&D in Croatia (GERD) is quite satisfactory (Table 3) placing Croatia high on the list of the newly-integrated European countries<sup>10</sup>. At the same time, industrial R&D which is the heart of the modern industrial societies has almost disappeared, while the technology capacities of companies and innovation capacities have been seriously weakened.

The diagnosis is that the problems are not so much in “inputs” but in “outputs” revealing that Croatia suffers from the same “pan-European” paradox (European Commission, 1995), of the effective use of research and science for economic development.

Such outstanding neglect and under-use of research and innovative technology capability in industry for making structural adjustments to global changes has a negative impact on both the macro and micro-level of economy. To illustrate, the overall structure of the industrial sectors of economy and export has not significantly changed for the last 25 years and is still dominated by the low-profit “Croatian traditional industries” like wood and textile industry, fishery, tobacco and shipbuilding (Jurlina-Alibegović, 2003).

Similarly, on the micro-level of the technology capability of companies, the comparison of some selected indicators like the number of patents, ISO standards 9000 and Internet hosts reveals that Croatia doesn't only lag behind the developed countries, but also behind the newly integrated European countries that Croatia used to compare to (The Official Gazette, 2003) .

In addition, the National Competitiveness Council (2002) ranked Croatia 58<sup>th</sup> by its national competitiveness and 43<sup>th</sup> by technology index among 80 countries (Table 4).

## C. Weak Science-Industry Cooperation

The strengthening of industrial R&D sector greatly depends on the science industry cooperation, a mechanism which is widely used in developed countries for translation of R&D potentials into new marketable technologies. The low level of the technology capabilities and industrial research in Croatia resulted in very weak science-industry cooperation. The industry is not capable of absorbing and using research services, while

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<sup>10</sup> Still below Slovenia with 1.5% of GDP, but above Slovak Republic and Hungary with 0.68% of GDP, or Poland with 0.75% of GDP.

the research sector is traditionally closed system focused on the basic research and state support. It is estimated that today only about 10% of the revenues of the institutes and 6% of the revenues of the universities come from the contract research with industry (Švarc et al., 1996)

This cooperation was better even in the socialist period when it was dictated by the State through the socialist organization of the scientific work (“providers” and “receivers” of R&D activities). At that time almost the 30% of the revenues of public institutes and the 23 % of the revenues of universities was coming from industry. (Peruško et al., 1989)

#### D. The Lack of Stimulating Environment

Since the roles of innovation and knowledge based factors of growth in economic development were not recognised, the setting up of the proper environment was also seriously neglected. The elements commonly found in NSIs all around the world, in Croatia simply do not exist:

- Domestic venture capital industry for start-up and technology based SMEs;
- Encouraging the system of the protection of intellectual property rights in research sector (project is still in its initial phase within STP and CARDS);
- Large infrastructure institutions for technology development like technology or science parks and other forms of the centres of technology excellence;
- Technology foresight exercises;
- The centre of competences in generic technologies like biotechnology, nano-technology, new materials, even computer technologies which today play the same role as electricity did in the past;
- The mobility of researchers and experts between industry and academia.

It is obvious that in Croatia, unlike in the developed and fast growing countries, there are businesses capable of performing and investing into R&D. There is a great need to develop supportive environment for upgrading the technological capabilities and innovativeness of companies, stimulating science-industry cooperation and developing in-house R&D activities.

## 5 Conclusions

The transition from the mere market economy to the knowledge based economy requires the new policy paradigm of growth, an innovation policy focused on the productive and commercial use of knowledge instead of standard production factors. In practice, it is oriented towards the establishment of the NSI as a model of integration of domestic science and research potentials with the other sectors of national economy and society that all take part in the production of innovation as commercially exploitable knowledge.

Such a change in development paradigm towards KBE is overwhelming, pervasive and rather painful process since it requires radical changes not only in science and technology but also in socio-economic environment that includes various sectors such as financial sector, legal arrangements, management and decision making as well as changes in cultural values and patterns of communication.

Providing the review of the chronological development of innovation policy in Croatia with its main failings, the paper describes the difficulties in the emergence of the innovation policy in Croatia. It also argues that innovation policy and national innovation system are, in Croatia, still unrecognised as tools for economic development and as the essence of strategic policy.

The rule of de-industrializing elite and the spirit of semi-modernism resulting in the fundamental miscomprehension of the roles of knowledge based factors and innovation for economic growth are seen as the underlying reasons. Since the need for the structural adjustment of national economy to the knowledge based economy was not recognized, innovation policy and NSI were, consequently, disregarded and ignored.

De-industrializing elite has not recognised that innovation crosses the boundaries between science and industry and that the innovation policy as their strategic integration is needed for knowledge based growth. Instead, the obsolete dualism between science and industrial policy is maintained. Therefore, the role of science is restricted to the autistic policy of scientific research isolated from country's economic development. On the other hand, industrial policy is focused on financial rehabilitation and the privatization of traditional industries which lost their technology dynamism and dragged the whole economy to structural crisis and unemployment.

The paper, therefore, emphasises that failure in innovation policy and as well as moving towards KBE strongly depend on "hidden factors" of growth embodied in country-

specific socio-cultural and political factors. The different aspects of the historical heritage of a nation, the particularities of a national culture, political context, moral values, the way of industrialization, etc., produced in Croatia the “social incapability” for growth. These usually underestimated “soft” factors hinder the most important condition for change – the social assimilation of the new technology style that generates economic growth in the particular moment of historical development – today KBE.

Probably the most valuable experience earned from the 10 years of innovation policy is its practical demonstration that economic growth is primarily a social process (OECD; Sundquist report), a complex socio-economic phenomenon that does not happen spontaneously, but is constructed within the certain economic and social system (Freeman, 1988). Therefore, economic growth calls for the deliberate policy action, economic resources and social recognition. It is the result of the intentional activity of the whole society and the political elite in particular to install the new way of management of economic growth, today inclined towards commercial application of knowledge.

Today, the only policy program in Croatia that is intentionally aimed at the integration of knowledge based factors and economic development is HITRA. Although HITRA is almost marginal program in terms of financial resources, scope and related capacities, it is of capital importance for the Croatian overall future perspectives since it paves the way for the new policy paradigm that should become the dominant way of management of the national resources directed towards knowledge based growth.

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# Innovation in Croatian Enterprises: Preliminary Findings from Community Innovation Survey

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## Abstract

This paper reports preliminary results of the first Community Innovation Survey conducted in Croatia. The survey collects internationally comparable enterprise-level data on inputs and outputs of innovation processes in Croatian companies, covering the period from 2001 to 2003. Key survey findings are summarized and compared to selected countries of Central and Eastern Europe. These include the data on product and process innovation, expenditure on innovation activities, intramural research, information sources for innovation and factors that constrain innovation. Moreover, the relationships between some firm characteristics (firm size and ownership) and innovation are examined. Although the data provide some encouragement in terms of innovation outputs, unfavorable structure of innovation expenditures, widespread occurrence of intra-organizational constraints to innovation and failures in commercialization of innovations and/or their integration into business strategies concerns corroborate the assumptions that the movements towards a knowledge-driven economy in Croatia are still quite weak – emphasizing the need for policy improvements.

**Keywords:** innovation, innovation management, innovation policy, Community Innovation Survey

**JEL Classification:** O31

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# 1 Introduction

Innovation tends to be considered as a pivotal driver of both economic growth and competitiveness of companies and sectors. However, measurement and analysis of innovative activities and their impacts at micro-, meso-, and macro-levels have often been burdened with conceptual and applicative difficulties. Following the Oslo Manual (OECD, 1996), a methodology for collecting and interpreting enterprise-level data on technological and organisational innovation has been developed and applied to the countries of European Union, as well as accession countries. In addition to economic imperatives, transition economies of Central and Eastern Europe, have tended to embrace the innovation-related issues within their accession into the European Union, which states the development of a knowledge-based economy as a crucial policy goal.

In addition to underlining the importance of innovation for economic growth in the context of restructuring of the Croatian economy, the paper reports key preliminary results of the first Community Innovation Survey conducted in 2004 on a stratified representative sample of manufacturing and service enterprises in relevant sectors. The survey collected internationally comparable data on inputs, outputs and obstacles to innovation processes in Croatian companies, covering the period from 2001 to 2003. After basic insights into the methodology, the paper focuses on inputs (e.g. expenses, financing, R&D, sources of information), outputs (e.g. types of innovation) and obstacles of innovative activities. We then analyse the characteristics of innovative firms such as size and ownership, and finally offer some concluding remarks.

## 2 Innovation and Economic Growth

Recent years have seen the emphasis of the relationship between innovation and economic growth (Aralica and Bačić, 2004). For instance, there is a general consensus among economists that technological innovation plays a central role in the process of long-run economic growth (Radosevic, 2003, p. 4). Neoclassical growth theory (Solow, 1956) has not elucidated how the technological progress is achieved, although it perceived such progress as a source of growth. Within endogenous growth models (i.e. models based on externalities, Neoschumpeterian models and AK models) technological progress continues to be perceived as the main source of growth, but such models view it as a result of activity of firms and/or individuals (Romer, 1986, 1990). In the models based on externalities, learning from other firms within an industry leads to new ideas

that may result in technological progress. Knowledge, with which technological progress is identified, is considered free and thus can be easily spilled over. Neoschumpeterian models stipulate that research and development can spur economic growth (Grossman and Helpman, 1990, 1991; Aghion and Howitt, 1992). Namely, in the context of imperfect competition, firms will have an incentive to innovate since they can protect the innovation via patenting, thereby achieving strategic advantage and gaining extra profits. Within the AK models (e.g. Jones and Manuelli, 1990) economic growth stems from capital accumulation whereby capital is viewed as an agglomeration of different forms, including human and physical capital. However, these models fail to differentiate technology from physical capital, which makes them comparatively less sophisticated even in relation to the neoclassical Solow's (1956) model (Romer, 1999).

At the micro-level, the role of innovative SMEs in modern economies has been emphasised; such enterprises, which develop specific capabilities and are often included into corporate production networks, are characterized by higher rates of employment and output growth than other SMEs and large enterprises (Iliev and Račić, 2003). At the macroeconomic level, innovation tends to contribute to the accumulation of capital, and growth of employment and multifactor productivity (OECD, 2001). However, the relationship between research and development (R&D) expenditures and growth is not straightforward. Although significant, aggregate R&D explains limited part of variation of growth. This suggests that the factors such as allocation of R&D resources, and the mechanisms of creation, dissemination and commercial exploitation of knowledge matter fundamentally. These factors are significantly influenced by the national innovative capacity (Stern, Porter and Furman, 2000), which covers the ability of a country to produce and commercialise a long-term flow of innovative technology. R&D or ability to generate new knowledge is only one component of broader concept of national innovative capacity. Among other issues, national innovative capacity depends on the strength of a strong common innovation infrastructure, i.e. cross-cutting factors that contribute to innovation throughout the economy. Hereby the crucial factors include the science and technology policy, mechanisms for the support of basic research, and the accumulated stock of technological knowledge including diffusion and utilisation of the existing knowledge. Consequently, government policies can play an influential role in the facilitation of innovation - notably through support for R&D, education and labour market policies, entrepreneurship support, and the promotion of interaction among different organisations within the national innovation system (including the research institutions, business firms and government).

The realisation of the importance of innovative activities and innovation policy has recently been facilitated by two key factors. Firstly, there has been an exhaustion of growth and productivity improvements based on defensive restructuring and non-investment reallocation of resources (Mickiewicz and Radosevic, 2001). Since competition on the basis of low wages is an unfavourable and unsustainable strategic option for most of these economies, their long-term competitiveness requires technological advancement and the development of innovative capacities. Moreover, most of these countries are being integrated into the European Union. The EU is already the main foreign trade partner and the source of FDI for transition economies during the pre-accession period, which reinforces the need for maintaining and improving internal and external competitiveness. Furthermore, the EU not only states the development of a knowledge-based economy as a crucial policy goal for its current members, but also requires from the candidate countries to demonstrate the same orientation. Namely, innovation and increased technological change in new member states are viewed as fundamental to their economic convergence with current members and the cohesion of the enlarged EU. Consequently, maintenance of productivity and GDP growth require new mechanisms for supporting innovation and industrial upgrading (EC, 2001, p. 11). If transition economies are to catch up with the EU in terms of economic growth, that is likely to require increased competitiveness of firms and sectors in those economies i.e. their ability to withstand competitive pressures within the Union (Radosevic, 2003).

### 3 The Environment for Innovation in Croatia

In terms of relative wages, Croatia fares badly in comparison to the rest of CEE, which undermined the competitiveness of several traditional export-oriented sectors (e.g. textiles and apparel industries). On the other hand, retarded levels of technological capacity and product and process innovation have not provided an alternative route to competitiveness. The examples of internationally competitive innovations have been sporadic and they have rarely induced strong spillover effects. Moreover, inadequate factor markets (i.e. inflexible labour market and underdeveloped capital market) and insufficiently supportive policy mechanisms have even encouraged dislocation of certain activities to other CEE countries. Deteriorating competitiveness of Croatian exports has been observed both in the EU-15 and former CEFTA markets (National Competitiveness Council, 2003).

Therefore, the necessity for the development of innovative activities supported by adequate innovation policy is paramount for the catching up in terms of technological advancement, product and process developments and the resulting competitiveness of the Croatian economy. However, the realisation of this need by researchers and policy makers and the development of adequate policy mechanisms have been relatively slow and occasionally inconsistent. The economic policies mostly focused on macroeconomic stabilisation, reforms of the financial system, taxation and the pension system, and liberalisation of trade and exchange regimes. When it came to microeconomic issues, the policies have often been related to privatisation and restructuring of existing enterprises; even in these areas the success has been mixed due to political influences and weak institutional frameworks (Račić and Cvijanović, 2004). Consequently, not enough emphasis was given to the issues of new enterprise development, promotion of innovative activities, creation and effective functioning of interfaces between research community and industry, or the facilitation of integration of innovative enterprises into local, national and global industrial networks (Račić et. al., 2004). Moreover, due to inadequate investment promotion policy, the FDI inflows have predominantly occurred through privatisation of existing firms for market seeking reasons, mainly in the services sectors (transportation and telecommunication; financial intermediation; retail), and they have not resulted in significant technology transfers or spillovers (Bačić, Račić and Ahec-Šonje, 2004). More recently, there have been improvements within the area of enterprise development: new credit lines have been secured, and better technical assistance to entrepreneurs provided, which had noticeable effects on the performance of the SME sector and led to wider acknowledgement of its role in the economic growth and job creation.

The existing research into innovation (Radas, 2003a; Radas, 2003b), innovation policy (Švarc, 2004; Andrijević-Matovac, 2003; Aralica and Bačić, 2004) and competitiveness (National Competitiveness Council, 2003) indicates inadequate innovation performance of the Croatian economy and deficiencies in the processes supporting the development and commercialisation of new knowledge. However, these findings have not been supported by comprehensive firm-level innovation surveys that could also give insights into specific firm- and sector- level issues and support the formulation of a more effective innovation policy. First such survey has been conducted in 2004, and the remainder of the paper presents some of its preliminary findings.

## 4 Empirical Foundations and Methodology

Empirical basis for this paper is being obtained through the first Community Innovation Survey (CIS) in Croatia. In this survey enterprise-level data are collected in accordance with the Oslo Manual (OECD, 1996) guidelines and the available literature on the implementation of CIS III (e.g. Kurik et al., 2002; Boia et al., 2003a). The survey covers the period from 2001 to 2003. In addition to general information about the enterprise, the survey includes the data on the following aspects of innovation activities: product and process innovation, expenditures on innovation activities, intramural research and experimental development, innovation cooperation, information sources for innovation, factors hampering innovation activities, innovation protection, and important strategic and organisational changes in the enterprise. The survey is based on a stratified representative sample of all Croatian enterprises in relevant manufacturing and service sectors. Consequently, the survey is to provide comprehensive overview of innovative activities in Croatian enterprises, which should form a basis for the formulation of more effective innovation policy. Although the survey provides a fairly comprehensive data set, it also has a number of important shortcomings that can affect the validity and usefulness of the data, which have been tackled, among others, by Archibugi and Pianta (1996), Radosevic (1999) and Criscuolo and Haskel (2003)<sup>1</sup>. However, the shortcomings can be controlled to some extent by careful survey implementation and subsequent application of analytical techniques (for an example, see Boia et al., 2003b). The questionnaire was initially sent to companies by mail. Those who failed to respond to the initial mailing were contacted by phone. Those who still did not reply have received an additional mailing and a phone reminder. The survey was administered from May 2004 onwards. Preliminary findings have been reported on the basis of the first 617 valid responses from companies in relevant manufacturing and service sectors.

## 5 Innovative Activities: Inputs, Outputs and Obstacles

In this section we tackle some of the basic results from our survey, which deal with main inputs into innovation activities (structure of innovation expenditures, R&D activities undertaken and the persons employed in innovation-related activities), outputs of such

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<sup>1</sup> *The shortcomings stem from various factors ranging from the sampling procedure to definitional issues, composition of the questionnaire, and the implementation process. Moreover, since CIS is a voluntary postal survey, the results are necessarily subjective.*

activities (i.e. the types of innovations observed<sup>2</sup>) and the main obstacles to innovation activities and processes.

## 5.1 Structure of Innovation Expenditures

The majority of innovation expenditures are related to acquisition of machinery or equipment (83.1%). This indicates that innovative processes in Croatian companies are mainly oriented at purchase and use of “embodied” technologies (innovative machinery and plants). Although this type of innovation costs is also high in EU (50%) (Radosevic, 1999), its overwhelming position in the structure of innovation expenditures observed in Croatian companies is quite problematic. These investments do not seem to be accompanied by adequate technology transfer processes, i.e. they do not regularly lead to new innovations based on the acquired technology. Consequently, the investments in patents, licenses and know-how (4.0%) and education (1.3%) do not feature prominently. Furthermore, only 10.1% of innovation expenditures are related to intramural R&D. Extramural R&D is represented by only 1% of total innovation expenditures, which indicates very weak co-operation between companies and research institutions, as it has already been reported in similar studies (Radas et al., 2003). Total R&D expenditures (11.1%) considerably lag behind the EU average, which amounted to 41% in 1998 (Radosevic, 1999). Finally, expenditures for marketing of innovations are represented only by 0.4% of the total, which indicates a major drawback to the possibilities of market success of innovated products and processes.

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<sup>2</sup> *Within the questionnaire, innovation is defined as the creation of a new or significantly improved product (good or service) introduced to the market as well as a new or significantly improved process introduced within a company. By innovation we consider those activities that are based on the results of new technological developments, new combinations of existing technology or utilization of other knowledge by the company. Product innovations cover goods and services that are either new or significantly improved with respect to fundamental characteristics, technical specifications, incorporated software, or other immaterial components, intended uses, or user friendliness. Product innovations should be new to the company, even if they are not necessarily new to the market. It does not matter whether the innovation was developed by the company or by another entity. Changes of a solely aesthetical nature, and pure selling of innovations produced and developed by other companies, are not included.*

Type of expenditure	Percentage
Intramural R&D	10.1
Extramural R&D	1.0
Acquisition of machinery/equipment	83.1
Patents, licenses, know-how	4.0
Education and training	1.3
Design	0.2
Marketing	0.4

## 5.2 R&D Activities

Although intramural R&D makes only 10.1% of total innovation expenditures, 19.4% of the surveyed companies continuously engage in intramural R&D, whereas 16.9% of companies undertake intramural R&D occasionally. The combined figure of 36.3% companies engaged in intramural R&D at least at some level of intensity puts Croatia above Poland (10.7%) and Slovenia (22.7%) (Radosevic, 1999). Although such a high percentage signifies a large proportion of firms engaged in R&D, low share of R&D in total innovation expenditures (11.1%) implies that R&D is predominantly a non-core concern within corporate strategies. Since innovation activity is mainly related to equipment, R&D activities are currently insufficiently related to reaping of economic benefits through marketable products and/or more efficient processes.

Correspondingly, the majority of companies engaged in intramural R&D have small R&D teams with 1-3 researchers, whereas R&D departments of more than 10 persons exist in 2.2 percent of companies - as it can be seen in Table 2. Although the overall proportion of companies with R&D personnel has been fairly stable in the observed period, a negligible increase of the proportion of larger R&D teams can be discerned.

Number of employees	2001 (%)	2003 (%)
1-3	20.9	19.6
4-10	5.8	8.3
11-20	0.9	1.1
21 and more	0.9	1.1
No intramural R&D	63.7	63.7
No answer	7.8	6.2



### 5.3 Sources of Information for Innovation

The most important sources of information for innovations are fairs and exhibitions (11.6), suppliers of equipment, materials, components or software (11.2), and professional conferences, meetings, journals (11.1). Universities and companies for research and development are given low importance (6.9 and 3.9), which further indicates weakness of co-operation and technology transfer between research and business sectors.

Sources of information	Importance of the source
Within the enterprise	9.5
Other enterprises within your concern	6.0
Suppliers of equipment, materials, components or software	11.2
Clients or customers	9.6
Competitors and other firms from the same industry	10.6
Consultants	7.1
Universities and higher schools, their units and institutes	6.9
Companies for research and development	3.9
Professional conferences, meetings, journals	11.1
Expert associations	10.1
Fairs and exhibitions	11.6
Technical standards	9.6
Standards and regulations connected with health and protection	10.1
Standards and regulations connected with environmental protection	9.5

*Importance of sources of information is calculated by giving weights to each level of importance (high 0.6, medium 0.3, low 0.1), and by summing up weighted frequencies.*

### 5.4 Type of Innovations

The percentage of companies that have introduced new or significantly improved products during the period between 2001 and 2003 amounts to 36.6 per cent. On the other hand, the percentage of companies that have introduced new or significantly improved production process in the aforementioned period is 31.1 per cent. Both figures seem fairly high and may be partially due to bias towards innovative firms (which are more likely to respond to a voluntary survey), as well as to possible over-reporting. For example, comparable data for Estonia and the UK are 27 and 18 per cent for product

innovations, and 23 and 15 per cent for process innovations respectively (Stockdale, 2002 and Kurik et al., 2002)<sup>3</sup>.

## 5.5 Obstacles to Innovation

Factors that hamper innovation activities should carry strong features of the economic environment in which companies operate, but they may also reflect particular characteristics of organizational strategy and culture, which may be more or less supportive of innovation activities. The following table shows the main obstacles for innovation activities and their perceived degree of importance.

<b>Factors</b>	<b>Importance of the factor</b>
Excessive perceived economic risk	10.9
Innovation costs too high	10.0
Lack of appropriate source of finance	10.9
Market decrease	9.8
Organizational rigidity	9.5
Lack of qualified staff	10.6
Lack of information concerning technology	11.8
Lack of information concerning market	13.0
Insufficient support from the state for innovation activities	9.3
Insufficient flexibility of regulations or standards	9.9
Lack of customer responsiveness to new goods or services	11.8

*Importance of hampering factors is calculated by giving weights to each level of importance (high 0.6, medium 0.3, low 0.1), and by summing up weighted frequencies.*

The most important hampering factors are lack of information concerning market (13.0), lack of information concerning technology (11.8), lack of customer responsiveness to new goods or services (11.8). It can be observed that these are predominantly marketing-related, which can be linked to the rather low share of overall innovation expenditures allocated to marketing activities.

Furthermore, insufficient support from the state seems to be the least important hampering factor. This reinforces the claim that the main obstacles to innovation are within companies, rather than in insufficiencies in state support or the lack of funds for

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<sup>3</sup> *The Estonian data have been obtained through CIS 3, whereas the UK data stem from CIS 2.*

innovative activities. However, this is also likely to be related to the unfavorable structure of innovation expenditures, since the role of the state becomes more pronounced as innovative activities in enterprises (and in innovative SMEs in particular) begin to revolve around R&D and networking, rather than around purchase of equipment, as it is currently the case in Croatia.

## 6 Firm Characteristics

In this section we examine the relationship between some firm characteristics and innovation. In particular, we consider firm size and firm ownership and examine whether they have any impact on innovation output.

### 6.1 Firm Size

There is a large body of literature devoted to examining the relationship between the firm size and innovative activities. Some authors posit that several things cause the positive effect of firm size on innovation. For example, large firms can take advantage of scale and scope economies in productions of innovations. They have the ability to better spread the risk of R&D by conducting many projects at the same time, and to recover the investment through sufficiently large sales. They also often have better access to external finance. For manufacturing industry some studies justify the existence of a positive effect of firm size on innovation activity (Cohen (1995), Freeman and Soete (2001)). For services, a study by Arias-Aranda et al. (2001) found that firm size is positively related to innovation. Opposite arguments have also been suggested in Scherer and Ross (1990), Acs and Audretsch (1990, 1991) and Pavitt et al. (1987). These studies show that the relationship between firm size and innovation depends on industry sectors, definition of innovation output and other variables. However, Symeonides (1996) points out that most authors would probably agree that innovative output tends to rise with firm size, but less than proportionally, although other patterns were also suggested for particular industries, periods or countries.

In this study we measured firm size by number of employees. Firms were divided into four groups: firms with 9 employees or less (so called micro firms), firms from 10 to 49 employees, firms from 50 to 250 employees, and finally firms with more than 250 employees.

To examine if there is any relationship between firm size and innovation in Croatia, we first observe how many firms innovate in every size segment. For the EU and several CEE countries, CIS data shows that there is a positive relationship between firm size and the fact that the firm innovated; namely there is a higher share of innovating firms among large firms than among other groups (Radosevic, 1999). This same pattern is found in Croatian study, namely there is a much higher share of innovating firms among those firms with more than 250 employees. There is smaller percentage of micro and small firms that report innovation, both in products and processes, but there is a relatively high percentage of innovating firms among medium firms (between 50 and 250 employees). Please see table 5 for details.

Firm size	Both product and process	Only product	Only process
	Innovative	Innovative	Innovative
0-9	36.33%	30.04%	24.12%
10-49	49.74%	40.84%	36.32%
50-250	57.61%	49.45%	41.30%
>251	76.32%	63.16%	63.89%
	Pearson Chi Square 29.05, df=3, p=0.000002	Pearson Chi Square 21.95, df=3, p=0.000067	Pearson Chi Square 26.92, df=3, p=0.000006

It is obvious from the table 5 that the share of innovative enterprises increases with firm size. This is not unexpected finding, because it is shown in extant CIS studies that propensity to innovate generally increases with firm size. This finding, which is true for all the EU countries and those candidate countries that performed CIS surveys, confirms Schumpeter’s argument that large firms stimulate innovations.

When we compare share of innovative firms in Croatia with the share of innovative firms in the EU, we find that these numbers are very close (table 6). This is a very unexpected finding, and it certainly does not mean that Croatia is as innovative as the EU (unfortunately abundant anecdotal evidence points to the contrary). We have to take in account the fact that a very large number of companies did not respond to the survey. It is only natural to assume that most of them are non-innovative companies, since it is logical that such companies would not take the time to fill out an innovation survey.<sup>4</sup> This would mean that the percentage of innovating firms is in reality much lower.

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<sup>4</sup> It is known that CIS samples can be biased towards innovating firms (Radosevic, 1999).

Firm size	EU*	Croatia
10-49	39%	50%
50-250	60%	58%
>251	77%	76%

\* The data for the EU is from the most recent third CIS survey.

Apart from exploring if firm size is related to the fact that companies innovated, we examine a related issue of whether the structure of innovation output depends on firm size. We would actually expect that this relationship does exist in Croatia. For example, in Croatia larger firms have more resources that can be devoted to innovations development, which can result in their ability to develop and commercialise larger number of new products than smaller firms. This should hold true in particular for incremental new products, where economies of scale, power in distribution channel and better management and marketing skills are more important. Regarding radically new products, one could again make the case for large companies. Croatian industry is for the most part capital intensive, and small firms do not possess adequate resources for investment that radical innovation requires. In addition, radical innovation usually requires research proficiency. Many small firms simply do not have enough research "man-power", because majority of active research scientists who are employed in industry work for large companies. To prove that point, we regressed the number of highly educated employees against the total number of employees. Resulting regression shows that the number of highly educated employees increases with firm size.<sup>5</sup>

As measures of innovation output, we consider number of new products and their share in firm's sales. We first divide new products in three categories according to how new they are to the firm and to the consumers (here we followed established CIS methodology). The first category consists of products that are not very new for the firm, but are new for the market. An example of such product is when company lengthens its product line with new offerings. For instance, a chocolate producer introduces a chocolate with a novel filling or some new properties (chocolates with 70% or more cocoa were an example of such product when they first appeared on the market). Here the firm has necessary technology and experience, so it does not consider the product to be very new from their perspective, although it is new for the consumers. This is a very good situation for the company, because it can enjoy first mover advantage with minimal

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<sup>5</sup>  $F=581.56$ ,  $p=0.0000$ , adjusted  $R^2=56.33\%$ .

investment. Second category consists of products that are new for the firm and not new for the market. For example, if a company that regularly produces chocolate starts producing chocolate ice cream, this will be quite new for the company (it needs new equipment, technology and expertise), but consumers would consider it as just another chocolate ice cream. Since this involves certain investment in new product development for the firm, such new product must be able to return the investment unless its role is to be the loss leader and to fulfil certain strategic mission in the company portfolio. The last category of products that we consider is those products that are new both for the company and for the firm. Such radical innovations require substantial investments in terms of heavy R&D, special organizational arrangements and developmental activities, but they present huge profit opportunities.

We conducted regression analysis to examine whether the number of new products in each category is related to the firm size. We expected to find that the larger the size, the more new products are introduced. We conducted three separate regressions (one for each new product type) with the number of new products of specific type as dependent variable and number of employees as independent variable. All three regressions turned out to be non-significant<sup>6</sup>, suggesting that in our sample there is no relationship between size and the number of new products of any type.

Next we conducted three separate regressions (one for each new product category) to examine whether the share of sales from new products depends on the firm size. We found that regressions for the first new product category (i.e. products not new for the firm, but new for the market) is significant, but does not have a good fit<sup>7</sup>. The other two regressions are not significant<sup>8</sup>. These findings show that the share of new products in sales does not depend on firm size except for the products that are line extensions (not new for the firm but new for the market), where we detect a decreasing trend. This last result is contrary to findings in Radosevic (1999), who points out that for the EU the shares of new products in firm sales follow a U type relationship (share is larger for small and large firms than for medium ones). However, because of the low fit in our data

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<sup>6</sup> Regression statistics for “not new for the firm, new for the market” are  $p=0.57$ ,  $F=0.56$ , regression statistics for “new for the firm, not new for the market” are  $p=0.33$ ,  $F=1.11$ , regression statistics for “new for the firm and for the market” are  $p=0.79$ ,  $F=0.29$ .

<sup>7</sup> Function is decreasing,  $p=0.017$ ,  $F=4.23$ , adjusted  $R^2=6.5\%$ .

<sup>8</sup> Regression statistics for “new for the firm, not new for the market” are  $p=0.058$ ,  $F=2.93$ , regression statistics for “new for the firm and for the market” are  $p=0.099$ ,  $F=2.37$ .

it would be dangerous to draw general conclusions about capability of large Croatian enterprises to commercialise innovations<sup>9</sup>.

Another interesting issue is where innovations are developed. Here we adopt four categories from extant CIS surveys. Namely, innovations can be developed by the enterprise, or by the enterprise in collaboration with other companies and institutions. Innovations could be developed by other companies and institutions, or they could be developed by the enterprise group that a company belongs to. Not surprisingly, overwhelming majority of firms that answered that question reported that they developed their innovations within their enterprise and without any collaboration. Table 7 compares Croatian results with the EU results from the most recent CIS survey (European Communities, 2004).

	Croatia		EU	
	Product	Process	Product	Process
Developed by the enterprise or the enterprise group	26%	18%	66%	57%
Developed in collaboration with other companies and institutions	6%	9%	18%	25%
Developed by other companies and institutions	3%	3%	9%	9%

\* Percentages in columns do not add up to 100 because of the non-response.

To investigate that issue further, we explored whether firms of different sizes differ in where they develop innovations. For example, large firms often have larger networks and could develop more products in collaborations than small firms. To test whether firm size is related to where the innovation is developed, we used the Chi-square statistics. We found that this relationship is statistically significant<sup>10</sup>. For all firms size groups, majority of products are developed mostly in-house, but this is most pronounced for micro and small firms. On the contrary, among the companies that develop their products in-house but in collaboration with other firms and institutions, there are more medium and large firms than micro and small firms. This reflects weak network structure of small firms. This result is not surprising; as all CIS surveys show that large firms are more networked than the small ones. Interestingly, the interaction between firm size and the

<sup>9</sup> It should be noted that such discrepancy could be also caused by industry structure.

<sup>10</sup> Pearson Chi Square 22.78, df=9, p=0.007. Less than half of product innovating firms supplied the information about the place where the products were developed.

place where new processes are developed is not statistically significant<sup>11</sup>. Again as for the new products, we observe that most new processes are developed in-house. Certain percentage of processes is developed in-house, but in collaboration with other companies or institutions. This percentage is larger for processes than for products, which reflects the nature of technological process where certain procedures can be adopted from outside and then improved on. Please see table 8 for details.

Table 8. **Where new products/processes were developed**

Size	Developed by the enterprise		Developed in the enterprise group that the company belongs to		Developed in collaboration with other companies or institutions		Developed by other companies or institutions	
	Product	Process	Product	Process	Product	Process	Product	Process
0-9	7.80%	59.26%	0%	0%	18.06%	29.63%	11.11%	11.11%
10-49	82.67%	63.77%	1.33%	1.45%	6.67%	21.74%	9.33%	13.04%
50-249	58.14%	58.33%	11.63%	5.56%	20.93%	30.56%	9.30%	5.56%
>250	59.09%	47.83%	0%	0%	31.82%	43.48%	9.09%	8.70%

Extant literature shows that new products and processes are connected, namely the firms that develop new processes also develop new products (Koschatzky et al., 2001; Radas, 2003a, Radosevic, 1999). This relationship is confirmed again in this study, where we find a strong and significant correlation between the number of new products and the number of new processes introduced from 2001 to 2003<sup>12</sup>. This reflects the fact that to realize new products, especially those of higher novelty, firms have to improve outdated technologies and processes.

It might be beneficial for the company to enter into collaboration with another company or institution when developing certain types of new products. For example, when developing a product new for the firm but not new for the market, it might be better to collaborate with a company that already has required expertise and technology. On the other hand, products that are not new for the firm would be better produced in-house. Development of radical innovations might benefit from collaboration with a research institute. If these hypotheses are true, we might be able, for example, to find that on average larger number of products that are new for the firm but not new for the market

<sup>11</sup> *Pearson Chi Square 10.59, df=9, p=0.3. Less than half of process innovating firms supplied the information about the place where the processes were developed.*

<sup>12</sup> *R=0.55, p=0.0000.*



are developed in collaborations. To investigate that issue further, we used the location where product was developed<sup>13</sup> as a categorical factor in ANOVA analysis, and then we examined whether there are any differences among the mean numbers of new products for each location. We performed such analysis for every category of new product separately, and did not find any significant effects. To check if this effect is dependent on the firm size, ANOVA was performed for all firm size groups separately. Again, no significant relationship was discovered. This indicates that for every new product category, the number of new products is not related to where the product is developed. This same result holds for all four groups of enterprises (micro, small, medium and large). This means that all our hypotheses stated in the beginning of this paragraph should be rejected.

Regarding innovation expenses, in EU total innovation expenditures per employee increase with firm size (Radosevic 1999), indicating that there is a positive relationship between firm size and innovation intensity. Interestingly, we do not find that effect in Croatia. On the contrary, we find that the total innovation expenditures per employee are decreasing with firm size. Although we observe that innovation expenses per employee are lowest in large firms, the variability of the data is so large that this effect is not statistically significant (ANOVA analysis was performed,  $p=0.26$ ). Please see table 9 for details.

**Table 9. Innovation expenditures per employee<sup>14</sup>**

<b>Firm size</b>	<b>Mean innovation expenditures for innovative firms</b>
0-9	1109.414
10-49	9069.315
50-249	132.551
>250	15.552

This finding might suggest that large firms do not make sufficient investments in innovation, which could seriously hamper their innovation capability in the future.

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<sup>13</sup> *These items are: developed by the enterprise, developed in the enterprise group that the company belongs to, developed in collaboration with other companies or institutions, developed by other companies or institutions.*

<sup>14</sup> *Expenditures are expressed in HRK 1000.*

## 6.2 Ownership and Innovativeness

Extant studies indicate that innovation capability for firms in CEECs could depend on their ownership structure (Bonin and Abel 1998, Bojnec 2000, Shipley et al. 1998). The rationale is that owners, being vitally interested in their business performance, will be strongly motivated to foster innovation. For example, Shipley et al. (1998) find that there is a higher incidence of new product development among privatised firms in Poland.

To examine whether the same is true in Croatia, the firms in the sample were divided in two groups: those that are in predominantly private ownership, and those in predominantly state ownership.

We first examine whether the share of innovative firms is larger among privately owned companies. Although we would expect to find many more innovative firms among private companies due to entrepreneurship, the data shows that the share of innovative firms is almost the same for both privately and state owned companies. The same fact is found in Radas (2003a) in a study of hundred leading Croatian firms. Similarly, Koschatsky et al. (1998) find that there is no relation between ownership structure and innovative performance in Slovenia, which they explain as the consequence of private owners being not yet developed enough to "...exert their ownership rights and supervise management ". It is possible that the same explanation would work for our findings, although to be precise we would need to control for a variety of factors.

However, when we look into the structure of innovation, we do find some indications that private companies might be more innovation active. In order to control for the type of the private company, we distinguished those that are newly formed (i.e. after 2001) from those firms that were established before 2001. When we explored if private and state owned companies differ in the number of new products, we found that the number of new introductions is on average indeed larger for private companies, as we would expect. However, ANOVA analysis showed that the effect is statistically insignificant for all three-product types, due to large data variability exhibited by state owned enterprises. Similar results are found when share of sales based on new products is examined in relation to ownership. Again we observe that privately owned firms indeed earn more of their sales from new products, but again because of large variability among state owned firms ANOVA showed that the relationship is not significant. Please see table 10 for details.

	Mostly owned by state, state agencies and institutions	Mostly privately owned	
		Founded in the period 2001-2003	Founded before 2001
Innovated	25	5	227
Did not innovate	24	11	252
Average number of new products			
Not new for the firm, new for the market	3	4.3	3.5
New for the firm, not new for the market	0	5.6	5.3
New for the firm and for the market	3	2.4	1.3
Average share of new products in sales			
Not new for the firm, new for the market	1	23.1	23.0
New for the firm, not new for the market	0	13.6	14.9
New for the firm and for the market	1	14.3	14.3

An interesting question is whether the distribution of private and public innovative firms changes with firm size. Table 11 shows the distribution of the share of innovative firms across firm sizes and ownership. We observe that in all size groups, except among medium enterprises, the shares of innovative firms are almost the same. If we compare it to the results of Polish study from Radosevic (1999), we can see that the results are very similar for large enterprises, while for small and medium firms we observe certain differences. For example, more innovative enterprises are reported among small firms in Croatia than in Poland. This is true both for public and private ownership. Also, among privately owned Croatian firms there is a higher share of innovative enterprises than is reported in the Polish study. We need to take these comparisons with a grain of salt, as there might be differences in sampling and response that one would need to account for.

	Small	Medium	Large
	CROATIA, 2004		
Mostly owned by state, state agencies and institutions	0.16	0.40	0.44
Mostly privately owned	0.38	0.17	0.70
POLAND, 1997			
Mostly owned by state, state agencies and institutions	0.16	0.44	0.74
Mostly privately owned	0.16	0.29	0.70

In conclusion, we can say that firm characteristics do have some bearing on innovation, although not all effects are statistically significant. Regarding firm size, we find that

share of innovative firms increases with firm size, i.e. the largest percentage of innovative firms can be found among large companies. Most new products are developed in house regardless of firm size, while medium and large firms engage in some collaboration with other companies and institutions. This collaboration is more pronounced for new processes than for new products. The average number of new products increases with firm size, but this effect is not statistically significant. However, the share of new products in firm's sales decreases with firm size. Both of these facts together suggest that large firms might lack ability to commercialise their innovations. We also observe that innovation expenditure per employee decreases with firm size. Although this effect is not statistically significant, comparison with the EU where innovation expenditure increases with size indicates that large firms do not invest enough in innovation.

Regarding firm ownership, contrary to expectations, we do not find larger share of innovative firms among privately owned companies. Similarly, we do not find statistically significant impact of ownership structure on innovation output, although private firms on average introduce more new products and have larger share of new products in income.

## 7 Concluding Remarks

Although recent years have seen the emphasis of the relationship between innovation and economic growth, this has not been sufficiently realized neither in the business practice of Croatian enterprises, nor in the development of an effective innovation policy. Consequently, the mechanisms of creation, dissemination and commercial exploitation of knowledge are still being developed, with varying degrees of success. In this context, the preliminary results of the Community Innovation Survey for the period between 2001 and 2003, which have been analyzed in this paper, have presented a mixed picture. Although the overall performance - in terms of product and process innovations - seems relatively strong, this still requires corroboration that could not be undertaken for the purpose of this paper.

The share of innovative firms increases with firm size. The largest percentage of innovative firms can be found among large enterprises. In our sample we have detected no relationship between size and the number of new products of any type. The share of new products in sales does not depend on firm size except for the products that are line

extensions (not new for the firm but new for the market), where we detect a decreasing trend. It is likely that enterprises innovate on the fringe of their businesses and thus fail to integrate innovation into their strategic concerns. Most new products are developed in-house - regardless of firm size. Medium and large firms engage in some collaboration with other companies and institutions – although more often when developing new processes than new products. Innovation expenditure per employee decreases with firm size, although this effect is not statistically significant. The predominance of investments into machinery and/or equipment in the structure of innovation expenditures – at the expense of research and development, patents, licensing, know-how and education – demonstrates a rather restrictive view of innovation and value-creation, which hinders the development of sustainable innovation capabilities.

Correspondingly, main obstacles to innovation seem to be within companies, rather than in insufficiencies in state support or in the lack of funds for innovative activities; the key obstacles are discerned in unsupportive organizational strategies and cultures, which result in inadequate managerial and marketing practices. Even if this is acknowledged, a need for improvements in innovation policy can be discerned – especially in order to stimulate business R&D, reduce the risks and costs of setting up and growth of new innovative SMEs and facilitate the collaboration between various actors in industrial networks. The policy areas that might be addressed in this context include science-industry collaboration, technology transfer, innovation finance and integration of innovative enterprises into wider industrial networks, as well as linkages between innovation policy and other (economic) policy areas – such as science and technology policy, enterprise policy and industrial policy.

Although enterprise-level data obtained through the Community Innovation Survey provide some encouragement in terms of innovation outputs, unfavorable structure of innovation expenditures, widespread occurrence of intra-organizational constraints to innovation and failures in commercialization of innovations corroborate the macro-level findings that economic growth is still largely driven by private consumption and investment in low-tech sectors with limited spillovers (i.e. construction), rather than through dynamic medium- and high-tech manufacturing and services. That leads us to the conclusion that the movements towards a knowledge-driven economy in Croatia are still quite weak – which necessitates urgent development of a more effective innovation policy.

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# Patenting Activity for Innovation Capacity Building Process in Selected Central and East European Countries

Đuro Kutlača\*

## Abstract

A patent is the main result of R&D activities and the first step in the creation of intellectual property rights (IPR) system in a country. Patenting culture is predefined by the level of development of a particular National Innovation System (NIS), compatibility of country's IPR law with internationally adopted standards and norms and embedded innovation capacities and entrepreneurial behavior of individuals, organizations and institutions. Patenting activity in selected Central and East European (CEE) countries is analyzed in order to identify patterns of resident as well as non-resident patenting in these countries. Transformation of original patent data grouped under IPC (International Patent Classification) as WIPO defined units, into sectoral (HC – Harmonized Classification of sectors of economy) patent data using OECD proposed concordance programme, modified by the author for the use of publicly available national patent data, is made for a preliminary analysis of the validity of proposed transformation, as well as for the analysis of innovation capacity built into manufacturing sectors of transition economies.

**Keywords:** patenting activity, National Innovation System, WIPO, Central and East European countries

**JEL Classification:** M31

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# 1 Introduction

It is a generally adopted finding that all technological advances have their origins in fundamental scientific research, sometimes based on research efforts which have not been predicted to have applicable results, and in most cases based on research and development (R&D) conducted 5, 10, and even 15 and more years ago! In a number of papers it is proved that scientific and technological (S&T) knowledge and advance are drivers for industrial competitiveness, but it still remains difficult to understand, evaluate and measure the socio-economic impact of R&D activities. This is, at least for the R&D community, an important issue, because of the need to establish an acceptable enough rationale for public and private investment in R&D activities, the cost of which is significantly increasing every year. Therefore, the role and contribution of, especially public S&T innovation, has been a major concern of S&T policy since the 1960s (OECD, 1991). A common conclusion of a number of studies is that *“absorption and utilization of new knowledge into new artifacts and industrial innovations is an extremely complex social process involving a range of corporate sources and external knowledge and skills where most relationships and two-way interactions between research and technological development are neither direct nor obvious”* (Tijssen, 2002).

Patents are one of the very rare *measurable* indicators of R&D activities, which can shine a light inside the “black box” of R&D activities, but still, patents are only intermediate outcomes of innovative-driven R&D. There is a need for further development, resulting in marketable new products or processes or services. In fact, some patents will never end with marketable outcomes; some (so called “generic” patents) could be used for several innovations; some complex systems could be arranged with a number of interrelated and/or incremental patents. An additional problem is the question about the *way* in which the transformation of scientific research into marketable technologies functions? Answers started in 1970s with the linear model of innovation process<sup>1</sup>, which begins with laboratory science and moves through successive stages till the new knowledge is built into a commercial application that diffuses in the economic system. The S&T policy for this model fosters critical direction of S&T advancements and enhances the flow of knowledge down along the innovation chain, with emphasis on the process of designing market needs into R&D activities. Further work recognizes the

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<sup>1</sup> *Linear Model of Technical Change is the conceptualization of technological change as a unidirectional sequence, in which innovation appears as a step or stage, following invention (or applied R&D), which follows basic R&D and precedes diffusion. There are no feedbacks among the stages in this sequence (MERIT, 2000).*

complexity of innovation process, illustrated with a “chain-link” model<sup>2</sup>, characterized by many feedback loops between the different stages of the innovation process (Klein and Rosenberg, 1986). This model is supported with innovation policy, which recognizes the concepts of national, regional, sectoral and other sorts of innovation systems (Freeman 1987). The innovation policy is intended to: (a) enhance two-way communication across different nodes in the innovation process chain and (b) improve all sorts of innovation systems in order to inform decision makers about R&D, commercialization, technology adoption and implementation, etc. Although this model is still predominant in the present organization of public governance of R&D and other innovation activities, further improvements cope with process of networking between all actors in national innovation system (NIS), which is illustrated in figure 1 (EC, 2003a).

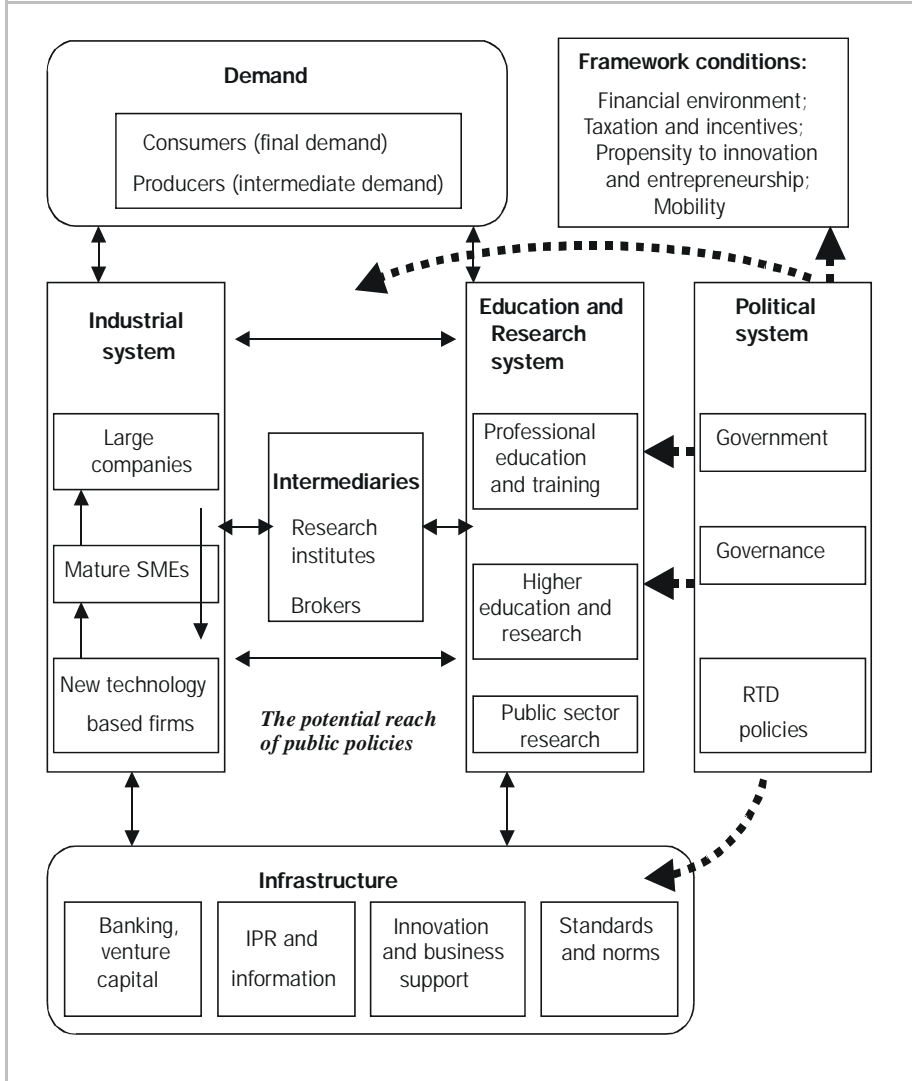
In this view, innovation could be considered as a result of learning process, which is by nature *interactive* and *cumulative*. Interactions within economy, which can result in a combination of existing knowledge or, in some cases, with new knowledge, are among companies, financial, educational, R&D, and other organizations, government agencies and other public and/or private institutions (Galli and Teubal, 1997). Therefore, technological development is a result of complex interactions between mentioned organizations, named by Richard Nelson first as “*capitalism engine of growth*” (according to: Albuquerque, 1997), and later as “*national innovation system*” (Nelson, 1993).

Intellectual property is an important part of infrastructure for NIS, as a basis for organization and functioning of the NIS. Knowledge codified in patent documentation represents a resource for further development into marketable products/processes /services. This wealth of knowledge has to be available to all other participants in national innovation system. Equal treatment of resident, as well as non-resident inventors in one country is the foundation and basic principle of world intellectual property organization (WIPO) and international relations in this area. The unification of patent laws, a process driven by WTO, brought national regulations and inventors into similar position worldwide.

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<sup>2</sup> *System Model of Technical Change is the approach that focuses on the interactive links approach that focuses on the interactive links between different stages in the innovation process and the composition of these linkages. It assumes that technical change is an emergent property of the whole set of interactions (MERIT, 2000).*

Figure 1. **National Innovation System – Concept modified and extended by S.Kuhlmann (EC, 2003)**



Process of adaptation of intellectual property rights (IPR) laws to EU standards in CEE countries became an integral part of transitional changes and one of the indicators of how successful this transition is in a particular country (WDR, 1996). Moreover, a precondition for a significant inflow of foreign direct investment (FDI) in CEE countries, preceded with protection of foreign inventions, was the adoption of IPR law fully adjusted with IRP laws in leading EU countries. One should have in mind that before 1989, “the overall number of foreign patents in CEE countries, with exception of ex-

*Yugoslavia and ex-SU, was marginal*” (Radošević and Kutlača, 1998). Not to forget that NIS in the form illustrated in figure 1 had existed in none of CEE countries before 1989. Therefore, progress in the adaptation of IPR regulation and increase of foreign patents are significant indicators in the process of transition, as well as the process of building of NIS in CEE countries.

In this paper we analyze patent activity in CEE countries in order to identify patterns of resident as well as non-resident patenting in these countries. Having in mind that patenting culture is predefined by the level of development of particular NIS, compatibility of country’s IPR law with internationally adopted standards and norms and embedded innovation capacities and entrepreneurial behavior of individuals, organizations and institutions, in the following chapters we will present the analysis of the process in which patenting activity contributes to the *innovation capacity building process* in selected CEE countries.

## 2 Innovation Capacity

*“National innovative capacity is the ability of a country – as both a political and economic entity – to produce and commercialize a flow of new-to-the-world technologies over the long term”* (Furman, Porter, Stern, 2002). The authors of this concept of national innovative capacity distinguish three building blocks for this concept:

- a) Presence of a strong innovation infrastructure;
- b) Specific innovation environments present in a country’s industrial clusters;
- c) Links between the common innovation infrastructure and specific clusters.

Again, patents are the main visible innovative outputs, as a result of properly engaged national innovative capacity. The proposed model of national innovative capacity integrates R&D funding and performance, degree of technological specialization, knowledge spillovers, human capital, as well as public policies and institutions. Analysis is based on international patenting activity (defined by authors as the number of patents granted to inventors from a particular country other than United States by the US PTO (US Patent and Trademark Office) in a given year). The main findings suggest that *“public policy plays an important role in shaping a country’s national innovative capacity – beyond simply increasing the level of R&D resources available to the*

*economy, other policy choices shape human capital investment, innovation incentives, cluster circumstances, and the quality of linkages” (Furman, Porter, Stern, 2002).*

In this paper we shall use the concept of innovative capacity of the economy under the framework of national innovation system, but rather as *potential for interaction* between the actors of the NIS, than *ability to innovate*. This is so because of the choice of countries, NIS of which is the subject of analysis: developed economies use the already built ability to innovate; developing economies are in search for their potentials for innovation. In this paper we analyze patenting activity in CEE countries, and most of them are developing, some could be treated even as undeveloped economies, and just one, Slovenia, could be classified as a developed economy, in a way this is defined by UN (by the level of GDP *per capita*)!

### 3 Patents as a Technological Indicator

A number of authors have discussed justification for the use of patent data as a technological indicator. Usually, patents are compared with R&D expenditure as technology proxies: R&D expenditures are a measure for inputs and patents are a measure for outputs (Fai and Tunzelmann, 2001). There is consensus that patent statistics are an important, but imperfect indicator of innovative activities (Pavitt, 1988; Griliches, 1990).

There has been additional discussion on whether to use national patenting data or the US foreign patenting data, for the purpose of international comparison of technological performances between selected countries. The US foreign patenting data are most commonly used in the case of comparison between countries which are at the world innovation frontier. The relevance of the US foreign patenting is much less clear in the case of less developed or *latecomer* economies, because of relatively small numbers of patent granted by US PTO. Generally, the efforts for catching-up in technology development in latecomer economies may be divided into two components: *innovative* and *imitative* learning: imitative learning, which is in majority, is learning behind the world frontier; innovative learning, just sporadic and accidental, is technology development at the world innovation frontier.

Using the US market as the most competitive market, the US foreign patenting data measure primarily commercially relevant technological effort at the world frontier. The

US patents for latecomer economies measure only a minor part of the overall technological effort, that which is at the world innovation frontier. This implies that the interpretation of the US foreign patenting data for these economies should be different: the link between the US foreign patenting and the growth of the latecomer economy may either not be strong or completely absent in the early phases of catching up, because of different sources and national strategies for catching up process. For example, the cases of Korea and Taiwan whose economies had been growing vigorously for some time, whereas in terms of US foreign patents a visible increase is present only from the mid-1980s onwards (Choung, 1995).

Latecomer economies may grow over long periods based on imitative learning or improvements in production and organization which are not of patentable significance (Radošević and Kutlača, 1999). However, eventually long-term growth requires developed innovation capabilities, which then become visible in US patenting accompanied by a higher technological content of export. This is especially relevant in the case of CEE countries, where much of the technology effort was of imitative type either because of autarchic conception of development or foreign restrictions on importing high-tech. Even more, minor improvements such as adaptation of imported technologies for local use are needed, but usually not sufficient to be granted as patents. This implies another bias, bias of domestic patenting data, because “*local learning may exist without local patenting*”, therefore, domestic patenting data in developing countries do not capture a significant share of relevant domestic technological activities, which cannot be patentable (such as minor adaptations and improvements of imported technologies suited for local use, which are not straightforwardly translated into patents, etc.) (Albuquerque, 2000). A thorough analysis of the cumulative aspects of technology learning based on national patenting data is given in a survey of national patenting in Serbia in 1921-1995 period (Kutlača, 1998), where persistent, decades long highest share of resident patents in the field of mechanical engineering and agriculture, proved eventual country’ competitiveness in these two sectors, as well as country’ technological dependence in chemical industry, with the highest share of non-resident patents over the entire analyzed period.

Finally, we shall end discussion about the use of national patenting data or US foreign patenting data, with the importance of both types of patenting activities: “*US patents capture only part of the technology effort in latecomer economies. Irrespective of their size they indicate the existence of technology effort at the world innovation frontier. Like the tip of the iceberg they indicate the existence of underlying, much greater imitative*



*technology effort or R&D behind the world frontier. Both angles of technology effort, imitative and innovative, are important in a long-term for catching up.*” (Radošević and Kutlača, 1999).

Besides the US PTO, there are two other types of patent systems, whose importance on the global level should be considered from the CEE countries’ patenting activity point of view: common EU (or EPO – European Patent Office’ patents) and Japanese system (or JPO – Japanese Patent Office’ patents). A long tradition (more than a hundred years of existence) gives the US PTO a big advantage compared with EPO and JPO. The above discussions about latecomer economies, and rationales whether to apply for patent rights in world leading economies or not, are fully applicable here too. Additionally, a serious obstacle to inventors from CEE countries asking protection of patent rights in all three mentioned global systems is the level of costs one inventor must pay for the protection of one invention during the period of economic and political transition. According to OECD Patent manual, there is range of costs one inventor is faced with (OECD, 1994):

- Fees for the patenting procedure (filing, examination, and search fees);
- Fees for a patent agent of attorney;
- Renewal fees;
- If protection is sought abroad, inventor must pay translation charges;
- If protection is sought abroad, inventor must pay foreign patent agent of attorney.

Although it is difficult to calculate precise figures, estimates start from 2,000 EUR and could reach 14,000-20,000 EUR for more complicated patent applications (EPO, 2004). Economical situation in a majority of CEE countries, whether EU member countries or not, is too difficult, and costs for the protection of patent rights in US PTO, EPO and JPO are still too high for most of inventors, residents of CEE countries.

Clarification of all the above mentioned reasons why none of three global patent systems are attractive enough for inventors from CEE countries comes from the available data about international patenting from CEE countries, i.e. filing of patent applications abroad. Small figures for patenting in US PTO are already presented in (Radošević and Kutlača, 1999). Situation with patenting in EPO is illustrated with data in table 1. The second part of this table consists of data for so-called “triadic” patent families, i.e. for patents which are filed at the EPO, the JPO and are granted by the US PTO simultaneously. Figures for selected CEE countries are compared with the numbers of resident patents in those countries for observed years. Total figures (named as “*world*

*total*” in table 1) for both EPO and “triadic” patent families differ by about 1% from OECD member countries totals, i.e. other CEE countries can not contribute significantly – three selected CEE countries are sufficient for this analysis. Therefore, one must conclude that *patenting from CEE countries in EPO (and JPO too) is too small and cannot be used as proxy for R&D and innovation activity in these countries.*

Additionally, the expansion of protection abroad, from one CEE country to a number of countries, particularly to all three biggest patent systems, observed as number of “triadic” patent families is decreasing, as this is shown with data in table 1 in the observed period.

Table 1. EPO patent applications and Triadic <sup>(2)</sup> patent families by priority year and by inventor’s country of residence for selected CEE and OECD member countries							
EPO patent applications	Year			Triadic patent families	Year		
Country	1990	1995	1997	Country	1989	1993	1995
Hungary	69	53	70	Hungary	43	24	15
Hungary - % of NRP <sup>(1)</sup>	3.00	4.74	9.04	Hungary - % of NRP	1.62	2.09	1.34
Czech Republic	22	19	42	Czech Republic	11	8	3
Czech R. - % of NRP	n.a.	3.03	6.99	Czech R. - % of NRP	n.a.	0.89	0.48
Slovak Republic	0	7	13	Slovak Republic	0	2	2
Slovak R. - % of NRP	n.a.	2.56	5.56	Slovak R. - % of NRP	n.a.	0.71	0.73
Japan	12976	11801	13974	Japan	9968	8031	8601
United States	17396	20579	24129	United States	10743	10971	11162
European Union	27016	30620	39712	European Union	10537	9941	10316
Total OECD	60393	66801	82846	Total OECD	32682	30461	31711
Total OECD - % of world total	1.28	1.62	1.99	Total OECD - % of world total	0.76	1.13	1.10
World total	61177	67902	84530	World total	32932	30810	32064

Notes: <sup>(1)</sup>NRP – National Resident Patenting <sup>(2)</sup>Patent is a member of the “triadic” patent families if and only if it is filed at the EPO, the JPO and is granted by the US PTO.

Source: (OECD, 2001).

## 4 Central and Eastern Europe: Patents as Indicator of Transition

Transition from central planning to market economy in Central and Eastern European (CEE) countries is, among others, a process of catching-up with the average level of income in the EU economies. This process requires high rates of growth sustained over a long time period, what could be achieved only through technical change and technological learning. The cumulative nature of technological nature indicates the necessity to analyze technological trajectories in CEE countries and check whether the

technological history of this region is different, compared with western economies, as much as it is the case with political history, or not? One assessment of the basis and potentials for catching-up of CEE countries, based on the analysis of patenting activity in CEE countries and protection of their patents in the US patent office in the period 1969-1994, concluded that there is no such difference. The main findings of this analysis could be summarized in seven points (Radošević and Kutlača, 1998; Radošević and Kutlača 1999):

- 1) The US foreign patenting from CEE countries in the analyzed period was not below the levels of comparable market economies;
- 2) The levels and dynamics of US patenting activity of CEE as a region seem to be determined more by income levels and growth rates than by specific features of the command economy;
- 3) Despite the closed character of their economies in the socialist period, state policy allowed and supported the sale of technological knowledge abroad. This ranged from more or less independent patent activities by enterprises in Hungary, and, especially, ex-Yugoslavia, to controlled state sponsorship in the case of ex-Soviet Union or even direct State involvement in patenting process, as in Romania;
- 4) The US foreign patent trends in CEE reflect more their past capabilities than present strengths. The technological advantages of these economies are firmly rooted in their past successes and are very much based in metallurgical and mechanical technologies, and in chemicals/drugs;
- 5) There are significant intra-regional differences in the institutional basis of US foreign patenting which broadly follow inter-country differences in the institutional structure of R&D;
- 6) The basis for CEE for catching-up with the technological leaders is rather tenuous. The remaining strengths are in specific areas but not across sectors or industries. For example, in ex-Czechoslovakia, patenting activity is still strong in textile manufacturing equipment, in Hungary it is strong in drugs and organic chemicals, and Russia still obtains patents in mining and metallurgy equipment and processes. It is not likely that these countries can recombine world frontier R&D, design and manufacturing capabilities on a large scale but it is possible in the specific sectors that these economies still have patentable inventions. On the other hand, the level of human capital, size of R&D system, design and engineering capacities indicate that CEE countries may develop imitative capabilities not only in manufacturing but also in R&D and design.

Finally, one of the main messages of this analysis is that “*in order to catch-up technologically, CEE will have to generate innovations which are relevant for the world market*” (Radošević and Kutlača, 1998; Radošević and Kutlača 1999). One argument which supports this conclusion came from the analysis presented with data in table 1, concerning patenting from CEE countries in EPO. Patenting in EPO is more and more important since the enlargement of EU became a reality for several CEE countries and membership in EU emerged as the first national priority for a number of other CEE countries. Therefore, increase of importance of EPO for CEE countries is a natural process and a change in patenting structure, could be used as the *indicator of integration into EU innovation system*. This is something what is identified with data in table 1 – although not sufficient for a thorough analysis of innovation activities, in all three selected CEE countries one can notice increase of EPO patent application as the share of national resident patents, i.e. EU market becoming a target market for CEE countries! For example, the share of EPO patent applications in national total resident patent applications in Hungary jumped from 3% in 1990 to 9.07% in 1997; in Czech Republic it increased from 3.03% in 1995 to 6.99% in 1997; in Slovak Republic from 2.56% in 1995 to 5.56% in 1997 (see table 1).

This is a starting point in our analysis of national patent activity in selected CEE countries, which has to give answers to the three questions:

- 1) *What are the patterns of resident as well as non-resident patenting in CEE countries?*
- 2) *How national patenting activity in CEE countries could play a role as an indicator of transition and catching-up process?*
- 3) *How patent data could support the analysis of innovation capacity building into manufacturing sectors of transition economies?*

## 5 National Patenting Activity in CEE Countries in the Period 1989-2000

Using national patenting activity in selected CEE countries, we shall try to explore what are the main patterns of resident as well as non-resident patenting in these countries. Figures 1, 1a, 2 and 2a illustrate resident and non-resident patenting activity in 12 selected CEE countries (in brackets are abbreviations used in all figures in paper): Bulgaria (BU), Croatia (CRO), Czech Republic (CZ), Estonia (EST), Hungary (HU),

Poland (PL), Romania (RO), Russian Federation (RF), Serbia and Montenegro (SMN), Slovak Republic (SLR), Slovenia (SLO), Ukraine (UKR). Also data for former Czechoslovakia (CZ+SLR), former Soviet Union (SU), and former Yugoslavia (SFRY), are used for better understanding of differences between patenting activities in period 1985-1989 and in period since 1989, when transition processes in all these countries started.

Rationale for a logarithmic view in figures 1 and 2 lies in strong differences between absolute numbers of patents in former Soviet Union and other CEE countries; figures 1a and 2a illustrate patenting in 10 CEE countries, without Russian Federation and Ukraine, which makes these illustrations more visible; and all these figures lead us to the following conclusions:

- a) Resident patenting almost disappeared in the first 2-3 years of transition, falling to the app. 10% of the level in 1988 patenting! In a majority of analyzed CEE countries *recovering* phase in domestic patenting activity started in 1993-1994. None of these countries had achieved 1988 level in last observed year, 2000. This indicates:
  - 1) How strong was the process of disintegration of former R&D system;
  - 2) How slow is the process of establishing a new, market oriented national innovation system; and the
  - 3) How vulnerable and slow is the process of innovation capacity building in a country!

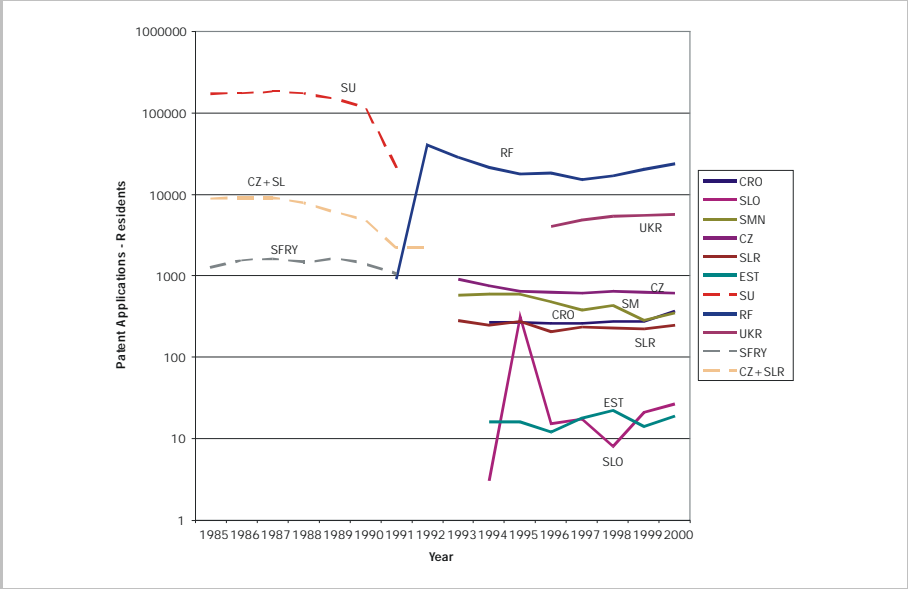
Relatively big numbers of resident patents in Russian Federation and Ukraine, after the year 1993 could be partly explained with preserved innovation capabilities, despite rather bad situation especially in manufacturing sectors in these two countries. Therefore, the analysis of patenting activity should be combined with the analysis of further exploitation of inventions, i.e. with the analysis of effectiveness of other chains in “chain-link” model of innovation system, which brings invention into marketable processes / products / services. Due to a limited size of the paper, we shall quote one the crucial findings of research of transition in CEE countries: *“To date, restructuring in Central and Eastern European countries has led to a more autonomous and competitive science base, but it has not yet produced a science system which is relevant to its changed economic and technological structure. Hence there remains a large gap between the region’s level of potential in labor skills and R&D, and the current low levels of growth and recovery. To achieve growth, the economies of Central and Eastern Europe must restructure their science and technology systems, reintegrate them into EU*

*innovation networks and initiate a structural shift towards a knowledge-based economy that supports innovation and learning at level of every institution and industrial sector.”* (Radošević, 1999).

- b) A completely different situation is with non-resident patenting activity in CEE countries, illustrated by figures 2 and 2a (again, a logarithmic view is used because of possible misleading disproportion between absolute numbers in former Soviet Union and other analyzed countries). As it was already mentioned in the introduction, the number of foreign patents in this region before 1989 was marginal. Since 1991 foreign investors launched “technological invasion” of CEE countries. One can notice that not all countries were “attacked” by a strong inflow of foreign patents. There are three groups of countries:
- 1) The first group are “leaders” in transitional changes: Hungary and Poland, surprisingly joined by Romania – foreign patents emerged very quickly, already in 1992;
  - 2) The second group consists of: Czech Republic, Slovak Republic, Estonia, Bulgaria and Slovenia – foreign patents significantly emerged in 1993-1994; and
  - 3) Countries in the third group are Croatia and Serbia and Montenegro – because of the very fragile political situation, foreign inventors started with significant filing of patent applications in these two countries in 1996-1997.

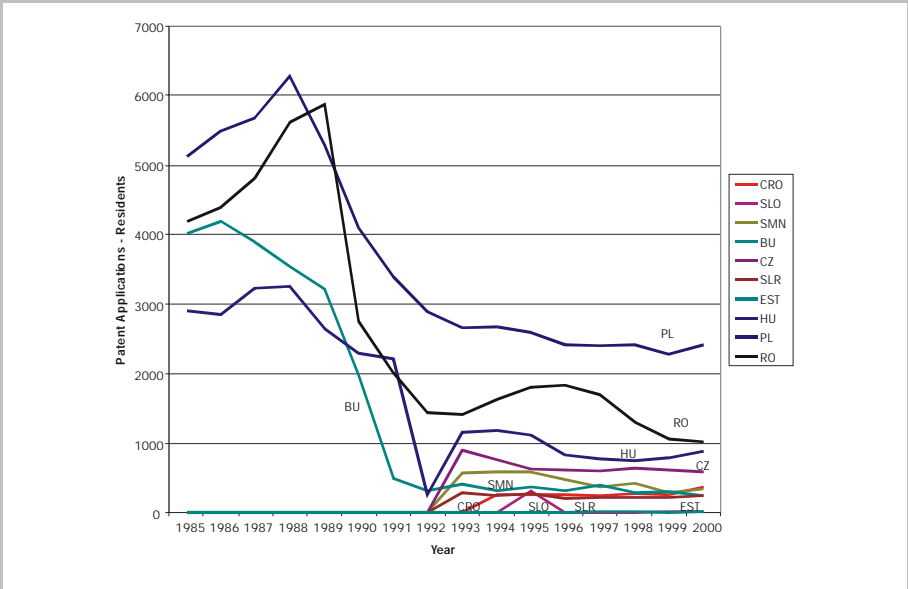
Although transitional processes in Russian Federation and Ukraine were (and still are) very slow, the size, potential market and geo-political position could be the main reason for early entrance of foreign investors in these countries, aligning them into first group countries.

Figure 1. Resident patent applications in CEE countries, in 1989-2000 period, selected countries, Logarithmic view



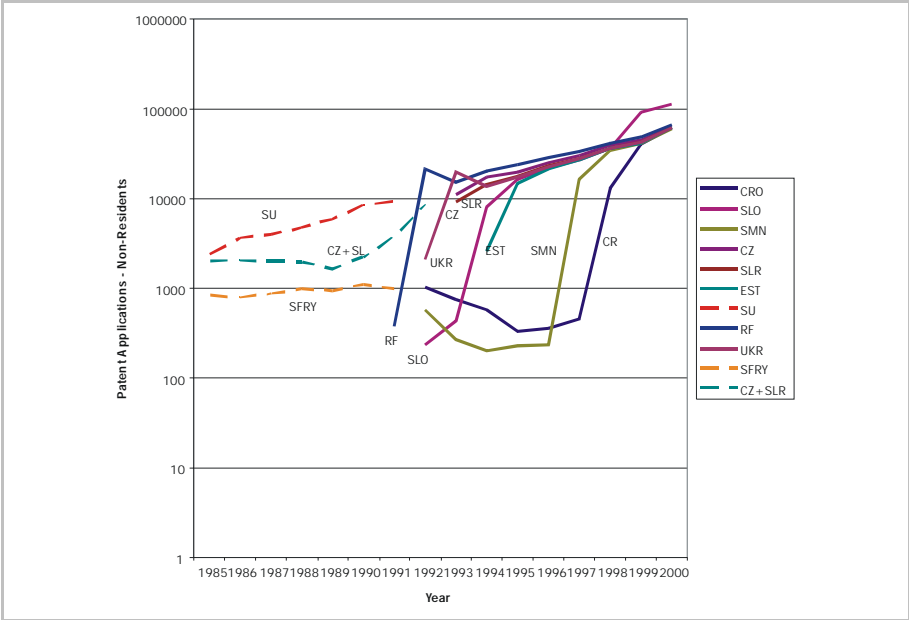
Source: (WIPO, 1985-2002).

Figure 1a. Resident patent applications in CEE countries, in 1989-2000 period – selected countries, Linear view



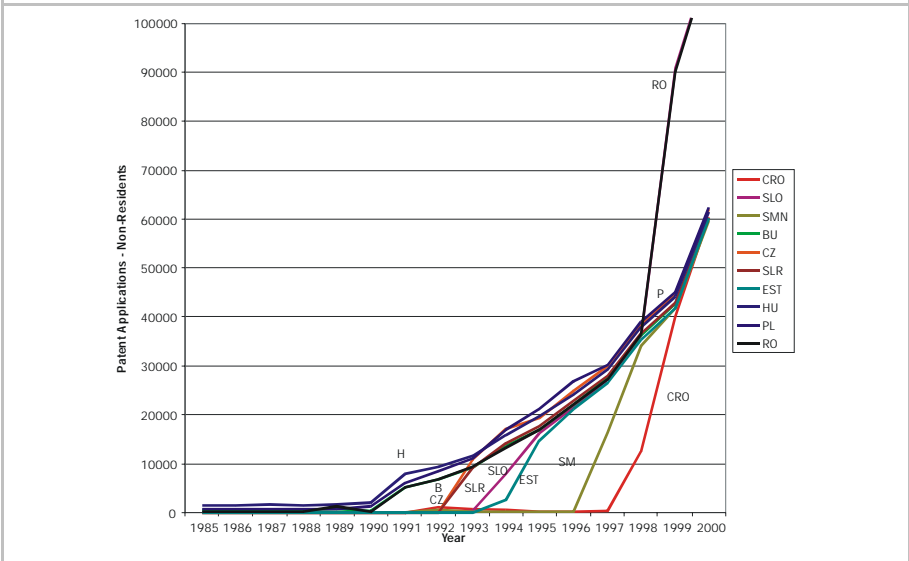
Source: (WIPO, 1985-2002).

Figure 2. **Non-resident patent applications in CEE countries, in 1989-2000 period, selected countries, Logarithmic view**



Source: (WIPO, 1985-2002).

Figure 2a. **Non-Resident patent applications in CEE countries, in 1989-2000 period – selected countries, Linear view**



Source: (WIPO, 1985-2002).



Tables 2, 2a, 3 and 3a illustrate patenting activity in the analyzed CEE countries in 1985-2000 period from another angle. The *Coefficient of Inventiveness* (CI) is the indicator of a country's inventive production, calculated as the number of resident patent applications per 10,000 inhabitants. Average value for OECD countries has increased from 5.77 in the period 1985-1990 to 6.16 in the period 1995-2000. Average figure for OECD member countries is misleading because of the extremely high value for Japan (25.01 and 28.23 in two periods respectively). Figures in table 2 indicate that high inventive production is in the countries where CI varies between 3 and 8. Values for CI between 1 and 3 represent moderate inventive production, and values under 1.00 represent countries with modest or very low inventive production. One should notice that in all OECD member countries, except Greece, CI has increased in the second analyzed period (countries are grouped in table 2 according to CI value in 1995-2000 period).

In table 2a are CI data calculated for selected CEE countries. In the first analyzed period, 1985-1990, CI values were rather good, comparable with highly inventive OECD countries (in Soviet Union, like in Japan, CI values are extremely high, 16.44). Situation has changed in the second analyzed period. CI values dropped under 1.00 in all analyzed countries except Russian Federation, but figure for this country has also shrunk to 1.27. Situation in former Yugoslavia and successor countries is quite specific. Small figure in the first period (0.62) revealed technological policy in former Yugoslavia, based on import of foreign technologies, without domestic "value added" development leading to domestic inventions and innovation, because of detached industrial and R&D sectors. In the second analyzed period figures remain small in all three selected countries: 0.62 in Croatia; 0.34 in Slovenia and 0.50 in Serbia and Montenegro. This is another proof that the process of innovation capacity building, as well as the process of establishing a new, market oriented national innovation system in all three countries is slow.

The *Coefficient of Attractivity* (CA) is the indicator of a country's eligibility for inclusion in global economy, calculated as the number of non-resident patent applications per 10,000 inhabitants. CA average value for OECD countries has jumped from 6.76 in the period 1985-1990 to 21.25 in the period 1995-2000. Figures in table 2 indicate that highly attractive markets for technologies are in the countries where CA scored more than 10. Values for CA lower than 10 indicate either some degree of closeness of one country for import of technologies (for example Japan), or how strong is one country in technology development (for example USA, Germany, France). Increase of CA value for more than three times in just 10 years indicates how strong and fast the process of globalization and technology development in developed countries is.

Country (Countries are grouped according to decreasing CI value in 1995-2000 period – see text)	CI = Resident patent application / 10.000 population		CA = Non-Resident patent application / 10.000 population	
	CI for 1985-1990	CI for 1995-2000	CA for 1985-1990	CA for 1995-2000
Japan	25.01	28.23	2.95	5.76
Sweden	4.14	9.30	39.24	139.06
Switzerland	5.56	8.34	47.96	173.39
Germany	5.22	7.96	8.35	15.49
Finland	3.82	6.56	14.92	220.52
Denmark	2.09	5.38	25.05	232.34
United States	3.04	5.19	2.83	4.62
Australia	3.93	5.05	9.42	24.56
United Kingdom	3.51	4.82	10.09	23.23
New Zealand	2.66	4.38	10.38	102.10
Luxembourg	2.13	4.37	586.23	2891.00
Netherlands	1.67	3.64	24.71	60.61
Norway	2.19	3.60	18.88	88.31
Austria	2.96	3.47	37.50	154.62
France	2.24	3.27	9.37	17.55
Ireland	2.07	2.49	8.88	249.05
Belgium	0.89	1.64	32.24	92.57
Canada	0.94	1.44	10.81	18.95
Iceland	0.87	1.16	3.80	1173.67
Italy	n.a.	1.09	n.a.	17.29
Spain	0.51	0.77	6.06	32.37
Greece	0.84	0.18	10.69	87.44
Portugal	0.08	0.11	2.61	124.08
Mexico	n.a.	0.05	n.a.	4.39
Turkey	0.03	0.04	0.14	5.36
Total OECD	5.77	6.16	6.76	21.25
North America	2.83	3.67	2.97	5.66
European Union	2.31	3.00	6.02	27.35
Nordic countries	3.22	6.70	24.65	179.54

Source: (WIPO, 1985-2002).

Country	CI = Resident patent application / 10.000 population		CA = Non-Resident patent application / 10.000 population	
	CI for 1985-1990	CI for 1995-2000	CA for 1985-1990	CA for 1995-2000
Bulgaria	3.87	0.39	0.73	41.51
Czechoslovakia	4.81	n.a.	1.25	n.a.
Czech Republic	n.a.	0.60	n.a.	35.52
Slovakia	n.a.	0.43	n.a.	64.46
Estonia	n.a.	0.12	n.a.	243.26
Hungary	2.70	0.85	1.59	35.69
Poland	1.41	0.63	0.23	9.69
Romania	2.01	0.65	0.23	22.58
Soviet Union	16.44	n.a.	0.50	n.a.
Russian Federation	n.a.	1.27	n.a.	2.73
Ukraine	n.a.	0.83	n.a.	6.87
SFRY	0.62	n.a.	0.39	n.a.
Croatia	n.a.	0.62	n.a.	42.04
Slovenia	n.a.	0.34	n.a.	255.08
Serbia and Montenegro	n.a.	0.50	n.a.	30.25

Source: (WIPO, 1985-2002).

The absence of foreign patents in CEE countries before 1989 resulted in CA values around 1 (Table 2a). During the process of transition from centrally planned to market economy, one country could become interesting for foreign investors only if legal requirements (intellectual property rights regulations in our case, combined with other laws, especially financial, company and similar laws), and openness of the domestic market to foreign technologies, goods and services suit international standards. Therefore, the Coefficient of Attractivity (CA) could be used as the *indicator of transition* too. This is the main explanation why situation has dramatically changed with CA in the second analyzed period. CA values jumped in all analyzed CEE countries. The largest value has been recorded in Slovenia (255.08), but in all other countries CA values are also very high. Differences reflect either the degree of compatibility of a particular country with EU market regulations (Hungary: CA=35.69; Croatia: CA=42.04; etc.) or how influential is the size of the country (Russian Federation: CA=2.73), somewhere combined with the slow process of changes in economy (Ukraine: CA=6.87).

Country (Countries are grouped according to decreasing DR value in 1995-2000 period – see text)	DR = Non-Resident patent application / Resident patent application	
	DR for 1985-1990	DR for 1995-2000
Portugal	33.66	1102.64
Iceland	4.38	1012.45
Luxembourg	275.00	660.91
Greece	12.73	484.11
Turkey	5.01	121.98
Ireland	4.29	100.07
Mexico	n.a.	94.25
Belgium	36.25	56.46
Austria	12.65	44.55
Denmark	11.99	43.21
Spain	11.99	41.99
Finland	3.91	33.61
Norway	8.60	24.50
New Zealand	3.90	23.33
Switzerland	8.63	20.79
Netherlands	14.77	16.64
Italy	n.a.	15.83
Sweden	9.49	14.95
Canada	11.48	13.12
France	4.17	5.36
Australia	2.40	4.86
United Kingdom	2.88	4.82
Germany	1.60	1.95
United States	0.93	0.89
Japan	0.12	0.20
Total OECD	1.17	3.45
North America	1.05	1.54
European Union	2.61	9.12
Nordic countries	7.66	26.78

Source: (WIPO, 1985-2002).

Country	DR = Non-Resident patent application / Resident patent application	
	DR for 1985-1990	DR for 1995-2000
Bulgaria	0.19	106.94
Czechoslovakia	0.26	n.a.
Czech Republic	n.a.	59.18
Slovakia	n.a.	148.64
Estonia	n.a.	1979.80
Hungary	0.59	42.19
Poland	0.16	15.47
Romania	0.11	34.92
Soviet Union	0.03	n.a.
Russian Federation	n.a.	2.16
Ukraine	n.a.	8.28
SFRY	0.62	n.a.
Croatia	n.a.	67.63
Slovenia	n.a.	750.87
Serbia and Montenegro	n.a.	60.93

Source: (WIPO, 1985-2002).

Tables 3 and 3a illustrate another indicator of patenting activity: dependency ratio (DR), or the number of foreign patents per 1 domestic invention. In almost all OECD countries DR scored above 1, only in USA and Japan are less than 1. Like CA values, DR values jumped in the second analyzed period extremely high (almost 1000 times more in some countries!).

Again, DR values are very close to zero in the first analyzed period in all selected CEE countries, and very high in the second analyzed period. Similarities between DR values in OECD and in selected CEE countries indicate not only the degree of compatibility between market conditions in analyzed CEE countries with OECD member countries (for example: Slovenia – DR=750.87; Estonia – DR=1979.80), but the respect of inventors from OECD countries to potential inventive capabilities in CEE countries too: foreign inventors apply for protection of IPR in order to anticipate expected domestic inventions (for example: Croatia – DR=67.63; Serbia and Montenegro – DR=60.93)!

## 6 National Patent Data Transformed into Sectoral Patent Data in Selected CEE Countries in the Period 1989-2000

In previous chapters it has been pointed that the use of US patents has been dominant in quantitative analysis of S&T. Moreover, decreasing costs of access to US PTO data as well as capability to use them in analysis at all levels (country, region, sector, firms) has led to proliferation of papers based on this source. US patents are extremely useful for measuring technology frontier technology effort. However, their relevance is lesser for understanding the whole spectrum of technology activities in countries behind technology frontier like CEE acceding countries and less developed EU economies. The key obstacle why there are no analyses based on national patents is methodological. Patents recorded under International Patent Classification (IPC) system are not compatible with international industry classification. Classification of economic activities (ISIC – International Standard Industrial Classification ver.3.0; HC – Harmonized Classification) is based on company's manufacturing, production or service activity. However, Daniel Johnson's (OECD 2002) methodological work has removed this obstacle (or, is an important contribution in this direction). Based on his work it is possible to establish concordance between IPC A-H classes and HC 4-digit level classification of industries in OECD countries.

The author of this paper has improved concordance between IPC Units (1-32) and HC 4-digit level classification of industries, and has implemented it with CEE countries' patent data. National patent data with industry level data, derived in that way, are then used for analysis in order to test different determinants of technological capacity at industry level. Figures 3, 4 and 5 illustrate the results of described transformation: non-resident (Figure 3), resident (Figure 4) and total patent applications (Figure 5) in selected CEE countries are distributed in 14 manufacturing sectors<sup>3</sup>.

Although it is too early to make strong criticism of the proposed procedure, one can notice a completely equal distribution of patents between manufacturing sectors in all analyzed CEE countries for all sorts of patent applications. Further analysis of patenting

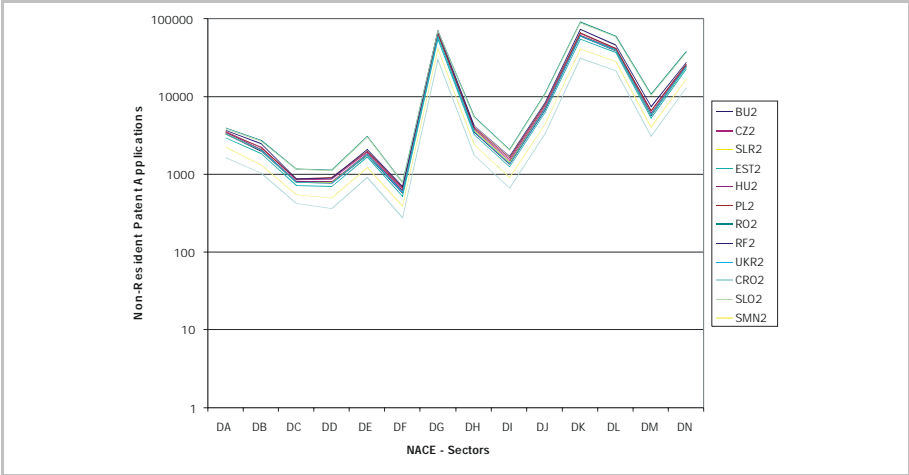
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<sup>3</sup> *Manufacturing sectors are:*

*DA – Food products; beverages and tobacco; DB – Textiles and textile products; DC – Leather and leather products; DD – Wood and wood products; DE – Pulp, paper & paper products, publishing & printing; DF – Coke, refined petroleum products & nuclear fuel; DG – Chemicals, chemical products and man-made fibers; DH – Rubber and plastic products; DI – Other non-metallic mineral products; DJ – Basic metals and fabricated metal products; DK – Machinery and equipment n.e.c.; DL – Electrical and optical equipment; DM – Transport Equipment; DN – Manufacturing n.e.c.*

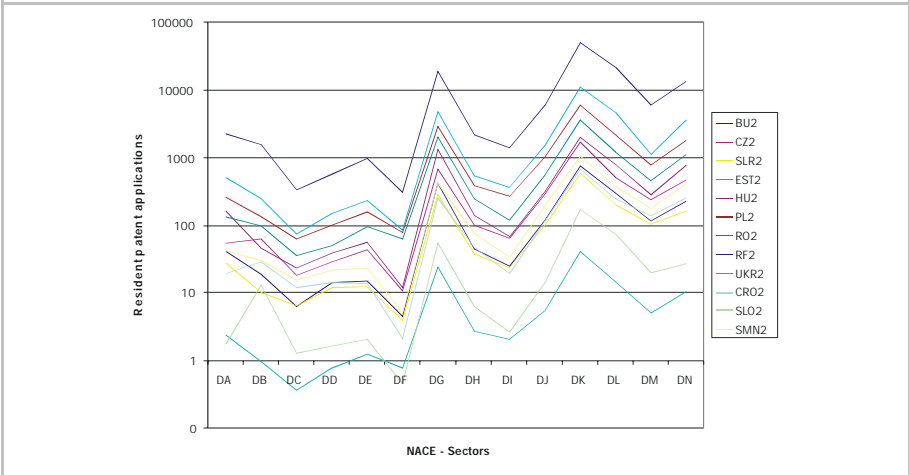
activity in countries with available sectoral patent data could support the evaluation of proposed concordance between IPC and HC classifications. Interesting results, after all, are highs in sectors DG ad DK, which are traditionally competitive sectors in selected CEE countries, and lows in DF and DI, again traditionally sectors of low competence in most of selected Central and East European countries!

Figure 3. **Non-resident patent applications in CEE countries, in 1989-2000 period, selected countries, logarithmic view**



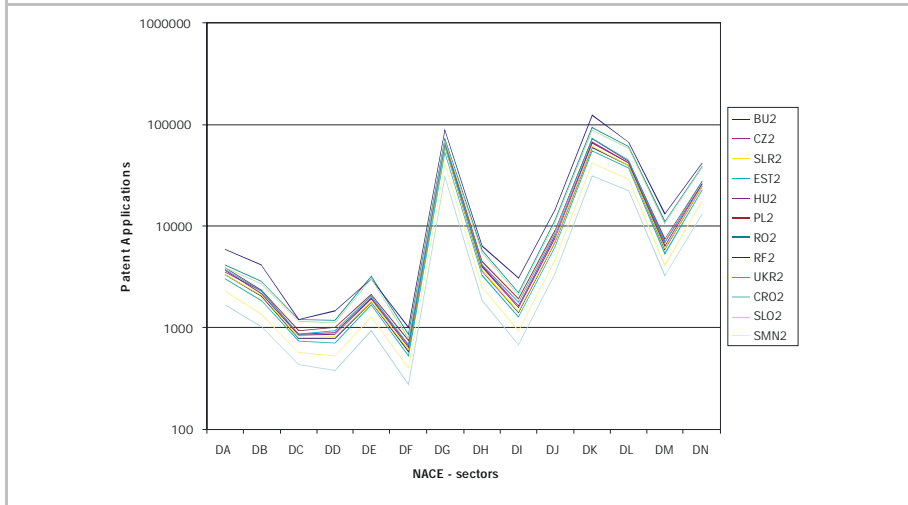
Source: (WIPO, 1985-2002; OECD, 2002).

Figure 4. **Resident patent applications in CEE country, in 1989-2000 period, selected countries, logarithmic view**



Source: (WIPO, 1985-2002; OECD, 2002).

Figure 5. **Total patent applications in CEE countries, in 1989-2000 period, selected countries, logarithmic view**



Source: (WIPO, 1985-2002; OECD, 2002).

## 7 Concluding Remarks

The presented analysis of patent activity in selected CEE countries could be summarized in the following 5 points:

- 1) Patenting behavior in selected CEE countries has undergone the process of change in the same degree and scope as other transitional changes started in 1989. Patenting inventions have become an important part of business activity in new, innovative climate, triggered and forced by market as well as by R&D impulse;
- 2) Indicators of patenting activity could explain the directions, trends, speed and degree of transition! Some of them, such as the coefficient of attractivity (CA) could be used as *indicators of transition* too;
- 3) The recovering of the intensity of domestic patent activity is an important process of innovation capacity building in CEE countries;
- 4) The strong inflow of foreign patents in CEE countries, which is aimed to conquer domestic market, could reduce areas to domestic inventors for competition too. Another aspect for treatment of foreign patents is use for the purpose of technological learning, increase of technological capabilities and competences, as this was case with import of technologies in Japan, South Korea and other countries in second part of XX century. Therefore, the presence of such a big number of foreign inventions, with available patent documentation, could become a source of technological development in analyzed CEE



countries. This is, again, one aspect of the process of innovation capacity building in CEE countries;

- 5) Although necessary for different purposes, patent data transformed from IPC to HC sectoral classification are still not fully available and applicable. Achieved results could only raise the issue of importance, but cannot be used for a thorough analysis.

Patent data remain a very rare measurable indicator of innovation activity. Therefore, the analysis of patent activity in Central and East European countries could support better understanding of the process of innovation capacity building and creation of national innovation system, which has happened under a new framework, predefined by the rules of the 20<sup>th</sup> century market economy as well as by the rules of knowledge-based development in the 21<sup>st</sup> century.

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# Foreign Business-led Mobility for Upgrading the Flow of Knowledge (New Measure and the Hungarian Experience)

Annamária Inzelt\*

## Abstract

This paper focuses on one part of the inflow of highly-skilled workers, namely on immigrants employed in relevant jobs by foreign (affiliated) companies. The aim of this research was to explore the relationship between foreign direct investment and knowledge-flow through mobility in the age of continuing internationalisation of companies. The internationalisation of economies is clearly changing the size, direction and character of employment-based mobility across countries.

This paper describes a new survey which was developed for this investigation in order to collect information relating to business-driven mobiles who are knowledge-conveyors in terms of brain and skill circulation.

Among the different types of business-led immigrants, managers first arrived in Hungary in the initial phase of transition. Foreign owners came here - or delegated employees - in the initial years of foreign direct investment in order to establish smooth collaboration - or simply to train locals in the jobs and apply tight controls. The importance of seconded CEOs (chief executive officers) should not be underestimated in the process of knowledge-flow, transfer of technology, and in changing the rules and behavioural routines. Managers create an environment for others to employ - or not to employ - their accumulated knowledge and skills and to support “upskilling” and mutual learning. In the later stages of development - more specifically in the late 1990s - other professionals were also imported by business, professionals such as development engineers and

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designers, and so many different types of knowledge assets flow into the country channelled through these occupations.

In the sample, most immigrants (one-third, in fact) were employed in sectors related to information and communications technology, and this clearly shows that Hungary, as a newcomer to the field of employers of immigrant labour, matched the contemporary “more highly educated immigrant” job pattern very well. This sector is, in fact, the leading employer for both groups – that of developed countries and the post-socialist and developing countries.

**Keywords:** knowledge flow, FDI, brain circulation, CEE

**JEL Classification:** J24, F21, O52

# Introduction<sup>1</sup>

Global competition for highly-skilled workers (HSWs) has placed the international mobility of more highly educated personnel at the very centre of policy concerns. The number of highly-skilled "globe-trotters" has increased rapidly, although this class of migrants still represents only a small fraction of all migrants - of the whole Human Resources of Science and Technology (HRST) population. However, it is no accident that both sending and receiving countries pay careful attention to this very small group of migrants. Highly-skilled (HS) human resources must be taken into account by policy-makers, since it is such skilled people who are essential for the production, diffusion and dissemination of knowledge. They are one of the most important factors linking technological progress, economic growth, and competitiveness, social and environmental well-being. The internationalisation of economic development has noticeably accelerated the spatial movement of people.

The migration of highly-skilled workers varies in its nature according to profession, and the motivational background to outflow and inflow varies also. In the internationalised economy one of the most important initiators of migration / mobility is business, mostly foreign direct investors. Business-driven migration can play an important role in acquiring and disseminating knowledge and in combining skills for generating new knowledge.

This study focuses on one part of the inflow of HS workers, namely on incomers employed by foreign (affiliated) companies in highly-skilled jobs which normally require higher educational degrees. These jobs may either be more or less sophisticated than their previous jobs, but differences in sophistication among such type of jobs goes far beyond the scope of the present survey.

Business-led mobility across countries has two aspects: (1) In the home country it is business which initiates HS inflow as a means of overcoming a lack of specific knowledge or expertise within the country, a shortage of skilled workers in a particular field or the acquisition of highly specialised skills. (2) Business, as an investor or trader in a foreign country, posts employees in host countries for longer or shorter periods.

The brain-gain in several fields is extremely crucial for the transition economies. When located within a socialist system, this type of peripheral industry, arriving late on the

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<sup>1</sup> *The paper is based on a report prepared for the EU Brain Drain project (EU ERBHP V2 CT 1999-07).*

scene, was effectively cut off from the major international sources of technology. During the transition period foreign investors could perform both types of business-driven migration (initiating and posting) in their role as initiators. The inflow of more highly educated people may become a genuine "brain gain" if these people are thoroughly involved in scientific/economic activity. Under the circumstances of transition, foreign affiliates seem to offer good examples for the study of business-driven migration and for examining gains in human resources of science and technology (S&T). The supplementary knowledge on which we are focusing can substantially help to compensate for the relatively low innovative performance of these countries.

*Central and Eastern European countries*, however, are appropriate "laboratories" in which to investigate this movement of foreign investors from the point of view of mobility. Foreign direct investment (FDI) started to penetrate into these countries in the 1990s when a positive correlation between the inflow of HS workers and the inflow of FDI was observable in the advanced market economies. At the same time, both brain-drain and brain-waste in the transition economies accompanied economic and political liberalisation. Political discourses as well as research studies concentrated on outflow (Carrington, 1998; Findlay, 1995; Glaser, 1978; Gokhberg, 1994; Sakkeus, 1997; Vizi, 1992; Walter, 1968), whilst our research is focused on investigation of inflow mobility - which is a very important part of brain-circulation.

This phase of research may assume that the *mobility of a highly-skilled person means spatial outflow and inflow of knowledge*. The assumption is that a mobile person transfers knowledge embodied in him/her from one country or region and/or on a job-to-job, employer-to-employer and sector-to-sector basis, across borders. Such embodied knowledge invariably has a (formally) certified content as well as a tacit content. It is, on the one hand, not fully transferable, whilst, on the other hand, the new environment may support the new combination of embodied knowledge which can lead to positive externalities for both the organisation and the individual.

In this paper we describe a pioneering survey which was developed to investigate the business-driven immigrants who are knowledge-conveyors in terms of brain and skill circulation. This novel form of measurement is currently in its infant stage, but it may be helpful in respect of the collection of information on international mobile HS people and the flow of knowledge.

The aim of this survey was to explore the relationship between foreign direct investment and knowledge flow through migration. We assume that the migration of highly educated people means a flow of knowledge from one country to another, and the question, therefore, was whether the penetration of FDI into Hungary has been accompanied by the appearance of international mobility, that is to say, how foreign investors are involving the Central and Eastern European countries (CEECs) in brain circulation. The survey, therefore, focuses on the role of foreign investors: entities are either small (that is, owned by one or a small number of foreign nationals) or they are giant multinational companies (MNCs). A side-effect of this survey is an investigation into non-FDI-related immigrants who are employed by foreign-owned companies. Consequently, the population examined in this study is that of HS immigrants working for foreign-owned companies - either posted, or simply employed by them.

## 1 Conceptual Framework

Knowledge may circulate across borders in many forms. Mobility is one of the instruments for the transfer of scientific, engineering, and business knowledge. A mobile human means a conveyor of knowledge. There are several ways for knowledge embodied in highly-skilled personnel to move across borders, and the basic mobility of HSWs is only one of these. The globalising, learning economy needs more mobile human resources. This brain circulation process has different impacts on national economies, on innovativeness, competitiveness and re-investment into knowledge.

The concept of this study derives from three quite distinct types of academic literature. The first lies in the field of innovation research. Here, important understanding has developed around key concepts, such as national innovation systems (Nelson, 1993; Edquist, 2000; Lundvall, 1992), and knowledge-based economies (David and Foray, 1996). An important part of innovation research is concerned with internationalisation, and the case is that internationalisation of the generation of innovation and technology has expanded considerably during the last three decades of the 20<sup>th</sup> century (Cantwell and Molero, 2003; Meyer-Krahmer et al., 1998; OECD, 1998; OECD, 1999; Patel and Pavitt, 2000; Pearce, 1999). The knowledge-based economies favour innovative networks and development of a dynamics of creation and circulation of knowledge, and so networking has become more and more common among different institutions - both at domestic and international level. The geography of the production of knowledge is on the way to becoming drastically modified. "Multinationals are establishing and



expanding R&D abroad, benefiting from the possibilities offered by ICT to internationalise the learning process along the whole of the value chain." (Cohendet and Joly, 2001, p. 80). Multinationals, in fact, are establishing operations in some significant locations where key competencies for high-quality research are already available – in this way benefiting from combining their own current capabilities with other, highly absorptive capabilities which are not only already active in their own right, but which offer an international dimension.<sup>2</sup>

The second strand of literature lies in the field of migration and mobility. Many academics have recognised (for example Findlay et al., 1994; Salt, 1997) that there is a positive correlation between the inflow of skilled labour and investment spending, as predicted by a model of migration of expertise following the economic theory of globalisation, but this is certainly not always the case. Intra-firm migration / mobility is a known phenomenon - although very little empirical evidence is available. Studying this topic is not easy since business organisations are usually reluctant to afford insight into this process (Winkelmann, 2002), and so the scarcity of studies in this field is due to many factors, the most important among them being the lack of data and general difficulties in measuring the phenomenon.

Another important strand of literature deals with measurement. Two OECD manuals provide detailed information on this issue, namely the Frascati Manual (2002) which defines the research and development population and their measurement, and the Canberra Manual (1995) which deals with human resources in S&T. The latter manual provides a conceptual work for measuring human resources devoted to science and technology (HRST). The total HRST population includes not only those working in research and development laboratories but also personnel such as shop-floor engineers, medical salesman and financial managers.<sup>3</sup> In this way the HRST population is broader than a simple group of scientists who are usually gifted, talented individuals (see the discussion of term in Cheese, 1991; UOE, 2001; David and Foray OECD STI, 1995, p. 27; Wolff, 1996).

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<sup>2</sup> *An important lesson from the experience of many countries is that FDI relates to pools of talent on a de facto, existing basis; foreign investors are not prepared to invest in education or in improving education (Pavitt, 1997).*

<sup>3</sup> *To employ Canberra Manual-type working definitions in this instance: to the HRST category belong those people who (a) successfully completed education at tertiary level in a science and technology (S&T) field of study 'more highly educated people'. (b) Not formally qualified as in (a), but who are employed in an S&T occupation where such qualifications are normally required 'skill level'.*

We have many unsolved problems to face in the measurement of migration of HS workers, including the basic one of the lack of a generally accepted definition of *highly-qualified migration*.

Many different terms are used in the literature to measure and discuss the international mobility of human resources in science and technology.

Definitions employed in scientific literature differ from the definitions found in official documents.<sup>4</sup> The length (of time) dimension is important in these notions but it does not enjoy overall priority over other factors. As Avveduto (2001) summarised the matter, literature sometimes uses the term “skilled international migration”, “skilled international labour circulation”, “professional transients”, “migration of expertise” and “quality migration”.<sup>5</sup>

Many different social science studies shed light on the drastically changing character of migration in the late 20<sup>th</sup> century (Chesnais, 1992; Cervantes and Guellec, 2002; Wolff, 1996; Salt, 1997; Salt and Singleton, 1995). A new wave and style of migration is emerging from the mobility of the scientific and business community.

The recent reshaping of the strategy of multinationals has increased “in-house” mobility and has changed the typical length of foreign postings. The professional pattern of posted personnel also differs from earlier periods. In general, multinationals and other foreign investors are becoming important players in the field of HS mobility. The forms of mobility accompanying foreign investment differ widely in that we can note both bilateral and multilateral posting of HS personnel, training of people in countries other than their normal workplace and long-term collaborative work involving short-term physical co-existence.

Foreign knowledge and the inflow of HRST are important sources of new technology, increasing productivity for any national economy, and foreign investors are becoming increasingly involved in, and responsible for, the migration of qualified personnel.

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<sup>4</sup> *The current UN definition, which is the basic definition for official statistics, defines migrants by calculating the length of stay (1 year + 1 day of residence in another country and foreign citizenship or permanent residence in a different country). This means that simple migration statistics cannot assist too much in classifying HS migrants as emigrant/immigrant or mobile.*

<sup>5</sup> *The original sources in order of notions: Findlay (1990), Cormode (1994), Appleyard (1991), Salt and Singleton (1995) and Todisco (2000).*

The "knowledge" embodied in individuals changes continuously by such means as further education, training and experience, as well as forgotten, disused or devalued knowledge. The impact of foreign highly-skilled workers on the economy of a host country depends on many factors: the differences in the knowledge actually imported by migrants relate to many factors - such as their education, work- experience and accumulated culture regarding the systems of innovation with which they are familiar, and so on. The knowledge actually embodied in "mobiles" can be either tacit or codified knowledge. Tacit or personal knowledge means that the individual concerned knows how to do something without necessarily being able to describe how he/she does it. Learning by doing is, therefore, one way of reproducing tacit knowledge. New people are brought into the company and the by-product of their activities is the diffusion of tacit knowledge (Arrow, 1994).

## 2 Penetration of FDI in CEECs and Mobility

Foreign investors range from the small foreign company, located in one or two countries, to the giant multinational<sup>6</sup>, and distinguished players in the process of internationalisation of labour markets are the trans-nationals. According to the recent UNCTAD 2000 report, roughly 40,000 multinational companies run 300,000 firms in 130 countries of the world, although MNCs actually originate in very few countries (of the 100 top MNCs 88 originated from "the Triad").

The regional structure of investment flow has changed much during the last three decades. Until the beginning of the 1990s the majority of investment flow took place among the most advanced countries - within "the Triad".

Each type of foreign investor has a part to play in international migration, although the MNCs, being such important players in the world economy, are the rule-makers in the field of intra-firm international mobility. In the 20<sup>th</sup> century these companies accelerated the internationalisation of trade and capital markets and played an important role in national labour markets. During the last two or three decades of the 20<sup>th</sup> century they were economic initiators of the free movement of people and commenced the internationalisation of business research and development activities.

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<sup>6</sup> *Foreign investment is classified as a direct investment if the foreign investor holds at least 10% of ordinary shares or voting rights in an enterprise and exerts some management influence. The term "foreign affiliate" is restricted to those foreign affiliates which are majority-owned.*

Multinational companies are important players in terms of brain circulation. They both export and import knowledge through internal mobility on an international scale. MNCs offer international career possibilities to their own employees, whilst the trans-national companies were always involved in organising the labour market across national boundaries, largely by encouraging people to change their location to where they could be most useful to the company. They brought managers into affiliates and created international career possibilities for people from both corporate headquarters and the affiliates. The differences may be observed by occupation and the status of affiliates within the group, this status relating to the position of individual countries in terms of world competition.

Types of such internal mobility include short-term migration (for example, in training seminars, on-the-job training and study tours within the "empire") and work under circumstances of short or long-term migration from one country to another (although such possibilities are not open to all employees). Both have important roles to play in dissemination, diffusion, accumulation and exchange of knowledge. The tacit and codified knowledge of organisations may be shared.

*Foreign-owned companies as employers of immigrants* may be classified into three different groups:

- 1) Long-term immigrants from investor-related countries (either from less or more developed regions). In such cases the home country of the investor and the citizenship of the immigrants are the same.
- 2) Long-term immigrants from non-investor-related countries (either from less or more developed regions). Here the home country of the investor differs from the citizenship of the immigrants.
- 3) Short-term immigrants from investor-related organisation (We do not, in fact, concern ourselves with this third group).

Any long-term immigrants may be business-led employees or job-seekers. The "business-driven flow" comprises both employment-driven and employment-initiated flows. In the first case, immigrants accompanying FDI are employees of the investor companies who simply post them from one location to another. The "employment initiator" may head-hunt specialists or recruit new employees through different channels in different foreign countries – but still in order to post them to the investment recipient

country. Business-led, highly-skilled workers are naturally employed as highly-skilled workers.

FDI is a relatively new phenomenon in CEECs. As is well known from the literature, the CEECs were outside the main flow of internationalisation for roughly four decades (WIIW Forschungsberichte No. 215, and Transition Report 1994), but they have now accumulated considerable experience of the influence of non-investment by foreigners in respect of knowledge flow. The less developed regions, which are generally avoided by investors, are usually great sources of migrant labour, including skilled migrants for the longer term, and only political constraints have prevented these countries from being large-scale suppliers of highly-skilled workers. The opening of borders has acted as a safety-valve for what we might perhaps term “pent-up migration”.

The collapse of the socialist regimes and the transition of CEECs towards market economies have totally changed the situation. CEECs have become important target countries for foreign investors in the new unipolar world system (Resmini, 2000; Kalotay, 2003; Sass, 2004; Antaloczy and Sass, 2001; Inzelt, 1999, 2000, 2003a).

Specifically, FDI has played a fundamental role in the transformation of the Hungarian economy. One of the most common forms of FDI, that is to say, acquisition, was an important part of the privatisation process. Inward FDI flows (as a factor of GDP and averaged over the period 1990-98) put Hungary at the very top of the list among OECD countries. At the same time, outflow was very limited and very much at the lower end of the ranking table (OECD, 2001, p. 99).

There are many factors (and actors also) involved in establishing the ways in which people and jobs are brought together across borders. If foreign investment is accompanied by employment-based HS migration, then the consequent inflow and outflow will result in effective brain circulation.

The penetration of foreign direct investment in the transition economies offers a good possibility to study how foreign investors lock their local CEE firms into intra-company mobility.

Foreign investors are important players on the Hungarian labour market. (Inzelt, 1994; 2000). As an OECD study (OECD, 2001, p. 102) highlighted, the ratio of foreign affiliates in employment in the Hungarian manufacturing sector is around 50% - as high as in Ireland and Luxembourg. The ratio of foreign affiliates in industrial R&D is also

high in Hungary at 70%. This high figure reflects the economic activity of foreign affiliates, since they carry out relatively more R&D than domestic companies. It is, therefore, worth studying how the posting of people from parent companies and of mobile people from other regions relates to this level of activity.

It was assumed that the internationalisation of employment in CEECs would occur first of all in those companies which had been bought or capitalised by foreigners. The foreigners would upgrade the knowledge of companies by transferring their own knowledge. Other scenarios, however, were not excluded. Foreign investors might preserve the company's capabilities at the same level - or might even downgrade them. These scenarios, however, do not belong to our study.<sup>7</sup> According to their area of employment, the personnel involved might be the managers of subsidiaries of multinationals, professionals, consultants, specialist workers or international experts. The foreign, highly-skilled workers might be transferred within foreign-owned companies, recruited abroad by the company or simply employed locally.

We would like to know whether the penetration of foreign direct investment in Hungary is accompanied by emerging international mobility. Do foreign investors bring highly-skilled people into Hungary to upgrade the knowledge in various fields? Is our economy involved in brain circulation? From the standpoint of the overall migration process, this might be a narrow topic, but it is very important.

We made an attempt to measure the employment-based HS worker inflow into the country. In this connection, an important part of business-led HSW mobility is the long-term business-posted emigration from affiliates and partner organisations. Until now CEECs have not featured on any map of such a type of mobility, even if scattered emigration may be observed towards investor countries and to other locations of the multinationals. This survey does not deal with this (almost negligible) outflow of HRST.<sup>8</sup>

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<sup>7</sup> *Concentrating on brain circulation, we are less interested in the general influence of MNCs on the labour market. We are interested in cross-national HS mobility accompanying foreign direct investment.*

<sup>8</sup> *Generally speaking, the HS emigration from CEECs is not negligible. Here I would emphasize that an outflow through foreign investment channels has, as yet, hardly occurred at all. This channel of knowledge acquisition and dissemination has scarcely existed.*

### 3 Designing a New Survey

The thorough investigation of data sources (see Country folder on Hungary 2002) illustrates very well that very limited data on R&D mobiles are available and that the data on non-researcher, highly qualified employees are minuscule. The assessment of available sources leads us to conclude that a new survey is needed to fill the gap of missing data and indicators to respond to many important policy questions which are emerging with the internationalisation of economies. One of the important issues is the brain-gain of the business sector in a receiving country.

The IKU Innovation Research Centre of Budapest designed a survey to study the inflow of FDI business-led, highly-skilled workers. The aim was to attempt to measure this process and collect adequate data for further investigation. The survey focuses on the role of foreign investors in HS inflow where the investors are either small foreign firms or giant MNCs.<sup>9</sup>

HRST-related manuals (the Frascati Manual, 2002; the Canberra Manual, 1995) and classifications (UN, 1998) simply touch upon migration-related definitions of this particular population sector. The measurement of brain circulation belongs to different (as yet un-harmonised) statistical domains. The effective realisation of "brain-gain" naturally takes different periods of time for different groups of immigrants, and, if we are to focus on HSW immigrants amongst the newcomers to a country, we need to divide them into two distinct groups. The greater part consists of incoming established HS personnel, although a further part will belong to the receiving country's HRST following a period devoted to accreditation of their HE degree under the rules and regulations of the receiving country. Personnel posted to a country by foreign-owned companies belong to the first group, although it should be remembered that foreign-owned companies, as normal recruiters in the local labour market, may also employ other new arrivals.

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<sup>9</sup>The design of the questionnaire and its testing in other CEE countries are described in an EU report (Inzelt, 2003b). Participatin in the survey process were Katalin Miskolczi (register preparation and survey testing), Nóra Csunderlik (survey testing and running) and Mandy Fertetics (data processing and tabulating). Their valuable work was extremely important for the successful completion of the pilot survey.

### 3.1 Questionnaire

The survey method employed was that of a telephone interview combined with a fax-sheet, since such combined survey methods increase the reliability of responses. (The questionnaires can be seen in Annex 1.). This type of questionnaire allows the collection of data on foreign HE employed by a company on the actual day [month] of investigation. This information is extremely helpful in learning the features of HS migrants, although many characteristics of mobility remain unclear. Two directions for further research can bring crucial, additional information to the study of the mobility patterns of HS and of changing business behaviour in employing HS migrants. One is a retrospective survey which makes use of company archives and the other is a direct survey of individuals. We have attempted the second of these. The main characteristics of the survey are described in Annex 2.

It is not easy to identify the target group of the investigation, but the target group of this survey are either partially or totally foreign-owned companies employing highly-skilled immigrants.

The working definition of this sample was that a foreign highly-skilled worker is a person employed in an occupation where a first-degree qualification is normally required and who has worked at the company surveyed for more than 1 year. Those who met these criteria were included in the sample, whether or not their employer was a Hungarian company. (The actual employer might be another firm within the same group but located abroad – or even another company which “borrows” them). This method allowed us to test the relevance of the definitions taken from the Canberra Manual and from UN Migration documentation.

Two categories of HS migrants are employed: (1) Business-led and (2) Job-seekers. In both groups a distinctive group of migrants, returnees, may occur. The returnee has no clear definition, but it is a term commonly used for natives who stay a couple of years or decades abroad and then return to their native country.

In 1998 the total number of foreign-owned companies in Hungary was 26,272, that is one third of all companies (Statistical Yearbook 2000, p. 275-279). Such a large group was unmanageable in relation to our feasibility study and so we were compelled to narrow the circle. It may be assumed, however, that (1) if a firm’s ownership is at least 51% foreign, the foreign affiliate is more likely to employ immigrants than others, and that (2) if a foreign-owned firm is innovative, it will employ highly-skilled workers more



frequently than non-R&D oriented, non-innovative firms. Without going into the details of sample selection, I would simply mention at this point that we used three different sources to identify firms which apply double or single filtering criteria.<sup>10</sup>

Only a minority of companies employ foreign HSWs on a long-term basis – that is for more than 1 year. There is, however, a great deal of what we may term short-term migrant activity among the companies which have not employed foreigners for a long time. In this connection, one or two respondents emphasised that highly-skilled foreigners regularly worked in Hungary for short periods.

Among companies who did not respond, it is worth mentioning one group of Hungarian medium and large-size firms owned by large foreign, national or multinational companies. Seven of these reported that records were at corporate headquarters (HQ), but the majority refused to respond to questions relating to the make-up of their workforce based on levels of *education, occupation and nationality*, mentioning "commercial confidentiality" as their reason. This behaviour does not relate to the person, occupation or nationality of the respondent but to the general corporate culture, the culture of the affiliate and the treatment of the affiliate by the group.

The results of sample selection are summarized in Table 1.

Systematic responses were received from 43 companies, *39 of whom employed long-term highly-skilled immigrants in 2000*. The remaining four had employed long-term HS immigrants in the 1990s. The sample, however, includes only those companies who were employers of long-term HS immigrants in 2000.<sup>11</sup>

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<sup>10</sup> *The sources were: The databank of the Ministry of Economic Affairs, which contained information on R&D, innovation, and technology transfer activities (in the broad sense) and on foreign investment. The reference year was 1998. Another source was the "Hungarian Top 200" compiled by "Figyelő" which included well-known multinationals in Hungary. A further databank of the Ministry of Economic Affairs became available in 2001 and contained data on companies partly foreign-owned - by relevant sector and based on 1999 data. Sources were used consecutively in the sense that when the shortcomings of one source became clear, we moved on to another.*

<sup>11</sup> *The "used to employ" group illustrates the presence of two phases of FDI-related HS immigration, although we do not have retrospective statistical evidence on the HS inflow and outflow of companies. People interviewed mentioned that the company used to have long-term immigrants - for one or two years in many cases. They had arrived in the initial stage when the company was set up (or acquired) by its first foreign owner. The owners arrived or posted a few HS employees to Hungary to inculcate the new corporate culture, to import capabilities which were lacking and to learn the newly set-up/acquired firm's local culture and capabilities. After a few years of co-working these positions were passed on to locals (whether trained abroad by the company or not). Similar tendencies are also to be observed in other post-socialist countries.*

Steps in sampling	Number of firms by sources		
	MEA, R&D <sup>1</sup>	'Figyelő' TOP 200 <sup>2</sup>	MEA, FDI <sup>3</sup>
Total	725	200	
Performing double filtering criteria*	172	36	1,095
Not employing HSW immigrants**	79	16	638
Refused, disappeared, etc.	53	12	438
Respondents	40	8	19
Employing HSW immigrants for more than 1 year	16	6	17

Notes: MEA = Ministry of Economic Affairs.

\*Filtering criteria by sources.

<sup>1</sup> 51 % foreign ownership and innovation.

<sup>2</sup> At least 51 % foreign ownership among the first 50 in the rank of Top Hungarian.

<sup>3</sup> 51 % foreign ownership and large net sales (about HUF 300 million).

\*\* Including short-term immigrants.

The number of firms by sources produces some overlapping.

## 4 Employment-based HS Immigrants at Foreign Owned Firms (The Main Findings of the Pilot Survey)

The 39 respondent companies employing highly-skilled immigrants provided detailed information on a total of 182 long-term employed, foreign citizens.<sup>12</sup> In the case of business-led immigrants, we can assume that the organisation posting an employee had a clear wish to transfer the embodied knowledge of the employee in order to realise positive externalities from the new combination of knowledge.

Of a total of 182 highly educated foreign employees, 96 arrived from the home countries of the investors. The vast majority of these (60) came from the same countries or had the same citizenship as the investors. The number of business-led immigrants is somewhere between 60 and 96. Originating from non-investor countries are 86 HS immigrants, 18 of these from developed economies (UK, Belgium, Norway and Portugal) (Table 2).

There is much empirical evidence in the literature which shows that the country of origin, the sector of activity, the size of firm and the relative and absolute size of investment have an important influence on the flow of knowledge between the investor and the receiving countries. Our previous case studies have supported these observations.

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<sup>12</sup> The sample covers 5% of HS immigrants registered by National Employment Office. (Migration Statistics identified 4,384 higher educated immigrants in 1999 - 24% of total immigrants. The other statistical source, The National Employment Office registered 3,771 in the same year.)

The same influencing factors are as important in the transition economies as they are crucial in other parts of the world. Let us first characterise the investors.

The total number of investor countries is 13, whilst the number of countries sending immigrants is 25. Common to both groups are 9 countries that are both investors and senders of immigrants. Twelve countries which are the source of foreign ownership comprise the advanced European market economies (excluding the USA); whilst another is the post-socialist giant, Russia. The 25 different countries from where immigrants arrived are made up of 13 advanced market economies, together with 8 CEE post-socialist countries and 4 belonging to the developing world.

We do not have exact data on business-driven and job-seeking immigrants, but we can use rough measures to classify respondents into these two groups. It may be assumed that the “business-driven flow” is roughly the same as that of immigrants from investor countries and that the “job seekers” are those who arrived from non-investor countries - including both the advanced market economies and the post-socialist and developing countries.<sup>13</sup> At this stage of transition this rough classification is relevant, although there are exceptions to be found in both groups (See table 2).

We term the first group “business-driven” immigrants and the second “non-FDI-related” immigrants’ even though the latter group was also influenced by FDI. Foreign investors have an important influence on labour market conditions in that, during the first period of transition, the companies privatised by foreigners or who were invested in by foreigners, sometimes offered jobs with higher salaries than the others. In several sectors they were job-keepers/creators in the transition period.<sup>14</sup> Our sample covers only those groups of companies which maintained or created jobs. A large group of foreign investors employs no foreigners whatsoever - neither posted nor job-seeking.

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<sup>13</sup> *The investor countries in our sample are the developed (advanced) countries - with one exception: Russia. This Russian-owned company employs 1 Russian, which supports our rough measure.*

<sup>14</sup> *Foreign acquisition has produced very different impacts on the job-market. In many cases departments and/or factories were simply closed, but, if the companies recruited or were ready to employ HE job-seekers, they usually offered better prospects than other companies.*

Table 2. Number of Foreign HS Employees by Country of Investor and Citizenship

Country of investor	Citizenship of foreign HS employee																			Total									
	Immigrants from country of investor										Immigrants from country of non-investor																		
	Germany	Austria	France	USA	The Netherlands	Finland	Sweden	Switzerland	Russia	Denmark	ALL	Romania	UK	Yugoslavia	Croatia	Poland	Belgium	Ukraine	Norway		Slovakia	Iraq	India	Portugal	Czech Republic	Iran	Egypt	ALL	
Germany	25	1			1	2										9	1										10	38	
Austria	2	5		7				1							3	15	3				1						22	37	
France			6													6												6	
United States	1															1					1	1					2	3	
Netherlands	1	1		1	1											4												4	
Finland					10											10												10	
Sweden	1	1		1	1	6										11	17	4	1		2		2				28	39	
Switzerland			3	2		1	6									12	2			1			1	1			8	20	
Russia								1								1			1								1	2	
Denmark				1												1												1	
Italy																		1										1	
Luxembourg	1		4													5												5	
Cyprus																												1	
Unknown			1											3		6	1							1			1	13	14
Total	31	7	15	11	3	11	9	6	2	1	96	48	11	4	3	3	3	2	2	2	2	2	1	1	1	1	86	182	

Note: Ranking of investing country by number of firms.

HS immigrant has citizenship of investing country.

## 4.1 Characteristics by Employers' Organisations and by Employees

From the 39-strong sample 21 investors originated from major, 10 from medium, and 4 from small economies.<sup>15</sup> (The remaining 4 were unknown). The most common foreign owners are Germans (13 of the 39) followed by Austrian (6), and French (4). Foreign investment has, to all intents and purposes, penetrated all sectors of the Hungarian economy. By economic activity, 7 firms were active in the manufacture of chemicals, in the commerce of chemical products and in the rubber & plastics sector. The second largest number, 5, had invested in the metal fabrication, whilst 4 are engaged in the manufacture of electrical and non-electrical machinery, in construction and high-tech services (software, engineering advisors, engineering firms, natural science and engineering R&D activities). Regarding the size of companies, the sample is very rich: since the smallest has 2 employees and the largest 8,427. At the end of 2000 the number of companies in our sample which were 100% foreign-owned was 21. Foreign capital ranging from 90.1% to 99.9% was involved in 8 companies, from 50.1% to 90.0 % in 5 whilst in 3 it was below 50%. Redeployment caused many changes in ownership between the period of selection and the investigation – which is the reason for foreign ownership being below 50% in several companies.

The total number of employees in the sample is 34,965, but data is not available as to how many highly-skilled people are employed by these companies. The total number of foreign employees and the number of foreign HE personnel are also unknown. Clearly, job-seeking, highly-skilled personnel may or may not obtain HS positions, and those who could not are usually missing from an employer's archives. Consequently, there is no one in our sample with higher education who does not perform an HS job. They were not, in fact, excluded from the investigation per se, but virtually no information is available on them through their employer.<sup>16</sup>

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<sup>15</sup> Here, and in several other tables, we classified countries as investors or as the sending country by the OECD classification of major, medium and small economies.

<sup>16</sup> There are many reasons why more highly educated migrants cannot work in HS jobs (e.g. the labour market situation, the receiving country devalues the degree acquired by the immigrant, a limited knowledge of receiving country's language). The acceptance of an immigrant's knowledge also changes in the receiving country according to such factors as the economic situation, the organisation of the recipients and by the degree of assimilation of the immigrant himself (language skills, accreditation of degrees, networking). Some are "under process" for HS in receiving countries; others not. The survey could not identify immigrants belonging to these "no longer" and "under process" groups of HRST. According to our fragmented information, these people do not report themselves as more highly educated if their chances of an HS job are very limited. They like to avoid the possibility of their degree becoming a burdening factor in their employment.

The total number of foreigners in our sample who were employed in highly-skilled jobs is 182, whilst the ratio of foreign HE employees to the total number of employees is around 0.5%. If we assume that the total number of highly-skilled workers is no more than 10% of all employees (3,497), then the foreign highly-skilled worker category represents 5% of all highly-skilled employees.

Out of the 39 respondent companies, 3 employ more than 10 more highly educated foreigners, whilst the 100% foreign-owned companies (21 in number) employed 75% of these (Table 3). As the last column shows, only 3 companies employ more than 10 foreign HE personnel. Two of these are active in information technology and carry out R&D activities in Hungary, whilst the third is a well-known multinational in the tobacco industry.

As Table 3 shows, half of the firms investigated employ only 1 highly-skilled foreigner and fewer than 10 % employ more than 10 HE personnel. The largest number of foreign highly-skilled workers is 39 (employed by a multinational company). The next in ranking is also an MNC, which employs 22. As we know from other sources, these MNCs have involved their Hungarian affiliates in R&D activity and both joint and shared R&D activities are characteristic of the category.

By size of group, medium and large companies employed 78% of foreign HE personnel and one quarter employed at least 6 such (one of these was to be found among the small companies).

Country origin of investment		Number of companies					
		Total	by number of foreign HE employees				
			1	2	3-5	6-10	11-
Major economies	United States	2	1	1			
	Germany	13	7	2		4	
	France	4	3		1		
	Italy	1	1				
	Russia	1		1			
Total		21	12	4	1	4	
Medium economies	Netherlands	2		2			
	Switzerland	1					1
	Austria	6	3		1	1	1
	Sweden	1					1
Total		10	3	2	1	1	3
Small economies	Denmark	1	1				
	Finland	1				1	
	Cyprus	1	1				
	Luxembourg	1			1		
Total		4	2		1	1	
Unknown		4	2		1	1	
Total		39	19	6	4	7	3

## 4.2 Key Characteristics of HS Foreign Employees

Relating to the development level of the host country, two main groups of immigrants may be distinguished according to their national origin:

- Immigrants from countries more developed than the host country itself
- Immigrants from countries less developed than the host country itself

In very rough terms, citizenship (in regional terms) might indicate differences in development level and variations in familiarity with types of national innovation system. Each group of HS immigrants has both common and different roles in the S&T system and in the economy of the host country. Table 4 summarizes the origin of foreign HSWs by main region.

Region	Total	Male	Female
EU countries	92	86	6
EFTA	8	7	1
New members (Poland, Slovakia, Czech)	6	4	2
Candidate (Romania, Croatia)	51	41	10
Other European countries (Ukraine, Russia, Yugoslavia)	8	7	1
America	11	10	1
Others	6	5	1
Total	182	160	22

*Note: Among the Romanians, 2 are Romanian citizens but ethnic Hungarian, 1 of whom has now been naturalised Hungarian; likewise, 1 German and 1 American are Hungarian by origin.*

One quarter of the foreign, highly-skilled employees are Romanian citizens (48). These are usually economic and ethnic migrants settling in Hungary or moving from East to West.<sup>17</sup> The second largest group of highly-skilled workers is German (31); which is due to foreign acquisitions and investment. In this category many nationalities precede the Austrians. A special group of migrants, the returnees, may arrive from both groups of countries, and among the immigrants two were identified as returnees posted by foreign owners. However, we know of several other returnees educated in Hungary, holding foreign citizenship and who were posted here. These people usually have an important role as knowledge conveyors and are actively participating in brain circulation.<sup>18</sup>

As regards gender distribution among long-term immigrants, professional women seem less involved in intra-firm mobility than men. The vast majority of HS immigrants (88%) are men - from 25 different countries – and women (12%) have arrived from only 11 different countries. Women may be more reluctant to move for family reasons or they may have fewer opportunities to be seconded or posted by their employers. It is, however, worth noting that only 36% of the females arrived from the advanced countries,

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<sup>17</sup> *Liberalisation in CEE countries plays an important role in ethnic-based economic migration. Other motivating factors were significant: economic differences and labour market possibilities in neighbouring countries are serious factors in short and long-term migration.*

<sup>18</sup> *Not only do official statistics find difficulty in collecting data on genuine, returning (HS) migrants; it is not easy even for a specific survey such as ours to collect them. Human resource managers reported as returnees those holding dual nationality and foreign citizens with Hungarian family origins (either born in Hungary or born abroad but speaking Hungarian). If a Hungarian citizen had worked abroad for 5-10 years without changing citizenship, he/she was not included in the immigrant category nor identified as a returnee (one from Germany and the other from the USA).*



whilst the proportion of males is 57%. The gender distribution factor may not be very far from the Hungarian average.

Different generations show various characteristics as knowledge conveyors. The younger generation usually conveys fresh, new knowledge but can offer very limited experience. In other words, there is more codified and less tacit knowledge embodied in younger people, and in this case it is extremely important that they acquire new knowledge wherever they can. On the other hand, the older generation possesses much in the way of familiarity with routine and practice, of skills and competencies which are conveyed from one work-place to another across borders. Their codified knowledge may be either up-to-date or out-of-date - depending on the individual's efforts and success in the life-long learning process.

Two-thirds of immigrants are below 40, so belonging to the generally more mobile population sector (Table 5). By their age 14% (25) employees are above 50, but only 4 of these arrived from post-socialist or developing countries (refugee supplier countries). Different proportions in age groups by country of origin highlight the fact that immigrants from different environments are arriving with different aims, expectations and opportunities. Immigrants from the advanced economies display strong mobility characteristics, in that, for example, young West Europeans and Americans look for jobs in Hungary (in CEECs in general) as a stepping-stone for a future career. More mature Westerners are given a job by their employer as a pre-retirement or "winding-down" position.

Region	Age group				Total
	20-29	30-39	40-49	50<	
EU countries, EFTA, America	16	49	15	22	102
Post-socialist countries	24	21	3	2	50
Others	2	3	-	-	5
Total	42	73	18	24	157

*Note: Age distribution was not known in each case.*

People from post-socialist and developing countries belong to typical age groups of economic immigrants and represent the most mobile generations. For them Hungary might be a final destination (for example, for Hungarian ethnic minorities from neighbouring countries and for those who were educated in the country and speak the

language). Alternatively, it may be nothing more than a transit stop on the way from their home country towards the more advanced countries.<sup>19</sup>

The picture of age-group by gender is very typical. On average, the female HS immigrants are younger than their male counterparts. Of the females, 73% were below 40 but only 66% of the males. The proportion of females to the total population below 40 is 14%, whilst above 40 it is 7%. The sample is, however, too small for further analysis. If we examine the occupation of immigrants by age group, we can find only senior officials and managers above 60. In the 50-59 age-brackets this proportion falls to 21%, whilst only 6% of all professionals belong to this particular age-group.

### 4.3 Imported Codified Knowledge

The University degree is a common measure of codified (certificated) knowledge. The information on certificated knowledge is based on the foreign worker's educational qualifications as accepted in the country of origin, but differences in educational systems among the countries of origin of the degree go beyond the investigation of this paper.

The response rate to this item proved lower than to others. We know the degree of education of 60% of employees, and so this part investigates together both the business-led and job seeker migrants who were employed by the companies investigated.

In respect of university degrees, the majority (119 immigrants) had a second degree, whilst two had a third - and no more than 21 had a first degree only. In the class of 'unknown' there are several non-graduates.

The largest group of immigrants have university degrees in engineering. In fact, two thirds have degrees in engineering, of whom half belong to ICT-related fields: electrical engineering and informatics (32% of item respondents). The engineering field was significant among arrivals from both the advanced countries and the former socialist countries (Table 6). Even the total number of arrivals shows almost the same proportion

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<sup>19</sup> *In addition to the turbulent migration within the region, Hungary and other CEECs, are becoming target destination countries for many Asians - at least temporarily. In accordance with general migration tendencies, people are arriving from the ex-socialist countries or satellites of the communist world (e.g. Mongolia, Vietnam, Afghanistan, Georgia and Uzbekistan). People from the large Asian developing countries are also among the immigrants, although we could not find many of these in highly-skilled jobs in the companies surveyed.*

of ICT-related engineers as higher among immigrants from candidate countries. 10% of respondents are educated respectively in the natural sciences or in business (management, marketing, and commerce). The majority of business degree holders arrived from EU countries and 35% of these are above 50 years of age. If we look at their occupations, this is self-explanatory (see Table 7 in the next section). People with a degree in the natural sciences came both from the former socialist countries and from the developing countries - 53 % of these are below 40 years of age.

**Table 6. Relationship between field of education and different groups of HS immigrants**

Field of education		Foreign HS employee from					
		Developed country			Developing country		
		business posted	business initiated and job seekers	total	business posted	job-seekers	total
Law		1		1			
Social and behavioural sciences	Economics	12	15	27		3	3
	Business	2	1	3			
	Total	14	16	30		3	3
Natural sciences	Biology, maths and computer-related		2	2		10	10
Medicine	General physician					1	1
Engineering	Unspecialised	25	6	31	1	13	14
	Business-engineer	4	5	9			
	Mechanical engineer	4	6	10		7	7
	Production engineer					1	1
	Electrical engineer	4	3	7		10	13
	Chemical engineer	1	1	2			
	Construction engineer	1		2		4	4
	Total	39	21	61	1	35	39
Total known		54	39	94	1	49	53
Unknown		5	11	17		10	18
Total		59	50	111	1	59	71

One interesting feature of those highly-skilled immigrants who arrive with foreign investment is that a home-country origin does not necessarily mean intra-firm mobility in all cases. Several highly-skilled workers were recruited in the home country (or in neighbouring or same-language family countries) specifically to work in the host country. We can assume that this type of recruitment policy which focuses on countries similar to the home-country is a transitory phenomenon. The reason for recruiting from countries similar to the home country (i.e. among the market economies) is perfectly rational: that is, to cover any missing capabilities in the host country and to upgrade knowledge in such areas as financial management, development management and

specialised engineering skills. Naturally, such recruitment policy also reflects the fact that we, as other transition economies, were a great puzzle to many foreign investors and that, in consequence, they preferred to employ leading professionals from their own, better-known environment.

#### 4.4 Knowledge Acquisition and Occupations of Immigrants

Accumulated working culture, skills, competences and certificated knowledge may all inflow through the jobs performed by highly-skilled immigrants. Among the factors involved in knowledge-flow by means of migrants, a common language as a tool of communication is very important. The few exceptions lie in those jobs where communication is less important and where the shortage of specialists is high.<sup>20</sup>

It is well known that Hungarian belongs to a very small language family and is not easy for foreigners to learn. One of the important lessons of our telephone interviews was that immigrants may split into two groups by language requirement - the requirement of posted immigrants to be fluent in the best-known foreign languages. In the initial period of foreign investment Hungarian language skill was supposed to be a crucial knowledge-conveying capability, and one of the functions of returnees was to help in communication with their particular language skills. After a few months, however, it became clear that this function is, in fact, not so important. Immigrants posted for this purpose were replaced very soon - either by locals or by other foreigners who could communicate in one of the better-known foreign languages such as English or German. The requirement was different for job-seeking immigrants from the post-socialist countries and the developing world as their jobs were also different. They usually have to know or learn Hungarian both as an everyday and as a professional language.

In relation to occupations of foreign workers, we used data provided by human resource (HR) managers. These occupations were classified by IKU into ISCO (International Standard Classification of Occupations) categories, although on several occasions we did feel it necessary to consult with the respective HR managers in order to obtain a clearer understanding of the actual occupation quoted.

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<sup>20</sup> *A well-educated Afghan dentist cannot work in his field in Hungary since he cannot adequately communicate with clients, even if he is fluent in English and Russian, but Afghan computer scientists can be employed as computer scientists in Hungary even with no Hungarian.*

Highly-skilled immigrants, as reported by companies, are employed in those types of job which require a university or college degree.<sup>21</sup> According to their occupation they were employed in highly-skilled jobs (Table 7).

The pattern of occupation by ISCO category is quite interesting. 43% of immigrants hold “leader” positions, although most of those involved in production and functional managerial positions arrived in the country without management experience. The other 57% are professionals and associates. Out of a total of 101 professionals, it is engineers and architects who form the largest group (45); second come computer specialists. Whilst managerial positions are held by foreigners emanating from developed countries (mainly owners or owners’ representatives) there is no significant pattern of professional jobs arising from developed, post-socialist or developing countries.

Occupation		Citizenship of foreign HS employees							Total	Total in %
		EU	EFTA	NM.*	Candidates	OEC**	America	Others		
1	Legislators, Senior Officials and Managers	58	6	1	6	2	3	2	78	42.9
1.2	Corporate managers	52	6	1	5	2	3	2	71	35.7
1.2.1	Directors and chief executives	16	2			1	1		20	10.4
1.2.2	Production and functional department managers	24		1	5		2	2	34	23.1
1.2.3	Other departmental managers	4							4	2.2
1.3	General managers	12			1				13	7.1
2	Professionals	33	2	5	45	6	8	2	101	55.5
2.1	Physics, mathematics and engineering science professionals	19	2	1	42	2	8	2	76	41.8
2.1.3	Computing professionals	6	2	1	18	1		1	29	16.5
2.1.4	Architects, engineers and related professionals	11			23	1	8	1	44	24.7
2.2	Life science and health professionals (biological scientists, chemists, pharmaceutical sales personnel)			1		3			4	2.2
2.4	Other professionals (Business professionals)	14		3	3	1			21	11.5
3	Technicians and Associate Professionals							2	2	1.1
	Unknown	1							1	0.6
	Total	92	8	6	51	8	11	6	182	100.0

Note: \* NM=New member \*\*OEC=Other European Countries.

<sup>21</sup> According to the experience of many other studies and our face-to-face interviews with immigrants, several graduates are employed in non-highly-skilled jobs for a variety of reasons (language, non-recognition of their degree, and the situation in the labour market) - for example, a Mongolian military engineer working as a maintenance mechanic is not included in the HS population. Without going into detail, we would like to emphasise that companies reported people as highly-skilled (HS) immigrants if they were employed in jobs requiring a degree.

The number of arrivals from investor and non-investor countries shows that the recruited and posted managers (people with a background in the business sciences) are almost the same. (This business-related inward migration is directed towards certain crucial jobs which did not even exist before transition.) Amongst engineers from the developed countries those who were posted represent two-thirds of the total number of engineers from the developed countries. This relatively large proportion illustrates the perceived importance of upgrading engineering knowledge in several fields and of co-operating in R&D activities in other fields.

The relationship between occupation and field of education is interesting, both variables being known in respect of 80% of the sample. One third of senior officials and administrators are graduates in the fields of social and behavioural sciences and law. Only one member of these groups was reported as holding a business degree. A majority of others in managerial positions have various engineering degrees, and, of a total of 40 engineering graduate managers, we found 20 who had a clear, distinct specialisation.

The strong correspondence between occupation and field of education illustrates very well that both those professionals who were posted here because of their profession and the job-seeking immigrants could obtain HE jobs if their degree or knowledge was considered relevant by the employers.

As regards the *sector of employment*, the largest single group of immigrants (one third) were employed in sectors related to information and communications technology, and it clearly shows that Hungary, a newcomer to the field of employers of immigrant labour, matched well with the contemporary “HE immigrant” job pattern.

This sector is the top employer for both groups – that of the developed countries and the post-socialist and developing countries. However, the proportion of HE immigrants from post-socialist and developing countries is higher (58%) than of those from the developed world.

Immigrants with an educational background in the natural sciences are employed only in three sectors, in Chemicals, in Radio, Television and Communications Equipment - and in “Services 2” (i.e. High-Tech Services). A background in Engineering and Business Sciences appears in almost all sectors.

## 5 Conclusions

The premise of this study was that the migration of highly educated people means a flow of knowledge from one country to another. This approach takes into account the migrants as knowledge conveyors from one country and/or sector to another, and the investigation focused on the inflow of HSWs from the perspective of the receiving countries' employers. The internationalisation of economies is clearly changing the size, direction and character of employment-based migration.

The question, therefore, was whether the penetration of foreign direct investment (FDI) into a transition economy has been accompanied by emerging international mobility, that is to say, how foreign investors are involving Hungary in brain circulation. Hungary, together with other CEECs, is a good laboratory for such studies, since the penetration of FDI coincided with the process of globalisation in the knowledge economies.

CEECs have accumulated considerable experience of the influence of non-investment by foreigners in respect of knowledge-flow. The period of the command economy system had constrained these economies from being involved in migration in any direction, and the political burden prevented these countries from being large-scale suppliers of highly-skilled workers. Subsequently, the opening of borders acted as a safety-valve for what we might term "pent-up migration". The inflow of HSWs is still narrower than the outflow, but its very presence is a good sign that a country is participating in the circulation of knowledge, since technology upgrading and innovativeness are both supported by the inflow of HSWs.

This newly-designed survey is an attempt to fill the information gap, and it focuses, therefore, on the role of foreign investors: entities are either small (that is, owned by one or a small number of foreign nationals) or they are giant multinational companies (MNCs). This survey investigated HS immigrants who are employed by foreign-owned companies and who arrived either with or without investment.

Most immigrants (one third) were employed in sectors related to information and communications technology, and it clearly shows that Hungary, as a newcomer to the field of employers of immigrant labour, matched well with the contemporary "HE immigrant" job pattern. This sector is the top employer for both groups – that of the developed countries and the post-socialist and developing countries.

Among the different types of business-led immigrants, managers arrived first in Hungary in the initial phase of transition. Foreign owners came here or delegated employees for the initial years of FDI to establish a smooth collaboration or simply to train locals for the tasks and to apply tight controls. The importance of the CEO should not be underestimated in the process of knowledge-flow, transfer of technology, and in changing the rules and behavioural routines. They create an environment for others to employ - or not to employ - their accumulated knowledge and skills and to support upskilling and mutual learning. In the later stages of development, in the late 1990s, other professionals were also led here by business, such as development engineers and designers. Different types of knowledge assets flow into the country through these occupations.

Germination of the seed sown by *posted R&D personnel and their activities has occurred in Hungary*. Involvement in research by MNC affiliates and extramural R&D activities are relatively new phenomena of globalisation, and the participation of Hungarian affiliates matches the new world experience. A few multinationals have posted professionals to manage research laboratories here in order to participate in research tasks allocated to Hungary, and *these are crucial representatives of brain circulation*.

Foreign owners prefer to recruit returnees and they can offer suitable jobs, providing salary and benefits packages fully comparable to those in the West. (This group of people may be identified only by means of oral interviews.)

If we consider the European Research Area, it is not sufficient to measure the process and its impact from the perspectives of the sending and receiving countries of Europe; the cost of transfer from one to the other is also crucial, and the globalising learning economies mean that it is extremely important to focus on such transfer costs. We need to elaborate further the concept of “brain drain”, “brain gain”, “brain waste” and “brain circulation”, but the findings are encouraging for the launching of studies into measuring the content of knowledge-flow through brain circulation.

Observation of the changes in the pattern of HS migrations over a period of time is crucial to learning the pattern of brain circulation and knowledge sharing as well as to obtaining a closer picture of the relationship between systems of innovation and migration / mobility. Relevant data and indicators concerning the size, character and tendencies of HS migration are important to policy-makers, to the business community



and to society in general. The aim of this survey was to explore the relationship between foreign direct investment (FDI) and knowledge flow through migration, and so we attempted to measure the employment-based inflow of HS workers into the region. This research proved that the opportunities of brain gain are open to less advanced countries, and for them a study of brain gain is as important as that of brain drain.

Changing the focus of the investigation from outflow to inflow leads to an important conclusion – that, even if the balance of the outflow and inflow is negative, the simple presence of inflow - and its durability - shows clearly that a country is participating in brain- circulation.

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## Annex 1. Mini Survey of HE Foreign Labour Force in Firms

### General Data

Name of the employing organisation: In Hungarian In English

Address:

Webpage:

Name of contact person:

Title of contact person:

Telephone number:

Fax number:

E-mail address:

In what language can he/she give information?

Nationalities	Person	Age-group	Gender F/M	Education		Field of sc.	Occupation	Since when employed by		Perm. issued
				Degree	Depart.			This firm	Mother/Aff	
... country	1)									
	2)									
... country	1)									
	2)									
... country	1)									
	2)									

*\*The question about country of birth was optional (only to mention if different from nationality or citizenship).*

## Annex 2. Lifelines of the Hungarian Academic Survey on Inflow of HSWs

(Business Sector)

Methodology	Characteristics
Kind of survey	Academic survey
Survey unit	Firms with foreign ownership and employing highly skilled immigrants.
Classification	ISIC Rev. 3 (two digit level); ISCO; ISCED
Definition	Canberra on HRST; UN on migrants
Obligatory/voluntary survey	Voluntary
Size of survey	
Number of responding firms	
employing HE immigrants - gross	43
- net	39
Number of highly skilled foreign workers employed by responding firms - gross	207
- net	182
Cut-off-point	Foreign ownership at least 50% Employing at least 1 HE immigrant
Questionnaire	Self development
Combination with other surveys	Not yet
Reference period	2001
Survey method & implementation	Phone interviews, face-to-face interviews and fax survey

*Data collected and analysed by IKU, commissioned by EU through MERIT.*

**Competitiveness of  
Companies and Sectors  
on the Road to the  
European Union**

## Keynote Speech

# Competitiveness of Companies and Sectors on the Road to the European Union

Bruce L. Jaffee\*

It is now nearly two decades since the collapse of the Soviet Union and the failure of other economic systems that relied on central planning, state ownership of the major factors of production, and protection from competitive and market forces. It is generally accepted that a competitive economic system, based on market determined prices, transparent information, and the unfettered movement of resources is currently our best hope to achieve rapid overall economic growth and high standards of living. However, we have also learned during this period that finding this preferred road to prosperity, keeping up with the “traffic”, and even staying on the path is not simple. It requires patience, a tolerance for uncertainty, and a willingness to take risk. Consumers, businesses, governments, and educational institutions need to move out of their traditional “comfort zones”, embrace change, and take advantage of opportunities. Otherwise, they risk being left by the roadside as other businesses, countries, and citizens improve their positions.

In this paper I will review what are considered to be key aspects of economic success in the first part of the twenty-first century. I will then describe some of the central aspects – and challenges – facing the most successful economic union in the world today, namely the union of the 50 “states” in the United States. I will then turn to the importance of new and effective management and the role of advanced management education. “Lessons learned” from the new International Graduate Business School’s (IGBS) MBA in Zagreb will be shared.

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A simple prescription for economic success for a business, especially one competing in the dynamic environment of the information age of the twenty-first century involves five factors:

- 1) Create a product or service of value to customers.
- 2) Keep costs low. Strive for efficient operations.
- 3) Develop a pricing scheme that captures much of that value for the firm.
- 4) Grow the market through effective marketing and promotion coupled with a dynamic innovation strategy.
- 5) Retain the customers so that they are “locked in” and view the firm as the default supplier.

Many business people try to succeed in an increasingly competitive market environment by focusing on step #2: lowering costs, retrenching, and competing by being the low cost supplier. In the short-run this can be an effective strategy, but in the limit it can deteriorate into what might be described as the “anorexic theory of management”. A lean operation does have low costs, but it will not be an engine for economic growth, employment opportunities, or sustainable profits.

A more successful strategy is one that combines a focus on efficiency with a growth strategy. The *Wall Street Journal* last month<sup>1</sup> suggested that growth is critical if a firm wants to attract and retain talented employees. However, growth – either internally generated or through mergers and acquisitions – will be successful only if the firm’s core business dimensions are recognized for their high quality. Growth for its own sake has little value. It needs to go hand-in-hand with increases in profits.

The papers in this session are important contributions to the understanding of what are the keys to business organizational success and investment and economic growth in transition economies. The paper by Svetlana Avdasheva provides a valuable insight into the way in which enterprises, more precisely, “business groups”, are organized, managed, and controlled in Russia. The study by Tatiana Dolgopyatova looks at the important relationship between organizational structure and performance. As with the situation in many other countries, this analysis finds little relationship between the structure of corporate ownership and control on performance. There is no one structure

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<sup>1</sup> “The Best Ways to Grow” the *Journal Report: Leadership*, *Wall Street Journal*, October 25, 2004, Section R.



that clearly dominates others in terms of performance. The study by Malgorzata Runevic shows the importance and effectiveness of foreign direct investment in stimulating economic growth in the Baltic States. FDI, especially when it comprises a large proportion of total investment as it does in these countries, can be critical in enhancing the export competitiveness of various sectors.

It is generally accepted that a market based competitive economic system must have a clearly defined and consistently applied system of rules and expectations, especially as they relate to contracts and property rights and the transparency of accounting and financial information. We have also learned that high rates of productivity require unconstrained investment opportunities in the basic factors of production: labor, capital, land, and technology. Free movement of these factors of production, so that they can achieve their highest and best use, is a prerequisite to an effective economic system and a country's long run competitiveness in a system of open economies. That is not to say that there is no role for government in facilitating such an economic system and speeding up the transformation process. Yet it is important for government policy to be forward looking. Its emphasis should not be on protecting the status quo, subsidizing inefficient operations, or protecting businesses or workers from competitive forces. Instead it needs to let the system work, where "winners" truly succeed and reap the benefits whether they are generated by inventive technology, forward thinking and creative management, good timing, or even luck. In contrast, governments need to have a system where failures are truly the end, where bankruptcy means equity positions are lost and workers must find new positions, albeit with the possibility for government help with retraining and other adjustments but without a "safety net" that might become too comfortable.

The economic system in the United States is far from flawless. The recent corporate scandals (e.g., Enron, WorldCom, Adelphia, and Qwest), corruption and incompetence by accounting firms which led to the collapse of the accounting firm Arthur Andersen and the passage of the Sarbanes-Oxley Act, and recent investigations of the mutual fund industry and the insurance brokerage business indicate that there certainly is room for improvement. Yet a fundamental strength of the U.S. economic system is the free trade zone among the fifty states. Each of the states might be viewed as countries with its own government, parochial interests, and economic units that promote their narrow economic interests, especially protection from competition. Yet the U.S. has prospered as a whole by being willing to sacrifice the interest of the few for principles as diverse as a common currency, the free movement of labor and capital, and standard and reasonably transparent accounting and financial systems.

The role of education, especially management education, is another area where government – and business – investment is needed and is likely to produce high rates of return. This is especially true in economies that are still in the transformation process and face increased competition – and potential business opportunities – from the European Union whose educational institutions are emphasizing management education and are moving up in the ranking of top MBA programs.<sup>2</sup> Later in this paper I will describe the case study of the development of a full-time MBA program at the International Graduate Business School - Zagreb and “lessons learned” from that experience.

The importance of managerial and technical education is likely to increase in the future. A recent study by Fernald and Ramnath (2004) found that there was an acceleration in total factor productivity in the United States starting in the mid-1990s. They give a substantial amount of credit to the information and communications technology (ICT) sectors of the economy. Yet they find that the majority of the acceleration in the rate of growth of total factor productivity did not occur *within* the ICT industries. Instead, they found most of the acceleration to be occurring in the way in which ICT technology is *used* in a wide range of sectors in the economy. They find that sectors as diverse as wholesale and retail trade and banking have combined ICT innovations with numerous organizational changes to lower their costs, expand the range of their goods and services, and improve their service quality. All these changes require a different level of management training and leadership skills than are found in traditional educational programs or via on the job training.

The importance of management education in a competitive economic system is emphasized in a recent book by Robert Anderson (2004), a former World Bank consultant. He concludes his review of challenges and constraints facing countries that are trying to improve their economic growth rates by stating:

When business people are asked why their company’s performance is so bad, they are likely to blame the banks for not giving them loans to modernize, high interest rates, high taxes, government corruption, or bad infrastructure such as roads or power supply. They rarely blame their own inadequate management. McKinsey [A series of country studies conducted by the McKinsey Global Institute] concludes that poor management is often the most serious problem

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<sup>2</sup> See for example the special section, “FT Business Education”, in the *Financial Times* of Monday, November 1, 2004.

and is frequently caused by lack of competition. In other words, these companies can still be profitable without improving their performance because they face little competition. Owners and managers have little incentive to change.<sup>3</sup>

Clearly in Europe in the twenty-first century the “incentive to change” has occurred and will continue to increase. Advanced management education is certainly not a sufficient condition to ensure sustained economic growth and business success. However, it is increasingly clear that it is a necessary condition to achieve these objectives.

Let me turn next to a description of the efforts that my university has made in establishing a high quality management training program in Croatia. I will explain the background, indicate the adjustments that had to be made, and describe the MBA program that started in January 2004. I will summarize with “lessons learned” from this experience.

In August 2001, the Kelley School of Business at Indiana University was awarded a grant from the U.S. Department of State to work with a Croatian partner in developing a high quality, full-time, English language MBA program. The Request for Proposal (RFP) designated the Consortium of Faculties of Economics in Croatia (CFEC) as that partner. In the process of program development, IU was also charged with assisting in Croatian faculty development to upgrade teaching methodologies and curriculum content. Over time, these faculty would take on curriculum delivery in the MBA program, helping to ensure the program’s sustainability.

CFEC representatives were appointed by the deans of each of the four faculties – the Universities of Osijek, Rijeka, Split, and Zagreb. Given the population of Croatia – approximately 4.5 million – the establishment of one high quality MBA program would be sufficient to satisfy the country’s need for highly skilled managers, certainly for the next decade. By pooling their human and capital resources, and with the assistance of State Department funding and an experienced U.S. partner, all constituencies would benefit. These constituencies included:

- all four Faculties of Economics,
- the Croatian business and policymaking communities, in great need of trained managers,

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<sup>3</sup> Anderson (2004, p. 231).

- the pool of prospective students and, ideally,
- the Southeastern European region through the development of a cadre of skilled managers with an established network.

The U.S. partner, Indiana University, would also benefit by extending and deepening its experience in transition economies and developing a new international partner for future collaborative activities.

## Lessons Learned

### The Consortium Model

The concept of a consortium, particularly in a small area (a country, region, province) or in a highly specialized field, is appealing for many reasons. A cohesive consortium can pool limited resources, avoid unnecessary redundancy, share risks, and build on the comparative advantage of its members to create a higher quality product or service. In Croatia, with a total population of approximately 4.5 million, limited resources, and a pressing need for a skilled management force in the short – as well as longer – term, the idea of a collaborative effort among the Economics Faculties of the country's four universities to create one high quality management training program makes eminent sense. The introduction of an experienced outside partner to serve as advisor should provide valuable assistance and support to the consortial effort, lowering the learning curve, minimizing the risks, and supplementing resource constraints of the consortium. In doing so, the external partner should quicken the development process and enhance the likelihood of a project's success.

IU's experience with the Consortium of Faculties of Economics in Croatia (CFEC) revealed a simple but fundamental requirement for a successful consortium-based project. *There must be a clear project objective on which all members agree.* In the Croatian project, the lack of agreement on a clear objective by all partners predestined failure – not necessarily failure of the project's goal, but rather of the consortium model to achieve that primary goal.

IU was aware that politics would play a significant role in the MBA program development project. The University of Zagreb is, after all, the oldest, largest and, from its perspective, the best academic institution in Croatia. It came as no surprise to learn

that Zagreb intended to be the 'first among equals' and to make key decisions throughout the development process, even beyond. While surely chafing under this attitude, Osijek, Rijeka, and Split decided that the potential benefits of being 'in' rather than 'out' exceeded the costs of inevitable jockeying for position within the Consortium. IU, on the other hand, was committed to an open, collegial process.

After reflection and extensive discussion, it was decided that a successful MBA program needed to be in the population, business, and governmental center, namely Zagreb. Further, it was decided that to avoid internal discord among the faculties it was important to operate with a single entity who would be a true academic partner. We were able to develop this relationship with the Institute of Economics, Zagreb (EIZ) and used its facilities to start the full-time MBA program in January 2004.

## Challenges Faced

### Full-Time vs. Part-Time

Graduate programs in Croatia are part-time programs – this is the accepted norm. The RFP called for a full-time MBA program, and IU agreed with the logic of an intensive course of study. A full-time program could generate highly trained managers in a short period of time. In discussions with business members in Zagreb, for example, it was common to hear that an individual had been enrolled in a part-time MBA program for up to 7 or more years.

IU was cautioned against trying to introduce a full-time program by almost every Croatian, whether from academia, the business community, or the government. The Consortium assured IU that a full-time program would never attract students, and even the Institute of Economics was uneasy with the notion. While the IU planning team took seriously the concern and discussed among themselves the challenge this would be, IU decided this was a risk that had to be taken. Croatians, IU pointed out, were well aware that the most highly rated MBA programs in the U.S. and Europe are full-time. The new Croatian MBA would rival those high quality programs only if it adopted similar standards – excellent faculty, talented students, and an intensive course of study, the value of which would be evident in the product. While willing to discuss the issue at length, IU had decided that this was a key element of the program, and a barrier worth breaking. The full-time program would have to be marketed with skill to recruit the first

class of students; in years following, IU believed, the quality of the graduates themselves would be an outstanding marketing tool, even if the program structure needed to be modified to meet demand.

IU – and the MBA program itself – was incredibly fortunate to have an energetic, intelligent, and committed Croatian team for what was an inconveniently short recruiting season, particularly in light of the challenges we faced. Today’s 2004-05 MBA class is composed of fourteen extremely bright and hardworking young men and women. In the end, IU concurred in the decision to allow two of these students to complete the MBA in a staggered manner. The two students are company-sponsored, and their employer requested this exception in light of the small window between admission into the program and the employer’s need to absorb or reallocate ongoing work projects for the periods the students would be away.

## Challenges Ahead

### Short-Term

- 1) The key challenge facing the IGBS MBA program in the near term is the recruitment of a second class of MBA students. In light of the outstanding quality of the first class, IGBS and its partners will have to be very careful in reviewing applications and recommendations. Maintaining the high quality of the opening class, and its faculty, will make an important contribution to longer-term sustainability.

Partners have agreed that the class of 2005-06 should be larger than the inaugural class. A student base of 20 to 25 will help the School’s financial prospects, as grant funds become depleted, and continue to draw attention to the program. A “stretched” two year version is being considered.

- 2) A second challenge concerns MBA program personnel. The talents of entrepreneurial administration are not highly developed in many transitional states, as these professional positions are relatively new. This is the case in Croatia. However, IU and the Institute of Economics seem to have found the ideal Administrative Director in winter 2003. A former employee of the Ministry of Economy, Mr. Neven Trbovic is surprisingly insightful about the elements that are

needed to produce a high quality MBA program. He is also talented and energetic enough to make sure they are in place. Trbovic helped draft the IGBS promotional material – indeed, he designed what has become the IGBS logo – laid out an administrative plan that included all the key aspects that the Consortium had been exposed to during their week-long visit in February 2002 (marketing approaches and audiences, student recruitment, application criteria and procedures, tuition policies, alumni development – still comparatively uncommon in Europe – etc.). Trbovic's relations with students and faculty are excellent, and he is an important representative of IGBS Zagreb and the MBA program. Retaining Trbovic's commitment to the program and his services is very important to the success of the project in the next two years. His assistance in any inevitable transition will also be extremely valuable.

IGBS was fortunate to have an outstanding academic with extensive experience in U.S. business schools, Prof. Sonja Radas, as its first dean. Prof. Radas, with a background in Marketing, was extremely helpful in the recruitment of the first IGBS MBA class, and she understood the importance of faculty and course materials to the academic quality of the MBA program. Nevertheless, Prof. Radas is a scholar at heart and, after devoting great energy to the start-up process, she chose to return to research. Her successor, Dr. Zlatan Fröhlich, engineered a seamless transition and, it appears, is an excellent match for the current needs of the program. As an academic active in the policymaking and business worlds of Croatia and Europe, Dr. Fröhlich has excellent ties to business executives and economic policymakers. Thanks to his efforts, Kelley School of Business faculty have been able to include key guest lecturers in the classroom, and to arrange field trips to companies that typically result in an interaction with the CEO. The project is very lucky to have Fröhlich as dean, and anticipates his continued commitment to the program.

### Long-Term

The long-term challenge for the IGBS Zagreb MBA program is sustainability. In the first, and likely in the second, years of the program, reliance on the support of the U.S. State Department has been essential. Also key has been the participation of Kelley faculty, which will continue in 2005-06. Yet, the program must begin to include non-Kelley and non-U.S. faculty to help guarantee its sustainability. Of course, if the program can generate sufficient revenue, 'outside' faculty can continue to participate. A number of Kelley faculty who were involved in the development of an MBA program at the

University of Ljubljana, Slovenia, in the early to mid 1990's continue to teach there, despite the fact that there is no U.S. government support and stipends for teaching are tiny. It is hoped that such relationships will grow out of the Croatian project as well, but the number will not be sufficient to deliver the entire curriculum.

Experience to date has been that Croatian faculty do not yet feel comfortable teaching side-by-side with Kelley faculty. There is also the political issue of Croatia's Economics Faculties boycotting the program, though we believe that is (a) a short-term phenomenon, and (b) there are not yet, unfortunately, sufficient Croatian faculty to deliver a top quality MBA curriculum.

IU is currently scheduling faculty for the 2005-06 year, and it is our intention to seek non-Kelley faculty – from the U.S., Europe, and Croatia – to deliver as much of the curriculum as possible, while not jeopardizing the quality of the program. Helping IGBS over this hurdle is the next important task of the U.S. partner.

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# Business Groups in Russia: Internal Organisation and Innovation Strategies

Svetlana Avdasheva\*

## Abstract

This study is based on a series of surveys and interviews of top-managers for approximately 400 Russian industrial enterprises, which was conducted during the years 2001-2003. The main focus of the paper is the scope of business groups in Russia, which are based both on shareholding and alternative forms of coordination; entry into business-group incentives for insider owners (that is to change the right of control on certain gains), innovation strategies of enterprises within business groups and the sources of competitiveness of both enterprises and the business groups as a form of industrial organization in Russia. The survey results show that industrial firms within business groups have different innovation and restructuring strategies in comparison with the firms that remain outside of both formal and informal business groups. Those firms that are controlled by business groups as outside owners are oriented primarily toward restructuring of internal organization and management, introduction of new products and expanding production. At the same time, this group of enterprises spends less effort on withdrawing unprofitable products and marketing restructuring. Results of an in-depth interview demonstrate the division of authority and responsibility within business groups. Goals for the enterprise management within business groups are formulated in terms of quantity of production along specific product lines, but not financial targets. The parent company retains all the detailed financial control over enterprises. This kind of organization provides ambiguous impact on competitiveness of business group enterprises in the short and long run.

**Keywords:** enterprise, business group, restructuring, innovation

**JEL Classification:** P23, P31, M20

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# 1 Introduction

Business groups<sup>1</sup> as a specific form of organization in Russian industry have attracted attention since the beginning of the 1999 economic recovery. Many people in business, academics and government hope that new holding companies could be the driving force of effective modernization of industry. At the same time, a number of questions about the business group's influence on decision-making and performance remain unanswered.

The objective of this article is to analyze the influence of business groups on the innovation strategies of Russian firms, which were established in the Soviet period. The main sources of information are the results of surveys and in-depth interviews of managers and owners of industrial enterprises, conducted within the project "Non-market Sector in Russian Economy" (2001-2004). The alternative theoretical explanation for the persistence of business groups as an organizational form in Russian industry is based on the analysis of data on innovation strategies, corporate governance, and incentives for the owners and managers of enterprises (according to their own estimation) to join a business group.

## 2 Organization of Russian Industries: General Context of Development of Business Groups

It is obvious that the only way to explain business groups in Russia is to analyze the main tendencies of development of Russian industrial organization since 1992. Thus the problem becomes very complex, taking into account the specifics of Russian transition and the presence of many different and, very often, contradictory explanations of these specifics in the modern literature. Trying to restrict the scope of discussion, it is crucial to mention four aspects of industrial organization in Russia: the model of ownership and

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<sup>1</sup> *Speaking about business groups, one can mean fairly different organizational forms. First, it includes the holding companies both "old" (emerged as a result of reorganization associated with privatization) and new (emerged as a result of a wave of mergers and takeovers, especially after 1998). Second, it includes various types of "hybrid" organizational forms, which have become typical of Russian industries, especially in production of homogenous products. Third, it is some kind of network, both informal and formal, that is created with state support (for example, officially registered financial industrial groups – FIG). Any big business in Russia typically includes all these types of links, and that is why there is some kind of common knowledge that the main participants in Russian markets are not "companies", but "business groups". A typical business group is a conglomerate, with a very complicated combination of shareholding, structural and personal relations. From some viewpoints business groups can be considered a type of strategic alliances, specific to Russian industries.*

corporate control, the organizational structure of Russian companies, the mechanism of contract enforcement and the sources and determinants of competitiveness between Russian companies.

The prevailing type of ownership in the Russian economy in recent years is the concentrated insider ownership (Dolgopyatova, 2002; Dolgopyatova, 2003). Actually, even in the Soviet period, insiders (managers of the enterprises) had significant property rights (Nureev and Runov, 2001). In this context, privatization in most cases merely formalized and legalized the property rights that had already been acquired. The extremely high enforcement costs of contracts between outsider owners and managers in the transition period were an additional factor, which strengthened the positions of insider owners and contributed to the redistribution of formal ownership to insider managers. Typically the value of minority shareholding to outside owners, who have no additional tools to control decision-making of insider managers in Russia, was negligible during the last decade. The comparative advantages of insiders in Russia became clearer when the factors that decrease efficiency of insider control, such as competition for resources and product markets, have a relatively weak impact on enterprise performance. The legalization of insider property rights took a long time in many cases since in practice privatization resulted initially in dispersed ownership. The concentration of ownership required a long time and in several companies has not been completed even today. During the transition period the non-coincidence of “formal” and “actual” ownerships was typical and that non-coincidence caused further complications in the Russian model of ownership.

Concentrated corporate control was the cause for the specific evolution of the legal form of public corporations in Russia. Today many of these public corporations (open joint-stock companies) are de facto closed ones. For most of them obligations linked to their legal status of open JSC create more or less high but useless additional costs (Yakovlev, 2003). In such companies, most traditional instruments of corporate governance actually degenerated. For instance, analysis of decision-making in joint-stock companies in the Ekaterinburg region (Sverdlovsk oblast) (Tkachenko, 2004) showed that the boards of directors function only as an appendage of the decision-making system: boards of directors either legalize the decision of the actual owners or do not make important decisions at all.

The evolution towards “recombinant property” (Stark, 1997) became the pronounced tendency in the development of Russian companies organizational structure during the

transition period, when the decision-making and the organization of key transactions were taken outside the formal boundaries of the firm. David Stark, who is the author of the term “recombinant property”, explained these forms by the evolutionary development of enterprises in the transition economy. The related concept in the modern institutional economics is the change of the firm’s boundaries. In Russia various forms of “recombinant property” have been cited and extensively described by different authors (one specific form is tolling or processing arrangements, see Avdasheva, 2002). To define the business unit using this organizational structure the term “dispersed company” is sometimes used. The prevailing explanation for “recombinant property” in Russia were the tax avoidance or tax evasion schemes (Kuznetsov, Gorobets and Fominych, 2002), and the specific forms of receiving income from property (Rozinsky, 2002). According to alternative explanations for “recombinant property”, which are rarely encountered, such organizational forms could be efficient in a specific context even when there is no tax evasion (Avdasheva, 2002). Regardless of the “main” reason for the use of the “recombinant property” model, there is no doubt that this model explains well the different characteristics of industrial organization in a transition economy, including corporate governance, outsiders-insiders relationships and externalization by company management of marketing functions from production functions).

Concerning contract enforcement, it is necessary to stress the extreme importance of personal relations and personal trust as a precondition for completing any contract in Russia. Again, personification of economic links in the transition period was evidently inherited from the Soviet period. Before liberalization, the formal rules of centralized planning were supplemented by informal links between directors and the directorate (administration) on the one hand, and the Communist Party bodies and executive authorities on the other hand. It is possible to argue that the very system of centralized planning was only the outer form for a complex of informal and personified relationships. But, there is no doubt that links between directors played the same role in the Soviet economy that the networks of firms do in the market economy. After the break-up of the former system of central planning, and under the slow development of market-type coordination, the significance of personal relationships in Russian industries grew as never before (Kleiner, 1996). Keeping in mind the high costs of contract enforcement, it seems very natural that personal links and personal trust provide support for formal contracts.

Finally, the determinants of the competitiveness of Russian enterprises are also important for our study. While incentives to innovate or just to restructure the enterprise’s activity

are a complicated subject, we can say that they depend on the extent to which more efficient market participants can increase market share and profit. Unfortunately, a number of authors have shown that on the one hand, restructuring of Russian enterprises typically has not significantly increased productivity, and on the other hand, the financial performance of Russian companies varies mostly because of shifts in demand and has no connection with any indicators of productivity (Bhaumik and Estrin, 2003). The analysis of case studies of the restructuring of Russian enterprises often shows that the influence of restructuring on the financial and overall economic performance is almost absent (Linz, 2000). Similar results were obtained in studies performed at the micro-level, and also at the level of industries: total factor productivity (TFP) decreased or stagnated in the export-oriented industries that demonstrated remarkable growth and improvement of financial performance after 1998 (Bessonova et al., 2003).

Some researches have tried to explain why production efficiency does not matter in Russia. One such explanation that initiated broad discussions in Russia was presented in the report of the McKinsey consulting company “Unlocking economic growth in Russia” (McKinsey & Co., 1999). Authors of this report argued that the unequal conditions of competition in the broad sense (including fairly different cost of inputs and different tax regimes for various groups of agents) neutralized the cost advantages of more efficient producers almost completely. That is why the incentives to invest in order to raise productivity (or equivalently to decrease cost) are relatively weak. In this context the question of incentives to innovate (especially for the different types of innovation) at the level of the enterprise or the business group is left unaddressed.

How can we explain the development of business groups in Russian industries within the transition economy? Initially business groups emerged because of the break-down of the former system of coordination, which included planning and contract enforcement. In the new economic conditions the boundaries of firms (as economic items) coincide with the legal boundaries of the Soviet enterprise, but evidently these exogenous boundaries could not be efficient. Disorganization (Blanchard and Kremer, 1997) increased the transaction costs sharply and created incentives to restructure the firm’s boundaries. The typical Russian privatized enterprise could only survive by revising its “make or buy” decisions in the new environment after liberalization.

In most cases, the efficient restructuring of the firm’s boundaries required both the elimination of old units from the organizational structure and the inclusion of new ones. In the early 1990s the process of eliminating the unwanted structures (including sales of

assets, split-offs etc.) was more active (Dolgopyatova, 1995), and the second type of restructuring (including takeovers and emergence of business groups) has become more intensive under the economic recovery since 1999 (Pappe, 2000, 2002a and 2002b).

Besides economizing on transaction costs, business groups in Russian industries extract other sources of profits (Dolgopyatova, 2003). Additional coordination tools allow them to decrease losses in efficiency when there are bilateral monopolies. There is scope to escape the “double marginalization” problem in vertical relation of agents which have substantial market power. Horizontal mergers and alliances can create scale economies. The substantial inefficiencies in organization of markets in Russia during the transition period created the potential to capture all these gains.

Researchers of transition economies are still puzzled by the very low rate of restructuring of existing firms boundaries (Murrell, 2004). Similar results – relatively stable legal boundaries of enterprises - were documented for Russian industries too (Lazareva, 2004). It is possible that the development of business groups based both on shareholding and tools of coordination not related to ownership instruments (Avdasheva, 2002) can provide at least one explanation for this paradox: the business groups can be considered as means for changing the actual boundaries of the firm under given boundaries of legal entities.

According to many authors, extensively developed business groups, characterized by a specific system of coordination and contract enforcement, have come about as a result of inefficiency of legislation and its enforcement in transitional countries. Combined with a long tradition of extra-legal conflict resolution under the Soviet period, this fact increases the comparative advantages of different forms of networking. In this context, the underdevelopment of legal regulations should be offset by the development of personalized networks (Ledeneva, 2001). Many authors believe relational contract development to be the explanation for the increase in investments within business groups (Volchkova, 2001; Frye, 2003).

It is quite natural that these relational contracts, especially in the first years of transition, were primarily associated with links inherited from Soviet times. It is also empirically confirmed that during the 1990s the greatest returns were extracted from networks which had emerged before liberalization and privatization (Moers, 2000). The development and use of such networks was sometimes considered as an alternative to market-oriented restructuring of enterprises (Gaddy and Ickes, 1998).

These suppositions are, however, not supported by the results of empirical research on contract enforcement and conflict resolution in Russia and other transition countries (Murrell, 2004). Russian enterprises relatively seldom rely on the help of “third parties” to resolve their conflicts, as opposed to mutual relationships and legal rules (Hendley, Ickes, Murrell and Ryterman, 1997). Similar results were also obtained in other transition countries, for instance, for Romanian firms (Hendley and Murrell, 2003).

Returning to empirical studies of the evidence for the use of networks as an instrument to build trust between agents, even in these studies it has been demonstrated that informal structures within networks are imperfect substitutes for the formal ones; the use of informal structures reduces the decline in production. There can be no doubt, however, that economic growth requires more developed formal structures (Moers, 2000).

Empirical research shows interesting evidence on the sources and causes of trust in relations between firms, where the level of prepayment in advance of delivery is considered as an indicator of trust (Raiser, Rousso and Steves, 2003). It revealed that “trust” as measured by the level of prepayment increased in networks which were based both on family relationships and friendship as well as inside business associations. At the same time, there has been no evidence of higher trust within holding companies. This evidence, among others, raises doubts about the ability of informal structural relations within business groups to serve as a viable alternative to the enforcement of laws (contracts), although this view is widely expressed by Russian observers.

But even if membership within a business group does not provide contract enforcement within the group, the weakness of contract enforcement outside the group creates incentives for expansion of hierarchical control and emergence of business groups. The weak protection of legal property rights increases incentives to invest in assets under direct control by the investor. Investors fairly estimate the additional rights of control as equivalent to an increase of expected returns of the given asset. That is why the development of business groups replaces the imperfectly developed financial market in Russia. This has been demonstrated by empirical evidence since the middle of the 1990s (Perotti and Gelfer, 1998). This evidence can explain the rapid growth of business groups since 1999, especially the experience of companies in the oil and gas sector, and the ferrous and non-ferrous metals sectors (Dolgopyatova, 2003). In this context the additional inflows of funds would most likely lead to increased investments inside business groups, if we remember that the avenues for capital outflows have been restricted. As mentioned in many studies, there are more incentives to invest and a

correspondingly higher share of invested profits within business groups as compared with the economy as a whole because of better contract protection within business groups due to the use of relational contracts (Volchkova, 2001).

To sum it up, there is a number of both complementary and conflicting explanations for the rapid development of business groups in Russian industry. At the same time, it seems that the existing explanations for the development of business groups contain some paradoxes which remain to be explained. How does the expansion of business groups co-exist with the prevalence of insider control? If there are high transaction costs that create incentives to replace market control for hierarchic or hybrid-type control, why should we think that the cost to enforce interfirm contracts is lower? There are some reasons for sharing the opposite assumption: whether we must associate enforcement of interfirm contracts in the transition economy with an underdeveloped legal system and unsettled moral norms which impose very high costs. In the context of business groups development, the wide authority of insider owners creates a threat to the very survival of any business group, especially taking into account the very complicated structural and ownership relations within typical groups.

From another perspective, if business groups are the heritage of the collectivist Soviet tradition and they rely mostly on relational contracts, how does that coincide with the rapidly increasing proportion of business groups based on partial shareholding, which are trying to re-organize themselves as more or less “classical” conglomerates? At first glance, informal relations can be significantly independent from the allocation of legally assigned property rights.

Another set of questions is connected with industry and size specificities of organization, which are almost absent in Russian business groups. Why do we observe common features in the business groups of the biggest companies in oil and gas sectors and in those groups created by the fairly small firms in retailing?

Again, why is the organizational form of business groups in Russia consistently reproduced in spite of instability of many business groups? If we take a look at the list of the biggest business groups (associated with the richest “oligarchs”) at the end of the 20<sup>th</sup> century (Pappe, 2000), we find that a significant part of them no longer exist and the existing ones have lost control over many enterprises. Nevertheless, business groups still exist and continue to emerge in Russian industry and make significant impact on the innovation strategies of the firms within the group.



This paper attempts to answer at least part of these questions on the nature of Russian business groups, the incentives for insider owners to give up part of decision rights in favor of business groups, the specific distribution of decision rights between insider manager and outsider owner within business groups. Some conclusions are drawn about the innovation strategies of business groups as compared with “stand alone” enterprises.

### 3 Russian Business Groups in Surveys and In-depth Interviews: 2001-2003

This section is based on the results of surveys of industrial enterprises. The sample was developed within the research project “The Non-market Sector in the Russian Economy” in order to answer a broad set of questions. As for business groups, the general purpose was to explain the prevalence and the stability of business group as an organizational form in the context of prevalence of insider control and the high enforcement costs in the contracts between outsider owners and insider managers. In order to answer these issues we compared the economic performance, innovation (restructuring) strategies, and mechanism of decision making of the respondents within business groups and “stand alone” ones.

#### 3.1 Surveys and In-depth Interviews: Sample Characteristics

Questions about the relationships between firms and business groups were put in two surveys organized in 2001 and 2002 (“Survey 2001” and “Survey 2002”). The samples for these two surveys were not the same, but they overlapped substantially. The questions about business groups and innovations at the level of the firm differed slightly in these two surveys.

For a part of the firms in the sample we had data from official statistical reports. In addition, the role of business groups in making important decisions at the firm level was explored through a series of in-depth interviews organized in the autumn of 2003. It is important to stress that the firms in the sample surveys and in-depth interviews are primarily medium-sized. This can be considered as an advantage of the sample, keeping in mind that our goal is to reveal some features of the “median” business group consisting of “typical” firms. Moreover, the development of big business in Russia is characterized in many papers.

The next very important feature of the sample is that it consists of firms that were organized in the Soviet period and later privatized in the 1990s. There are few start-up enterprises in in-depth interviews, but generally the scope of the research is medium-scale privatized firms in machine building, in the light industry, and the food processing industry.

According to the results of these surveys, a substantial part of Russian firms enter into business groups or associations of various types. In the "Survey 2001" 63% of the 431 respondents said that they represent stand alone enterprises, 13% identified their firms as entering into an informal business group, 11% said they were included in a legally identified group which determines strategic development of their firm (as opposed to executive management), and 13% - as entering into a legally identified group where the group performs executive management at the enterprise level. In "Survey 2002" the distribution of answers differs slightly: 68% of the 484 respondents are stand alone enterprises, 15% are members of an informal group and 17% are members of a legally identified group.

As one could expect, the bigger the firm is the higher is the probability that it is part of a business group. Industrial differences are present but they are not very significant: the highest proportion of enterprises united by business groups is in the machine building industry (a third), and the lowest proportion (about a fifth) exists in the construction materials industry.

There were 30 participants of the in-depth interviews who represented enterprises and firms. All the respondents were CEOs of their firms: 14 were general directors, 11 were deputy directors. The companies were mostly established in the Soviet period and then privatized (60% are open JSC and 30% are closed JSC): 37% of respondents were in the light industry, 30% in the food industry, and 33% in the machine building industry. As was already mentioned, interviews were conducted in mostly medium-size companies: 13 companies had 100 to 500 employees, 12 had 501 to 1000 employees, and only 5 had more than 1000 employees. The typical firm in the sample is characterized by relatively stable financial performance, while there were some firms in bankruptcy, including those which were under external management at the time of the interview. Most of the firms demonstrated a huge increase of output since 1998.

Out of the total of 30 firms where interviews were conducted, 16 were part of different business groups, which were owned by outsider owners. Only one respondent said that

his enterprise entered into a business group which had no share in the ownership but which actually performed the functions of executive management. Several firms in the textile industry operate under stable processing contracts.

Out of 26 respondents who were able to assess the degree of ownership concentration in the firm only two said that their shares distribution was still widely dispersed or at least allowed for further future concentration<sup>2</sup>. For the rest of the sample, ownership is definitely concentrated. In only three companies there are state shares, though in none of them does the state retain control rights.

### 3.2 Competitive Advantages and Innovation Strategies of Firms Inside Business Groups (Survey)

The first question was: did firms inside business groups demonstrate a greater increase in output during the period of recovery since 1999. Though it is impossible to answer this question precisely (considering significant variations in output growth for both groups of firms – see Table 1), on average firms inside business groups grew faster during the period 1999-2002 than did the “stand alone” enterprises. If some advantages did exist for the first group of firms, they became apparent only after 1999 but not in the period since 1997 (Table 1). It was only in the recovery period since 1999, and not the period of economic decline (covered from 1997 for the sample) that the firms in business groups obtained some advantages which fostered increased output.

The survey data give clear explanations about the causes for faster growth demonstrated by the firms which are part of business groups. These are connected with the higher demand that led to the higher indicators of orders from the relevant firms. Analyzing the answers to the survey question about the length of the firm’s production time needed to complete the received orders, we can see (Table 2) that among the firms in business groups (“Survey 2002”) the share of those whose production times were less than a month is three times lower in comparison with stand alone enterprises. Correspondingly, for the firms in business groups the share of those who have orders for a year or more is two times higher. For the “Survey 2001” the demand advantages for the firms in business

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<sup>2</sup> *Some respondents spoke about ownership concentration in spite of the fact that their companies were organized as partnerships. We think that we can consider these estimations keeping in mind the clear economic sense (control rights concentration).*

groups were even higher. Consequently, this group of respondents had higher capacity utilization ratios and higher estimates of economic and financial performance.

**Table 1. Output and employment of enterprises inside and outside business groups: 1997-2002\***

	Increase of output (times)		Increase of number of employees (times)	
	1997-2002	1999-2002	1997-2002	1999-2002
"Stand-alone" enterprises	243 6.56 (69.85) 0.83	244 4.68 (38.80) 1.03	272 1.05 (0.87) 0.93	284 1.13 (1.52) 0.96
Firms in "informal" business groups	56 3.11 (7.56) 1.14	54 5.40 (22.94) 1.24	59 1.27 (1.94) 1.05	61 1.60 (3.00) 1.08
Firms in "formal" business groups	64 1.44 (1.87) 0.96	64 9.49 (61.88) 1.00	70 1.64 (5.40) 0.96	71 1.44 (3.99) 0.99
Sample average	363 5.13 (57.23) 0.90	362 5.64 (41.98) 1.06	401 1.18 (2.48) 0.94	416 1.25 (2.36) 0.97

\* Data in cells are number of observations, mean, (standard deviation), and median.

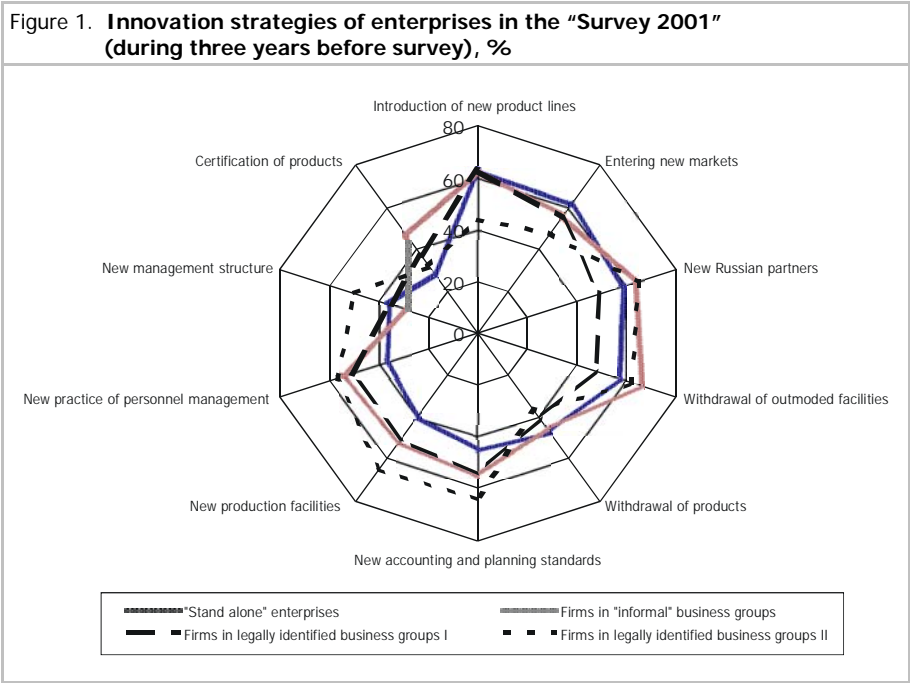
**Table 2. Demand for the products of "stand-alone" enterprises and firms in business groups (proportions of respondents of relevant types, %): Survey 2002 (answers are for the previous year)**

Period to complete orders received	"Stand-alone" enterprises	Firms in "informal" business groups	Firms in "legally identified" business groups	Sample average
< 1month	25.00	17.81	8.75	21.10
1-3 months	25.32	30.14	15.00	24.30
3-6 months	14.42	20.55	21.25	16.60
6-12 months	28.53	17.81	37.50	28.40
> 12 months	6.73	13.70	17.50	90
Number of respondents	312	73	80	465

Different groups of enterprises apply innovation (or restructuring) strategies which differ significantly (fig.1 and 2).

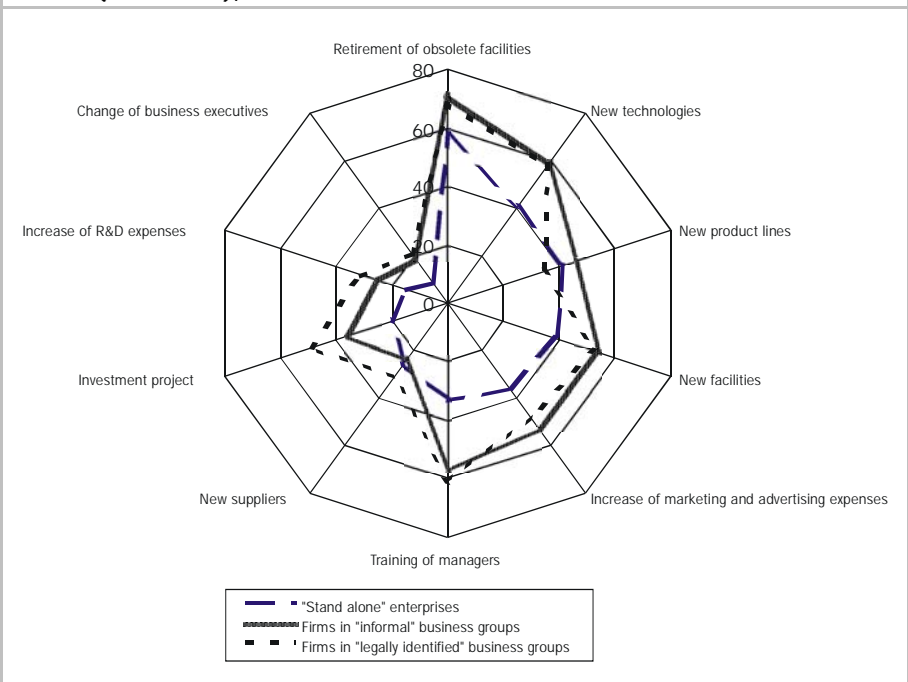
Among the firms within business groups the share of those that introduced new production facilities, changed management structure or top management, organized management training, introduced new accounting and planning standards, increased R&D and marketing expenditure and financed investment project was higher in comparison with the other group of respondents. At the same time, the introduction of new product lines and adjustment of product variety by removing products less in demand are less frequent in this group of firms.

If we eliminate some actions connected with the expansion of output (for instance, new production facilities), we can conclude that firms within business groups apply fewer innovations connected with marketing (especially the adjustment of product variety), in comparison with other changes, such as management organization and changes of CEO and staff. It seems that innovation strategies of business group firms are more “inside-oriented” while restructuring of “stand-alone” companies is outwardly oriented (toward marketing and external demand).



Note: \**“Legally identified business groups I” – business groups which “perform only strategic management” for the firm;*  
*“Legally identified business groups II” – business groups which “perform both strategic and operational management” for the firm.*

Figure 2. **Innovation strategies of enterprises in the "Survey -2002" (2001-2002), %**



The reasons for different innovation strategies can be found in industry-specific factors, size of typical stand-alone and business group enterprise, and also in the ownership structure and corporate governance. The last point requires special attention. It is surprising that stand-alone enterprises and firms within business groups do not demonstrate remarkable differences in ownership structure, concentration, and structure of executive bodies. We can mention that ownership concentration is slightly higher in firms in legally identified business groups, but the general trends of ownership distribution for different groups of enterprises almost coincide (Table 3). The typical size of the board of directors (seven members) and representation of different groups of owners are almost the same. The executive director worked quite a long time both with this enterprise and in this position in the companies of both types.

Table 3. **Ownership concentration in public corporations: 1998 and 2001\***

	<b>"Stand-alone" enterprises</b>	<b>Firms in "informal" business groups</b>	<b>Firms in "legally identified" business groups</b>	<b>Sample average</b>
Share of the biggest shareholder in 1998 (%)	129	42	43	214
	36.26 (24.41)	30.78 (23.26)	39.79 (25.17)	35.89 (24.40)
	30.00	20.00	39.00	29.29
Share of the biggest shareholder in 2001 (%)	141	44	47	232
	40.39 (25.58)	39.41 (25.06)	43.69 (23.29)	40.88 (24.82)
	34.00	38.00	48.50	38.00
Share of three biggest shareholders in 1998 (%)	103	35	32	170
	46.99 (22.81)	48.99 (29.42)	55.50 (24.93)	48.44 (24.63)
	45.10	45.00	52.50	46.50
Share of three biggest shareholders in 2001 (%)	115	37	36	188
	54.49 (23.97)	58.32 (27.61)	64.49 (24.27)	56.77 (24.85)
	54.00	59.00	67.00	55.00

\* Data in cells are number of observations, mean, (standard deviation), and median.

### 3.3 Competitive Advantages and Incentives to Join Business Groups: In-depth Interviews

Results of in-depth interviews highlight the specificity of corporate governance and overall decision-making at the level of firms within business groups. Respondents pointed out all the possible explanations for entering into business groups mentioned in analytical papers devoted to big business in Russia (Dolgopyatova, 2003).

Let's give several examples<sup>3</sup>. As we already mentioned, the firm boundaries which were exogenously determined in Soviet times became inefficient after liberalization. The same can be said about market structures: too many sellers found themselves in the market. This problem was most acute for firms in industries which faced tough competition from imported products (namely food, textiles etc.). Almost all respondents in the in-depth interview mentioned this.

*«Recently our market segment... changed dramatically. From 23 Russian producers only 12 are in the market now, and only 7 of them have modernized capacities and increased output. It seems clear that in three-four years time only 4-5 of the biggest firms will remain in the industry. Our enterprise is not among the biggest and recently has become*

<sup>3</sup> Citations from interviews are given in italics.

*detached from the market leaders... Enterprises like this will be captured by the market leaders anyway*” (respondent is a deputy director general of a firm in the food processing industry, it employs 840 staff).

Several respondents mentioned the possibility of cutting costs within a business group because of unified procurement and marketing policies. Almost all respondents insisted that the advantages of the “full technological cycle” within the firm were crucial in the Russian context. For all of them competitive strategy was to develop the value chain from raw materials to the supply of production and then to the final consumer. Respondents were not unaware of the losses caused because of weak incentives in the complicated system of hierarchical control, but they were absolutely certain that these losses are outweighed by gains from centralized decision-making at the level of business group.

*«It would be better for the owner to buy the firms on subsequent stages of the technological chain instead of any certain enterprise... He must have professional staff for any technological process and professionals for the whole production. Starting from the supply of raw materials to the sale of products to final customer... all questions must be solved at the top level»* (respondent is an executive director of a textile company with 300 employees).

As an incentive to enter into a business group respondents mentioned the problems associated with the quality control of raw materials and reliability of supply, which are much easier to solve inside an integrated company. This kind of evidence confirms the traditional view that business groups result from high transaction costs in Russian markets, which have decreased very slowly in comparison with what would have been expected ten years ago. The prevalence of vertical as opposed to horizontal integration inside Russian business groups also seems to provide additional arguments for this point of view.

The real surprise is that according to the results of interviews the insufficient adaptation of managers to a market environment is still a valid reason for the creation of business groups. The common tool to overcome this problem at the business level is to drive a set of important managerial decisions out of the firm that becomes a “production facility” only. Mentioned in the case of big businesses (Pappe 2002a, 2002b), this effect takes place in medium-size companies, too.



*«People are used to work in the old manner; they cannot work in the new environment. That is why all the questions about procurement, about tariffs on processing, on marketing and dealing – all these questions are solved here (by new owner). Some time ago I tried to delegate a set of responsibilities to the level of the enterprise but the only thing I received was a mishmash in accounting files... So I decided that it should be better to do all here...»* (respondent is a new (initially outside) owner / executive director of a textile firm with 300 employees).

It is also surprising that the respondents representing firms consider this kind of authority sharing to be an advantage despite the fact that it evidently restricts the self-dependence of the firm. The executive managers of firms in Russian business groups – even if they are controlling owners, - have almost no decision rights in the field of marketing.

*«Enterprise is free from the unusual and unnecessary decisions. The holding company performs the functions of the Soviet Glavk (industrial planning body under socialism). We don't have to care about what and how much to produce... The holding company supplies the raw materials, sells our products, and decides all accounting, tax and financial issues. Director don't have to think about taxes, wages etc... The holding is a buffer that saves us from the market...»* (respondent is a director general of a machine building enterprise with 1100 employees).

*«(The holding's authority) is in the first place in marketing. I do not have to care any more to whom to sell the product and at what price»* (respondent is a director general of a food processing enterprise with 430 employees).

In this context, analyzing the results of interviews we again found the answer to the question about why the processing arrangements are so popular in Russian industries. The specific feature of processing (tolling) arrangements is that it drives all the important marketing functions out of an enterprise (Avdasheva, 2002). Among the respondents of this sample survey, those who operated under processing contracts were mainly found in the textile industry. As they mentioned, initially processing contracts were considered only as a temporary tool to solve the problem of a deficit of working capital. But now the respondents are absolutely certain that this form of organization has important advantages for their firms.

*“Under this scheme, under processing arrangements... there is no need for substantial managerial efforts... We know all the suppliers of materials for processing and they*

*know us... The question is only to sign a contract, and after that business becomes very simple*" (respondent is a new (initially outside) owner / executive director of a textile firm with 300 employees).

In the context of the question on the authority of business groups towards their member firms, the largest part of respondents mentioned the *"unified marketing and technological (and of course, financial) policy"* within the group. Business groups make decisions about product specialization, as well as the amount and directions of capital investments. At least in two firms in the sample for in-depth interviews business groups initiated large-scale restructuring, including significant changes in the variety produced in order to complete the "technological chain" associated with massive capital investments. The latter example raises very important questions: do the firms within business groups have better access to the market for investment funds?

From our sample we did not find any positive dependence on availability of investments because of the fact that the firm belongs to a business-group. Comparing capital investments during the four years before the interview<sup>4</sup> with the other characteristics of the firms (including the relationships with business groups), we found (as expected) that the decisive determinant for capital investments was the financial performance of the enterprise (Table 4). In turn, financial performance does not depend on whether an enterprise is a part of a business group or not.

The data about the sources of the enterprise investment funds is very interesting. In addition to the enterprise profits, which comprise the main source of investment funds, a significant part of respondents (two thirds of the sample) have obtained bank credits in recent years. Seven respondents mentioned state support (mainly indirect incentives such as tax privileges and special guarantees, as in one case where there was repayment of 50% of the interest on debt) as one source to attract investments. Funds from business partners (including holding companies) are also significant as a source of investment funds, but an interesting fact is that the possibility of using this source does not differ for enterprises that form a part of a business group and those that do not. From our sample, four respondents of the first type and three respondents of the second type mentioned this source of funds. Therefore, the results of interviews do not confirm the statement that

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<sup>4</sup> *When interpreting the results of interviews it is, unfortunately, impossible to estimate the scale of capital investment. We tried to separate capital investments from investments in expansion of working capital or nonsignificant expenses for equipment, where it was possible.*

better access to investment funds is a common consequence of entering into a business group.

Table 4. **Financial performance, relationships with business groups and capital investments (% of respondents)**

		Financial performance			Overall
		Unsatisfactory	Satisfactory	Good	
Capital investments in the last years	No	75.0	25.0	0.0	26.7
	Yes	25.0	75.0	100.0	73.3
Enterprise is a part of business group	No	50	40	66.7	46.7
	Yes	50	60	33.3	53.3
Number of respondents		4	20	6	30

Summing up, the results of interviews allow us to draw important conclusions about the national model of distribution of authority and responsibility between insider manager and outsider owner (firm and business group in our context). In spite of many authors who mentioned extremely high centralization of decision-making in the hands of a controlling owner as an important feature of Russian corporate governance, we found very little evidence of strong centralization of *all type of decisions*.

One possible solution of this paradox may be connected with the fact that distribution of authority and responsibility between firms and the business group is subordinated to the logic of “marketing center – production facility” but not to the logic “strategic decisions – day-to-day management”. All the marketing and financial decisions are highly centralized while “production” decisions are decentralized enough. The following statement is typical:

*“Key decisions are made at the enterprise level, the business group developed only for marketing”* (respondent is a director general of a machine building enterprise with 300 employees). Very critical in this statement is the strong opinion expressed by the respondent that marketing decisions are of secondary importance to him.

The examples of complete centralization of decision-making at the level of business groups are more rare, but also present. In all of these examples the firms, including those with controlling inside shareholders, function only as pure “production facilities”:

*«The holding controls all the finance, buys all the inputs for production, provides us with technologies, including all the documentation... We supply the final products in*

*exchange for that»* (respondent is a director general of a machine building firm with 1800 employees).

But the typical situation is where most of the “production” decisions (technology, personnel, even product variety and product quality) are delegated to the level of the firm. Assessing this type of allocation of authority and responsibility from a more or less traditional point of view, one can find “excessive centralization” (financial and marketing decisions) and “excessive decentralization” (“production” decisions, including input management).

### 3.4 Competitive Advantages of Business Groups: Contract Protection or Just Marketing?

The model of relationships between enterprise and business group described above can be considered as a special type of “dispersed company” that was described in the first place in connection with tax evasion (Kuznetsov, Gorobets and Fominych, 2002), but not explained completely by the reasons for tax evasion. This model emerged because the inside managers of Russian enterprises adapted imperfectly to the new market environment, apparent market deals actually serve to complete the decisions made and enforced under hierarchical control. A similar model was described by Stark as “recombinant property” (Stark, 1997).

In the model of “dispersed company”, financial and marketing decisions are driven out of the “production facility” that is an enterprise for the level of decision-making, which is legally separated from the company. We can see the same thing in the business groups we have analyzed. An important difference is in the roles of inside managers versus inside/outside owners. The development of “dispersed companies” served the interests of inside ownership and control, for instance, allowing inside owners to receive income from property that is non-related to dividends (Rozinsky, 2002)<sup>5</sup>, while in business groups outside owners have played a more significant role. It is important to ask,

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<sup>5</sup> *The phenomenon of “non-dividend income from property” is essential to understand overall decision-making at enterprise level. The main idea is that the prevailing part of income of an insider top-manager is transferred from the revenue of firms affiliated with him to those that are suppliers of raw materials to the enterprise under consideration. This system is known as “participation in cost” as opposed to “participation in profits”. Evidently under this system a top-manager has not enough incentives for cost saving, since cost saving would lead to the decrease of his income (Rozinsky, 2002).*

however, in what sense can we call an owner of a business group an “outsider” owner with respect to the typical Russian firm which is part of a group? Despite the recent distribution of shares, it is the executive manager (or a group of executive managers) of the business group who make important decisions for the firm. In certain cases, even if this owner initially is an “outsider”, in the course of time he becomes a very important decision-maker and can be considered as an “insider” for the business group as an integrated business. Redistribution of shares may follow redistribution of authority and responsibility, albeit relatively slowly.

Speaking about redistribution of power in favor of business groups, we must keep in mind that it takes place while there is a prevalence of insider ownership in the Russian enterprise. So we have to ask several questions. Why does an outsider business group insist on redistribution of authority described above? Why do insider managers/owners agree with it? How does this model of decision-making influence the development of a national model of corporate governance?

Because of the weakness in law enforcement, contracts between an owner and a manager should have the properties of an incentive contract. Among other things, they should be easily verifiable and should prevent opportunistic behavior. It seems that the model of business group organization satisfies these conditions. The manager’s assignment is formulated as an output program. This format requires relatively low monitoring costs, and also it restricts the possible opportunism of managers since their role in the apparent external agreement is just a technical one. On the other hand, the incentive for the insider manager (who is typically also a controlling shareholder) to accept such a contract is insured because being a “production facility only”, the firm receives more gains than being a stand-alone enterprise and trying to perform marketing and financial functions.

It is natural to assume that inside manager (who is often a controlling shareholder at the same time) will agree to give up some of his authority only if the business group insures him at least the same level and source of income. One of the ways to do so is to retain as a main supplier the firms affiliated with the top management. To remain the “traditional” source of income means to remain the traditional source of income for inside managers from the revenues of supplying firms. But that means that there is a very restricted perspective for radical restructuring of enterprise activity, since top-managers are not interested in cost-saving.

The results of surveys and interviews raise a doubt about the idea that business groups provide better contract protection. It seems possible that the main competitive advantages for business groups are connected with the removal of marketing functions from the management of the firm level and the possibility of business groups that better perform these functions. In the surveys and interviews we found little evidence of “trust” between firms and business groups. Instead, the agents apply specific strategies to create incentives for the “fair behavior” of the partner.

## 4 Business Groups and Innovation Strategies of Russian Enterprises

As we indicated above, firms within business groups implement innovation strategies (at least some of them) more often than “stand-alone” enterprises. This result remains true in the data of both “Survey 2001” and “Survey 2002”. At the same time, the data presented above do not allow us to answer the question as to the extent to which this is an effect of the business groups themselves, as opposed to specific circumstances connected with the industry, size and even region of the firm. To explore this question more precisely we used probit-analysis, where the endogenous variables were the different innovation strategies.

For the regressions we used the data of “Survey 2002” (Table 5). Explanatory variables are industrial dummies (3-digit), regions where enterprises are located, size of enterprises (where “small” means that the number of employees is under 100, “big” means that the number of employees is over 500), dummies of competition with import and domestic producers (normalized to 1 being the toughest competition). “Orders” dummy was also normalized from the estimated period through which enterprises were confident about their orders. In several specifications we also introduced variables for the “influential stakeholders” of certain enterprises derived from the answer to the question “How frequently do you consult with (a given group of stakeholders) to make strategic decisions?” with answers “almost never”, “sometimes”, “often” and “almost always”. Here a zero value for the variable refers to the answer “never” and one refers correspondingly to the answer “almost always”. This group of variables was used to highlight the impact of different groups of stakeholders within a business group on the strategies of an affiliated firm and therefore to define the role of business groups in the development of Russian enterprises.

The characteristics of ownership and its redistribution are also introduced: the variable for state ownership – the value is zero when there are no shares belonging to the state and one —when there are, and the variable for a change in ownership for the biggest owner – the value is zero if there was no change of controlling owner in the past three years, and one if there was). The special variable reflecting the “lock-in” effect was drawn from the answer to the question “How high are the costs to change the main suppliers?” (where a value of one refers to the answer “It’s almost impossible to change suppliers” and a value of zero to the answer “It’s possible to change suppliers without any difficulties”). This variable reflects an important concept of “quasi-rent” and “hold-up problem” that was very crucial for enterprises in transition due to an underdeveloped market infrastructure and lack of competition.

In many papers (see, for instance, Bevan et al., 2001) it has been shown that competition from imported products (in contrast with competition from domestic producers) provides significant incentives to innovate (for almost all types of innovations). Following these papers, we also introduced dummies (assigning a value of zero if there is no competition and a value of one if there is competition) for the estimate by the respondents of competition from imported products and domestic competitors.

As for business groups, the picture is mixed. On the one hand, the firms within business groups (especially informal ones) have an increased probability of introducing new production capacities. But it is necessary to keep in mind that this effect is almost completely explained by the positive dependence of probability to introduce new production capacity on the amount of orders guaranteed and on the participation of firm partners as influential stakeholders in decision-making. Firms within legally identified business groups have a higher probability of implementing investment projects and this fact can support the viewpoint (see Volchkova, 2001, Frye 2003) that investments inside the group are better protected. Within business groups there exists a credible threat that is disciplining manager (confirmed by a higher probability of change in the top management of firms within business groups).

At the same time, firms within business groups have a lower probability of introducing new product lines and of changing their main input suppliers. In other words, firms within business groups are reluctant to perform several restructuring strategies.

Table 5. Russian enterprises: innovation strategies and business groups (probit-models), Survey 2002

Table 5.1. – Innovation strategies: production capacity, investment projects (cell contains regression coefficient (standard deviation in parenthesis))

	Introduction of new production capacity				Retirement of obsolete capacity				Investment projects		
Small	-0.25 (0.18)	-0.51* (0.32)	-0.31 (0.22)	-0.47* (0.23)	-0.06 (0.18)	-0.30 (0.19)	0.06 (0.19)	-0.06 (0.19)	-0.34 (0.36)	-0.32 (0.35)	-0.14 (0.26)
Big	0.28* (0.17)	0.06 (0.23)	0.23 (0.20)	0.30 (0.19)	0.32* (0.18)	0.40* (0.19)	0.30 (0.19)	0.34* (0.18)	-0.12 (0.28)	-0.06 (0.25)	0.13 (0.22)
Competition from import	0.32* (0.18)	0.46* (0.26)	0.46* (0.21)	0.38* (0.20)	0.53** (0.18)	0.50* (0.19)	0.47* (0.19)	0.49* (0.19)	0.54* (0.27)	0.55* (0.27)	0.27 (0.22)
Competition from domestic producers	0.16 (0.17)	0.28 (0.24)	0.23 (0.20)	0.20 (0.20)	-0.06 (0.17)	-0.09 (0.17)	-0.08 (0.17)	-0.04 (0.17)	0.06 (0.27)	-0.06 (0.26)	0.01 (0.21)
"Formal" business group	0.13 (0.21)				0.35* (0.20)		0.21 (0.22)	0.47* (0.23)	1.25*** (0.34)	1.12*** (0.32)	0.66* (0.23)
"Informal" business group	0.26 (0.21)				0.36 (0.22)		0.45* (0.24)	0.34 (0.22)	0.02 (0.29)	-0.06 (0.28)	0.02 (0.24)
Orders	0.69* (0.27)	0.38 (0.40)	0.38 (0.30)	0.52* (0.30)					0.34 (0.44)	0.03 (0.42)	
Customers are stakeholders		-0.71* (0.39)	-0.31 (0.30)	-0.49 (0.31)		-0.86** (0.27)					
Suppliers are stakeholders		0.14 (0.47)	-0.21 (0.36)	0.26 (0.36)		0.36 (0.32)					
Banks are stakeholders		-0.47 (0.39)	-0.59* (0.31)	-0.62* (0.31)		0.39 (0.29)					
Partners are stakeholders		0.52* (0.32)	0.50* (0.24)	0.55* (0.24)		0.10 (0.24)			0.94** (0.34)	0.92** (0.32)	0.74** (0.26)
No state ownership									0.64* (0.32)		
New owner (3 years)		-0.35* (0.21)								-0.49* (0.22)	
Control of owner			0.32* (0.19)				0.53** (0.17)				0.54* (0.22)
Cost of changing the supplier				-0.51* (0.29)				-0.55* (0.25)			
Industrial (3 digits) and regional dummies	+	+	+	+	+	+	+	+	+	+	+
Constant	-0.34 (0.26)	0.50 (0.51)	-0.29 (0.32)	-0.48 (0.33)	0.00 (0.22)	0.16 (0.26)	-0.32 (0.26)	0.32 (0.27)	-1.79*** (0.49)	-0.69* (0.40)	-1.33*** (0.31)
Number of observations	376	224	328	312	391	344	368	367	215	226	345
P> Chi2	0.141	0.02	0.230	0.065	0.156	0.131	0.167	0.171	0.186	0.04	0.446

Note: \* significant at 10% level; \*\* significant at 5% level; \*\*\* significant at 1% level.



Table 5.2. – **Innovation strategies: production capacity, investment projects**  
(cell contains regression coefficient (standard deviation in parenthesis))

	Adoption of new technology		New product lines			Increase of R&D expenses			
Small	0.00 (0.18)	0.06 (0.19)	-0.37* (0.19)	-0.10 (0.26)	-0.33 (0.21)	-0.31 (0.21)	-0.22 (0.23)	-0.78* (0.33)	-0.71* (0.33)
Big	0.22 (0.18)	0.13 (0.18)	-0.08 (0.17)	-0.07 (0.22)	-0.08 (0.18)	0.12 (0.17)	0.10 (0.19)	0.13 (0.23)	0.15 (0.23)
Competition from import	0.47** (0.18)	0.48* (0.19)	0.20 (0.17)	0.20 (0.22)	0.22 (0.18)	0.49** (0.18)	0.68** (0.20)	0.14 (0.23)	0.06 (0.23)
Competition from domestic producers	0.04 (0.16)	0.09 (0.16)	-0.13 (0.17)	-0.05 (0.21)	-0.16 (0.17)	0.01 (0.17)	0.05 (0.19)	0.12 (0.22)	0.04 (0.23)
"Formal" business group	0.48* (0.20)	0.40* (0.21)	-0.10 (0.21)	-0.14 (0.28)	-0.08 (0.22)	0.46* (0.21)		0.79* (0.27)	0.93*** (0.27)
"Informal" business group	0.32 (0.21)	0.32 (0.22)	-0.19 (0.20)	0.26 (0.24)	0.13 (0.21)	0.26 (0.21)		0.31 (0.27)	0.37 (0.27)
Orders							0.44 (0.31)		
Customers are stakeholders							0.32 (0.29)		
Suppliers are stakeholders							-0.66* (0.36)		
Banks are stakeholders							-0.17 (0.32)		
Partners are stakeholders							0.61* (0.25)		
No state ownership				-0.41* (0.20)					
Control of owner		0.36* (0.17)						0.48* (0.24)	
Cost of changing the supplier					-0.31 (0.25)				-0.82** (0.32)
Industrial (3-digit) and regional dummies	+	+	+	+	+	+	+	+	+
Constant	-0.44* (0.22)	-0.69** (0.26)	-0.17 (0.23)	0.23 (0.32)	0.03 (0.27)	-0.33 (0.22)	-0.53* (0.30)	-1.95*** (0.36)	-1.20** (0.34)
Number of observations	390	369	392	251	369	387	328	364	356
P> Chi2	0.104	0.106	0.150	0.082	0.129	0.244	0.148	0.178	0.814

Note: \* significant at 10% level; \*\* significant at 5% level; \*\*\* significant at 1% level.

	Change of input supplier			Increase of marketing and advertising expenses			Change of executive managers			
Small	0.14 (0.20)	0.14 (0.22)	0.25 (0.28)	-0.31 (0.21)	-0.18 (0.31)	0.12 (0.25)	-0.07 (0.29)	-0.09 (0.32)	0.08 (0.31)	-0.06 (0.31)
Big	-0.04 (0.19)	-0.06 (0.21)	-0.23 (0.22)	0.12 (0.17)	-0.08 (0.23)	0.06 (0.19)	0.53* (0.22)	0.67** (0.24)	0.39* (0.23)	0.56* (0.23)
Competition from import	0.06 (0.19)	0.19 (0.21)	0.09 (0.23)	0.49** (0.18)	0.39* (0.25)	0.55** (0.21)	-0.12 (0.23)	-0.16 (0.26)	-0.10 (0.24)	-0.21 (0.24)
Competition from domestic producers	0.13 (0.18)	0.15 (0.19)	0.16 (0.22)	0.02 (0.16)	0.01 (0.23)	0.06 (0.19)	0.19 (0.23)	0.08 (0.25)	0.20 (0.24)	0.16 (0.24)
"Formal" business group	0.07 (0.22)	0.06 (0.24)	-0.26 (0.29)	0.46* (0.21)			0.62* (0.26)		0.63* (0.27)	0.64* (0.27)
"Informal" business group	-0.13 (0.23)	0.16 (0.26)	-0.35 (0.25)	0.26 (0.21)			0.36 (0.26)		0.29 (0.27)	0.37 (0.27)
Orders								-0.41 (0.42)		
Customers are stakeholders		0.58* (0.28)			0.39 (0.33)			-0.22 (0.42)		
Suppliers are stakeholders		-0.08 (0.36)			-0.82* (0.43)			0.44 (0.48)		
Banks are stakeholders		0.11 (0.33)			-0.19 (0.39)			0.13 (0.41)		
Partners are stakeholders		-0.36 (0.26)			0.47 (0.32)	0.62* (0.25)		-0.28 (0.33)		
No state ownership					-0.31 (0.26)					
New owner (3 years)			-0.44* (0.19)							
Control of owner						0.62** (0.20)			0.78* (0.29)	
Cost of changing the supplier						-0.88** (0.29)				-0.63* (0.35)
Industrial (3-digit) and regional dummies	+	+	+	+	+	+	+	+	+	+
Constant	-0.80*** (0.24)	-1.18 *** (0.28)	-0.36 (0.32)	-0.33 (0.23)	0.25 (0.35)	-0.32 (0.32)	-2.00*** (0.31)	-1.61*** (0.39)	-2.50*** (0.40)	-1.64*** (0.37)
Number of observations	383	339	260	387	220	325	379	323	362	356
P> Chi2	0.122	0.140	0.265	0.244	0.020	0.336	0.101	0.036	0.455	0.557

Note: \* significant at 10% level; \*\* significant at 5% level; \*\*\* significant at 1% level.

Interesting results were obtained about the impact of the relationships of enterprises with different “influential stakeholder groups” on innovations. According to a viewpoint that has recently become very popular, the participation of influential stakeholders in decision-making should improve the efficiency of the latter. From our survey sample, the control of decisions by different stakeholders has a differing influence on the probability of applying innovation strategies. For instance, control by partners in joint venture

projects increases the probability of implementing most of the analyzed innovation strategies (e.g. introduction of new production capacity, realization of investment projects, and increase of R&D investments, marketing and advertising). At the same time, the control of strategic decision-making by the bank decreases the probability to innovate. This evidence could be explained by the fact that the bank plays an important role for enterprises with unsatisfactory financial performance. But it is not easy to explain the negative influence on innovation strategies of the control by the consumer (decreases the probability to introduce new production capacity and to retire obsolete equipment) and coordination with suppliers (decreases the probability to increase marketing and advertising expenditure).

It is not easy to explain the negative influence of a change in ownership on almost every innovation strategy, and also the absence of a positive influence of completely private ownership (absence of shares belonging to the state on the probability of innovation).

Closer control of owners over the decisions of managers increases the probability to innovate and this can be considered as another argument in support of the viewpoint about the need to improve the overall system of corporate governance in Russia and to confront the attempts to prove the viability of a “national system of corporate governance” with a completely unique set of rules and norms.

Another interesting result is that the probability of almost every type of innovation decreases with the difficulty the enterprise has in changing input suppliers. This result (surprisingly) fully coincides with the institutional theory of a lock-in effect: the dependence of an enterprise on the suppliers decreases the incentives to innovate. This factor is important for Russian enterprises: in our sample only 15% said they could change suppliers easily, the proportion of enterprises which believed it was nearly impossible to change suppliers was at least twice as high.

## 5 Business Groups, Innovation strategies and Competitiveness of Enterprises in Transition: the Main Conclusions

The influence of the described business group functioning model on the competitiveness of enterprises is ambiguous. On the one hand, as surveys and in-depth interviews show, business groups are more successful in marketing than are stand-alone firms.

Correspondingly, firms within business groups face higher demand and demonstrate better financial and overall economic performance. Inside business groups, funds are invested in projects which are oriented to the development of competitive product lines, to new forms of accounting and management, which allow them to better estimate the economic performance and the determinants of competitiveness and therefore to make more efforts for further improvements.

On the other hand, the positive influence of business groups on the strategies of firms is still restricted by a number of factors. Some of them are connected with inside ownership which prevails in Russian industry: under inside ownership (even if it is only formal) redistribution of decision-making towards the parent company of the business group seems to be inefficient. While shares are in the hands of insider management, the investments of the business group in its affiliated firms will be less than optimal. Moreover, in many cases redistribution of shares to outsider owners is not a desirable solution, since in the context of extremely flawed institutional environment outsider owners cannot establish efficient control over insider managers without becoming an insider owner themselves. This will evidently restrict the prospect for business groups to develop to a point which allows them to support “first-hand control” of the controlling owner.

It is necessary to mention again that the development of business groups in Russian industry represents a compromise in the face of the need for market-oriented restructuring and the dominance and relative stability of insider’s control and insider shareholding.

Returning to competitiveness, it is necessary to emphasize that the described allocation of decision-making between a firm and the business group it is associated with demonstrates important inefficiencies. Those agents apprehend the market signals (business groups) which typically have restricted the ability to adopt an entirely new production according to these signals and do not have perfect knowledge about the possibilities of production to adopt. In turn, managers of enterprises, which have firm-specific knowledge about production and can adopt it, do not perceive information about the market demand. This is the cause for the lower speed of adjustment of product variety of business group firms in comparison with stand-alone enterprises.

The improved performance of business groups in the period after the 1999 recovery has been determined mostly by an increase in demand, as opposed to cost saving. There are a

number of evident reasons for this. Insider managers do not have incentives for cost saving first of all because the considerable source of income for them is “participation in cost” (revenues of affiliated companies). Being aware of that and being incapable of establishing efficient control over the firms, business groups too lacked sufficient incentives to invest in cost-savings. This is one explanation for the non-reliance on restructuring of Russian enterprises as a means of cost savings and cost savings being the reason for better financial performance (Bhaumik and Estrin, 2003) for the firms within business groups (which is a substantial part of Russian privatized firms).

Again, the economic and financial performance of the described business groups is mostly determined by a change in demand for the products of firms. Under import-substitution and economic recovery – when it is possible to increase output without any increase of production efficiency, - business groups demonstrated themselves to be successful enough. But we should keep in mind that a fall in demand could highlight all the weaknesses of decision-making inside the groups, which in turn would contribute to the decline of firms and business groups.

In conclusion, the entire story about privatized enterprises and business groups in Russian industries tells us that a significant portion of market participants in Russia are still in the process of transition to market economy. For many of them, the transition takes very specific forms as described in this paper.

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# Stock Ownership and Corporate Control as Determinants of Company Modernization: The Case of Russia

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## Abstract

The paper studies evolution of stock ownership and corporate governance mechanisms in the Russian industrial companies and their impact on business restructuring and innovation activities. The study is based on original enterprises' survey, statistical data and in-depth interviews with top-managers of selected companies. Empirical data for several years were collected and the research outputs were obtained within the project "Structural Changes in the Russian Industry" implemented at the Higher School of Economics (HSE) under the supervision of Professor E. Yassin.

**Keywords:** corporate governance, property rights, business restructuring, investment policy

**JEL Classification:** G32, G34, P31

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# 1 Introduction

The second section describes empirical data used in the paper. The third one shows the main trends in redistribution of corporate ownership for over a decade of reforms. The fourth part analyzes the internal mechanisms of corporate governance: board of directors and replacement of executive top management. The fifth section describes the basic approach for evaluation of the major effects of corporate ownership and control specifics on business restructuring and performance. The sixth section presents a brief overview of known empirical research and puts forward several qualitative hypotheses. The conclusive seventh section brings the outputs of the analysis. We found that level of property concentration, and different structures of corporate ownership/corporate control have no effect on restructuring and business performance. The impact of directors' (CEOs) turnover is weak and contradictory. The only indirect characteristic of corporate control – company's participation in business groups demonstrates positive effects on enterprise modernization policies and business performance including positive dynamics of gross value added per employee.

## 2 Brief Description of Empirical Base

Our paper is characterised by a combination of several methods of analysis including statistical analysis of official reporting data of enterprises based on a wide and representative sample, study of random enterprises' survey data based on a formalized questionnaire and, finally, analysis of a number of in-depth interviews with top-managers.

The basic representative sample covered 1288 enterprises located in 12 constituent territories of the Russian Federation. The enterprises were included in the observation programme so that the sectoral composition of the sample would correspond to the regional location of industrial sectors. About 800 joint stock companies (JSCs) were included into this sample (See brief description of Russian corporate sector in Box 1). Reporting data (from statistical and accounting reporting sheets) reflect performance of companies during 1997-2002 including outputs, costs and profits, assets and liabilities, investments and other indicators of enterprise activities.

### Box 1. The main legislative specifics of Russian corporate governance

The foundations of corporate legislation were created in Russia when Section 1 of the RF Civil Code (passed in October 1994, effected starting from 1995) and the Federal Law on Joint-Stock Companies (№ 208-FZ of December 26, 1995) were adopted. This law was amended in 1996 and 1999 and was significantly modified in 2001. The revised version of the Law was starting from 2002 when minor changes were made. Corporate relations are also regulated by security markets law and privatization legislation.

Under Russian legislation, there are two main types of joint-stock companies in the economy – open JSC (i.e. public) and closed JSC (i.e. a type of a private company). In case of an open JSC the number of founders is unlimited, while the number of founders of a closed JSC may not exceed 50. If the number of a closed joint stock company's shareholders exceeds 50, such company must be transformed into an open one within a period of one year.

The main feature of closed JSC is a ban on free circulation of shares. An open JSC has a right to do placing of shares and issued securities of the company convertible into stock through both open and closed subscription. A closed joint stock company is not entitled to do placing of the company's shares and convertible securities through open subscription or to offer them for purchasing to an unlimited number of persons through any other method.

Shareholders of both open and closed JSCs have a right to alienate their shares without consent from other shareholders and the company. At the same time, the shareholders of a closed JSC intending to sell their shares to a third party are obliged to notify the rest of shareholders and the company thereof in writing. Here, other shareholders enjoy a privileged right to purchase the stock sold by closed joint stock company's shareholders. The Charter of a closed JSC may also provide for a priority right for the company itself to buy out such shares if the company's shareholders fail to take advantage of their priority rights.

Official reports of enterprises do not allow an analysis of the factors resulting in their performance. Therefore, for an in-depth analysis of enterprise behaviour, statistical information was enhanced with top management survey data. Additionally, special formalized survey of the basic sample was conducted by the HSE in autumn 2002. As a result, 473 questionnaires were received from enterprises with the assistance from the State Statistics Committee of Russia (Goskomstat). The formalized survey brought data on ownership and corporate governance, business restructuring and investments, integration and decision-making. This combination of different sources of information allowed the creation of a comprehensive database incorporating six years of statistical data and questionnaire data. A reader could see detailed description of samples and the database in Yassin (2004).

All questionnaires specified regional location and sectoral association, while the rate of response on other questions equalled 80-98%. State-owned enterprises (federal or regional property) accounted for one-fifth of the sample as a whole, with joint-stock companies accounting for more than two-thirds, of which 80% are open joint-stock companies. Every ninth enterprise was a limited liability company.

The main structural parameter of the sample is its sectoral composition (Table 1). In comparing sectoral composition of the sample and the main set with the number of enterprises in Russian industry, deviations were a maximum of 3-4 percentage points.

Sectors	The Sample		Operating industrial enterprises
	Number of respondents	Share, %	Share, %*
Fuel and energy	53	11.2	9.5
Metallurgy	12	2.5	2.3
Chemical and petrochemical	9	1.9	4.3
Machinery building and metal working	133	28.1	32.4
Forestry, paper pulp and timber	66	14.0	13.7
Construction materials	38	8.0	6.0
Light industry	72	15.2	11.0
Food industry	90	19.0	16.0
TOTAL	473	100	-

*Note: \* Sectoral shares in the total number of industrial enterprises were calculated on the basis of data as of the end of 2001, see (Goskomstat, 2002, pp. 20-23).*

The 2002 average employment (including dual job holders and contracted employees) was used to identify peer groups. In the sample as a whole, every fourth enterprise had up to 100 employees. The bulk of enterprises (46%) were classified as “medium-size” with a payroll of 101 to 500 employees, the rest of the sample being “large” (501 to 1000 employees) or “extra large” (over 1000 employees) enterprises.

There is a correlation between the size of enterprises and their sectoral association, with small enterprises being more widely represented in energy and light industry (32% and almost 44%, respectively). Medium-size enterprises were more widespread in construction materials and food industry, while enterprises employed more than 500 persons in metallurgy and machinery building.

The analysis of ownership and corporate control and quality of management would have been incomplete without the use of interviews or case-studies. In-depth interviews involving managers of 37 industrial enterprises from 7 Russian regions were held in autumn 2003 relying on the scenario developed on the results of the formalized survey. Interviews were focused on the study of enterprise modernisation and factors that contribute or hold back positive shifts in business competitiveness in the 2000s. Interviews were complemented by analytical papers based on information received

during visits to the enterprises and also data from web sites, regional mass media and other open or 'hidden' sources.

Interviews were held in the most widespread sectors such as machinery building, food and light industries (these sectors covered 60% of enterprises accounting for over 52% of total employment and over 30% of industrial output in Russia) and metallurgy (14% of industrial output and 10% of employment)<sup>1</sup> as an example of export-oriented production. In selecting companies we took into account other characteristics such as a variety of "success stories" and "failure stories", mandatory coverage of green-fields, and enterprises that underwent restructuring or bankruptcy proceedings, and also companies integrated into alliances or business groups. The sample included 33 JSCs, of which 23 were open companies and 10 closed companies employing from 200 up to 100000 employees.

Almost one half of respondents were general (executive) directors while others were deputy directors supervising economic, financing and investment issues of enterprise operation. In a number of cases interviews involved key owners and chairmen of the board. Almost all respondents worked at the given enterprise for a minimum of 4-5 years.

One should note that if the basic sample included over 800 joint-stock companies, the sample of surveyed enterprises consisted of about 320 companies, including 310 joint-stock companies whose statistical data and data received through surveys were combined. We can use the basic sample for ownership composition studies. Research of restructuring activities has been carried out only in respect of those joint-stock companies whose CEOs were surveyed at the end of 2002. And results of in-depth interviews were used for qualitative explanation of observed phenomena and justification of hypotheses.

### 3 Structure of Corporate Ownership and Major Trends in Ownership Changing

Starting from the mid-90s, a number of empirical researches carried out by the Bureau of Economic Analysis (BEA), the HSE, the Russian Economic Barometer (REB) and other institutions have focused particularly on the examination of the issues of corporate

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<sup>1</sup> See Goskomstat, (2002, pp. 20-31).

ownership and control in Russian companies. The above research (Aukustionek et al., 2003; Vitebsky et al., 2002; Guriev et al., 2002; Dolgopyatova, 2004; Radygin and Entov, 2001; and others) has revealed that intensive processes of redistribution of corporate ownership have been under way in Russian industry for over a decade.

Those processes have resulted in:

- a reduction in the participation of federal, regional and local authorities in capital with the continuation of the privatisation campaign;
- a growth in participation of the company top-management in equity with a noticeable drop in participation of all the other employees;
- a growth in the share of outside non-government owners against the background of vertical and lateral integration, and development of conglomerates as well;
- significant increase in concentration of equity in the hands of the dominating shareholder (or tightly consolidated group of shareholders).

Economic growth after the 1998 crisis was accompanied by intense redistribution and concentration of ownership, as well as a switch-over of ownership from company managers to outside private businesses. Consolidation of capital based on its expansion in the Russian economy continued (Deryabina, 2001; Pappé, 2002a). Various integrated business groups (not only the oligarchic groups on a nation-wide scale, which are constantly being mentioned in the mass media, but also regional groups and local groups) were formed.

The specifics of the 'property' institution in Russia, as it was mentioned in (Ustyuzhanina, 2001), consists in constant changes in ownership. Such intense processes have been noted by many researchers. According to the data of the HSE (Dolgopyatova, 2002) and the REB (Kapelyushnikov, 2001), nearly 5% to 7% of joint-stock companies changed their principal owner on an annual basis in 90s. According to our latest survey, one out of five enterprises (on the average 6.6% a year) experienced radical changes in the composition of influential owners in a three-year period (from autumn 1999 till the end of 2002).

The above research pointed to an insignificant role of financial investors and foreign shareholders in the equity composition of enterprises. Principal owners included employees of enterprises and outside stockholders (legal entities). It is to be underlined that the share of participation by the management in the capital of JSCs is always underestimated.

Structural annual survey carried out by the Goskomstat of Russia at 27,000 large and medium-size industrial enterprises has shown that the share of participation by employees and individuals in the capital declined, with a significant growth in participation by non-financial institutions. However, available outputs of the statistical survey (Table 2) are related not only to joint-stock companies, but also to other legal entities, while the structure of authorised capital was calculated using the size of authorised capital as 'weights'. So, on average, it tends to larger entities. In this case, the preservation of the position of authorities in the composition of equity capital is a result of the calculation method.

More adequate data of the structural survey in respect of the reference sample (the average structure of capital is determined by calculating a mean of shares of each joint-stock company) (Table 3) shows similar results.

Generally, surveyed JSCs are characterised by the same lines of redistribution of ownership (Table 4, Column 1-3). According to data as of the end of 2002, employees accounted for a larger portion of stock capital followed by non-financial commercial institutions and individuals. The aggregate share of outside private investors exceeded that of employees of companies by 20 percentage points.

Let us examine the structural characteristics of authorised capital of only those JSCs where one or another type of shareholder is included in the composition of owners (Table 4, Column 4-6). The data on the number of such JSCs clearly points to the extent of participation of that shareholder. Though employees as shareholders participated in capital more frequently than other types of owners they still accounted, on the average, for less than a half of the capital. Outside private owners participated in the capital of 80% of enterprises in the sample and aggregately owned about 70% of equity. Such a higher extent of participation (greater than that of employees) is achieved through participation in the capital of non-financial commercial institutions.

A number of surveys (Dolgopyatova, 2002; Kapelyushnikov, 2001; Kuznetsov, 2003; Radygin and Entov, 2001) have shown that Russian companies are characterised by a high degree of ownership concentration the extent of which grows from year to year. The index of the largest shareholders' share in the capital of an industrial enterprise amounted to nearly 20% to 35% in the late 90s and early 2000s. Companies with owners with a controlling interest accounted for 15% to 25% of the sample.

Indirect evidence from respondents (Golikova et. al., 2003) points, for instance, to the fact that a dominating owner can be found in at least two-thirds of open JSCs. Interviews which help identify the extent of affiliation between shareholders also point to the fact that Russian JSCs are characterised by a huge extent of property concentration. So the 33 interviewed JSCs demonstrated an extremely high level of concentration. In fact, 25 companies had a dominating owner with a controlling block of shares in his hands. Except for one company that preserved the post-privatization dispersed ownership with managerial control, all other JSCs had blockholders. Practically all interviewed companies had dominating owners controlling their activities: 20 respondents called external owners (legal entities or individuals) and 12 other respondents mentioned company directors.

The surveyed JSCs are characterised by a high level of concentration of capital. It was high even in late 1998. In a three-year period, it increased by more than 5 percentage points (Table 5), while the gap between the mean and the median narrowed, that is, the dispersed portion of capital decreased.<sup>2</sup> By 2002, two-thirds of JSCs had a blockholder; while over 38% of JSCs already had an owner with a controlling block of shares.

Integration has had a great effect on the structure of corporate ownership. Property transformation was accompanied by various reorganizations in the corporate sector and creation of complicated schemes of ownership became the major mechanisms of integration (Pappe, 2002b). Russia became a leader in Central and Eastern Europe as regards mergers and acquisitions (PWC, 2002). Whereas since 1999 business groups have been actively expanding their presence in the economy in conditions of consolidation of capital, starting in 2002 they switched over to restructuring and legal reorganisation of establishing holding companies (Radygin, 2002).

The high weight of non-financial commercial institutions in the equity illustrates property integration based on shareholding. In different surveys, this group of shareholders is typical of 15% to 30% of companies in the sample. Also, their share in that portion of the sample is estimated on average at a level of 40% to 55% of the equity capital.

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<sup>2</sup> Such a gap was also observed in other research. It proved the dispersal of shares among minority shareholders with a high concentration of capital by dominant owners. For instance, according to a survey of over 300 JSCs carried out by the HSE in 1999, it amounted to nearly 5 points in 1995 and 1998 (Dolgopyatova, 2002).



Integration plays a significant role in corporate control. Our interviews showed that 20 entities interviewed were members of business groups or presented holding companies of a group. At the same time, only 4 respondents mentioned non-property forms of integration (market coordination or “give-and-take” or tolling contracts).

Shareholding links support intense participation of a group in management of companies – members of groups including both strategic and operative issues. Also, shareholding of a group pushes replacement of enterprise’s top managers by a new team. New CEO may be the owner of the business himself or a loyal hired manager.

Our survey also showed that enterprises participated in amalgamation and business-groups. Two-thirds of respondents did not consider their JSCs to be members of amalgamation, while other JSCs were included in one or another amalgamation (about 15% of JSCs were members of informal groups, while over 19.5% of JSCs were members of legally registered amalgamations). Though the figures above do not only reflect property links between JSCs in these groups, interviews point to the fact that such links prevail.

Shareholders or founders	1999	2002	Change in the three year period
Authorities – the total, including	18.5	17.7	- 0.8
- Federal authorities	10.4	9.9	- 0.5
- Authorities of constituent entities of the RF	7.3	6.8	- 0.5
- Local authorities	0.8	1.0	+ 0.2
Commercial non-financial institutions	41.6	65.7	+ 24.1
Financial institutions	3.2	5.3	+ 2.1
Non-commercial institutions	4.3	1.5	- 2.8
Individuals – the total, including	20.1	9.8	- 10.3
- employees of the enterprise	10.3	3.8	-6.5
Total	100	100	-
Including foreign individuals and legal entities**	6.6 (40.3)	10.8 (42.8)	+4.2 (+ 2.5)

Note: \* In respect of JSCs and limited liability companies, excluding small businesses.

\*\* Only enterprises with foreign participation are shown in brackets .

Source: Author's calculations based on the aggregate data of the structural survey, see (Goskomstat, 2002, p. 81, 98-99); (Goskomstat, 2000, p. 72) as well as the preliminary data for 2002 provided by Goskomstat to HSE.

**Table 3. Structure of authorised capital of JSCs in the reference sample as of the end of the year (% of the authorised capital)**

Shareholders	1999	2002	Change in the three year period
Authorities – the total, including	9.5	6.9	- 2.6
- Federal authorities	4.7	3.4	- 1.3
- Authorities of constituent entities of the RF	3.4	2.5	- 0.9
- Local authorities	1.4	1.0	- 0.4
Non-government external investors – total, including	45.6	55.2	+ 9.6
- Commercial non-financial institutions	22.2	28.4	+ 6.2
- Financial institutions	0.7	0.8	+ 0.1
- Non-commercial institutions	4.2	3.3	- 0.9
- Individuals	18.5	22.7	+ 4.2
Employees of a particular enterprise	44.9	38.0	- 7.0
- Total in respect of the sample of JSCs	100	100	-
- Including foreign legal entities and individuals	2.9	3.6	+ 0.7

Source: author's calculations based on the data of Goskomstat structural survey in respect of nearly 790 JSCs in the reference sample.

**Table 4. Structure of authorised capital of surveyed JSCs as of the end of the year (% of authorised capital)**

Shareholders	In respect of all JSCs			In respect of JSCs with a listed shareholder*		
	1999	2002	Change in the 3-year period	1999	2002	Change in the 3- year period
	(1)	(2)	(3)	(4)	(5)	(6)
Authorities –the total, including	11.1	9.6	- 1.5	40.9 (77)	43.2 (65)	+ 2.6
- Federal authorities	6.4	4.5	- 1.9	37.7 (48)	36.0 (37)	- 1.7
- Authorities of constituent entities of the RF	3.4	3.9	+ 0.5	41.8 (23)	45.6 (25)	+ 3.8
- Local authorities	1.3	1.2	- 0.1	38.0 (10)	33.7 (10)	- 4.3
Non-government external investors – total, including	45.7	55.4	+ 9.7	61.8 (210)	69.4 (234)	+ 7.6
- Commercial non-financial institutions	21.6	30.0	+ 8.4	44.3 (139)	53.6 (164)	+ 9.3
- Financial institutions	0.8	1.0	+ 0.2	11.3 (20)	17.9 (17)	+ 6.6
- Non-commercial institutions	5.3	2.6	- 2.7	35.3 (43)	25.4 (30)	- 9.9
- Individuals	18.0	21.8	+ 3.8	31.5 (164)	34.6 (185)	+ 3.1
Employees of an enterprise	43.2	35.0	- 8.2	51.1 (240)	45.3 (226)	- 5.8
- Total in respect of the sample of JSCs	100	100	100	-	-	-
- Including foreign legal entities and individuals	2.8	3.4	+ 0.6	38.2 (16)	32.7 (30)	- 5.5

Note: \* The number of JSCs with contribution in the authorised capital by the listed shareholders is given in brackets.  
Source: Author's calculations based on the data of Goskomstat structural survey of nearly 300 JSCs (surveyed in 2002).

	End of 1998		End of 2002	
	Mean	Median	Mean	Median
Share of the largest shareholder, %	36.4	29.4	41.8	38.2
Share of the three largest shareholders, %	48.8	47.0	57.4	55.5

*Source: Author's calculations based on survey data .*

So, dispersed ownership of employees has become a thing of the past. It was replaced by a high concentrated corporate property of enterprise managers or outside investors. In many cases the latter represented the interests of business-groups. The status of the dominant owner turns an outside shareholder into 'an insider' (in the standard meaning of the term, based on the notion of insider's information), since such an owner directly participates in the management of the enterprise or exercises tight control over managers appointed by him.

## 4 Major Internal Mechanisms of Corporate Control in Companies

The board of directors of a joint-stock company is a collegial body formed by the meeting of shareholders for taking strategic decisions and organising and monitoring the work of executive bodies of the JSC (see brief description of a Russian JSC's bodies in Box 2). The ratio between representatives of shareholders or stakeholders in the board of directors describes the structure of corporate control (power structure) at the company.

Against the background of consolidated insider ownership, the work of the board of directors of a large number of companies is characterised by a decrease in the number of directors. This phenomenon is limited only by the need to comply with the norms provided for by the Russian law on JSCs with the number of shareholders exceeding 1000 or 10000). Also, representatives of insiders openly dominate in the composition of the board of directors, while executive management has an important role to play.

## Box 2. Specifics of a Russian JSC's governing bodies

Under Russian corporate law, the bodies of governance in a JSC include:

- general shareholders' meeting – top body for company governance;
- a board of directors – general body governing the company activities;
- executive bodies of company – managing company's current operation and reporting to the board and general shareholders' meeting.

Executive bodies of a company may be: a) company's sole executive body (director, general director) or b) company's sole executive body (director, general director) and company's collective executive body (management board, directorate). In this case, the person who exercises the functions of company's sole executive body also performs the functions of company's collective executive body's CEO; c) profit managing organization or an individual manager under the terms of a contract on delegating authority of the company's sole executive body.

The board of directors exercises general governance over company's activities except for issues that are the competence of the general shareholders' meeting. The number of board members must not be less than 7 members for companies with more than 1000 shareholders; and 9 members for JSCs with more than 10000 shareholders.

Members of company's collective executive body may not make up more than  $\frac{1}{4}$  of the total number of board members. The chairman of the board of a JSC is elected by a majority vote of the total number of company's board members if not established otherwise by the Charter. The person performing the functions of the sole executive body may not be elected as the chairman of the board.

In a company with less than 50 shareholders, who are holders of voting shares, the Charter may provide for the functions of the board to be performed by the general shareholders' meeting.

In the first years after privatisation, representatives of employees usually occupied at least 60% to 70% of seats in the board of directors (Basargin and Perevalov, 2000). The quantitative analysis of the structure of the board of directors based on the outputs of surveys carried out by the HSE and the BEA in the late 90s (Dolgopyatova, 2004; BEA, 2001) points to the preservation of dominant positions of employees. The leading role in the board of directors belongs to representatives of the management (one-third to 40% of seats) followed by representatives of employees (mostly the same managers) or external shareholders. To analyse the comparative advantages of shareholders with regard to power structures, let us compare the ownership structure and the composition of the board of directors using the ratio of representation which is determined as the share of representation in the board of directors per 1% of the share capital by each group of shareholders.<sup>3</sup> As a rule, that ratio as regards employees is significantly more than one

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<sup>3</sup> *The ratio was proposed in (Basargin and Perevalov, 2000, p. 124); the authors calculated it in respect of 43 JSCs of the Sverdlov Region in 1993-1998.*

(1.3-1.5), primarily due to participation by managers of corporations.<sup>4</sup> As regards outside private owners, that ratio is smaller (at a level of 0.6-0.8). Partly, it reflects the limited abilities of minority shareholders to exercise control. As regards authorities, that ratio amounts to 0.8-0.9, primarily due to a more active participation by regional and local authorities.

According to our survey, the average number of directors is less than seven. Also, there is a decrease in that number. The average number of members of the board of directors correlated with the size of the JSC (six persons at small JSCs to eight persons at large companies). Employees dominated in the board of directors, both in 1998 and three years later (Table 6). However, their representation gradually decreased (according to respondents it was due to a decrease in participation by the management). In absolute terms, large shareholders (individuals) were leaders among outside owners. They represented either new outside owners or the former management which no longer ran the enterprise. In relative terms, there was a rapid growth in the extent of representation of authorities and other directors, including the so-called independent directors. In the latter case, estimations by respondents should be treated cautiously. In most cases they do not understand the meaning of the term 'the independent director'. The highest ratio of representation (1.63) was observed with employees, the ratio of outside private investors amounted to 0.55 (the highest ratio (0.82) in that group was observed with large shareholders (individuals)), while that of the authorities amounted to 0.73.

Actually, as seen from interviews, along with large shareholders and company's managers other stakeholders influence to a certain extent the decision making process in corporations. The management of companies regards regional and local authorities and labour teams (in case of large enterprises) as the most influential forces. The boards of directors of some JSCs include representatives of labour teams from among medium level managers or trade-union leaders, particularly if there are still employee-shareholders. In individual cases, those representatives can pursue a relatively independent policy. However, they are closely affiliated with the management. Also, as early as the late 90s there was a trend to include in the boards of directors representatives of regional and local authorities which were not shareholders of these companies (Dolgopyatova, 2002). Thus, the authorities 'add' direct and legitimate methods of corporate control over activities of JSCs to tight administrative regulation and

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<sup>4</sup> Respondents may overestimate the representation of ordinary employees and the extent of their participation in the stock capital. At the same time, they underestimate to a great extent the share of managers in the capital.

widespread informal relations those typical for Russian economy. The above phenomena should be taken into account in estimating the performance of the so-called independent directors.

<b>Representatives of shareholders or stakeholders</b>	<b>End of 1998</b>	<b>End of 2002</b>
Employees of the enterprise	60.3	56.0
- including management of the enterprise	38.5	35.4
Large shareholders (individuals)	16.5	17.9
Authorities (municipals, regional, federal)	5.1	6.7
Commercial institutions, including financial institutions	12.0	12.7
Non-commercial institutions	1.6	1.5
Other directors, including independent directors	4.5	5.2
Number of JSCs which supplied answers	278	294

*Source: author's calculations based on survey data.*

Incidentally, in assessing the need for approval of key decisions by executive management with various stakeholders, large owners were rated first by respondents (managers). They were followed, with a significant lag, by labour teams, the enterprise's business partners in joint projects and alliances and regional and local authorities. Enterprises had the least need to coordinate their decisions with federal authorities and banks rendered services to them.

It has become clear from the interviews that boards of directors are usually formed by the dominant stockholders and follow their instructions. At the same time, boards of directors are closely related to the executive management. Large outside owners are often members of the top management team. To some extent, the board of directors performs formal organisational duties, while actual decisions are made by a narrow group of persons who combine the 'roles' of a shareholder, an executive manager and a non-executive director. The aim of the board of directors as a monitoring mechanism of executive management and a protecting tool of the rights of all shareholders and stakeholders is not implemented today.

Another mechanism of corporate control by shareholders of the company is turnover of the top management. Theoretically, it should encourage managers to be more competent and serve as incentives for their improved performance (Muravyev, 2003). If the CEOs of the surveyed JSCs held office for one month to 33 years, their average term in office was 8 years (Table 7). CEOs were replaced both for natural causes and for reasons

justified by decisions of major shareholders. Many “new” CEOs are often appointed from among top managers of the enterprise; the average parameters of the record of service of the CEO at a particular enterprise are twice as much as the CEO’s term in office.

	<b>Number of JSCs</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Median</b>
Record of service as a CEO	342	0.1	33.0	8.1	6.0
Record of service of a director with a particular JSC	342	0.1	47.0	15.5	15.0

*Source: Author’s calculations based on survey data.*

According to survey data, the process of replacement of CEOs was intensified in Russian JSCs after the 1998 crisis. In the past four years (after the 1998 financial crisis till the time of survey) over 40% of new CEOs took office, while in the period after completion of privatisation (within seven years from the second half of 1995) and during the entire period of reforms (over the past ten years), this number was 57% and about 70%, respectively. Nearly 40% out of the latter (that is, nearly 30% of CEOs in the sample) came from the outside. So, the major part of CEOs took office in the period of emergence of the market economy in Russia.

Incidentally, our in-depth interviews show that 15 JSCs replaced a CEO after the 1998 crisis and another 3 companies in 1997-1998. About half of the companies interviewed went through the change of key owners as well. New shareholders came after bankruptcy or captures, sometimes voluntary sale of shares took place. As a rule, replacement of the CEO was initiated by the dominating owners including business groups. The new CEO could either be an owner or a hired manager representing the owner’s interests. Sometimes the owner may be ready to appoint a member of the old managerial team as a new CEO. At the same time, there are several cases where the CEO turnover was not connected with the change of owners. Reasons for CEO’s exit may be supported by natural determinants or the personnel policy of a business group.

As a result, insider control by dominant owners prevails at Russian industrial companies. They include the managers of enterprises, either representatives of the former directorial corps or new owners. On the one hand, such an ‘insider’ type of corporate governance mitigates the agency problem (Stiglitz, 1999). On the other hand, it is accompanied by a violation of the rights of minority shareholders, the “closure” of the company to outside

investors, and lack of transparency. Thus, the survey showed estimates by respondents (senior managers) as to the prospect of improving the transparency of their businesses and granting access to new investors with whom they will have to share control with. One out of six respondents found it hard to answer, while the aggregate of other respondents consisted of two nearly equal portions; one portion of respondents admitted that they were not prepared for such developments, while the others said they would sooner make public information and share control with investors. These outputs correlated with the availability of bank loans; the greater the problem was to receive a bank loan, the more prepared the respondents were to share control with a new shareholder.

## 5 Effects of Ownership and Control on Modernisation: Analytical Approach

Corporate ownership and control are the factors which in the static are regarded as internal conditions for modernisation of enterprises. To analyse their role, groups or clusters (Table 8) characterised the ownership structure and corporate control mechanisms were formed. Comparative statistical analysis of these clusters will help identify the differences in business modernisation and performance indices.<sup>5</sup>

The extent of ownership concentration is measured by the index of the stake owned by the largest shareholder. Groups with a high, medium and low concentration of capital were identified on the basis of controlling interest or blocking ownership. In addition to this, JSCs with a high concentration of ownership and the aggregate of other companies were compared.

Ownership structure by the principal shareholder was presented by groups of JSCs in which each type of the shareholder occupied dominant positions.<sup>6</sup> For the purpose of grouping, statistical data as of the end of 2002 was used.

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<sup>5</sup> To identify the links between different groups or compare index values depending on the specifics of comparable variables, the methods of calculation of contingency tables, rank correlation and comparison of sample averages were used. The threshold value of significance for statistical correlation was set at a level of 0.05.

<sup>6</sup> Under this definition, the dominant shareholder is regarded as a shareholder whose share in the stock capital (or in the composition of the board of directors of a JSC) exceeds the share of any other shareholder as applied to the break-down of shareholders into three major types: employees, authorities and non-government outside owners.



<b>List of groups (clusters)</b>	<b>Number of JSCs</b>	<b>% of the sample</b>
1. Dominant group of owners	290	100
1.1. Domination by employees	94	32.4
1.2. Domination by authorities	25	8.6
1.3. Domination by outside private investors	171	59.0
2. Extent of ownership concentration (the largest shareholder's stake)	232	100
2.1. Absence of blocking ownership (the stake does not exceed 25%)	78	33.6
2.2. Absence of controlling interest with existence of blocking ownership (the stake is over 25%, but less than or equal to 50%)	64	27.6
2.3. Existence of controlling interest (the stake exceeds 50%)	90	38.8
3. Existence of the dominant group of shareholders in the composition of the board of directors	269	100
3.1. Domination by employees	169	62.8
3.2. Domination by authorities	11	4.1
3.3. Domination by outside private investors	89	33.1
4. Change of JSC's CEO	342	100
4.1. CEO's record of service does not exceed 4 years	138	40.4
4.2. CEO's record of service is over 4 years and less than 10 years	99	28.9
4.3. CEO's record of service is over 10 years	105	30.7
5. Participation in amalgamations and business-groups	338	100
5.1. JSCs are not members of any amalgamations	224	66.3
5.2. JSCs participated in informal or formal amalgamations	114	33.7

*Source: Author's calculations based on survey data.*

To reflect the structure of corporate control, data on the composition of the board of directors of companies according to the type of principal shareholders was used. Though employees dominated in this group, it was impossible to identify whether the company's management was hired or consisted of shareholders. Taking into account the fact that the group of companies with domination of authorities in the ownership structure or composition of the board of directors was small, particular attention was paid to the comparison of JSCs with domination of employees or outside private owners.

To analyse the CEO turnover, a variable reflecting the record of service of the general director in that position was used. The sample of JSCs is divided into groups of companies where CEOs were replaced either in the period following the 1998 crisis ('young' CEOs), or in the period starting from the beginning of mass privatisation (CEOs with a record of service of more than four years and less than ten years) or even earlier ('old' directors).

The indicator of integration was the participation of the enterprise in an amalgamation or business group established on the basis of formal or informal relations.

The comparison of the groups has revealed a weak correlation between indicators of ownership structures. Groups with a low and medium extent of concentration of capital are almost similar as regards representation of the major types of shareholders. However, JSCs with a high concentration of capital stand out. In JSCs with domination by outside owners, the extent of concentration of ownership was nearly nine percentage points higher than that in companies with domination by employees.

As regards indicators of corporate control, they correlated, as expected, with the equity capital composition. If employees dominated in capital, they preserved the leading positions in boards of directors in 88% of cases. If outside owners dominated in the capital, they dominated in less than 43% of boards of directors, while in 54% of cases the domination switched over to employees.

A certain “nonlinear” relation of the composition of the board of directors was also typical of JSCs with a different level of concentration of capital. With a low level of concentration, outside owners dominated only in 22% of enterprises, while with a medium and high level of concentration they dominated in 55% and 41% of enterprises, respectively. With domination by outside investors, the average size of a parcel of shares of the largest shareholder was 7 percentage points higher than that in the case of domination by employees.

A more intense change of CEOs was typical of enterprises with concentrated ownership and domination by outside shareholders in their structure and composition of the board of directors. The above confirms that new outside shareholders induce a replacement of an enterprise’s CEO and bolster control over executive management through the board of directors.

Dispersion of the extent of ownership concentration between groups of JSCs with “young” CEOs and “old” CEOs amounted to over 6 percentage points. In enterprises with domination by employees, one out of two CEOs held office for more than ten years and less than 23% of CEOs were replaced after the crisis. As opposed to this, with domination by outside private shareholders 50% of CEOs took office after the crisis, while less than 23% of CEOs remained in office from the early 90s..

Indicators of integration such as participation of company in amalgamations did not correlate with any of the above indices of ownership or corporate control.

The major indicators of business performance are statistical indices of resource utilization and costs in the period 1999-2002. They are as follows:

- labour productivity (gross value added per worker) as the most important indicator;
- capital productivity (ratio of gross output to the value of fixed assets);
- profitability (ratio of profit (loss) to the cost of goods, jobs and services sold).

The year 1999 was selected as the reference year (the first post-crisis year of industrial development and growth). The comparison of groups is based on the use of the following two forms of indicators:

- for comparison of different enterprises, standardised deviations of the value of performance indices from the industry average value (in respect of eight major branches of industry) were calculated as per year of the above period. In this case, average values of JSC groups were compared separately with each other as per year.
- for analysis of changes in dynamics, special parameters by the index within the period of the last three years (2000-2002) were considered. As regards profitability, it was the difference between the levels of profitability in 2002 and 1999; as regards capital productivity, it was the rates of growth (or decline), while in respect of labour productivity, the fact of its growth (or decline) in 2002, as against 1999.

The past three years showed positive dynamics of the selected indicators in most JSCs. In the sample, on average, labour productivity increased at more than 79% of JSCs, while capital productivity increased at 78% of enterprises. As regards the level of profitability, the results are not that positive; a growth in profitability was typical of only one-third of JSCs.

In addition to the above, for estimation of the business performance, the questionnaire includes subjective integral estimation by respondents of the financial and economic situation of their enterprises. As of the time of the survey, one out of five JSCs said that the financial and economic state of their companies was poor, while less than one out of ten enterprises noted that it was sound.

Such survey variables as certain restructuring and reforming events at the enterprise served as principal indicators of modernisation. In the sample of JSCs, each of the 14 listed major measures was carried out by 13% to 76% of enterprises. Indices of investment activity (the volume of investments in fixed assets) allow a more

comprehensive picture of modernisation to be drawn. Statistical indicators are formed as follows:

- for the purpose of dynamics analysis of company's investment activity, the rate of growth in aggregate volumes of investments in 2000-2002, as against 1999, was used;
- for comparison of investment activity of different JSCs, a relative index of the extent of investment activity (the ratio of the volume of investment to the value of fixed assets) was used. The index was calculated as per year and compared as per group of JSCs.

In general, the investment activities were rather moderate; 35% to 42% of JSCs in the sample did not make any investments in fixed assets. In this context, it is not only the fact of such investments that is important, but also the relative volumes thereof. It has been revealed that over 60% of JSCs within the four-year period under consideration (1999-2002) invested less than one-fourth of the value of their fixed assets, while more than 46% of JSCs made investments within a range of 10% of the value of their fixed assets.

In addition, investment activities are characterised by the structure of financing. These indicators were found in the questionnaire. According to the survey, own capital is the major source of company investments (it accounted for over 80% of total investment) followed by bank loans (11% of investments), Russian partner-enterprises (3.7%) and other Russian investors (2.1%). Budget funds accounted for less than 2% of investments, while stock market funds, for the mere 0.3%.

## 6 Effect of Ownership and Control on Business Restructuring and Performance: Justification of the Hypotheses

There are many empirical studies of the impact of privatisation, ownership structures and corporate governance features on restructuring and performance of enterprises in different transition countries. These studies use different indicators of business restructuring and/or performance indices based on accounting and survey data. Usually, current performance indices are used, but sometimes researchers can attract data from special surveys of enterprise restructuring activities. The results of different surveys implemented in different years are difficult to compare. Besides, as special comprehensive observations of many surveys have shown (Carlin, 1999; Bevan et al.,

1999; Djankov and Murrell, 2002), it is impossible to make exact and final conclusions based on a bulk of studies.

In many empirical studies, a quantitative analysis of the correlation between enterprise performance and the ownership structure (share of various types of shareholders) was made. However, they did not produce any clear conclusions in respect of the influence by one or another shareholder on the company's performance. Thus, as was shown in (Djankov, 1999), in 6 CIS countries (including Russia), the property of outside private or state investors was not correlated with enterprise restructuring. At the same time, property of managers was positively correlated with business performance at low or high levels (so the link has a U-form), and large (more than 30% of stock) foreign investors ownership was positively correlated with the performance. Also, a positive effect of foreign shareholders was captured in a study of Romanian companies (Earl and Telegdy, 2001) as well as in the recent study of Czech companies – also in case of concentrated foreign property (Hanousek, Kocenda and Svejnar, 2004). Another study conducted in Romania, Bulgaria and Poland (Angelucci et al., 2002) could demonstrate positive effects of foreign ownership on business development. In the study of Romanian firms, a positive effect of private property in comparison with state property was revealed (Earl and Telegdy, 2001), but in case of the Czech Republic it is difficult to make clear conclusions. Thus, state companies differed with smaller profitability indices and had the same sales indices in comparison with private enterprises (Kocenda and Svejnar, 2002). Also, in a large-scale research of privatised companies in 25 transition economies the impact of the type of property was not observed (Carlin et al., 2001).

In studies carried out in Russia by the BEA, the REB and other institutions, indicators of the positive influence of employees as owners on the efficiency of Russian companies (Aukutsionek and Batyaeva, 2000; Kapelushnikov, 2001; BEA, 2001; Bevan et al., 2001) were revealed. However, a positive correlation in a number of cases was explained by the endogenous factor, that is, the selection by employees of the most desirable enterprises in the course of privatization (BEA, 2001; Kuznetsov and Muravyev, 2001). Advantages of outside owners were identified in other studies (Radygin and Entov, 2001). It seems that certain conclusions can only be made in respect of a positive correlation between the presence of foreign shareholders and the efficiency of the enterprise revealed in many researches both in Central and East-European countries and Russia (Kuznetsov and Muravyev, 2001; BEA, 2001; Radygin and Entov, 2001; Bessonova et al., 2003).

There is no exact evidence of the positive effect of property concentration either. Attempts of econometric analysis of the effects of ownership concentration on the company performance in Russia and other countries did not yield clear outputs either. For example, Earl and Telegdy (Earl and Telegdy, 2001) have shown that ownership concentration was positively correlated with the performance (labor productivity) of Romanian companies. But in the Czech Republic it was possible to reveal positive impacts of dispersed property on the profitability of companies surveyed (Kocenda and Svejnar, 2002). In Poland it was shown that the effect of concentration on performance has a U-form, and competition works as a complimentary phenomenon for concentration in corporate governance (Grosfeld and Tressel, 2002).

Based on the data of 400 Russian companies, a team of English scholars (Bevan, et al., 2001) could not find correlations between business restructuring and enterprises performance. In some cases, a positive effect of ownership concentration was revealed (Radygin and Entov, 2001), while in others this was revealed as negative (Kuznetsov and Muravyev, 2001). In most cases, that correlation was not linear. Thus, a survey of mainly medium-sized industrial enterprises in the sample of the REB (Kapelushnikov, 2001) showed that enterprises with a medium extent of concentration were the most efficient (10% to 15% equity participation). According to data from Russia's largest companies (Kuznetsov and Muravyev, 2001), the correlation between ownership concentration and profitability had, on the contrary, a U-form; it hit the minimum with equity participation by the largest shareholder amounting to 52%.

Effects of integration on business restructuring and performance on the basis of empirical data have not been studied. It was noted by researchers that large business groups played an important role in investment processes and the hiring of skilled personnel (Dynkin and Sokolov, 2002), as well as in the structural transformation of the Russian economy (Deryabina, 2001). Integration was mainly necessitated by the need to reduce production costs and minimise transaction costs, as well as the need for consolidation of the market power and protection against opportunistic behaviour of market counterparts (Avdasheva, 2002). Integration was accompanied by such intense enterprise restructuring as was related both to reorganization of assets and establishment of a new business management system.

The effect of the replacement of the CEO on the company's performance was assessed differently. Data on 217 companies in the period 1998-1999 (Goltsman, 2000) revealed that the likelihood of change of the top management did not depend on the company's

performance. According to a survey carried out by the BEA (Muravyev, 2002), it was concluded that the likelihood of dismissal of a CEO with a poor performance record was higher. As noted in Muravyev (2003), the analysis of the management turnover was complicated due to the need to separate the effects related to such a replacement and the effects related to the shifts in ownership structure.

Our interviews gave basis for preliminary comparison of ownership and control features with the economic state of surveyed companies. Our qualitative data demonstrated (Table 9) that JSCs characterised by higher ownership concentration, non-separation of property and control and by property of business groups had a better financial state and higher investment activities. At the same time, JSCs with 'old' top-managers demonstrated higher investment activities without a significant difference in the financial state. In this case, start-up businesses run by owners and privatised enterprises that retained the old directors are combined in the same group. And 'de novo' businesses determined better indicators of enterprise development.

Let us formulate the major hypotheses (on the basis of interviews and outputs of various empirical researches) in respect of the role of ownership and mechanisms of corporate control in enterprise's modernisation.

Groups of JSCs	Financial state			Investment activities		
	Good	Medium	Bad	High	Medium	Low
Ownership concentration						
- Higher	46	39	15	27	54	19
- Medium and low	17	33	50	17	50	33
Dominant owner						
- Top-managers	46	31	23	39	39	23
- External shareholders	35	40	25	15	55	25
Integration						
- Shareholding links	50	35	15	30	55	15
- No links	23	31	46	15	46	39
Replacement of CEO						
- Changed after the crisis	39	39	22	22	50	28
- Not changed	43	36	21	29	50	21
Total	39.5	39.5	21.0	24.2	51.5	24.2

- 1) Ownership concentration provides the basis for the emergence of an efficient owner who is interested in reforming the business and the prospect of development thereof. The differences between new private shareholders and 'soviet-type' CEOs who became key owners of their enterprises are eliminated.
- 2) Integration makes it easier for enterprises to gain access to resources and market channels and facilitate restructuring and business development.
- 3) Formal structures of ownership and corporate control do not reflect the specifics of internal corporate relations, so they cannot be treated as factors behind modernisation of business.
- 4) The turnover of the company's CEOs is a complicated variable. It correlates closely with other parameters of ownership and corporate control. It includes both the dismissal and voluntary resignation of the CEO. In conditions of domination by a large shareholder, the CEO is either the owner or the secondary person in the business (whose situation is typical of the new CEOs). In this context, a change of the CEO cannot be regarded as a factor behind modernisation. In our opinion, a detailed analysis of a combination or separation of ownership and management should be taken into account in future studies.

## 7 Effect of Ownership and Power Structures on Business Restructuring and Performance: Major Outputs

*Ownership structure: concentration of capital.* Contrary to our assumptions, the clusters in question did not correlate with any indices of business performance. It was also neutral in respect of restructuring measures taken by enterprises. Separation of JSCs with the largest shareholder with the controlling interest did not reveal any differences in the performance of business, either. However, it showed that these companies were more active in implementation of investment projects.

Those companies probably had better access to outside financing. JSCs with a higher extent of concentration of ownership used less their own capital; instead, they spent bank loans and funds received from Russian partners or non-government investors. If in the group with the owner with the controlling interest the share of their own capital amounted to 71% of investments (the share of banks and Russian investor-enterprises amounted to 14% and 11%, respectively), in the group of JSCs with a low concentration



of capital it was over 86% (the share of banks and Russian investors amounted to 8% and less than 3%, respectively). More active borrowing by the enterprise from outside sources can be explained by the existence of the owner of the business; in such a situation the risks of non-repayment of loans become lower. Another evident explanation is the mitigation of “the insider’s dilemma”, since, as was shown above, domination by outside owners is more typical of JSCs with a high concentration of capital.

*Ownership structure: domination by the owner.* The comparison of the two main groups of JSCs, which differ in the type of the dominant owner, did not constitute the case for the latter. Only a weak positive correlation was revealed between domination by insiders and the capital productivity over 3 years (1999, 2000, 2001) and the level of profitability in 2002. The group was neutral to distribution of JSCs according to investment activity and restructuring. In this context, there is no sufficiently convincing evidence for the fact that employees are efficient owners.

*Structure of power: domination by the shareholder in the board of directors.* The comparison of the two main groups of JSCs did not show significant differences in business performance either. Statistical data revealed only a weak positive correlation between domination by employees and the level of capital productivity in 2000 and 2001.

Domination by outside private investors had an effect on frequencies of equipment sales and the managers training (such measures were taken by these companies 40-50% more often than by JSCs with domination by employees).

Though investment activity was mostly the same, JSCs with domination by outside private owners financed 75% of their investments out of their own capital, as against 82% of investments in case of the group with domination by employees.

*Mechanisms of corporate control: turnover of the CEO.* The CEO’s term in office correlated weakly with the subjective estimation of the economic situation of the JSC. The best estimations were given by CEOs who held office for 4 to 10 years, while the worst estimations were given by ‘young’ CEOs. It is not excluded that such a difference can be explained by the fact that the new generation of CEOs put forward higher demands. However, objective statistical data also showed a positive correlation between the CEO’s term in office and the level of labour productivity in respect of the gross value added in 2001 and 2002 and integral dynamics of that index in a three-year period. If, in

the group of JSCs with 'young' CEOs, a decrease in labour productivity in respect of the gross value added was observed with 29% of JSCs in the group of JSCs with 'old' CEOs, it was observed in a mere 12.5% of JSCs. Also, in a period of three years the index of profitability positively correlated with the length of the CEO's term in office.

The length of CEO's work in this position is a factor which is primarily neutral in relation to restructuring. A trivial significant correlation is the positive correlation between the existence of a 'young' CEO and a radical change of the team of senior managers.

Thus, CEOs who came to work at the enterprise before privatisation showed higher performance of their JSCs. To some extent, the above fact shows the higher efficiency of JSCs with concentrated ownership by employees (that is, ownership by managers), or it may also mean that managers were able to privatise more efficient enterprises.

*Integration: participation in amalgamations and business groups.* This group is characterised by a certain correlation with enterprise performance. A positive correlation between participation in business groups and capital productivity and labour productivity (in 2001 and 2002) was revealed. So, 87% of integrated companies showed growth in this index in a three-year period as against 76% of autonomous JSCs. Participation by the company in an amalgamation correlated with the higher utilisation of industrial capacities by the enterprise.

Only this group showed a close correlation with many restructuring measures (Fig.). There was a significant difference between enterprises affiliated with business groups and autonomous enterprises in respect of nine restructuring measures whose difference proved a positive correlation between participation in amalgamations and taking measures aimed at replacing obsolete equipment, putting into operation new facilities and introducing of new technologies and an increase in spending on R&D, marketing and advertising, and the training of personnel (20-40% more often). Implementation of an investment project, advance training of managers and change of the team of senior managers were undertaken 80% to 100% more often by integrated companies.

In 2002, affiliated JSCs were more active in investments; the level of relative investments was 2 times higher than that of autonomous companies. Differences in sources of financing in the sample in question were statistically insignificant (JSCs belonging to groups financed 76.1% of investment out of their own capital and 13.8% of

investment out of bank loans, compared with 83.0% and 9.2% in autonomous JSCs). At the same time, affiliated JSCs had easier access to investment loans. According to estimates of respondents, access to loans was easy or impossible for 29% of such JSCs in each case. As regards autonomous JSCs, only 16% of such companies had easy access to investment loans, while 44% estimated their company's access to loans as impossible.

Thus, integrated JSCs were more active in carrying out technical reconstruction, training of personnel and business restructuring related to market promotion. These companies can be characterised not only by an active restructuring policy, but also by a comprehensive nature of such policy, stronger investment policy and higher business performance.

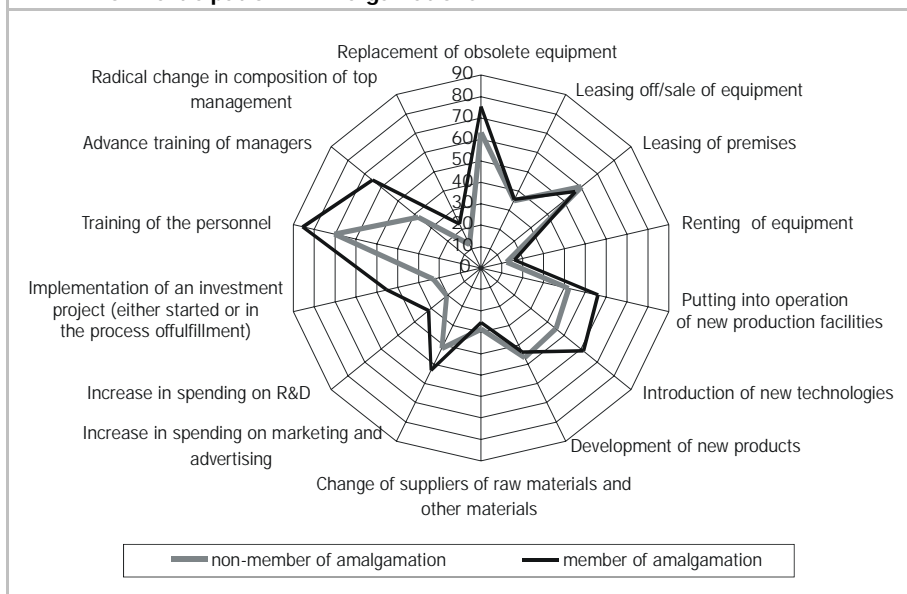
## 8 Concluding Remarks

The main conclusions drawn from the outputs of empirical analysis are as follows:

- After the 1998 crisis, intense processes of corporate ownership concentration and transfer of ownership from employees to outside private shareholders, and replacement of the senior management have taken place. Corporate ownership was mainly concentrated with insiders, which also included dominant outside owners. At the same time, executive management retained prevailing positions; it can either be a large owner or be affiliated with outside private owners. Insider control alone does not mean that ownership and control are separated or combined in the hands of the executive management. This topic demands further studies. Regional and local authorities (in some cases labour teams) are important stakeholders in corporate governance.
- Intense vertical or lateral integration is the reality of the present-day development of the Russian industry. Integration stimulates the transfer of shares to outside owners and a change in composition of the dominant shareholders and mechanisms for enforcement of corporate control.
- Different structures of corporate ownership and corporate control have no significant effect on business restructuring and performance. In this context, the hypothesis on the positive role of concentration of ownership was not convincingly proved.

- Replacement of CEOs of JSCs was partly justified by redistribution of ownership and composition of the board of directors. The use of the above mechanism of CEOs turnover did not contribute to comprehensive enterprise restructuring and growth in their investment activity. At the same time, there was explicit evidence of the less efficient operation of enterprises run by new CEOs. 'Old' CEOs probably 'took hold' of the most potentially efficient enterprises.
- The surveyed JSCs were characterised by low investment activity and the prevalence of their own funds in investment sources; the above showed the existence of significant barriers for business development. The specifics of financing investments were strongly connected with the insider type of corporate governance. Only one out of six respondents directly said that they were prepared to make their companies transparent and share control with new investors. A high concentration of capital or domination by outside owners in boards of directors contributed to a relatively greater use of outside sources of financing, mainly, bank loans and funds of Russian non-governmental investors.
- Integration had a great effect on activities of JSCs. These phenomena had no correlation with the ownership structure and corporate control features. So we received corroboration for one of our hypotheses. Indirect characteristics of corporate control such as participation by the enterprise in amalgamations and business groups contributed to comprehensive restructuring and business development, growth in investment activity and improvement of the access to loans. As a result, the dynamics of the generated gross value added per employee was positive at integrated companies.
- Obviously, the outputs obtained and conclusions drawn are correct to the sample data and indicators used. Therefore, ownership structures and composition of the board of directors cannot be regarded as factors behind modernisation of companies. It is likely that other factors and conditions have an effect on modernisation. At the same time, the available quantitative data inadequately reflects the actual property relations and internal corporate control specifics. It should also be stressed that with integration it is difficult to determine the actual company's business boundaries (an enterprise as a legal entity vs. a firm as a business of dominating shareholders). It complicates the correct interpretation of statistical indices or survey data of an individual enterprise and can distort any precise statistical calculations or econometric analysis.

Figure 1. Profiles of Enterprise Restructuring Depending on Participation in Amalgamations



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# The Impact of Foreign Direct Investments on Export Competitiveness of Companies and Sectors: the Case of Baltic States

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## Abstract

The Baltic States belong to a group of „radical reformers” who have successfully conducted their economic, political and social reforms. Since the early 90ties they have chosen the EU markets as their foreign policy orientation. This policy was mainly implemented through the development of trade relations and building of a friendly environment for foreign investors (particularly from the EU), as well as adjustment process to the EU accession. Today most of the finance, telecom and a large part of manufacturing sector are foreign-owned. Overall, FDI has financed around one-fifth of fixed investments. With the relatively high importance of FDI, there has been very little academic research on FDI in the Baltics and their role in export specialization (with certain exceptions in Estonia). The paper attempts to present empirical evidence of the role of FDI in building competitive advantages of companies and sectors of the Baltic States on the EU Single Market in 1992-2003. The remainder of the paper proceeds as follows: Section 1 examines the sector, branch and regional structure of FDI in Baltic States. Section 2 represents the specialization indexes of the Baltic States in trade with the EU in a comparative analysis of Estonia, Latvia and Lithuania. Section 3 analyses the correlation between FDI, specialization and employment in high, medium-high, medium-low and low-tech manufacturing branches in the Baltic States. Finally, Section 4 gives some evidence of the contribution of foreign-owned firms to export competitiveness of the Baltic States to the EU markets. The paper ends with some concluding remarks and policy implications.

**Keywords:** transition, FDI, trade specialization, competitiveness

**JEL Classification:** F14, F15, F16

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# 1 Sector, Branch and Regional Structure of FDI in Baltic States

Small countries like the Baltic States usually attract only small amounts of FDI in nominal terms, which explains the fact that three Baltic countries received about 6-7 percent of FDI inflows into CEE countries, which makes some 1.4 billion USD (2002) (Table 1).

Table 1. **Inflows of FDI to the Baltic states in 1993 - 2002 in millions of USD**

Year	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Baltic States	237	398	729	641	973	1799	1031	792	1407	1325
Estonia	156	212	199	111	130	575	222	183	201	364
Latvia	51	155	244	379	515	303	331	153	430	514
Lithuania	30	31	72	151	328	921	478	456	776	447

Source: *The EU Foreign Direct Investment Yearbook 2001, Eurostat 2002: World Investment Report 2002, UNCTAD.*

However, this insignificant amount (in international comparison) is very important for the small Baltic economies, and makes some 20-40 percent of gross fixed capital formation and finances a large part of the current account deficit.

It is important to note that Estonia started to receive FDI earlier than Latvia and Lithuania as it was more attractive for foreign investors due to early market reforms. In 2003, the inward FDI stock in Estonia was 70 percent of GDP, twice as high as in Latvia (37.4 percent) and Lithuania (34.5 percent) (Table 2). In all three Baltic countries, the stock of FDI (in percent of GDP) is above the world average.

Table 2. **Inward FDI stock in % of GDP in 1992-2003**

Year	1992	1994	1996	1998	1999	2000	2001	2002	2003
Estonia	21.0	27.0	27.8	29.4	25.4	51.5	57.2	65.9	69.0
Lithuania	23.0	23.1	23.0	24.3	22.5	20.9	22.2	31.4	34.5
Latvia	11.2	14.9	18.1	20.1	25.0	29.1	30.4	32.4	37.4

Source: *Economist Intelligence Unit 2001; U. Varblane, Foreign Direct Investments in the Estonian Economy, Tartu 2001, p. 59.*

More than half of the FDI stock in the Baltic States came from the EU. In 2003 Estonia attracted the highest share of direct investments from the EU – 83.44 percent, in comparison to Latvia - 50.9 percent and Lithuania - 56.2 percent. Moreover, the biggest

part of FDI stems from the Scandinavian and Nordic countries (Sweden, Finland, Denmark).

The sector distribution of FDI reflects the structure of the Baltic economies. As Table 3 shows, service sectors – such as transport, telecommunications, business services, and finance – have attracted the bulk of FDI in the last years of 1995-2003, whereas in the earlier period 1993-1995 most of FDI went to the manufacturing sector (on average in Estonia – 23 percent, Latvia – 20 percent, Lithuania – 26 percent).

Sectors	Estonia		Latvia		Lithuania	
	1995	2002	1995	2002	1995	2002
Manufacturing	45.0	23.0	22.6	20.8	45.0	25.6
Agriculture	5.0	1.6.0	0.2	0.5	4.9	0.5
Trade	24.0	14.0	7.1	14.1	23.9	20.4
Financial intermediation	7.0	23.0	12.8	16.1	-	19.8
Transport and communication	11.0	19.0	31.0	17.4	18.0	18.8
Others	8.0	17.4	26.3	32.1	8.2	14.9
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: *Foreign Direct Investment 2002: U.Varblane, Foreign Direct Investment in the Estonian Economy, Tartu 2001; Estonian Statistics 2003, Monthly No. 4 (136).*

Privatization processes, followed by trade liberalization, have become leading factors attracting foreign investors (Linge, 2000). The high share of FDI related to transport, storage and telecommunications is specific to the region. It is due to the transit position of the Baltic countries - from Russia to the EU countries. Financial intermediation is another service sector that has attracted considerable interest of foreign investors. It accounts for 16-28 percent of total FDI. Tallin, the capital of Estonia, is considered to be the financial center of the region. In the banking sector foreign control is almost complete. About 90 percent of the banking assets are held by foreign subsidiaries.

The share of manufacturing in inward FDI stock ranges from 20 percent in Latvia to 26 percent in Lithuania. Most of the manufacturing FDI is in low-tech sectors of wood processing (including paper and furniture), textiles and food. These three industries received almost 40 percent of the manufacturing FDI in Estonia, 55 percent in Lithuania and 47 percent in Latvia in 2002 (Table 4). While the food industry mainly targets the local markets, exports of the wood processing industries are substantial (particularly for Latvia). The chemical industry comes second owing to an oil refinery that refines

Russian oil for export (in particularly in Lithuania and Estonia). Textiles and clothing FDI represents about 10 percent of manufacturing FDI in all three countries. New greenfield investments in this sector are export oriented, especially in Lithuania and Estonia.

**Table 4. Structure of manufacturing FDI in Baltic states in 1996 and 2002 in %**

Manufacturing branch	Estonia		Lithuania		Latvia	
	1996	2002	1996	2002	1996	2002
Food, beverages and tobacco	31.0	22.6	40.9	42.4	50.9	29.9
Textile and textile products	10.1	13.8	9.0	12.2	12.0	11.9
Leather and leather products	0.6	-	1.4	3.5	0.1	0.04
Wood and wood products (excluding furniture)	0.5	-	0.1	0.1	12.0	17.6
Pulp, paper, publishing and printing	6.0	16.5	4.1	4.8	0.4	0.5
Coke, refined petroleum & nuclear fuel	5.5	-	4.4	4.1	2.0	1.5
Chemicals and man-made fibers	17.6	9.7	14.3	3.4	0.4	0.3
Rubber and plastics	3.0	1.1	1.1	3.9	0.9	1.0
Basic metals and fabricated metals	16.8	-	5.3	6.9	1.8	2.5
Electrical and computer equipment	4.2	3.3	1.2	1.3	1.0	1.8
Optical equipment	5.7	6.2	0.8	0.9	0.3	0.6
Transport, machinery and equipment	4.0	6.9	0.5	5.5	0.1	4.4
Manufacturing (including furniture)	7.2	4.0	1.0	1.3	-	-

*Source: Estonian Statistics 1999, Tallin 1999; data from The Latvian Bureau of Statistics, Riga 2003; The Lithuanian Statistical Department, Vilnius 2003; WIIW, Nr. 286 (2002);*

Higher value added sectors of machinery, optical, electronic and transport equipment have a combined manufacturing FDI share of more than 14 percent in Estonia but only 7-8 percent in Lithuania and Latvia. Some of the foreign subsidiaries in high-value-added manufacturing have become increasingly export oriented, like the Finish electronic equipment producers in Estonia. The other two countries are still lacking export-oriented investors in high and medium-high tech industries.

## 2 Trade Specialization of the Baltic States Trade with the EU: Comparative Analysis of Estonia, Latvia and Lithuania

Since 1993 the Baltic States trade with the EU progressed with remarkable speed, both in imports and exports values (Table 5). After trade liberalization and re-orientation, the EU markets (in particularly its Baltic Sea Region members) have become the target markets (UNCTAD, 2003). All three countries have been marked with negative trade balances with the EU during the observed period 1993-2003. A broadly similar picture can be observed in the manufacturing trade as well.

Table 5. **The Baltic states trade with the EU in 1993-2002 as % GDP**

<b>Export</b>	<b>1993</b>	<b>1995</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>
Estonia	43.5	54.7	48.6	55.1	62.8	68.5	69.0	64.3	70.1
Latvia	-	44.2	48.8	56.6	62.6	64.7	59.8	60.6	62.6
Lithuania	21.0	36.4	32.5	38.0	50.1	47.9	49.4	48.4	54.0
<b>Import</b>	<b>1993</b>	<b>1995</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>
Estonia	55.3	66.0	59.2	60.2	57.8	56.1	53.2	55.4	51.3
Latvia	-	49.9	53.1	55.3	53.7	52.4	50.4	54.2	49.4
Lithuania	23.0	37.2	44.3	47.2	46.5	43.6	42.4	46.0	43.0

Source: *Foreign Trade 1999; 2000; 2001. Statistical Yearbook on Candidate and South East European Countries, Eurostat 2002; Estonian Statistics 2003, Tallin 2003.*

The share of the EU in total manufacturing exports ranged from 41% in Lithuania (in 2000) to 58% in Estonia (in 1999) (Latvia 49%). The trade deficit with the EU was mainly due to a rising surplus in labor- or mainstream goods, such as textiles, wood products and manufacturing (mainly furniture), in case of Lithuania also coke and refined petroleum products. Estonia has significantly improved its export deficit in high-tech products in relations with the EU (in 2002 compared to 1995).<sup>1</sup> This does not concern the other two Baltic countries.

The indicator of the revealed comparative advantage provides a more concise picture of trade specialization. The RCAs presented in Table 6 indicate that Estonia has achieved revealed comparative advantage in trade with the EU in: textiles, wood products and furniture. There was one branch where Estonia saw a drop in the RCA index in 1995

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<sup>1</sup> See Hunya (2002).

compared to 1992: food sector, which has developed mainly due to the inflows of FDI (the share of FDI amounted to 20-30% in 1995).

Table 6. **Revealed comparative advantage (RCA) of Estonian manufacturing trade with the EU in the years 1992, 1995, 1999, 2003**

RCA in trade with the EU		1992	1995	1999	2003
	Year				
I	Food products, beverages and tobacco	0.33	0.11	-0.40	-0.15
II	Textile and textile products	0.25	0.26	0.43	0.45
III	Leather and leather products	-	-	-	-
IV	Wood and wood products (excluding furniture)	-	-	2.00	1.62
V	Pulp, paper & paper products, publishing and printing	0.25	0.90	-0.43	-0.13
VI	Coke, refined petroleum products & nuclear fuel	-0.24	-0.34	-1.07	-0.79
VII	Chemicals, chemical products and man-made fibers	-0.29	-0.19	-0.68	-0.56
VIII	Rubber and plastic products	-	-	-0.98	-0.91
IX	Basic metals and fabricated metal products	0.10	-0.05	-0.14	-0.13
X	Electrical and optical equipment	-0.75	-0.50	-0.03	-0.08
XI	Transport, machinery and equipment	-0.15	-0.13	-1.01	-1.27
XII	Manufacturing (including furniture)	0.68	0.67	1.37	1.72

Source: own calculations based on formula  $RCA_j = \ln [x_j / m_j : \Sigma x_j / \Sigma m_j]$ , where  $x$  – export,  $m$  – import,  $j$  – selected product group and data from Statistikaamet, Tallin 1993r.; Eesti Pank, Annual Report 1994; Foreign Trade: Lithuania, Latvia, Estonia 1999, 2001, 2003.

Despite a significant inflow of FDI into petroleum and chemical, computer and electrical equipment industries these branches show no improvements in trade relations with the EU. In comparison to Estonian bilateral relations with Finland and Sweden (its main trade partners) some positive results can be observed. Starting from 1997, apart from the traditional branches (textiles, wood products), Estonia has been observing positive RCAs in electrical, communication and optical equipment trade with Finland. Similar effects have been noticed with Sweden since 2002.

Lithuania's competitive position in trade with the EU measured by RCA index improved as well in 1995-2003 compared to the period 1992-1995. Similarly to Estonia, there were few branches where Lithuania had a positive comparative advantage: textiles (the highest RCA among Baltic States), leather, wood, coke and refined petroleum products and furniture (Table 7).

In bilateral relations with its main partners – Great Britain, Denmark - Lithuania has also observed RCA improvements, apart from its traditional branches - wood, textiles, refined

petroleum products (with the exception of Denmark in 1997), in electrical and transport equipment (with the exception of Great Britain).

**Table 7. Revealed comparative advantage (RCA) of Lithuanian manufacturing trade with the EU in the years 1992, 1995, 1999, 2003**

RCA in trade with the EU		1992	1995	1999	2003
	Year				
I	Food products, beverages and tobacco	-1.04	0.01	-0.48	-0.08
II	Textile and textile products	0.02	0.52	0.88	0.82
III	Leather and leather products	0.53	0.48	0.94	0.57
IV	Wood and wood products (excluding furniture)	0.81	2.26	2.53	2.28
V	Pulp, paper & paper products, publishing and printing	-0.89	-0.63	-2.40	-2.99
VI	Coke, refined petroleum products & nuclear fuel	2.63	-0.56	0.26	3.26
VII	Chemicals, chemical products and man-made fibers	0.51	0.26	0.02	-0.41
VIII	Rubber and plastic products	-0.08	-0.54	-1.31	-1.56
IX	Basic metals and fabricated metal products	1.04	-0.02	-0.53	-0.84
X	Electrical equipment	-1.66	-0.34	-0.69	-0.97
XI	Optical equipment	-1.34	-0.77	-1.11	-0.77
XII	Transport, machinery and equipment	-0.82	-0.46	-0.87	-0.99
XIII	Manufacturing (including furniture)	-0.56	0.38	0.97	1.61

Source: own calculations based on formula  $RCA_j = \ln [x_j/m_j : \Sigma x_j/\Sigma m_j]$ , where  $x$  – export,  $m$  – import,  $j$  – selected product group and data from Lietuvos Statistikos Departamento, Vilnius 1993; Foreign Trade: Lithuania, Latvia, Estonia 1999, 2001, 2003.

The RCAs for Latvia presented in Table 8 indicate that the country has achieved the highest comparative advantages in wood products (among Baltic States in 2003), refined petroleum products, basic metals, leather products and textiles. Positive RCAs have also been observed with Latvia’s two main EU partners – Germany and Sweden (about 40-50% of total turnover with the EU in 2003). The advantages with Germany have been achieved due to growing exports of wood products and textiles. A deteriorating trade competitiveness can be observed in trade relations with Sweden, in particularly in exports of textiles, wood products and furniture, yet there have been remarkable improvements in trade relations with Denmark (due to exports of transport equipment).

Table 8. **Revealed comparative advantage (RCA) of Latvian manufacturing trade with the EU in the years 1992, 1995, 1999, 2003**

RCA in trade with the EU		1992	1995	1999	2003
Year					
I	Food products, beverages and tobacco	-0.60	-0.86	-1.72	-0.99
II	Textile and textile products	2.89	0.53	1.18	0.54
III	Leather and leather products	1.2	-	0.89	0.86
IV	Wood and wood products (excluding furniture)	3.68	1.95	4.31	4.11
V	Pulp, paper products, publishing and printing	-1.70	-	-2.41	-2.41
VI	Coke, refined petroleum products & nuclear fuel	-	-	0.76	0.56
VII	Chemicals, chemical products, man-made fibers	-1.69	0.34	-1.51	-2.04
VII I	Rubber and plastic products	-0.72	-	-2.12	-1.38
IX	Basic metals and fabricated metal products	0.21	1.93	0.16	0.72
X	Electrical equipment	-2.89	-1.51	-1.89	-1.96
XI	Optical equipment	-1.40	-	-2.12	-2.41
XII	Transport, machinery and equipment	0.21	0.66	-2.41	-3.22
XII I	Manufacturing (including furniture)	2.60	1.66	1.08	0.95

Source: own calculations based on formula  $RCA_j = \ln [x_j / m_j : \Sigma x_j / \Sigma m_j]$ , where  $x$  – export,  $m$  – import,  $j$  – selected product group and data from Latvian Statistical Office, Riga 1993; Foreign Trade: Lithuania, Latvia, Estonia 1999, 2001, 2003..

The export of the Baltic States on the EU markets consists of intra-industry trade (over 60% in 2003). This confirms that their export specialization is based on similar goods with relatively different quality (Table 9).

Table 9. **Intra-industry trade (IIT) indexes for Baltic states with the EU (2003)**

	Estonia	Lithuania	Latvia
I Food products, beverages and tobacco	0.61	0.83	0.59
II Textile and textile products	0.84	0.74	0.95
III Leather and leather products	0.72	0.67	0.79
IV Wood and wood products (excluding furniture)	0.15	0.25	0.06
V Pulp, paper & paper products, publishing and printing	0.58	0.08	0.17
VI Coke, refined petroleum products & nuclear fuel	0.87	0.10	0.92
VII Chemicals, chemical products and man-made fibers	0.31	0.67	0.28
VIII Rubber and plastic products	0.44	0.78	0.16
IX Basic metals and fabricated metal products	0.77	0.50	0.28
X Electrical equipment	0.93	0.45	0.87
XI Optical equipment	0.99	0.52	0.17
XII Transport, machinery and equipment	0.36	0.04	0.08
XIII Manufacturing (including furniture)	0.46	0.55	0.75

Source: own calculations based on the formula  $IIT = \text{Export } j + \text{Import } j - \text{Export } j + \text{Import } j / \text{Export } j + \text{Import } j$ , where  $j$  – denotes the particular product or group of commodities. The indexes values vary from 0-1 and indicate the intensity of the intra-industry trade. Source of data: The Statistical Office of Estonia; Lithuanian Department of Statistics; Latvian Statistical Office.



We can see that the highest IIT indexes in the Estonian trade with the EU have been in selected technology-driven (electrical and optical equipment), capital-intensive (petroleum and metals), marketing-driven (food and beverages) as well as labor-intensive products (textiles, leather)<sup>2</sup>. Lithuania's intra-industry trade specialization is the most intensive in labor-intensive products (textiles, wood, leather) and partly capital-intensive products (chemicals). There was a drop in specialization indexes in refined petroleum products, which was caused by a decreasing import from the EU in the last years 2002-2003. The structure of IIT indexes for Latvia looks similarly to that of the previous two Baltic countries. It has a dominant specialization in labor-intensive, capital-intensive products as well as technology-driven ones (due to increasing imports from the EU of electrical equipment, machinery, radio and communications equipment).

The level of intra-industry trade indicates the structural differences between the Baltic States and the EU. In 2002 the average level of this index amounted to 0.62% for Estonia, 0.47% for Lithuania and 0.46% for Latvia.

### 3 FDI, Employment and Trade Specialization

The regression analysis between RCAs and manufacturing FDIs in high, medium-high, medium-low and low-tech industries in the Baltic States revealed their positive correlations. The function of regression is defined as  $RCA_t = mFDI_t + nEI_t + b$  (t - selected year), where EI is the employment rate in high, medium-high, medium-low and low-tech industries. The data covered the period 1994-2003 for the three Baltic States. For ease of interpretation, it was considered that the impact of independent variables (FDI and EI) on the dependent ones (RCA) is equal in all groups (Weresa, 2001).

The regression model for Estonia indicates that its comparative advantages measured by RCA in the period t had a low dependence on FDI and employment rates. The closest to the desirable level was medium-low-tech industry (production of transport equipment) and low-tech (production of refined petroleum products, wood products and furniture). Relatively high correlation was observed for the high-tech industry (production of communications equipment). In the case of Lithuania the highest correlation was observed in the case of medium-high-tech industry (production of machines and electrical equipment), and medium-low-tech industry (production of rubber and plastics).

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<sup>2</sup> See Varblane (2000).

The correlation in low-tech industry covers mainly textile production. There was a low correlation between RCA and FDI in the high-tech industry. The correlation results for Latvia indicate a strong dependence of RCA on FDI inflows and employment in high-tech (production of communications equipment) and medium-high-tech industries (electrical machines and equipment).

The test of significance (t-Student) confirms (with probability of error at 5 percent) the significance of FDI in explaining the comparative advantages in Estonia in the medium-high-tech industry, in Lithuania in the medium-high, medium-low and low-tech industries and in Latvia in high-tech and medium-high-tech industries. Changes in employment had similar impact on RCAs in the mentioned industrial branches.

Summing up, the analysis of regression revealed different results for each country. Estonia and Lithuania observed the lowest correlation among the Baltic States between comparative advantages, manufacturing FDIs and employment rates. However, it is important to note that the results of regression could differ a lot if they were based on the bilateral trade-investment correlation – for example on the Estonian-Finish relations.

#### 4 The Importance of Foreign Owned Companies in Developing Export Competitiveness. Role of Technology-transfer and Investments into R&D

Empirical evidence from broad-based country studies suggests that FDI has a positive impact on economic growth, restructuring and competitiveness – both directly through transfer of capital and knowledge to foreign-owned companies and indirectly through spillovers to the domestic sector (Hunya, 2004). The data showing the share of foreign-owned companies in output, exports and employment are not available from statistical offices (with the exception of Estonia). The author's own survey on a small sample of 108 firms acting in Baltic States (2003/2004). In Estonia there were 24 firms (foreign-owned companies made 33 percent and domestic 67 percent), in Lithuania 50 firms (foreign-owned made 54 percent and domestic ones 46 percent) and in Latvia 34 firms (foreign owned made 44 percent and domestic ones 56 percent). Some 54 percent of Estonian foreign-owned firms (telecommunications and electrical equipment), 38 percent of Lithuanian foreign-owned firms (food, tobacco and electrical equipment) and 38 percent of Latvian foreign-owned firms (electrical and telecommunications equipment) have exported their goods to the EU markets. Some 81 percent of Estonian, 100 percent

of Lithuanian and 84 percent of Latvian companies have significantly improved the quality of their products (Table 10).

Table 10. **Share of firms which introduced new products or used improved technological systems of production**

% companies	Domestic firms						Foreign-owned firms					
	Estonia		Lithuania		Latvia		Estonia		Lithuania		Latvia	
		%		%		%		%		%		%
Improved products	5	63	14	52	12	80	12	81	21	100	16	84
Improved systems of production or technology	3	37	18	67	9	60	9	56	18	78	15	79
Have quality certificates ISO 9001 ISO 14000 Other System of quality control	8	100	18	67	13	87	16	100	13	62	14	73

Source: author's own survey.

These changes were observed in most of the foreign-owned companies (63 percent of Estonian, 52 percent of Lithuanian, 80 percent of Latvian). Some 56 of Estonian, 78 percent of Lithuanian and 79 percent of Latvian foreign-owned companies received technological know-how from the mother companies.

Survey showed that FDI also strengthened the host countries' export potential by increasing company investments into R&D. Activities related to R&D were conducted by 68 percent of foreign-owned and 63 percent of domestic Estonian companies, 69 percent of foreign-owned and 77 percent of domestic Lithuanian companies, and 89 percent foreign-owned and 73 percent of domestic Latvian companies. Survey showed that in all three countries foreign-owned companies aimed to meet the local consumers needs, whereas in domestic companies R&D activities aimed at new management and production solutions. Moreover, R&D activity in foreign-owned companies was concentrated mainly in the smallest (up to 50 employees) and the largest firms (more than 500 employees) (with the exception of Latvia). These companies have spent on average 4-5 percent and 3-4 percent of their total turnovers, whereas domestic companies have spent only 1-3 percent.

Another survey based on a larger sample of Estonian companies (1999) proved that foreign-owned companies (over 50 percent of foreign capital) in low-tech and high-tech

industries achieve 40-50 percent better productivity and larger exports per employee. Such data is, however, not available for the other two countries – Latvia and Lithuania.

## 5 Concluding Remarks and Policy Implications

In 1992-1995 major part of FDI went to manufacturing sector, while in the last years 1995-2003 most of FDI has been directed to services. Manufacturing FDI went mainly into low-tech industries. FDI has reinforced the given economic structure and has not generated much structural change. Latvia and Lithuania with their export-oriented FDI in textiles, wood products and refined petroleum products are more similar to other less developed transition countries. Estonia has succeeded more than the other two countries in attracting export-oriented transnational corporations specializing in high-tech products.

FDI can strengthen manufacturing and services functions for the regional market. However, the extent of the FDI impact on the country's specialization depends also on other policies enhancing the FDI inflows, technological learning and spillover effects in the national companies.

The Baltic States should continue to absorb a fair amount of international FDI flows. The transit role of the Baltic States for the EU and Russia should attract substantial international FDI inflows to the Baltics. Finally, one of the important policies affecting the FDI inflows into high-tech industries of the Baltic States are their long-term innovation and competitiveness strategies, which will facilitate further catching-up processes, improve their long-term export competitiveness and develop their national specialization in the EU markets.

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**European Economic  
Space – Development  
Problems and Accession  
Challenges**

## Keynote Speech

# The European Economic Space: the Governance of Industrial and Knowledge Networks in Medium Technology Sectors

Riccardo Cappellin\*

The model of the “knowledge economy” has become a paradigmatic framework in Europe within which a proposal of new industrial and economic development policy can be designed. However, the concept of the “knowledge economy” appears as rather loose. In this perspective it seems useful to underline the difference between this concept and other related concepts, such as:

- high tech or R&D intensive industries,
- information and communication technologies,
- new technologies, biotechnologies and nanotechnologies,
- human capital and education levels,
- knowledge intensive services,
- intangible assets and intellectual capital.

Usually, the concepts of the “knowledge economy” are used in order to indicate a development phase where the scientific knowledge and human resources represent the strategic factors. In this study, the concept of knowledge economy is identified with that of the “learning economy” and the analysis is focused on the link between the processes of learning, innovation and competitiveness.

In a knowledge economy the competitiveness of the firms is determined by the quality of the products and processes, the decrease of decision, production and delivery times of new products, the adoption of technological and organizational innovation in production

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processes. It is crucial to develop the competencies and professional skills of the labour force, the intermediate and top managers. The factor which determines the survival and success of firms are increasingly less the fixed investment and the financial resources and more the know-how, the intangible resources and the distinctive competencies.

This contribution aims, first of all, to illustrate the importance of medium and low technology products in international trade and the competition between the three world large economic regions.

Secondly, it illustrates the process of innovation, knowledge creation and interactive learning, which characterizes national and regional innovation systems specialized in medium and low technology sectors, and the structural characteristics of knowledge and innovation networks<sup>1</sup>.

Thirdly, it illustrates the model of multi-level governance as the most appropriate method for promoting the processes of systemic innovation, both in the high technology sectors and in the medium and low technology sectors, by facilitating the integration of the various actors and firms within interactive learning processes.

In general, this contribution aims to illustrate that the processes of innovation in the medium and low technology sectors are different from those in the high technology sectors, as they are not based on high investments in R&D but rather on the importance of interactive learning processes, informal research activities and the development of tacit competencies of integration.

It also aims to highlight that an high international competitiveness of economies specialized in medium technology industrial sectors requires the steering of knowledge and innovation networks within the national and regional innovation systems and a new policy making approach which may be defined as the process multi-level governance and is different not only from the traditional hierarchical planning approach but also from pure competition as in the free market model.

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# 1 The International Specialization in the Medium Technology Sectors

According to OECD statistics the share of medium technology trade is not only more than half of the total trade in OECD countries, but it has also been rather stable in the last ten years, as the growth of high technology sectors has occurred at the expenses of low technology sectors and not of medium technology sectors.

	<b>High technology</b>	<b>Medium-high technology</b>	<b>Medium-low technology</b>	<b>Low technology</b>
1992	19.7	38.9	16.5	24.9
1993	20.6	38.4	16.2	24.7
1994	20.9	38.9	15.8	24.3
1995	21.2	39.1	16.0	23.6
1996	21.6	39.4	15.6	23.3
1997	22.7	39.2	15.4	22.6
1998	23.9	39.2	14.8	22.0
1999	25.1	39.2	14.1	21.5
2000	26.9	38.1	14.7	20.3
2001	26.1	38.3	14.7	20.8

Source: OECD, *STI Scoreboard 2003* and STAN database, May 2003.

World trade may be analyzed by comparing individual countries, as the United States and the individual European countries, which clearly have a much minor size whether they are taken individually. Otherwise, it can be analyzed by considering large areas of economic integration. In this framework, Europe or the European Community can be compared to the North American economy (NAFTA). That requires subtracting the trade flows with the contiguous countries belonging to the same regional area. It results that the export from the NAFTA area (481 mld dollars) to the other world areas were in 2002 almost the half of the European exports (940 mld dollars)<sup>2</sup>.

On the contrary, the imports of products from both areas (respectively 981 e 933 mld.) were almost equal between North America and Europe. Therefore, the low value of exports or the low competitiveness of American productions on the international markets

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<sup>2</sup> See WTO (2003a).

are the fundamental reasons of the enormous deficit of the American trade balance, which increasingly appears as the most important dangerous factor of instability of the world economy (WTO, 2003a).

Often it is argued that a greater specialization in the high tech sectors is crucial in order not to lose share of international trade. This statement is rather general and needs to be qualified. In fact, the analysis of the period 1992-2001 indicates that the growth rate of international trade has been very high in various sectors with intermediate technology (such as electrical machinery) and even in some low technology sectors (such as other manufacturing products)<sup>3</sup>.

Moreover, the flows of ICT products have increased in the most recent years (2002) to a much lower pace than the other industrial products. That is clearly linked to the burst of the dot-com speculative bubble, determined by excessive investments in the ICT sectors and to the increasing role in the international trade of fast growing countries, such as China, which are determining higher trade flows in other products, such as raw materials and traditional industrial products.

The percentage of high tech sectors on total exports is an inappropriate indicator of innovative capability, since high values are indicated not only for Japan and US, but also for Mexico and Hungary, which overcome countries such as Sweden and Finland (OECD, 2003).

According to OECD, manufacturing sectors can be distinguished in high, medium-high, medium-low and low technology sectors on the base of their average ratio of R&D expenditure on value added. In this framework, the ICT and pharmaceutical sectors, in which the US specialization is strong, are among those with high technology, while among the medium-high technology sectors are those in which traditionally European countries are specialized, such as electrical machinery, automobile industry and chemical industry (OECD, 2003).

In this perspective, it may be useful to analyze on the base of the WTO data for the years 2000-2002 the network of world trade flows for some categories of product, which have been defined according to inclusive criteria and may be classified according to an increasing order of technological intensity, such as: a) total trade and within it: b)

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<sup>3</sup> See OECD (2003).

manufacturing products, and within it: c) machinery and transport equipment, and within it: d) office and telecommunication equipments. Three areas may be considered: North America, which includes US and Canada, Western Europe and the rest of the World, which thus includes large countries such as Japan, China and the other Asian economies.

As it is well known the US are usually considered as the most technologically advanced economy of the world and various scoreboards elaborated by international organizations define the US as the most competitive economy. Therefore, the data of world trade should indicate that North America has a large positive trade balance especially in the most advanced sector, such as the “office and telecom equipments and then in the following order: the machinery and transport equipment, the manufactures non machinery and finally also for manufactures products.

In fact, it may be seen that North America has a deficit even in the office and telecom equipment sector and a greater and increasing deficit (-176) in the machinery and transport equipment. A slightly lower although increasing deficit (-163) appears in the manufactures non machinery sector and finally a very low and also decreasing deficit (-51) in the non manufacturing sectors such as agricultural and mining products<sup>4</sup>.

Therefore, the specialization of North America economy is greater in the sectors with lower technological intensity, such as agricultural and mining products and it is decreasing in the more advanced sectors, such as machinery and transport equipment.

Similar indications may be derived from the analysis of the shares of individual products on the total exports of the individual areas and from the index of specialization in table 3 (world equal 100).

North America is characterized by a rather peculiar specialization. On the one hand it has a strong specialization in the agricultural and mining products and on the other it has a strong specialization in the machinery and transport equipment. Finally it had a positive specialization, later becoming negative, in the office and telecom equipment sector.

Therefore the specialization in the “high tech” sectors of North America is not the result of an absolute strength in these sector, as it would be in the case of a supposed greater competitiveness in these sectors, while it is the simple statistical result of the low overall exports of North America.

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<sup>4</sup> *Our elaboration on WTO (2003b).*

In fact, North America has a negative trade balance, as indicated above, both on machinery and transport equipment and on office and telecom equipment and on the other hand also the exports of other sectors are low, such as in the case of manufactures non machinery, which indicate a very strong negative trade balance and a very low specialization index.

Therefore, the strong specialization of American export in the high technology sectors, on the one hand does not hinder the fact that North America has a high deficit in the high technology sectors and on the other hand it is due to the low value of the medium and low technology exports. In other terms, it is the results of an even weaker competitiveness of the medium and low technology sectors.

On the contrary, the European economy is characterized by a large positive and increasing trade balance in the machinery and transport equipment sector and by an even larger balance in the manufactures non machinery sector. Similar indications may be derived from the observation of the export shares and of the index of specialization of these two sectors. On the other hand, Western Europe is characterized by a large trade deficit in the agricultural and mining products sectors, where North America for simple geographical reasons is largely favoured.

Finally the Rest of the World, where Japan and the other Asian economies have a crucial role, is characterized by a positive trade balance in the office and telecom equipment sector and in the agricultural and mining products sectors. Similar indications may be derived from the analysis of the export shares of these sectors and by the index of specialization.

In conclusion:

- Western Europe is specialized in the manufactures products and in manufactures non machinery products,
- North America is specialized in the agricultural and mining products sectors and in the machinery and transport equipment sector,
- Rest of the World is specialized in agricultural and mining products sectors and in office and telecom equipment sector.

The specialization indexes do not change substantially in time. However, it is possible to observe that:

- North America despecializes from the office and telecom equipment and the machinery and transport equipment
- Western Europe despecializes from the agricultural and mining products and the office and telecom equipment,
- The Rest of the World specializes even more in the office and telecom equipment sector.

**Table 2. Trade balance for products with different technological intensity in three world areas**

	Total merchandise exports		Agriculture and mining		Manufactures		Manufactures non machinery		Machinery and transport equipment		Office and telecom	
	2000	2002	2000	2002	2000	2002	2000	2002	2000	2002	2000	2002
North America	-347	-390	-291	-51	-289	-339	-135	-163	-154	-176	-54	-62
Western Europe	4	109	-603	-111	125	220	75	115	50	105	-56	-65
Rest of the World	344	281	895	162	164	119	60	49	105	71	110	107

Source: WTO (2003b).

**Table 3. Share of exports by sector on total exports**

	World			North America			Western Europe			Rest of the World		
	2000	2001	2002	2000	2001	2002	2000	2001	2002	2000	2001	2002
Agricultural products	8.81	9.20	9.29	10.04	10.45	10.72	9.27	9.27	9.36	7.90	8.64	8.71
Mining products	13.85	13.17	12.56	7.19	7.51	7.16	7.74	7.25	6.89	22.14	21.29	20.11
Manufactures	74.83	74.97	75.06	77.98	77.04	76.91	80.77	81.27	80.70	68.08	67.87	68.80
Manufactures non machinery	32.96	33.88	34.58	28.46	29.17	29.76	38.66	39.16	40.08	29.42	30.47	30.81
Machinery and transport equipment	41.88	41.09	40.49	49.52	47.87	47.15	42.12	42.11	40.62	38.66	37.40	37.99
Office and telecom equipment	15.33	13.91	13.36	16.46	14.08	12.58	10.94	10.20	8.99	18.96	17.55	17.99
Residual	2.50	2.66	3.09	4.79	5.00	5.21	2.21	2.21	3.05	1.87	2.19	2.38
Total merchandise exports	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: WTO (2003b).

	World			North America			Western Europe			Rest of the World		
	2000	2001	2002	2000	2001	2002	2000	2001	2002	2000	2001	2002
Agricultural products	100	100	100	114	114	115	105	101	101	90	94	94
Minino products	100	100	100	52	57	57	56	55	55	160	162	160
Manufactures	100	100	100	104	103	102	108	108	108	91	91	92
Manufactures non machinery	100	100	100	86	86	86	117	116	116	89	90	89
Machinery and transport equipment	100	100	100	118	117	116	101	102	100	92	91	94
Office and telecom equipment	100	100	100	107	101	94	71	73	67	124	126	135
Residual	100	100	100	192	188	169	88	83	99	75	82	77

Source: WTO (2003b).

Total merchandise exports	2000	2000	2000
Share Export/import	North America	Western Europe	Rest of the World
North America	0	36.37	148.62
Western Europe	-26.67	0	118.46
Rest of the World	-59.78	-54.22	0
Total export/import	-41.31	-19.10	44.95
Total merchandise exports	2002	2002	2002
Share Export/import	North America	Western Europe	Rest of the World
North America	0	59.14	73.34
Western Europe	-37.16	0	-1.37
Rest of the World	-42.31	1.39	0
Total export/import	-29.19	4.26	11.79

(Percent ratio Export/import )

Source: WTO (2003b).

Therefore important factors are:

- the strong and increasing positive trade balance in Western Europe in the manufactures non machinery sector,
- the strong positive trade balance of the Rest of the World in the office and telecom equipment sector and the increasing specialization in this sector,
- the fact that the large specialization of North America in the machinery and transport equipment sector does not hinder that North America has a large and increasing negative trade balance in these sectors, as also in that of the manufactures non machinery sector.

In North America the share of high technology products on total exports is large mainly because the production and export capacity in the medium and low technology sector is low, due to the relocation of these productions toward the emerging countries.

In particular, a recent study by Business Week (2004) has analyzed about 300 companies, for which data are available<sup>5</sup> and are included within the roughly 700 non-U.S. companies that are part of the Standard & Poor's Global 1200. It indicated that the share of R&D and capital spending, as percentage of outlays<sup>6</sup>, is larger in non US companies, mainly European and Japanese, than in the US companies for many and rather important industrial sectors, characterized by an intermediate technology, such as:

- Autos & Components
- Capital Goods
- Consumer Goods
- Food, Beverage, & Tobacco
- Household Products
- Materials

On the contrary, this study indicates that the share of R&D and capital spending is higher in the US companies only in the case of a limited number of so called “high tech” sectors, which as it is well known have been characterized by a sharp decline of shares and sales value in the last few years after the “new economy” bubble, such as:

- Drugs & Biotech
- Semiconductors
- Software & Services
- Technology Hardware

That demonstrates that the traditional distinction between “high tech” and “non high tech” sectors obscures the importance for a national economy to compete through a greater R&D and investment effort in many intermediate technology sectors, which play a major role in international trade.

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<sup>5</sup> Fiscal years ended on or before June 30, 2004.

<sup>6</sup> Outlays consist of capital spending plus a broad measure of operating expenses, including R&D.

Moreover, the greater importance of intermediate technology sectors in the European economies with respect to the US economy to a large extent explains also the different characteristics of the labour force in the two areas. In fact European countries indicate a much higher percentage of graduates in the engineering field of study on total graduates, of graduates in science and technology on total population and also a higher share of technicians on total employment. On the contrary, the greater importance of service activities in the US economy explains the higher share of professionals on total employment.

The enormous trade balance of United States is exemplified by the fact that the American exports toward Western Europe and the rest of the World have a value that is respectively lower by 37% and 42% than the imports from these areas.

It seems necessary to distinguish the US supremacy in the scientific field, which is undisputable and it is related to virtuous processes and specialized intermediaries in the financing of R&D institutions and activities, and on the other hand a supposed supremacy of the US production or industrial system in the innovation activity, since it can be hardly demonstrated that it is possible to be both highly innovative and little competitive in international markets.

**Table 6. Employment in manufacturing industries for the EU, Candidate countries, Japan and the US - 2000**

	Total manu- facturing	Total manu- facturing	Total manu- facturing	High-tech manufacturing	Medium low- tech manufacturing	Medium low- tech manufacturing	Low-tech manufacturing
EU-15	28482	100.00	100	9.7	27.3	25	38.1
Italy	4821	16.93	100	7.1	23.8	27.5	41.6
Germany	7551	26.51	100	9.4	38.3	24	28.4
France	4027	14.14	100	13	24.6	25.1	37.3
UK	4100	14.40	100	12.9	23.8	23.6	39.7
Spain	2595	9.11	100	4.5	21.3	28.1	46
Sweden	792	2.78	100	12.9	31.3	22.7	33
US	19533	68.58	100	17.9	23.2	21.3	37.6
Japan	12483	43.83	100	13.4	27	18.3	41.3

Source: Strack (2004).



	Graduates in Science as % of total graduates (**)	Graduates in Engineering as % of total graduates (**)	Graduates in S&E fields of study as % of population (**)	Professionals on total employment (*)	Technicians on total employment (*)
EU15	11.1	14.6	1.57	n.a.	n.a.
Italy	7.7	15.4	0.83	10.9	17.5
Germany	8.9	17.0	0.93	13.0	20.5
France	15.4	15.1	2.61	11.2	18.0
UK	13.0	9.9	2.56	12.9	12.3
Spain	10.5	16.3	1.84	12.5	10.5
Sweden	10.1	21.9	1.54	17.9	19.8
US	8.9	8.4	1.28	15.8	16.9
Japan	2.8	19.9	1.84	10.2	5.5

Source: (\*) OECD (2003) and (\*\*) and Eurostat News release (2004).

A devaluation with respect to euro by more than 30% in the last two years is not consistent with a supposed greater innovativeness of the US productions and it seems rather to demonstrate the low international competitiveness of US industry. In fact, usually a country, which has the capability to improve the quality and the innovation level of its products is lead to a revaluation of its currency, being capable to ask for higher prices for its exports.

Moreover, US exports have not increased notwithstanding that large devaluation and the rapid growth of the World economy in the last two years. That seems to indicate that the cause of the low international demand for the American growth is not the price, but rather their inadequate quality and innovation content. In particular, that support the thesis that the crucial factor of the US trade deficit is the very poor international competitiveness or even the actual lack of adequate production capacity in the intermediate technology sectors, since they are both the major component of US trade deficit and those sectors, that would have been benefited by the large dollar devaluation with respect to the euro.

Finally, the 30% devaluation of US dollar has decreased by an equal amount the share of the US economy on the World GDP and it questions the real significance, at least in an international comparison, of the higher US growth rate with respect to the European economy, measured in the national currencies.

Therefore, it seems unjustified to assume the US as a model of international competitiveness. On the contrary the factors of weakness of the US economy may provide useful lectures for the direction of industrial policies in Europe.

The very low specialization in the low technology sectors, such as manufactures non machinery sectors, of North America seems to have been the reason of the decrease of the specialization and of the increase of the trade deficit in the high technology sectors, such as machinery and transport equipment sector and even in the office and telecom equipment sector.

In fact, the medium and low technology sectors represent both the source for the production capabilities in the high tech sectors and the driver of the demand of the high tech products. A strong industrial base in the sectors which apparently are defined as low technology sectors, such as the manufactures non machinery sectors, represents the necessary condition for the development of high technology sector, such as the machinery and transport equipment sector. In fact, Western Europe has a strong specialization in the low technology sectors, such as the manufactures non machinery sectors and that seems to have allowed to maintain a positive and increasing trade balance in the high technology sectors, such as the machinery and transport equipment sector.

Thus, the problem for the industrial development in Europe seems not only to consists in how to increase the exports of high technology sectors, but rather and especially how not to loose the competitiveness in the medium technology sectors.

## 2 From Technology Transfers to Interactive Learning Processes

The concept of “knowledge economy” or of “learning economy” lead to a substantial change in the approaches to innovation policies. In fact, according to a traditional approach technology represents an additional production factor with respect to labour and capital. Therefore, investment in R&D represents the necessary instrument for the adoption of new technologies and these latter determine the growth of productivity and then the decrease of production costs and a greater competitiveness of firms.

On the contrary the approach of the “knowledge economy”, the adoption of product and process innovation and not the diffusion of technologies is the crucial factor for the

competitiveness of firms and national economies. In particular, the scientific discoveries and the adoption of innovation by the inventors and the entrepreneurs require information, new knowledge and technical and organizational competencies, on the base of which is the development of both collective (“interactive”) and individual learning processes of the labour force, technician and entrepreneurs. In this new perspective, the problem of technological development is not solved only by the growth of R&D investment, but it requires an increase of the public and private expenditure in the continuous training of the human resources and the creation of structures (“networks” or “social capital”) which may facilitate the exchange of knowledge and its original integration, which generates innovations.

The development in the European countries toward the model of the knowledge economy does not complete itself in the development of new high-tech sectors or R&D intensive sectors. Moreover, the R&D investment should be integrated by policies which deal with other crucial dimensions of the innovation process.

In fact, the new knowledge economy is different from the development of high-tech industries. The perspective of the knowledge economy modifies in substantial way the industrial development strategies and also the prospects of technological change. In the traditional industrial (“fordist”) model, technologies are mainly a product, such as in the case of new equipment. Therefore, firms should invest in R&D, since that activity generates new technologies. However, they may also choose to directly buy technology on the market for technologies. Technology implies a decrease of costs and an increase of productivity. Therefore, it solves directly the problem. On the contrary, the labour creates obstacles to technologies and technology is adopted in order to substitute labour. The ideal model is that of the totally automated plant. Therefore, technologies represent a “bitter medicine” which costs both directly for its purchase and also for its costs in terms of decrease and retraining of employment.

On the contrary, in the model of knowledge economy the aim of the firms is not the adoption of technologies, but rather the adoption of product and process innovation. The innovation is not a good but a process. As indicated above, innovation requires information, new knowledge and technical and organizational competencies and these latter are the results of interactive learning processes, where the crucial actor is the human being, the innovative entrepreneur or the worker. They are not the object on which technology has an impact but the subject which promotes the innovation. That leads to the need to promote continuous learning investments at all high and low levels

and to promote the interaction between the various actors and firms, by creating networks, production clusters and intermediate institutions and in general the so called “social capital”.

## 2.1 The Cycle of Knowledge Creation

According to an evolutive perspective technologies is knowledge. Therefore, it is linked to the process of comprehension, elaboration and assimilation of information and it has a cognitive dimension.

A modern industrial economy can be defined as a “complex adaptive system” (Holland, 2002), which is similar to a cybernetic circuit performing various calculations or to a network of biological cells, which leave together in a relationship of symbiosis.

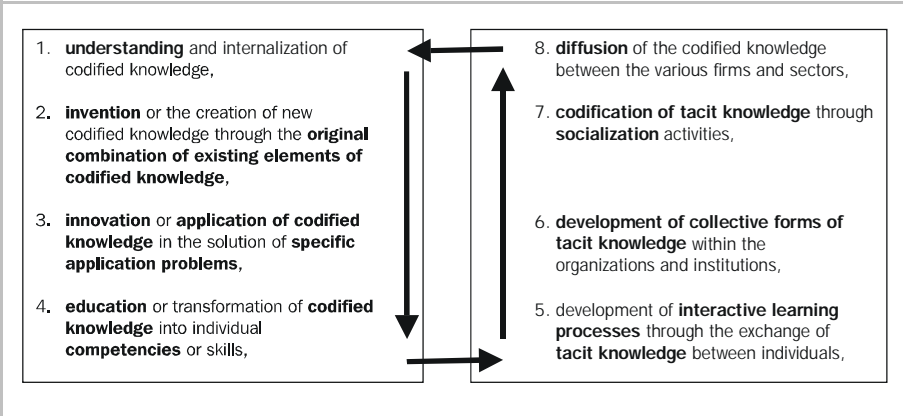
The base of competitiveness and of survival in the knowledge economy is the diversity and the cooperation between the various nodes in the knowledge networks. In fact, a knowledge economy should enhance the diversity of knowledge and competencies, since they allow the complementarities and the cooperation.

Technological change presents two important characteristics (Cappellin, 2003):

- it has an interactive dimension or it is based on interactive learning processes,
- it has a combinative character or it is based on the original connection of concepts and elements, which may even be already known but where previously disjoint between themselves.

In fact, learning and innovation are collective and interactive processes, which require the access, interaction, integration of heterogeneous actors, capabilities and technical competencies and of complementary fragments of knowledge and information. Innovation has a systemic, organizational and often territorial nature and it implies the collaboration and integration of a variety of differentiated actors according to different forms and intensity.

Table 7. The cycle of knowledge creation



This has led to an innovation model which is different from the “linear model”, based on the evolution from the basic research, the applied research, to innovation and technology transfer and which may be defined as the “systemic model” based on the interdependence between the development of knowledge and their application to the production processes and the integration between various actors.

Knowledge is not a private good, which is rival in the consumption, neither a public good for which the principle of exclusion is not valid. It is the result of interactive learning processes between various actors. Therefore, knowledge does not exhaust itself in the use, while the continuous use of knowledge generates new knowledge.

In particular, the creation of knowledge is the result of a cognitive process, which may be represented as a cumulative cycle made of different phases, in which the role of tacit knowledge is crucial. In fact, tacit knowledge insures both the comprehension of codified knowledge, which was imported from outside (phase 1), and the capability to combine in an original way codified knowledge (phase 2) as also the capability to apply the codified knowledge to the solution of specific problems in different localized contexts (phase 3).

On the other hand, codified knowledge are crucial in the process of development of the competencies of the various individuals, in the education activities (phase 4) and thus in the development of tacit knowledge.

The availability of tacit knowledge by the individual actors represents the base for the development of interactive learning processes which lead to the further development of knowledge (phase 5). This underlines the cumulative character of the process. These

interactive learning processes lead to the development both of individual knowledge and of tacit collective organizational and technological knowledge (phase 6), which characterizes specific groups of individuals, firms and organizations.

The socialization of tacit knowledge within the groups, firms and organization is preliminary and instrumental to their codification and transformation into tacit knowledge (phase 7).

Tacit knowledge can be more easily organized, maintained and diffused within the firms and organizations and also between the various firms and organizations (phase 8). Finally, the diffusion of knowledge and the transformation of local knowledge in diffused knowledge and their access is not sufficient whether is not accompanied by the development of the receptivity of the involved actors. However, the development of understanding capabilities requires the availability of tacit knowledge (phase 1).

## 2.2 The Definition of Innovation

According to a wide definition, innovation should include new products and services, major changes of production methods, incremental improvements in the processes and products, new approaches to marketing, new forms of distribution, change in the management approaches and in labour organization and changes in the competencies of the labour force.

Industrial innovation often is not the result of a formal and planned research activity which aims to new products and services, but rather the result of an informal “search” activity or of a long term process of interactive learning between various actors which are independent one from the other and based on a creative integration of four components:

- a) the knowledge of one or more rather advanced technologies in a specific sector;
- b) the intelligent use of a system of various innovative equipment, software and intermediate product and services, which have been recently developed in other sectors at the national and international level;
- c) the original identification of technical problems and specific needs of potential users and the gradual development of new applications for specific not yet exploited market;

- d) a continuous public investment in the development of technical standards, social norms, and organizational, financial and institutional solutions, which may facilitate the adoption of the considered innovation.

The concept of innovation is neither limited to the adoption of individual new products and processes nor in the development of new products by the individual firms. It may consist in the development of continuous learning processes, which lead to an even gradual change of the organization of processes and products within the individual firms, and also in the systemic change of the organization of production processes, which are performed by various firms, which are vertically or horizontally integrated within specific sectors and clusters. Finally, innovation may consist not only in new products but also in the development of new markets, which are created by the capabilities by new types of products to respond in an original way to the new needs of industrial or final users.

### 2.3 The Role of Tacit Knowledge, Informal Research Processes and Competencies

The distinction between codified and tacit knowledge is of great relevance. However, together with this almost traditional distinction it is necessary to associate the distinction between the formal research activities and the informal search activities as also the distinction between the development of innovation/inventions and the development of internal competencies within the firms.

In fact, the development of tacit knowledge, combinatorial knowledge and non formalized research activity based on interactive learning processes within the networks of firms emerge as crucial factors in promoting innovation processes especially in the medium and low technology sectors and in the small and medium size firms.

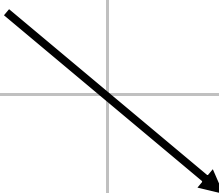
In particular, as indicated in table 8, innovation process can be characterized by specific forms of combination between different inputs, processes and outputs (Cappellin, 2004c).

- 1) The development of interactive learning processes in the traditional sectors where the SMEs are dominant is characterized by: tacit knowledge, informal research processes and development of competencies.

- 2) the development of interactive learning process in the university institutions is characterized by: codified knowledge, formal research activities and development of competencies, which are related to the education function of universities;
- 3) the development of interactive learning processes in the large firms is characterized by: tacit knowledge, formal research activities and development of inventions/innovations;
- 4) the development of interactive learning processes in the modern knowledge intensive services is related to: codified knowledge, informal research activities and development of inventions/innovations.

**Table 8. The relationships between: a) types of knowledge, b) types of research processes, c) development of competencies, d) invention and innovation within the interactive learning processes**

University institutions	Large firms	<b>Formal research</b>	<b>PROCESS</b>	University institutions	Large firms
Knowledge intensive services	SMEs in non high-tech sectors	<b>Informal research</b>		SMEs in non high-tech sectors	Knowledge intensive services
<b>Codified knowledge</b>	<b>Tacit knowledge</b>	<b>INTERACTIVE LEARNING PROCESSES</b>	<b>OUTPUT</b>	<b>Competencies</b>	<b>Invention or innovation</b>
<b>INPUT</b>				<b>OUTPUT</b>	
University institutions	SMEs in non high-tech sectors			<b>Competencies</b>	
Knowledge intensive services	Large firms	<b>Invention or innovation</b>			



Source: Cappellin (2004d).



Innovation policies mainly focus on the financing of only R&D activities in the individual firms. Firms are understood as a “black box” which organizes given factors and produces by choosing between given technologies. Therefore, the aim of public incentives is to facilitate the access to these technologies. On the contrary, firms represent an evolutionary system, which on the one hand adapts to the change and on the other generates new production combinations, through a well known “creative destruction” process. That requires that firms develop:

- the strategic capabilities which are linked to the generation, identification and exploitation of economic opportunities: a capability which pertains to the top management;
- the adaptive capabilities which are linked to the learning of previous experiences and to the reaction to changes, which should characterize all organization levels.

That approach implies a critique to the linear and sequential model, which is focused on the radical technological innovation based on R&D investment.

The innovation process has systemic characteristics and it requires the tight integration between high tech sectors and medium and low technology sectors. The innovation and productivity growth are a rather horizontal phenomenon which seems quite apart from the average R&D intensity of the individual sectors. More important is the relative R&D intensity of the firms in a given sector with respect to the competing firms in other countries and regions.

Therefore, a strong and growing specialization in the so called high tech sectors can not represent the main objective of a national or European innovation policy.

## 2.5 The Concept of Sectoral, Regional and National “Innovation Systems”

The concept of “innovation system” clarifies the crucial role of the governance of the interaction between the main actors of innovation. It is completely different from the “linear” approach, which characterizes the alternative concept of “technology transfer” and it represents a new paradigm which is currently adopted by international organizations, such as the European Union and the OECD and various national governments and regional institutions. It is clear that a sectoral/regional/national

“innovation system” represents a wider and more complex concept of the research community or the university world or the only realm of the high tech or science based sectors. In particular, a national innovation system (NIS) may be represented as a matrix made by regional innovation systems (RIS) and of sectoral innovation systems (SIS)<sup>7</sup>.

Interactive relationships in an innovation system are various and do not only consist in the buying and selling of intermediate products and services, or in financial transactions or in information and knowledge flows between the various firms and actors. A key role is played by the mobility of people and by personal relationships, the sense of common belonging to specific social or productive communities, which are characterized by specific values, norms, languages and technological standard (Cappellin, 2004b).

A regional innovation system is made by firms tightly embedded with other firms of various sectors, with clients, suppliers and partners as also with centres of knowledge such as universities, research centres and technology transfer agencies and a set of governance structures such as private industrial associations, chambers of commerce, training and development agencies and local and national public institutions.

## 2.6 The Structure and Evolution of Knowledge and Innovation Networks

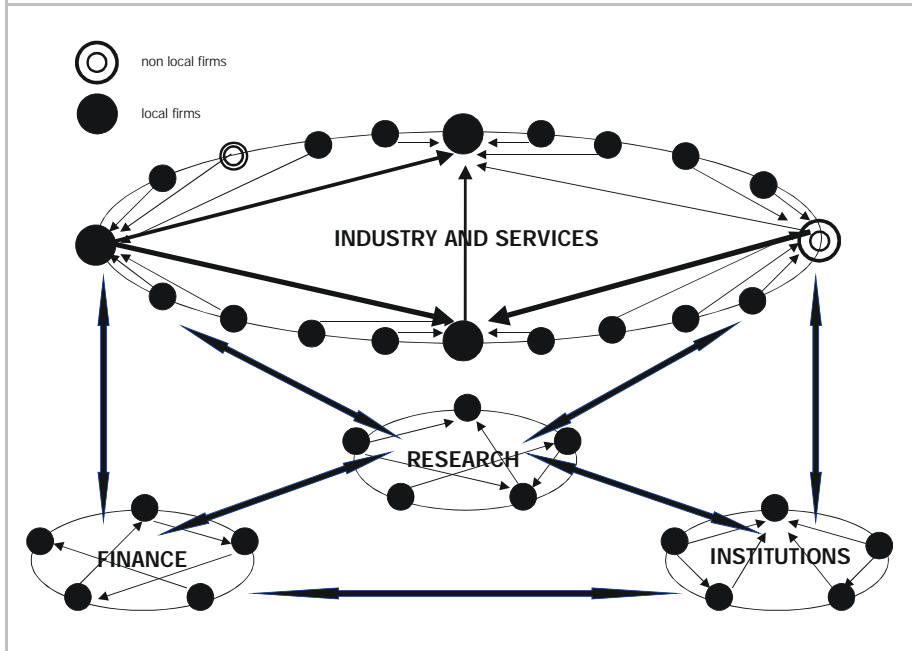
In the case of small and medium size firms and of intermediate technology sectors the process of learning, knowledge creation and innovation is the results of a tight interaction between various actors and it is not only or mainly the result of the internal activity within the various firms, as the flows of information and know-how (“tacit knowledge”) is embedded in the networks of relationships between the various firms and local actors.

Network forms of organization due to their flexibility and openness often prove to be more appropriate in order to manage the relationships between the various heterogeneous and complementary actors in the innovation process than the competition mechanisms within traditional markets or the power relationships within hierarchical structures.

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<sup>7</sup> See Chung (2002).

Table 9. The network of links in a national / regional innovation system



Source: Cappellin (2004d).

Thus, the network approach may prove to be most appropriate for the organization of industrial and innovation policies in countries facing major restructuring problems such as the new accessing countries and Croatia.

The structure of a network of firms may be represented as in the figure 9, where the various firms, organizations and institutions are grouped within a four specific clusters or sub-networks, corresponding to the four main elements of a sectoral/regional/national innovation system:

- industrial and service firms,
- research and university institutions
- financial intermediaries,
- local and national public institutions

Some of these actors are local, while other important actors in a network may belong to other regions or countries and characterize the openness of the network and increase the diversity and the complementarities of the nodes belonging to a given network.

The structure of a network is characterized by:

- nodes, which may be firms and other private and public actors,
- links or flows, which may be material or immaterial and in an economic context are made by products and by production factors,
- distance, which is not only geographical but also technological, organizational, cultural, institutional, distance and which determine specific obstacles or transaction costs in the circulation of the flows,
- infrastructures, which reduce the distance and facilitate the circulation of the flows and give stability to the network and may be material or immaterial, such as norms, institutions and social capital.

The network structure affects and is affected by the network behaviour, which is determined by the aims of the various nodes or actors and the agreements reached between these latter on common objectives.

Network analysis allows examining various crucial dimensions of knowledge and innovation networks. Network analysis usually focuses on the measurement of various indicators which describe the form of a network. However, it could also study:

- the homogeneity between the internal characteristics of the various nodes or their “distance” measured as difference in technological level and in internal organizational characteristics,
- the rules regulating the reciprocal relations between the various nodes or the “institutions” and immaterial infrastructures which facilitate or hinder the relationships between the various nodes,
- the relationships between the behaviours of the nodes and their internal characteristics and the rules which characterize a given network.

Moreover network analysis may allow studying the evolution of the network form in time (Cappellin, 2003) or:

- the changing intensity of the existing flows between any couple of nodes,
- the creation of new linkages between nodes which were previously disconnected or the disappearance of some existing linkages,
- the creation of new nodes or the disappearance of existing nodes.

Networks performance is related to the balance between the transaction costs between the nodes and the exploitation of network economies or synergy effects. In particular, the governance of a network aims to a flexible balance between apparently contradictory characteristics and processes, such as:

- homogeneity between the various actors of the network and diversity and complementarities of the competencies and characteristics of the same nodes,
- thickness of the network or tight integration between the various actors and relative isolation or specificity of the nodes characterized by outstanding excellence,
- integration and cooperation between the various nodes and the preservation of clear distinctive competencies and roles of the various actors, to avoid forms of collusion,
- cooperation between the various actors and existence of conflict of interests and complex negotiation procedures between the same actors.

The experience of other countries in Europe indicates that within a network or a sectoral/regional/national innovation system may emerge three types of problems (Isaksen, 2001), such as:

- the lack of density or of a significant number of diversified actors that would be necessary to promote interactive learning processes: a case which is frequent in economic lagging regions,
- the fragmentation or the lack of cooperation and thrust between the various actors characteristics: a case that may occurs in large metropolitan regions where the individual actors work in different worlds not communicating each other;
- the lock-in effects and the obstacles to accept innovation too distant from traditional approaches: a case that often occurs in the highly specialized regions facing industrial reconversion problems.

## 2.7 International Openness as a Factor of Innovation and Development

The actual “knowledge society” is characterized by the rapid enlargement of the production processes both in a geographical and institutional perspective. Even local clusters are increasingly integrated in the regional, national, European and global economy. Thus, local networks are gradually extending at the international/interregional level.

While internal integration between the various local actors and institutions is a key factor of development, a complementary and seemingly opposite factor is the degree of diversity and of openness of a regional economy. Diversity and openness are crucial in order to avoid that the integration between local actors is not leading to lock-in effects and to allow the combination and synergy between actors of different regions and countries.

External stimulus and collaborations are required in the process of industrial restructuring and to improve the international competitiveness of regional or national industry. Interactive learning processes should develop not only between the various local actors but also between these latter and external actors and innovation policy should remove the obstacles hindering the development of external relationships.

In a globalized world of freely moving capital and increasingly freely moving people, only social capital remains tied to specific locations. Thus, the “learning economy” is characterized by the hyper-mobility of the information and knowledge and the local character of the social capital.

Participation to international learning processes and innovation networks is affected by internal receptivity and by internal institutional thickness. The receptivity or absorptive capacity of new technologies by a firm corresponds to the quantity of external knowledge it is able to utilize and is related to the technological distance and to organizational/ institutional proximity between two economic actors. Clearly, the absorption capacity of a specific regional production system is related to his level of social capital and institutional thickness.

Moreover an effective international transfer of codified and tacit knowledge requires a higher similarity of the institutional framework between the regions and countries involved. The existence of common values, history and traditions together with the international partners facilitates cooperation and the participation to interactive learning process at the interregional level. In fact, knowledge transfers may become not territorially bounded, when culture, organizational framework, social capital and institutions are common or harmonized.

Thus, the connectivity between the various institutions should be a central concern of policies aiming to extend to an interregional and international dimension the interactive

learning processes and of innovation networks, actually existing within a limited local framework (Cappellin, 2004b).

### 3 The Role of Institutions Within Networks and the “Governance” of Innovation Policies

Knowledge is channeled within networks by formal and informal institutions. While explicit and codified knowledge may be traded on markets, tacit knowledge competencies and skills can not be transferred effectively through conventional markets. Institutions have a key role in the governance of knowledge and innovation networks as they can:

- reduce transaction and production costs,
- increase trust among economic and social actors,
- improve entrepreneurial capacity,
- increase learning and relational mechanisms,
- reinforce networks and cooperation among the actors.

Thus the diffusion of knowledge and innovation creation in a specific network or sectoral/regional/national innovation system depends on the “institutional thickness” of the innovation system to be considered. Institutions have a key role in the process of innovation and in the generation and working of “knowledge and learning networks”. A wide range of institutions is required in the process of innovation.

Regional governments are required for attracting external investments, to coordinate large strategic projects and to promote the birth of new firms and entrepreneurial capabilities.

Local governments are required for an effective territorial planning and for the creation of efficient transport and logistics infrastructures.

Local credit institutions are required for the financing of innovative projects by existing firms and to enhance the creation of new firms.

Local education institutions, such as vocation training and university institutions are required for the identification of labour skills required by the new technologies and for maintaining the traditional productive skills in a given territory.

Labour agencies, trade unions represent specialized institutions required for an effective management of the local labour markets and to facilitate the interaction between the supply and the demand of labour, the wage negotiation procedures and the management of the “welfare” system.

Chamber of commerce and industry associations are major partners in promoting a regional innovation system and in the identification of strengths and weakness and of strategic lines of competitiveness and development.

The concept of “knowledge economy” is tightly related to those of institutions and of “multilevel governance”, social capital and immaterial infrastructures. Moreover, it is crucial to identify forms of coordination and “institution building”, which are most appropriate in the case of a “knowledge economy”.

The expression “governance” is used to indicate decision making systems where the decisions are not taken through the traditional hierarchical processes with a public authority at the top (“government”), but rather through open forms of collaboration between a variety of public and non public actors, which may vary according to the policy area and the level of government to be considered. Governance operates within complex networks and the decision making processes include forms of horizontal and vertical negotiation, where the exercise of a hierarchical power is only a component and often not the most important.

“Multi-level governance” defines a new mode of regulation and coordination based on heterarchic negotiations around interfirm networks and public private partnership. It is based on negotiations or strategic alliances between multiple stakeholders in order to secure agreed objectives which are mutually beneficial.

Thus it is important to underline the difference between the traditional “government” model, based on economic planning, state intervention, and public owned firms and the “governance” model based on negotiation, coordination mechanisms and “intermediate institutions”.

It is now widely recognized that the dirigist model (“government”) in the innovation policies is neither possible nor desirable, since innovation for its very nature can not be reduced to command and it has a pro-active character and it is open to new discoveries. Innovation depends on the autonomy and active collaboration of researchers and



entrepreneurs, rather than on passive obedience. Incentives and negotiations, rather than orders seem to be the main instruments in order to promote and manage innovation.

Within a network, the policy-maker can not adopt typical hierarchical methods, such as traditional planning (“government”), but it should be capable to guide or to steer (“governance”) the network of the various economic, social and institutional actors, in order to promote the flows and to orient the relationships between these latter, for promoting self-sustained economic development processes.

Whether the “government” model is not appropriate to the modern innovation policies, it is clear that the free market approach based on the only regulation of prices and competition is inadequate to manage the issue of innovation.

The speed of information flows and of decision making processes is tightly related to the stability of the organizational forms and it depends on the existence of a well developed institutional system (“social capital”) and from immaterial structures and infrastructures which facilitate the relationships between the various actors participating in the innovation process and reduce the transaction costs. In fact, the instability and the risks associated with the market mechanisms lead the various actors of a given innovation system to search a shelter in more structured organizations and in a framework of shared values, leading to collaborations and avoiding negative forms of competition.

Moreover, the innovation processes are tightly connected with the division of labour, the specialization and integration of various production phases and labour competencies. This increasing labour division requires a framework, which allows connecting the contributions of different firms and actors. Institutions and economic policies have a crucial role in the development of systemic interactions between the industrial firms, the financial system and the training of human resources and scientific institutions and in the development of forms of production integration, leading to local and also global supply or value added chains. Therefore, a social and institutional framework is required by the processes through which tacit knowledge is transformed into codified knowledge and is incorporated into a complex innovation.

Knowledge circulates within networks through formal and informal institutions. While explicit or codified knowledge may be exchanged on technology markets, tacit knowledge has an asymmetric character and it is non tradable, while it requires allocation mechanisms which are different from the markets. Only specific organizations

and institutions and not traditional markets are capable to insure the access to information and those connections which allow the exchange and the tight interaction of knowledge, competencies and technology transfers. These organizations may be made by large multinational companies, joint projects for new productions, norms and technical standards between the participants to a network, local networks or clusters of firms, forms of public-private partnership or large “network of excellence” between research institutions.

Institutions reinforce the identity and reciprocal thrust and allow limiting the disadvantage of the asymmetric circulation of information, reduce uncertainty and the risks related to the unforeseeable results of innovations, increase the incentives to invest for medium and long term projects and support investments in specialized training, which may increase the receptivity to innovation by the various actors.

The transition to the model of the knowledge economy requires the creation of new hard and soft infrastructures, both at the local and at the European level, which may facilitate the enlargement of the knowledge and innovation network in order to include also the economic lagging regions, sectors and firms (Cappellin, 2004a). However, the creation of these institutions requires appropriate investments, as networks can be considered as a form of capital, which requires collective economic resources for their creation and maintenance and without which the “social capital” would be lead to a progressive decay.

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# The Spatial Dimensions of Development in Croatia – from Theory to Policy Vacuum

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## Abstract

It is generally accepted that, following the positive avis regarding Croatia's application to join the European Union, spatial dimensions of development will take on an increased importance. This text offers a broad introduction to the state-of-the-art of spatial economics in Croatia. In this context, it provides a basic overview of theories, policies and practices in spatial development in contemporary Croatia, setting these in an historical context, and outlining possibilities for the future. The paper addresses the complexities and spatial specificities of the Republic of Croatia in terms of geographical, historical, ecological, and socio-economic dimensions. The implications of this complexity, heterogeneity and regional diversity suggest that a plurality of approaches to spatial development is required.

The paper goes on to discuss the need for a clearer triangulation between development theories, research and education in Croatia, and addresses the relationship between national and international currents. Noting the legacy of theories of development under

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socialism, and going beyond a crude opposition between 'neo-liberal' and 'neo-Keynesian' theories, the paper sets out the basis for an integrated approach to development management and strategic development planning, itself requiring innovative, multi-disciplinary, research approaches and educational processes committed to the creation of new, flexible, competences.

The paper also focuses on aspects of the complex relationship between spatial development and good governance. The paper notes the distorting impact of a range of external assistance programmes and of international consultancies, and the continued tension between European and American approaches. Internal impediments to good governance are discussed in terms of their horizontal dimensions – policy confusion; the proliferation of institutions and strategic bodies; and tensions and inconsistencies between legal, political and administrative dimensions – and their vertical dimensions – in terms of the lack of fit between, and unsustainability of some aspects of, different tiers of government.

The concluding part poses a series of open questions regarding the future relationship between research, policy and practice in this area. Throughout the paper, reference is made to work undertaken by the authors on aspects of regional and local development policy and practice in Croatia.

**Keywords:** spatial economics, regional theory, strategic development planning, good governance

**JEL Classification:** R1, R5

# 1 Croatia's Specificity

## Basic Geography and History

Croatia is special. It is situated on the cross-roads between Central Europe and the Mediterranean, close to the developed and densely populated European countries. It extends from the foothills of the Julian Alps in the north-west and the Pannonian Plain in the east, over the Dinaric mountain range in its central region, to the Adriatic coast in the south. Its total area is 87,609 sq. km, 31,067 of which is territorial sea. Its coast is one of the most indented in the world. It totals 5,835 km. The mainland coast encompasses only 1,777 km (30%), and the remaining 4,058 km is the coast of the islands. There are 1,246 islands (some 45 are inhabited) making it the second largest archipelago in the Mediterranean.

In 2001 at the time of the last Census there were 4,437,460 inhabitants in Croatia (78.4 per sq. km) living in 21 counties, composed of 121 towns and 416 municipalities.<sup>1</sup> Population density varies across the counties – the highest is in Međimurje County (162.4) and the lowest in the County of Lika-Senj (10.0). The biggest population density is around the urban centres (Zagreb, Pula, Rijeka, Split, Osijek) which cover approximately 12 percent of the territory, and is home to approximately 63 percent of the total population.<sup>2</sup>

Demographic trends show that until 1991 Croatia had positive natural growth. During the Homeland war (1991-1995) the natural growth rate was negative, and only in the short period 1995-1997, was the birth rate higher than the death rate. After 1997 there was a sharp decline in the birth rate which resulted in negative natural growth. The natural growth rate in 2003 in the Republic of Croatia was negative reaching -2.9 (-12,907). The County of Split-Dalmatia had a positive growth rate, whereas a negative growth rate was recorded in all other counties and in the City of Zagreb. A positive natural growth rate was recorded in 79 towns/municipalities. Negative growth rates were recorded in 459 towns/municipalities and in the City of Zagreb, while 11 municipalities had a zero natural growth rate. The highest negative natural growth (-1,246) was recorded in the City of Zagreb.

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<sup>1</sup> *The numbers grew in the meantime. Today there are 124 towns and 426 municipalities.*

<sup>2</sup> *Izvjješće o stanju u prostoru Republike Hrvatske 2003.*

Forced migration caused by the War, especially migration towards Zagreb in the period 1991-1995, resulted in a concentration of population in the capital. According to estimates for 1999, 20 percent of the total population lived there. In the period 1994 - 2003, more than 716,000 people moved from one settlement to another within the Republic of Croatia. The largest share of the migrating population (11.8% - 84,000 persons) was recorded in 2003. With regard to the place of migration in the period 1994 - 2003, migration between counties accounted for the largest part (45%). In 2003, out of the total of twenty counties and the City of Zagreb, six counties and the City of Zagreb had a positive migration balance (the number of in-migrants was larger than the number of out-migrants). The highest positive balance was recorded in the County of Zagreb (more than 2,000 persons) and the County of Istria (around 800 persons). Fourteen counties had a negative migration balance, the highest being in the counties of Vukovar-Srijem (more than 1,000) and Slavonski Brod-Posavina (around 900).<sup>3</sup>

Croatia has always been a point of contact of different cultures and civilisations. Its regional identity is rooted both in geography and turbulent historical developments. For centuries the Mediterranean area was subjected to Italo-Venetian influence, while the Pannonian parts were subjected to influences coming from the central Ugro-Pannonian area. Northwestern Croatia was influenced by Germanic Central Europe. After centuries of difficult political struggle which culminated in the war of 1991-1995, Croatia obtained independence in 1991. In 1992 it became a member of the UN and in 1998 the last occupied parts of the country were reintegrated. War damages were immense in terms of population loss, as well as in terms of damage to the physical and natural environment.<sup>4</sup>

## Ecological Fragility

The mixture of continental European, Alpine and Mediterranean influences in Croatia results in rich ecosystems. Diversified landscape, climate and unique geological features contribute to a diversity of regional ecosystems and species. Forests cover about 44% of Croatia, primarily in the mountains and in the northern lowlands. Wetlands along the northern rivers provide important habitat for many species, particularly migratory birds. Furthermore, the bays and straits of the Adriatic are home to numerous rare and endangered fish species. Endemic species have found their habitat in small wetlands

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<sup>3</sup> [www.dzs.hr](http://www.dzs.hr) (*Priopćenje 7.1.1 and 7.1.2*).

<sup>4</sup> *Strategija prostornog uređenja Republike Hrvatske (1997)*.



including ponds on the Adriatic coast and islands, and moors in the mountains as well. A rich agricultural history has contributed to biodiversity and its management. Understanding of karst geology and hydrology is critical for an assessment of its biodiversity as karst covers 54% of Croatia.<sup>5</sup>

According to the Law on Nature Protection<sup>6</sup> there are eight categories of nature protection: national park, nature park, strict nature reserve, managed nature reserve/wildlife sanctuary, natural monument/natural landmark, protected landscapes and seascapes, park forest, and park architectural monument. There are 450 protected areas in Croatia, covering over 10% of the country. Only 8 such areas, covering about 1.7% of the country, are National parks. Three national parks are on islands (Kornati, Brijuni, Mljet); two represent karst hydrology and morphology (Plitvice lakes, Krka); three are mountainous areas (Risnjak, Paklenica, Velebit). Three out of ten nature parks are mountainous (Medvednica, Biokovo, Velebit), one is an island nature park (Telaščica) and two are wetlands (Kopački rit, Lonjsko polje).

## Regions

Croatian heterogeneity has led to quite a heterogeneous set of proposals as to how to divide the country into regions. As usual, the main obstacle is statistical data because the existing counties, towns and municipalities for which most of the data has been collected are not compatible with geographic, historical and economic regions.<sup>7</sup> Of the possible categorisations, i.e. those that are based on county and municipal data, two are of particular significance: economic categorisation and categorisation based on geographical features.

Croatian counties can be ranked according to the development index, which is based on four different groups of indicators: infrastructure, human resources, standard of living and the global efficiency of the economy. In this way the City of Zagreb, the County of Istria and the County of Primorje-Gorski kotar are ranked highest (ranks 1, 2 and 3). The

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<sup>5</sup> [www.mzopu.hr](http://www.mzopu.hr) (*Izveštće o stanju okoliša u Republici Hrvatskoj, 2003*).

<sup>6</sup> *Narodne novine 34/94 and 72/94.*

<sup>7</sup> *The history of territorial - administrative division is also rich. However, none of numerous divisions in the last 60 - 70 years followed geographic, historical and economic criteria seriously.*

County of Virovitica-Podravina, the County of Vukovar-Srijem and the County of Lika-Senj are at the bottom of the list ranking 19, 20 and 21 respectively.<sup>8</sup>

Categorisation based on geographic features leaves administrative boundaries behind and reveals three large spatial units – Central, Adriatic and Eastern Croatia. Central Croatia has the most developed economy, as well as infrastructure. Furthermore, it is characterised by a great concentration of cities of the Central European type. Adriatic Croatia can be divided into three different parts each one with specific development patterns and problems – underdeveloped hinterland, the urbanised coastal area, and islands with their specific development needs. The main feature of Eastern Croatia is agriculture-based economic structure and a well developed network of small settlements which provide the possibilities for more balanced spatial economic development.

Regional differences in economic and social development are usually defined in terms of unemployment rate and per capita gross domestic product in a region (RGDP), and are aggravated by structural changes, which have social and economic consequences. However, analysis of regional disparities in Croatian economic and social development has been limited due to lack of regional statistics, so that researchers have to rely upon various estimates. Two sets of figures were calculated here: the contribution of each region i.e. county GDP (RGDP) to the total GDP of Croatia and the ratio of RGDP per capita to the mean national per capita GDP.

In 2001, only three out of 21 Croatian counties had a per capita GDP above the national level. The per capita GDP of the City of Zagreb in 2001 was 56 percent above the national level, in Istria it was 21 percent above, and in the County of Primorje-Gorski kotar it was 31 percent above. In all the other counties estimated per capita GDP was below the national level. Per capita GDP varied between 67 percent of the national per capita GDP level in the County of Zagreb and 96 percent of the national per capita GDP level in the Dubrovnik-Neretva County.

Contribution of the RGDP to the total GDP has a similar distribution. The greatest part of Croatian GDP was produced in the City of Zagreb (27.4 percent in 2001). The smallest contribution was provided by the County of Šibenik-Knin (1.0 percent). The contribution of RGDP to the total GDP varied between from 1.6 percent in the County Požega-Slavonija to 8.5 percent in the County Split-Dalmatia.

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<sup>8</sup> *For more details on methodology and list of indicators refer to Izvješće o stanju u prostoru Republike Hrvatske (2003).*

**Table 1. The contribution of RGDP to the total GDP, the ratio of RGDP per capita to the national GDP per capita, and unemployment rate by counties in 2001**

	Contribution of RGDP to the total GDP	RGDP per capita/national GDP per capita ratio (national GDP per capita = 100)	Unemployment rate %
County of Zagreb	4.69	67	25.45
County of Sisak-Moslavina	3.28	78	33.84
County of Karlovac	2.65	83	33.59
City of Zagreb	27.40	156	13.43
County of Međimurje	2.30	86	20.44
County of Krapina-Zagorje	2.54	79	21.32
County of Varaždin	3.96	95	19.38
County of Koprivnica-Križevci	2.55	91	23.04
County of Brod-Posavina	2.75	69	36.29
County of Požega-Slavonija	1.63	84	29.20
County of Virovitica-Podravina	1.87	89	34.19
County of Osijek-Baranja	7.18	96	31.34
County of Vukovar-Srijem	3.23	70	41.35
County of Bjelovar-Bilogora	2.44	81	33.79
County of Istria	5.63	121	13.43
County of Lika-Senj	1.00	82	29.59
County of Primorje-Gorski kotar	8.99	131	18.43
County of Dubrovnik-Neretva	2.67	96	24.04
County of Split-Dalmatia	8.55	82	30.07
County of Šibenik-Knin	1.83	72	37.77
County of Zadar	2.85	78	31.42
Total	100.00	100	23.07

Source: Calculated on the basis of Central Bureau for Statistics data.

The second indicator of regional development and regional disparities is the regional unemployment rate. As there are no official statistics of unemployment rates at the county level, unemployment rates by counties also had to be estimated. The unemployment rate at national level in 2001 was 23 percent. At county level, there were some remarkable deviations from the national average. The lowest unemployment rate was in the City of Zagreb and the County of Istria (13.4 percent). The highest unemployment rates were recorded in the County of Vukovar-Srijem (41.4 percent) and in the County of Šibenik-Knin (37.8 percent). Regarding regional disparities, the capital or the capital regions usually demonstrate the lowest unemployment rates and respectively a higher RGDP. The counties with per capita GDP above national level also have lower unemployment rates (City of Zagreb, County of Istria, County of Primorje-

Gorski kotar). On the other hand there are quite a few rural areas characterized by increasing unemployment and falling employment opportunities.

## Spatial Development Management

In Croatia, as elsewhere in the world, the question about whether economic development should be managed is often put. Answers stem from neo-liberal (in its extreme, a plain 'no') to socialist which in its extreme leads to requirements for central control of the entire economic process. Discussions tend to be about the structure of the economy and are rarely about its regional aspect and spatial pattern in general. However, given the fact that economic development happens in space and that its spatial aspect is unavoidable, the neo-liberal perspective does not appear reliable. Suboptimal, if not heavily distorted, spatial distribution of population and economic activities as well as unsustainable (locally catastrophic) use of natural resources in the last 60 to 70 years of Croatian history clearly point out that there has always been a case for regional development management, environmental protection and urban-rural policy considerations. The governance of Croatian spatial economic development thus appears as a necessity.

It is therefore quite a challenge to inquire about spatial development policies in Croatia, their theoretical foundations, development measures and their effects, corresponding institutions and organisations and whatever else constitutes a spatial development policy. Have policy makers ever relied on theories, has the development itself proved that the spatial patterns appeared as the theories propose, and so on, are questions that have to be answered if the governance necessary for sound spatial development is to be introduced in Croatia.

## 2 Not Long Ago - Socialism

### Primary Accumulation

Although the first physical plans in Croatia were produced already in the 1930s there is hardly any evidence of regional, urban or any other kind of spatial economic policy in the period between the two World Wars.<sup>9</sup> The first Croatian post-war period appears thus

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<sup>9</sup> *So called regulatory plans produced in the 1930s marked the beginning of more than a half a century long practice of producing physical plans with insufficient economic planning inputs.*

as the best point in time to start the analysis. Socialism was newly established in Yugoslavia and Croatia within it immediately after the Second World War. The Soviet (at the time Stalinist) influence was very strong particularly in economic policy. The basic idea and the measures that followed were rather simple: the labour surplus that existed in the agricultural sector had to be transferred to an industrial sector that lacked workers. This would allow for fast industrialisation, secure warranted rapid economic growth, enlarge the working class and thus improve the class structure of society. The way to achieve this was also simple (or looked simple on the central planners' desks) but painful: the compulsory purchase of agricultural products was introduced so that peasants had to sell food to the state at prices that were way below those obtained on the food market. The food was then sold in the stores that belonged to the state retail network. It was, of course, cheap which meant that industrial wages did not have to be high and that "accumulation" generated by the industrial sector could be used for further industrial investments. The policy did work. Deprived of the means of survival, peasants went to work in industry. The class structure seemed to have improved as requested and the annual growth rates were amongst the highest in the post war socialist countries (Stipetić, 1968). Foreign loans played their part too, but this was rarely mentioned in the Federal Planning Committee reports.

What is of particular interest here is that this dramatic policy stands as a rare example of deriving policy measures almost directly from a theoretical concept. The theory was named the "socialist accumulation of capital", a derivative of Marx's famous concept of "primary accumulation". Its author Evgenij Preobraženski formulated the model in the Soviet Union in the 1930s<sup>10</sup> inspired by the urge for fast development and the requirement to catch up with capitalism as quickly as possible.<sup>11</sup> Yugoslav planners copied it in the late 1940s but, just as the Soviet planners before them, failed to consider its spatial aspects. The planners seemed not to care that a transfer from the agricultural to the industrial sector inevitably triggered a massive departure of peasants who stormed the "would be" industrial cities and that the requirement to have factories of large capacity meant that machines often had to be transported from various places and concentrated in urban areas. Compulsory purchase was lifted in the early 1950s and

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<sup>10</sup> *The model was criticised by Nikolai Bukharin who proposed development of small scale labour intensive units evenly distributed in space. The discussion was about optimal economic structure and about its spatial distribution but ended with actual implementation of Preobraženski's proposal, which had to do mainly with the structural aspects. It simply fitted better in the centralised Soviet power structure.*

<sup>11</sup> *Preobraženski (1980).*

primary accumulation was finally dropped from the socialist development agenda in the early 1960s. The piling up of the rural population in the cities continued, however, and produced congestions that characterised socialist urbanisation to the end.

## Provinces, Departments, Municipalities and Districts

Paradoxically at first glance, central socialist planning was paralleled with a vast territorial administrative decentralisation. In 1947, the territory of Croatia was divided into 81 departments, 18 towns (and town districts) and 2,278 local councils. Two years later Croatia was re-divided into 6 provinces (Dalmatia, Bjelovar, Karlovac, Osijek, Rijeka and Zagreb), 89 departments, 24 towns with 9 districts, 5 towns and 2,338 local people's councils. The newly formed provinces were said to have represented economic-geographical entities out of which some had homogeneous economic-political characteristics. Provinces were cancelled in 1951 on account of strengthening the role of departments' and towns' people's councils. However, the next Republic law passed in 1952 brought a new territorial division of 58 departments, 6 towns, 60 town municipalities, 637 municipalities and 13 so-called "outer municipalities" i.e. territories which for some reason could not be included into a town municipality but represented economic and cultural unity with the town.

The next division came about in 1955. Croatia now has 27 departments and 299 municipalities, which meant getting closer to a concept of a two-level system of local administration. In the period of 1955-1962, the number of departments remained the same but the number of municipalities decreased. The next law passed in 1962 brought a further decrease in the number of municipalities and departments and defined 9 departments (a later amendment reduced departments to 8), 11 municipalities and the Town of Zagreb. A municipality was defined as a community of interest of producers and consumers. Criteria taken in account were mainly of a political and an economic-technical nature. The geographical and historical factors came second.

The most significant changes in the territorial organisation of Croatia came with the cancellation of departments in 1967, which was explained by the fact that departments had not developed as political, economic and cultural centres. The same year the municipalities were enabled to merge into a community of municipalities and the Constitution of the Socialist Republic of Croatia of 1974 established communities of municipalities as an obligation. With amendments to the Constitution of 1988, this

obligation was transformed into an option. Finally, the Constitution of the Republic of Croatia, of 1990, completely ruled out any possibility of forming an association of municipalities (Šišinački et al., 2002).

Obviously, a regional policy, if any, could have been formulated and implemented only at the central Republic level, the only one that remained the same throughout this period. Also, it can be seen that the territorial administrative reforms were most frequent when the power and development decision making was centralised most. The fact that such tinkering with municipalities, towns and districts could only strengthen the central development management, was observed early enough but the reforms went on providing enough grounds for doubts that the whole process had a hidden agenda in favour of centralisation rather than decentralisation.

## Theories and Policies

Theoretically backed central planning coupled with territorial decentralisation backed with no theory lost momentum already in the late 1950s. The policies that followed in the 1960s were announced without theoretical explanations and development documents were produced without the usual first chapter on socialism, a transitory stage on the way to communism. It is thus interesting to review how western regional development theories fit with socialist policies after World War II. The picture is somewhat blurred and certainly less dramatic than the "primary accumulation" phase, because the planning directives of the 1940s and 1950s were replaced with measures that to a certain extent allowed for the introduction of the market. Since the rationale for particular measures was hardly ever explained to anyone and since there was no monitoring of their development effects, it is hard to see whether planners and decision makers ever first read a theoretical book and then designed a policy. It is more likely that spatial development came about due to the spontaneous reaction of the population and entrepreneurs to mainly structural economic measures.

Čavrak (2003) mentions that spatial development corresponded to growth pole theory as proposed by Perroux (Perroux, 1955) because industries concentrated in a couple of cities and could have been considered as carriers of development in certain regions. There is no evidence whatsoever that the Federal Planning Committee consulted Perroux's writings but the actual effects would certainly have not been welcomed by Perroux himself. An unbalanced spatial economic structure that developed as a result of

the primary accumulation policy and persisted until today proved not to be resistant to the transition crisis in the 1990s. Such development had major negative consequences on the decline of output, employment and income in those regions that had a higher share of large industrial sites.

In certain periods spatial development resembled the application of Rosenstein-Rodan's (1943) big push theory. Already in the 1960s, parts of Croatia were marked as underdeveloped and the transfer of savings (investments) was earmarked in the state budget. The criteria were economic but also political so that the results were "castles built in the desert" which in most cases proved unsustainable, and a constant burden for the state budget. In contrast to federal Croatia, the neighbouring federal Slovenia had a quite different spatial development as this republic put much more emphasis on balanced urban-rural growth. Such a development can be linked to early considerations of centre-periphery theory, leading nowadays to a smaller urban-rural divide in Slovenia. On the other hand and on the other side of the Yugoslav Federation, Macedonia reminded us of central place theory. The main investments and social infrastructure construction were located in the capital city which triggered vast in-migration. In the beginning of the 1970s half of the Macedonian population concentrated there.

In the 1970s the distribution of funds towards backward regions became an unquestioned policy measure. Regional development funds were established both at the Federal level and at the level of the Republics. Dependent areas were evolving and gradually getting used to continuous external support. Even today, a major number of these localities are considered as areas of special state concern in Croatia reminding us, above all, of dependency theory. In those days large companies located in the most advanced Yugoslav areas performed development projects in underdeveloped parts of the country. Obviously, funds were actually flowing in the direction of their headquarters widening rather than closing the gap.

What is also visible today in the Croatian context is the strong focus on comparative advantages fuelling policy debates to highlight agriculture and tourism as strategic futures of the country. Further, policies with the aim to strengthen the export base in urban areas during the 1980s were brought about by the occurrence of an economic crisis and the need to pay off a very high foreign debt. However, policy makers overlooked the fact that measures aimed at a particular economic sector usually have regional effects too. In a country as heterogeneous as Croatia, incentives to tourism will be felt only on the coast and on the islands, agricultural measures will affect only the continental parts



of the country, and so on. This intermingling of structural and spatial policy effects is illustrative here because policy makers do not need a theoretical background to see them.

Šimunović (1992) stressed that the affiliation of political and economic sovereignty led to the reduction of economic criteria and created ineffective economic units copied into less developed areas. Another contribution to this was the function of the central fund; i.e. the function of the financial transaction and on this base created autonomy and sovereignty in investment activity in less developed areas.

From the perspective of contemporary approaches to development, it is interesting that Bogunović (1984) mentioned already in the early 1980s that planning implies the tendency to encompass all conditions of life and work of working people, including equal treatment of economic, social and spatial developmental components. He also pointed out the importance of including the regional component into the development policy of the whole country and the development policy of the bearers of planning. Clearly, early indications of the sustainable development concept can be identified to have evolved at the turn into the 21st century.

The economic planning itself became less and less significant. Five years plans were replaced by so called "Social plans" which dealt with the general directions in which the structure of the economy should be developed and how fast GDP, investments and employment should grow. Already in the 1970s municipal social plans were produced as well. They stated the targeted growth of employment and GDP in the municipality but rarely had any operational dimension. Towards the end of the 1980s they lost any significance for development management on the municipal level. They are remembered as probably the least implemented development documents in socialism.

## Physical Planning

Regulatory plans produced in the 1930s marked the beginning of a long practice of physical planning in Croatia. They also marked the beginning of two planning practices: as opposed to economic planning which started as a firm centralised activity and gradually relaxed and got decentralised, physical planning gradually grew into a hierarchical multi-level system; physical plans have always been made at state, regional, municipal and sub-municipal levels.

Unlike social plans, physical plans were compulsory from the very beginning and there has always been a law about them. Once adopted, physical plans have always had a legal force and their preparation has always been reserved for licensed planning firms and institutes who have to follow a prescribed procedure. A public hearing as a form of ex post citizens' participation has been a part of the preparation of municipal and regional plans for decades. On the other hand, detailed plans that usually cover quite a small part of a municipality have to be in accordance with the municipal plan which in turn has to be consistent with higher level plans. No plan can come into force without approval from all higher levels.

This hierarchical and centralised system was established already in the 1950s but due to frequent changes of territorial administrative division and weak institutions, a hierarchical monitoring and evaluation mechanism was never developed. The system perpetuated itself successfully. By the end of the 1980s it had been well established with a strong professional group of physical planners who studied at one of the five Yugoslav Faculties of Architecture. Unapproved construction on the outskirts of big cities and in the tourist areas revealed the inability of the authorities to enforce planning recommendations and land use regulations. Due to a lack of monitoring, the extent of these violations have rarely been recorded. Hardly any data on the implementation of physical plans has ever been gathered either. Furthermore, physical plans hardly ever referred to existing social plans and vice versa. It was never known whether enough space was reserved for the expected growth of the municipal and/or the wider regional economy, if there was enough space for residential housing reserved for an increase of the labour force, and so on. A comprehensive warranted spatial development policy that would cover physical and structural planning never existed under socialism. Ever increasing physical planning and ever decreasing structural economic planning existed almost independently.

In the 1980s the situation became a little more complicated. In 1982 a regulation on environmental impact assessment was passed in Croatia, and a new document – the Environmental Impact Statement (EIS) - became a compulsory part of project documentation for particular investments. This was a pretty straightforward application of US legislation on Environmental Impact Assessment (EIA) and soon gained momentum. By the end of the 1980s a new profession emerged - physical planning firms extended their expertise (some even specialised) and started producing EISs, with some 200 EISs produced by the end of the 1980s. This activity was never consistently incorporated into the physical planning system. Permits issued by authorities that take

care of building management can still be overruled by denials issued by authorities that deal with environmental protection.

## Education

The educational dimension of spatial economics in socialist Croatia forms the shortest part of any review of spatial development governance. In the 1960s there were five Faculties of Economics and one course in Regional Economics. Students that happened to study at the Faculty of Economics in Zagreb could take it during the second academic year and that was all. The course was dropped from the curriculum in the 1970s. In spite of all the problems brought by socialist urbanisation, no courses in urban economics were ever offered. As for environmental economics, the Faculties of Economics in Rijeka and Split were the only ones to offer non-curriculum courses in the late 1980s. The few that were interested in the subject read the few available books or enrolled at a university abroad. The vicious circle which starts with no spatial economic education and ends with no spatial economic policy was closed already in the 1950s extending its undesirable effects till today.

Towards the end of the 1980s, in the last years of socialism, self made Croatian spatial economists could only observe that:

- in spite of early socialist theoretical concepts about economic development and how to make it faster, socialist spatial development has never been conceptualised;
- theory free economic development management has been detached from physical planning which is in turn detached from environmental impact assessment;
- regional policy, as a supposed part of the overall economic development policy, has been reduced to non transparent, heavily politically influenced, financial aid to underdeveloped regions;
- lack of monitoring coupled with frequent changes of territorial administrative division has made any spatial development policy almost impossible to implement; and
- there has been almost no education in the field of spatial economics whereas education for physical planners has been adequate but not sufficient.

### 3 Transition

The great experiment of transition made a great virtue of the liberalisation of all possible sins that a socialist state could have had before (Kolodko, 2000). Combined with the break-away from Yugoslavia, Croatia built a strong centralist state to protect this first time opportunity of freedom. Centralism was additionally justified by the war that the country was forced into right after achieving statehood. Neo-liberal rhetoric proved more than useful at the time. The party in power as well as the new rapidly growing administration used it to justify how centralisation of the development management functions and privatisation of socially owned<sup>12</sup> assets can go together. The same rhetoric was used to explain the complete lack of regional policy that characterised the overall macroeconomic management in the early 1990s. It was convincing for many: decentralisation of power to regions will strengthen the separatist tendencies and the young state will be seriously endangered. It should be added that regional development policy was remembered as a purely redistributive state activity linked to planning, i.e. a part of the socialist legacy. In this way private property and free entrepreneurship that were to replace socialism had much to do with a strong guardian state and nothing to do with funding the underdeveloped, subsidising the weak, and so forth.

#### Counties, Towns, Municipalities

Denial of regional policy and even of regionality as such was oddly coupled with further changes of the territorial administrative division. The newly formed Republic of Croatia inherited the division of the 1980s and had 103 municipalities and the city of Zagreb. On average, 46,000 inhabitants lived in the territory of one municipality ranging from 1,228 in the municipality of the island of Lastovo to 207,147 in the municipality of the coastal town of Split (Hrženjak, 1993).

The legal framework of the new system of local and regional self-government was set up by the Constitution of the Republic of Croatia towards the end of 1990 and a couple of corresponding laws<sup>13</sup> which were passed by the end of 1992. The new legislation

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<sup>12</sup> *The category of social ownership was never properly defined in socialist Croatia. All assets that had that status were brought under state ownership in 1991 and offered to buyers.*

<sup>13</sup> *The Law on the Area of Counties, Towns and Municipalities in the Republic of Croatia, the Law on Local Self-Government and Administration, the Law on the City of Zagreb and by passing of the Law on the Election of Members of Representative Bodies of the Units of Local Self-Government.*

introduced a two-tier system of local government in the Republic of Croatia: municipalities and towns were units of local self-government; while counties were units of local self-government and government. By the end of 1992 Croatia had 21 counties, 70 towns, 418 municipalities and 2 districts. However, the new laws allowed that communities i.e. parts of municipalities, groups of villages or even single villages can claim municipal status or even a township because of historical, economic or geographic reasons even if they do not meet the criteria stipulated in the laws. Consequently, the division of existing municipalities into two or three started right away so that already by 1993 there were 21 counties 71 towns and 419 municipalities. In 1995, 8 new municipalities and 5 new towns were formed. In 2004 the Republic of Croatia consists of 21 counties, 124 towns and 426 municipalities.

## Capital Formation

At the same time, the first steps in redefining, restructuring and rebuilding the economy on healthy grounds were made. The first part of this was the establishment of a stable macroeconomic framework. In 1993 a quite successful stabilisation programme was created and partially implemented (Anušić et al., 1995). "Partially", because the second phase of the programme that referred to structural adjustment was somehow forgotten in the process. Inflation was halted - that was the first and major goal of the programme. However, industry collapsed and never really recovered. Foreign direct investments bypassed Croatia and other former Yugoslav countries in a big loop primarily due to unstable political conditions. Macroeconomic stability was stubbornly maintained except for the unwarranted but unavoidable and constantly increasing growth of the balance of payments deficit. The State could borrow more and more funds on the international financial markets according to more and more favourable conditions. Financial markets were more or less stable, but persistently undeveloped. The banking system suffered a major crisis at the end of the 1990s, when a number of banks collapsed due to major plunders within the banking system and the economy. The part of the liberalisation concept was more or less fulfilled during the 1990s since liberalisation of financial markets and privatisation was well underway. Privatisation can not be considered successful, however. Tycoons bought to sell, not to maintain the production and most of the major industries vanished, without proper replacement.<sup>14</sup> Today, most of the banking sector is in foreign ownership - Italian, Austrian and German.

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<sup>14</sup> *More on bandit capitalism in post-socialist countries see in Sokol (2001).*

During the 1990s the two major schools of economic and political thought were coexisting and influencing the Croatian development. Clearly, the neo-liberal stream was and still is heavily promoted by international financial institutions such as the IMF, World Bank and EBRD. The European Union policy makers started the unification of the market and the liberalisation of the movement of people, capital, goods and services. At the same time, the growing importance of EU structural funds and cohesion policy actually revealed a significant neo-Keynesian legacy. Through the importance of cohesion policy, regional development policy received again high attention in the European Union at the turn of the century. This also affected Croatian policy makers.

Theoretical foundations for a modern regional policy (EC, 2004) evolved by changing development theory concepts, which moved from growth towards sustainable development. Spatial developmental aspects could not be avoided this time because the integration of economic, social and environmental dimensions into a new "triangulated" development concept simply could not leave aside the heterogeneity and fragility of the space in which development takes place. Such a paradigm shift calls for an interdisciplinary approach, and invites specialised, individualistic and sector-oriented scientists to widen their scope.

## Development Management in a New Context

Contemporary regional development theory has been influenced by two strong streams of thought: on one side the neoclassical, sectoral and very analytically oriented stream; and on the other a new stream of integrated development thought calling for interdisciplinary and more qualitative approaches. As Croatia is a quite young state and data on the local or regional levels are either not available or unreliable, the second qualitative approach appears more appealing and applicable in the Croatian context. On the other hand, the political leadership is more attracted by quantitative research results as they supposedly can be transformed into political arguments more easily than qualitative ones.<sup>15</sup>

Provided that the path of sustainable development has indeed been taken, regional development management has to be considered in the new context. The triangulation of the development dimensions leads to a new concept of regional development planning

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<sup>15</sup> *Most of the governments from 1991 till today revealed their centralist approach to development policy formation and implementation. They have been often labelled neo-liberal which does not necessarily imply that they were conversant with the doctrine itself.*

and management that is integrative and holistic in nature. Through various documents and guidelines, the European Commission introduced the programming principle that is applied throughout European regions.<sup>16</sup> Programming according to EU principles was piloted in Croatia as well, mainly through technical assistance projects.

Croatian authors set a cornerstone for modern regional and local development management already in the early 1990s. Fröhlich (1992) has elaborated on the functioning of big urban agglomerations and the organisation of information systems for regional planning. Šverko (1995) wrote on regional development, highlighted the importance of its sectoral and territorial aspects and proposed a complex regional development management. Also by the end of the 1990s, a group of authors worked on the first concept for regional economic development in Croatia (Fröhlich et al., 1999). Significant contributions on contemporary regional development research were presented also by authors such as Fröhlich on “bottom-up” and “top-down” development, Maleković on the European Union regional policy, Filipić on decentralised macroeconomic management or Črnjar on the need for integrated regional planning (Sundać, ed., 2001).

From recent experiences in the application of new development management approaches in Croatia, Dräger et al. (2003) identified some important findings. Activities such as programming, implementation, monitoring and evaluation, and regular revisions cannot be conducted successfully without techniques of development management covering the fields of: decision-making, motivation, communication, moderation, steering and organisation. The sequence of the main planning phases and management techniques is similar to project cycle management, but has to be considered in a broader sense. These findings implicitly address so-called soft management aspects. These include institutional, organisational and managerial aspects, finance and new public management, as well as networking and multi-level governance.

Application of contemporary development theory is already visible in Croatia in the National Island Development Programme (Starc, 1997) and the related legislation - the Island act and its by-law "The regulation on the content and methodology on the elaboration of sustainable island development programmes".<sup>17</sup> Constant avoidance of

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<sup>16</sup> *The European Commission methodological working paper Vademecum for Structural Funds Plans and Programming Documents 2000-2006 is probably the most comprehensive reference.*

<sup>17</sup> *Narodne novine 34/1999 and 94/2002.*

implementing this very demanding legislation can be considered as a significant finding in terms of Croatian institutional weaknesses and lack of administrative capacities. This can also be considered as a new field of research within regional development theory that is becoming more and more important in the Croatian research community.

## Policy Confusion

A very interesting and much debated aspect of policy creation arose in Croatia - the conflict between sectoral policies and regional policy. Since a coherent regional policy has never existed in Croatia, sectoral policies have always dominated the Croatian development arena. The spatial aspect is handled through spatial planning only which proved to be unable to integrate physical and socio-economic aspects. Development of regions and localities is not considered in the contemporary development management context, but exclusively in terms of financial support to areas affected by war and undeveloped areas such as mountain, border or island areas (Đokić, Sumpor, Starc, 2003).

In the research community and amongst politicians<sup>18</sup> a confusion of policy approaches can also be observed. One strand of policies is based on the neo-liberal perspective with a strong sectoral approach. Economic development is the focus of both research and policy, while social aspects are marginalised. Such views favour small and medium sized enterprises (SME) and cluster related development research and activities, while ignoring almost everything else. Croatia has already had a highly specialised Ministry for SMEs (2001-2004). The SME policy managed by this Ministry significantly interfered in regional and local development initiatives such as co-financing arrangements with local and regional self-governments for SME promotion or promotion and co-financing of industrial and business zones, centres, incubators. Cluster development is now promoted extensively (National Competitiveness Council, 2003). At the same time, it is obvious that Environmental policy is considered as expensive and not politically relevant, while Social policy is seen as residual help for the poor, marginalised and unemployed – an expensive and not development related burden.

The second approach to contemporary regional development management integrates all the above-mentioned aspects - economic, social, spatial and environmental as well as

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<sup>18</sup> *The two groups do overlap as economists often leave academia to take high positions in the government. However, there are very few examples of economists in power who managed to implement what they proposed in the classroom.*



institutional development. Accordingly, the broad participation of stakeholder groups and citizens is the key to the identification of real problems and achievable development goals (Dräger et al., 2003). Regional development policy in this context is viewed actually not as a separate policy helping poor regions, but as a framework channelling existing and needed sectoral policies from above according to needs and requirements from below. This approach has been introduced by foreign consultants from both sides of the ocean that come to provide financial and technical assistance. However, the nature of the assistance depends on where the consultants are from and which school of thought they belong to. So far they brought significant improvements but also contributed to policy confusion.

On the path to EU membership, Croatia will have to develop a coherent development policy framework in which regional policy will be an important counterpart to sectoral policies. These will have to be integrated into a National Development Plan, which will represent the basis for future national development activities and structural funds support. In order to set-up a coherent policy framework, Croatia will have to work on creating a well-functioning coordination mechanism. This mechanism will have to have a formal part integrated into the legislation, and an informal part also referred to as the open method of coordination (Ahonen, 2001) that provides actions based on common goals and projects.

## Supranational Actors and Regional Policy

Following Marks, regional policy is, in many ways, “the leading edge of multi-level governance in which supranational, national, regional and local governments are enmeshed in territorially overarching policy networks” (Marks, 1993; 402-3). Since it is now somewhat axiomatic that ‘governance’ is much more than ‘government’, it is important to replace Marks’ notion of governments with a wider concept of ‘actors’ including a whole range of non-governmental, non-state actors, acting independently of state actors or, more usually, in complex ‘partnerships’ or ‘contractual’ arrangements (Stubbs, 2003). In Croatian transition supranational and transnational actors have not been just neutral arbiters of ‘good governance’, but key players within a complex and contested multi-level governance environment. These actors include, but are not limited to:

- 1) Global Supranational Organisations such as the United Nations and its agencies, and the Bretton Woods Institutions or International Financial Institutions (IFIs), namely the World Bank and the International Monetary Fund.
- 2) Regional Supranational Agencies including the European Commission and the Council of Europe, as well as more temporary arrangements such as the Stability Pact for South-Eastern Europe.
- 3) Donor agencies of other governments (usually termed bilateral agencies) such as USAID for the USA, SIDA for Sweden, GTZ for Germany, DFID for the UK, and so on.
- 4) Non-state private aid and development organisations, usually playing a role of implementing partners of one or more of the above, including international non-governmental organisations and, increasingly, international private consultancy companies.

Croatia is a somewhat specific case in terms of the story of the influence of international agencies and actors on regional policy, which is, perhaps, much more complex, contested, confusing, and radically unfinished than in other parts of Central and Eastern Europe (CEE) as well as Southern and Eastern Europe (SEE). There are three key reasons for this. Firstly, most supranational agencies began their activities in Croatia during the war. Hence, their interventions were initially framed within a 'humanitarian' rather than a 'developmental' paradigm and were concentrated, in particular, on 'war affected areas'. This represents a kind of 'implicit' regional development policy with somewhat distortive long-term consequences, not least in terms of unsustainable expectations of external cash injections.

Secondly, many international actors tend to subsume development programmes within a broader democratisation discourse both in terms of support for a pluralistic development regime including the role of so-called 'civil society', and an uneven pattern of support for different political configurations at national, regional and local levels. Thirdly, the rapidly shifting relationship of Croatia to EU accession and associated programmes and policies, necessitates a very fast learning curve. Croatia was, only very briefly, included in the PHARE programme and then for political reasons its membership was blocked in 1995, following military actions. Later, the CARDS programme framed Croatia in terms of the Stabilisation and Association Process for the so-called countries of the Western Balkans. Now, with a positive avis and membership negotiations beginning in early 2005, a very different set of imperatives prevail.

Over time, the European Union has become the dominant supranational actor 'steering' regional development policy in Croatia, even sub-contracting UNDP as an implementing agency for some of the Regional Operational Plan (ROP) development. The World Bank and USAID remain, however, important actors, tending to focus more on local development at the municipal and city levels. In addition, a long term co-operation between GTZ and the Institute of Economics, Zagreb (EIZG) has sought to introduce a strategic dimension to local development planning, gaining wider acceptance over time. Current EU programming, attempting to learn lessons from the fragmented preparation for structural funds management in the new member states, is focused on institution building at national and county levels, with a consultancy currently funded designed to support a consensus on a National Regional Development Strategy (Hauser, 2003).

A number of issues and concerns are raised by the role of international organisations in the governance of regional development in Croatia. It is not clear whether there is genuine co-ordination and complementarity of effort between these agencies or, as sometimes appears to be the case, more competition and confusion. This relates to the complexities of the interests and value-base of diverse agencies, with distinctions between 'neo-liberal', 'Keynesian' and a hybrid, technocratic, approach reproduced between, but also within, agencies.

In addition, the dangers of what might best be termed the 'projectization' of regional development, in terms of a race to show results, which often involves cutting corners, not learning lessons, and utilising informal networks of influence, ironically contributes to a lack of transparency in projects which they were, in fact, set up to challenge. An alternative approach, emphasising processes, feedback loops, mutual learning, and a recognition of problems and failures, to an extent found in the GTZ/EIZG project, runs counter to the 'success culture' of external assistance programmes.

A complex role in development projects is being played by 'new intermediaries' often with power but no legitimacy, able to facilitate communication and action between levels. In addition, external actors provide opportunities for new vertical alliances in which certain discourses lacking national or local credibility can become favoured because of their amplification internationally. There are also problems caused by the rigid sub-contracting rules of the 'new public management', accurately described recently as the 'little brother' of neo-liberal economic ideology (Voipio, 2003, p. 360), which encourage a fetishism of form over content, a proliferation of agencies and approaches, and also contributes to competition and confusion.

The current emphasis on combining project-based grant aid with 'capacity building' including the positioning of foreign advisors in key positions within Government departments can be a valuable form of policy transfer. However, tensions and mistrust can be created by foreign advisors earning considerably higher sums than their domestic advisee counterparts, but often ignorant of key domestic realities. This can be compounded by the multiplication of advice, advisors, projects, and capacity building workshops, again contributing to confusion. A further paradox is that advice tends to function best on a human scale, with one advisor working with a small group of senior civil servants in one department, but this is the least likely to have widespread impact in terms of a whole government, joined up, integrated response.

More research is needed on the role of external agencies in the construction and implementation of regional development policy in Croatia. At this stage, it would be wrong to make detailed policy recommendations. Certainly, a more collaborative environment needs to be created in which local and national interventions are supported by external assistance rather than the other way round. Greater awareness of the need to address inevitable value dissensus, learn lessons, and strive towards a vision of Croatian regional development in a European context requires longer-term, more transparent, arrangements than currently found.

## Institution Building Frenzy

Instead of a rational, carefully chosen, 'shaping of institutional choices' (Dimitrova, 2001) regarding regional and local development, it often seems as if Croatia is in the midst of an institution building frenzy. In terms of the concept of 'multi-level governance' discussed earlier, much of this involves the diffusion of authority through the creation of autonomous or semi-autonomous agencies and funds which operate at arm's length from central government Ministries. At first glance this 'agencification' (Pollitt et al., 2001) appears to resemble that which has occurred, to varying extents and in varying forms, in most of the OECD countries, as part of a move to improve the performance of the public sector, sometimes termed 'distributed public governance' (OECD, 2002) often equated with modernisation and the new public management.

However, as Beblavý (2001) has pointed out with regard to Central and Eastern Europe, the pace of this reform has been much more rapid and, in addition, has tended to ignore the increasing criticisms, and retrenchment which has occurred regarding the model, in many of the Western democracies. His concern that 'agencification' represents a quick

fix, short-term, sectoral solution to complex questions, often based on uncritical transplanting of models from other countries and cultures, certainly applies to regional and local development policy in Croatia. The push for the proliferation of agencies rests, it seems, on an alliance of external actors from key international agencies and internal actors, often the technocrats of the newly created agencies, frustrated by the slow pace of decision-making and administrative restructuring.

Croatia's regional development scene now resembles that of an 'institutional jungle' (Hauser, 2002) with a vast array of new, and proposed new, agencies vying for position, influence, and mandate, alongside more 'traditional' actors such as Ministries, counties, and municipalities. Recently established agencies, often with the backing of external actors, include:

- Local Economic Development Agencies (LEDAs);
- The Fund for Regional Development of the Republic of Croatia;
- The Fund for Environmental Protection and Energy Efficiency;
- The Fund for Development and Employment;
- The Fund for the Reconstruction and Development of the City of Vukovar.

Currently there are discussions regarding the possibility of establishing a national Regional Development Agency, as well as more Regional Development Agencies, alongside the Istrian and Međimurje development agencies, which currently exists. This excessive faith in institutional solutions to intractable problems appears to be contributing to problems of accountability, of sustainability, and of policy distortion and confusion, all of which have been noted by Beblavý (2001). Whether this will lead to a backlash as traditional structures respond to an erosion of their autonomy, as he predicts, remains to be seen in Croatia.

## Tiers of Government

When the Croatian Government introduced its Work Programme in 2000, a huge reform of the public sector was announced, directed towards decentralisation. It was planned to stop the expansion of public administration, to introduce horizontal and vertical decentralisation, to provide an analysis of the effectiveness of the state administration, and to perform a territorial reorganization of regional and local units. Through a project 'Decentralisation of Public Administration' an operative execution of the planned

activities started in 2000 (Perko-Šeparović et al., 2003). Four years later a general comment can be made that initial steps in the decentralisation process have been taken but at the same time legal acts that supported decentralisation did not follow recommendations from the project. (Antić, 2002, p. 69). This notably relates to the documentation that had to support decentralisation: beside the Government Work Plan and the Project, the decentralisation process (seen as a tool to achieve specific goals) misses supporting documents that will secure its successful implementation. Above all, Croatia does not have a national spatial/regional development strategy through which the directions of its future regional development should be indicated. The decentralisation process thus started without analytical and strategic support of the administration. In practice, even a certain resistance was observed.

On the local level the decentralisation process was not welcomed for several reasons: the local administration did not have enough human and institutional capacity and also they were not trained enough to meet new requirements. Deconcentration of responsibilities was not followed by adequate fiscal decentralisation for all local government units. The question that arose was: if a local government unit cannot execute its responsibilities, what are the mechanisms to force it to cooperate with other local government units and if this is not the case can the unit (i.e. a town or a municipality) go bankrupt? Both questions are still unanswered.

The main issues concerning governance of local development are the following (Perko-Šeparović et al., 2003):

- local/regional governments do not have a clear and strong enough position in the overall legal infrastructure;
- the scope of responsibilities is defined without any distinction of the size, population, achieved development and, financial strength;
- a centralist orientation is still present in the territorial administrative system;
- the monitoring process is demonstrating severe weaknesses; and
- institutional capacity is inadequate.

There is no clear division of functions among the different levels of government, because of non-transparent and unclear regulations that govern the area of competence of local units. Although there is an outlined division of the affairs of local administration between the state, the county, and the city/municipality, it is very difficult to say which level is meant to undertake a given function (Ott and Bajo, 2002b, pp. 107-122).

Whereby the levels of responsibility are not specified in detail and seen as such might cause confusion, as many of the listed tasks interrelate with tasks of other levels of government. At the same time, details are thoroughly defined in a broad number of special laws, where expenditures are assigned specifically to each relevant level of government, highlighting as well central government responsibilities. Financial relationships are so excessively complex that in most cases the financing of individual functions is undertaken from all three levels.

The decentralisation process has not influenced the current system of state administration neither has it reduced the number of its employees. Reorganization of administration that took place on the regional and county level resulted in a decrease of the number of employees at that level.

## Decentralisation Promised

In spite of the increasing number of municipalities Croatia has remained a highly centralised country. Two main indicators, the share of revenues of local self-government in gross domestic product, and the share in the total government budget revenues, clearly support such a statement. In 1999 the share of local budget revenues in consolidated revenues of the general government budget totalled 10.32%, and their share in GDP amounted to 5.42%. In 2000, the year before the launch of the first phase of the decentralisation process in Croatia, the share of local budget revenues in consolidated revenues of the general government budget totalled 10.93%, and their share in GDP amounted to 5.18%. (Jurlina-Alibegović and Šišinački, 2004).

The attempted decentralisation of self-government competencies was accompanied by attempted fiscal decentralisation. In its first phase, 32 financially stronger towns and all the 21 counties in Croatia were assigned additional local responsibilities. The effects of fiscal decentralisation that was legally provided in 2001 are difficult to measure particularly in such a short period of time. However, from the institutional analysis perspective, estimates about financial strength of local self-government units (LGU) to manage their own development are quite discouraging. About one third of LGUs in Croatia can not cover current expenditures with current revenues, while basic responsibilities to be financed are equal for all LGUs. There is a strong dependence on central government transfers to provide mandatory services, or these services are not provided at all under the assumption that no sanctions will apply. Subsidies and grants

consist of approximately 8% of the total revenues of all local budgets, which leads to the conclusion that local self-governments are dependent on central state aid (Budak et al., 2004).

On the other hand the fiscal decentralisation process in Croatia brought some improvements. They can be observed in the following areas: division of functions and responsibilities, budget classification, fiscal capacity indicators, allocation of grants, consolidation of local governments' budgets, accounting system, budget planning, national treasury system, tax reports, long-term capital planning, financial control over borrowing system and participation of citizens (Ott and Bajo, 2002a). In spite of that, the existing organisation of local and regional self-governments is not efficient in terms of fiscal capacity.

## Education

Self made Croatian spatial economists benefited a lot in the first decade of transition. The inflow of theoretical, methodological and practical knowledge increased considerably while pilot projects lead by foreign consultants brought incoherent but nevertheless valuable practical experience. Membership in international science organisations (the European Regional Science Association, the Regional Studies Association, and similar) also helped. Those that tried to study spatial economics were at a complete loss, however. Education got worse and after a decade of transition there are no signs that it will improve soon. Spatial economics education is still reduced to extra curricular courses in environmental economics at Faculties of Economics in Rijeka and Split and there are no regional economics courses offered anywhere in the country. After decades of turmoil and highly problematic urbanisation no courses in urban economics are offered either. Another important discipline - institutional economics - is also missing from the curriculum. The latter is a clear legacy of socialism in which nothing of the kind was ever mentioned, let alone studied. The only exception is the University in Osijek where a promising postgraduate programme on "The Management of local and regional development" has been launched in October 2004.

After almost a decade and a half of transition, self made Croatian spatial economists can only observe that transition appears as "too young a phenomenon" to be theorised about and that numerous modern theoretical concepts developed elsewhere have a very limited application. A significant though sporadic development of methodologies of managing



local development still faces serious institutional obstacles both at the governmental and self-government level. Overall economic policy has become highly dependent on foreign actors and remains detached from strong and almost petrified physical planning which is in turn still detached from EIA. They would also observe that regional policy is non transparent, heavily politically influenced and still reduced to financial aid to the underdeveloped. The lack of monitoring coupled with frequent changes of territorial administrative division has made any spatial development policy almost impossible to implement. Finally, they would note that there has been almost no education in the field of spatial economics whereas education for physical planners has been adequate but not sufficient.

## 4 Concluding Remarks

Transition amazes. The fundamental changes that it brought about were expected to erase the various shortcomings and inconsistencies that were embedded in the socialist system and its ideology. It was also timidly expected by many that civilisation achievements brought about by socialism will remain in whatever system was to follow it. Quite a few expectations revealed only wishful thinking. Quite a few were founded in the analysis of what was called "real socialism" i.e. the actual performance of the socialist social and economic system. The latter grew in 1970s and 1980s all over the socialist world and led to conclusions that seemed unquestionable. All shortcomings and development bottle necks were blamed on the lack of democracy, lack of a free market, lack of active civil society and individual freedom, insufficient exchange of technologies and whatever intellectual achievements had occurred within the capitalist world and, last but not least, to environmental negligence. The last years of socialism supplied evidence in favour of such conclusions as all socialist countries entered a crisis which seemed fundamental and irreparable in the context of the existing system.

Discussions on regional policy and its ill performance in socialism were perhaps least frequent but they also gained momentum towards the end of socialism. In Yugoslavia and Croatia within it, the Federal fiscal policy was most often blamed for the suboptimal growth of the most developed parts of the country. Discussions about money earned in Croatia and spent somewhere else were quite frequent. Lack of regional policy or rather the wrong regional policy was explained again by lack of democracy, lack of expertise, the interests of ruling social strata in Yugoslav socialism, and particularly by Serbian hegemony over fiscal transfers.

Today, after more than a decade of transition, most if not all of the lamented obstacles have been wiped away. Democracy has been introduced, the door for "western" theories and methodologies has been wide open, the market has been institutionalised as well as private property, and the socialist ruling strata are history. Even the EU, the only goal that unifies all Croatian governments since 1990, favours regional policy and includes it in the long list of accession requirements. However, Croatia still does not have a regional policy, and similarities with socialist regional development management are vivid, almost striking.

The discussion about troublesome regional development governance is thus reduced but not made easier. The question: "if not the usually suspected obstacles, than what?" has to be put more seriously than before and the answers, no matter how theoretical, should have an operational value. The common explanation that all the shortcomings are just leftovers of socialism that will inevitably vanish simply because there is no more socialism around, does not hold simply because most of the problems proved persistent. The reasons are much more complex and should be sought for both in socialist legacy and in transition practice. It should not be overlooked that new institutions and corresponding organisations introduced in the 1990s have been coupled with quite a few ex-socialist institutions and organisations that survived the tough early years of transition and have even reinforced their position. Another explanation that is often put forward deals with competence. Administrators in ministries, agencies, county and municipal departments and whoever else is supposed to manage regional development are often said to be not competent enough and definitely not up to the job. Although the transition years brought enough evidence about incompetence in particular cases and concerning particular persons, the lack of regional policy can hardly be explained by lack of knowledge and skills. Had there been real intentions to establish such a policy, a decade and a half was more than enough to acquire necessary capacity either by training or by relying on foreign expertise.

The explanation that deserves much more attention deals with centralised governance and its relation to regional development management. The government that took power right after the Republic of Croatia was constituted was highly centralised which could have been justified by the need to preserve the young statehood and, of course, by the Homeland war. Already in the late 1990s all reasons for centralisation of this kind ceased to exist, but the centralisation tendencies remained strong and felt in most of the existing policies. This could be explained only by internal reasons i.e. the concern of an ever growing state administration to maintain its position and the interest of politicians in

power to maintain control of the distribution of funds earmarked for regional development. Such explanation sheds additional light on territorial administrative decentralisation as well. Quite a few communities that had won municipal status or even became a town in 1992 and subsequently, soon found out that decentralisation brought dependency on the central state budget and that one form of centralised development management was replaced with another, somewhat more subtle.

What is to be done? The answer to the famous development question should be put in the contemporary context: define a vision, derive goals and find ways to achieve them. As usual, the vision seems easiest to define and creates least problems as the state of affairs it pictures reaches far and high enough not to interfere with current interests. Important nevertheless, the vision that has to be defined here has to do with top-down and bottom-up policies and the balance between the two. Croatian regional development has hardly been ever managed but the measures that were aimed at certain regions were all top-down in their design. Bottom-up efforts were initiated only recently and the balance of the two, necessary for efficient regional development management, has not yet been achieved. As local self-government is not institutionally, organisationally and financially ready for good governance, the central government should gradually transfer tasks and the power to deal with them, build local self-government capacity, help both financially and in terms of expertise and, not least, do all this in a non-paternalistic way. In such a process lack of competence, socialist leftovers and the like are clearly not the obstacles. The main problem is the (lack of) willingness of those who have centralised the power to decentralise it.

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# The Possible Economic Effects of EU Policy Funds Inflow to Croatia

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## Abstract

The current situation indicates that Croatia is definitely on the path towards joining the EU. The most visible advantage of acquiring candidate status and, later, joining the EU is the financial support which the EU places at the disposal of candidate and member countries in the form of the various funds that constitute part of its policies.

This paper is intended to systematically describe and analyse the effects and benefits of different policy expenditures from various EU sources that are expected in Croatia. These differ depending on the various phases in the EU accession process: from the present situation, where the EU's CARDS programme is active in Croatia, to the Pre-Accession Strategy phase with its policy instruments Phare, ISPA and SAPARD and the corresponding expenditures, to post-accession appropriations for commitments and payments available to member states via the Common Agricultural Policy, the Structural Operations are divided between the Structural and Cohesion Funds and Internal Policies. It is assumed that these expenditures will, in any phase, affect general economic performance and overall employment patterns, and that their impact is likely to differ on a sectoral basis.

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This paper is based on the research project "Rural Employment and Agricultural Perspective in the Balkan Applicant Countries" (REAPBALK), as part of the EU's Fifth Framework Research Programme entitled "Quality of Life and Management of Living Resources" - QLRT-2000-01608.

In order to provide a sound methodological foundation for studying such impacts, this paper offers a systematic presentation of current EU financing in Croatia, as well as of pre-accession and possible (estimated) post-accession funds that are expected to be available to Croatia, with corresponding projected expenditure items. It also provides sound argumentation for its estimates through a quantified description of policies and, where applicable, the assumptions underlying the figures presented. EU support for Croatia is analysed based on an analogy with the previous ten candidate countries.

The impact analysis on basic economic variables has been performed using the I-O model under different scenarios concerning various projected funds inflow to Croatia, and depending on Croatia's varying status at different points in time: current status, EU candidate status, and EU membership. The annual amounts (real and estimated) of the aforementioned funds have been injected into national I-O matrices so as to obtain estimates of the impact generated by differently defined scenarios. The scenarios presented in this paper illustrate maximum impacts, as they were made under the assumption that EU expenditures will be fully absorbed, and also exclude anticipated national payments towards the EU.

The analysis has been performed in a static framework, and estimates only relative rates of change in output, income and employment due to newly available funds inflow and, consequently, increased final demand; it does not refer to absolute values. In fact, it measures the impacts of the described funds inflow in terms of delta change compared to the current situation. Therefore, only the effects of EU policy funds inflow for one year were estimated, and an analysis of cumulative effects was not performed.

The fact that the latest national I-O table for Croatia used in this paper's impact analysis dates from 1997, and that it was produced using the RAS method based on a direct requirements matrix for the year 1987, could represent a limitation in assessing precise values. However, for such an illustrative analysis it is sufficiently representative, and provides relevant results.

**Keywords:** EU accession, EU policies, impact analysis, economic development

**JEL Classification:** F15, D57, O12

# 1 Introduction

The latest news informs us about a new candidate country for EU membership. The Republic of Croatia was granted the status of an official candidate for membership in the European Union on Friday, 18th June 2004. This has opened the possibility of using resources from EU Pre-Accession Funds and, subsequently, of “post-accession” EU financial support. It marks a historical event for the Republic of Croatia, and the date for beginning its membership negotiations has been fixed for early 2005.

The paper intends to analyse the effects and benefits of EU pre-accession and post-accession funds inflow on Croatia’s economic performance. In order to present the results adequately, it has been structured as follows. The introductory section gives a general description of EU relations with Croatia, specifically of milestones in relations between the EU and Croatia since the very beginning of their co-operation. The general characteristics of the available national I-O table, and the corresponding assumptions of the methodology used for analysis in this paper, are presented in the second section.

The first step in an I-O analysis, based on the injection of pre-accession and projected post-accession funds into the national I-O matrix, is to identify the vectors of the modified final demand. EU pre- and post-accession financial support has been carefully examined and presented in the first part of the third section, together with an estimate of EU post-accession funds for Croatia. Following this, the different stages on the way towards the EU membership and the sectoral availability of different policy funds are presented in terms of the relevant scenarios. The projected funds are allocated to sectors of economic activity based on the objectives of each policy. In this way, an impact analysis for various funds may be carried out under the relevant scenarios.

The fourth section provides the results of the impact analysis and observations as to each policy’s implications. These results present the impact of EU policies on Croatia’s economic performance, and are compared to results obtained for Slovenia and Romania using the same methodological approach within the REAPBALK project.

The last section contains concluding remarks on the results and objectives of this paper.

## 1.1 EU relations with Croatia from 1991 to 2001

As already mentioned, the current situation, in which Croatia is on a new path towards EU membership, represents the starting point for the analysis performed in this paper. Croatia is a new candidate country, and this opens new possibilities for using resources from EU policy funds. The following section illustrates the steps taken by the Republic of Croatia on its path towards EU accession, in order to provide insight into past and present circumstances of its relations with the EU.

### Milestones in relations between the EU and Croatia<sup>1</sup>

- 1997: Regional approach. The EU Council of Ministers establishes the political and economic conditionality for development of bilateral relations with Croatia.
- 1999: The EU proposes a new Stabilisation and Association process (SAP) for the five countries of South-east Europe, including Croatia.
- 2000: Parliamentary and presidential elections in January 2000 result in a change of government in Croatia, ushering in a new political climate. The EU responds as follows:
  - February: Establishment of an EU-Croatia Consultative Task Force, which provides Croatia with expertise and technical assistance in preparing for the Stabilisation and Association process.
  - March: Upgrading the Office of the EC Special Envoy to Croatia in Zagreb to a permanent Delegation of the European Commission.
  - 24 May: The European Commission adopts a positive feasibility report on opening negotiations for a Stabilisation and Association Agreement (SAA).
  - June: The Feira European Council announces that all the SAP countries are “potential candidates” for EU membership.
  - September: Extension of duty-free access to the EU market for Croatian products.
  - 20 November: Opening of SAA negotiations within the Zagreb Summit.
- 2001: First year of the new CARDS programme:
  - 29 October 2001: Signing of the SAA, which provides for wide-ranging co-operation, and is to guide Croatia in its gradual approach towards EU structures. The SAA includes establishment of a framework for political

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<sup>1</sup> Available at: [http://europa.eu.int/comm/external\\_relations/sec/croatia/index.htm](http://europa.eu.int/comm/external_relations/sec/croatia/index.htm)

dialogue and promotion of economic and trade relations, with prospects for establishing a free trade area after a transitional period of 6 years.<sup>2</sup>

- At the end of 2001 the European Commission adopts a country strategy for Croatia, covering the period 2002-2006 and providing a framework for EC assistance. This assistance is to be delivered via the CARDS programme. The strategy paper is complementary to activities by EU member states and other donors.
- 2002: An Interim Agreement covering trade and trade-related measures is concluded in parallel with the SAA, and enters into force on 1 March 2002. The Interim Committee meetings are held in April 2002 and April 2003.
- 2003: As a further step in the development of EU-Croatia relations, Croatia submits an application for EU membership on 21 February 2003. On 14 April 2003 the GAERC Council requests that the Commission prepare an opinion on Croatia's application.
- 2004: On 18 June 2004 Croatia becomes a candidate for EU membership.

#### Financial statistics from 1991 to 2001

Between 1991 and 2000 Croatia received €367 million in EC assistance, with 65% going to humanitarian aid. The other major programme was refugee return. Most of the assistance provided to Croatia after 2000 has been implemented as part of the Community Assistance for Reconstruction, Development and Stabilisation (CARDS) Programme.

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<sup>2</sup> The agreement also provides a basis for cooperation in the fields of justice and home affairs, and identifies the *acquis communautaire* which Croatia will have to adopt in order to effectively participate in the European integration process.

	1994	1995	1996	1997	1998	1999	2000	2001	Total
OBNOVA*	0.10	0.30	11.70	10.30	9.00	11.50	20.34	60.00	123.24
ECHO humanitarian aid**	204.80	38.40	21.15	14.50	6.95	6.50			292.3
Media	0.09	0.31	0.72	1.67	0.59				3.38
Democracy and human rights			0.70	2.20	0.60	0.21	0.97	0.50	5.18
Specific activities***					1.00	1.42	1.81	1.00	5.23
TOTAL	204.99	39.01	34.27	28.67	18.14	19.63	23.12	61.50	429.33

Source: [http://europa.eu.int/comm/external\\_relations/see/croatia/index.htm](http://europa.eu.int/comm/external_relations/see/croatia/index.htm) (15.09.2004.)

Note: \* The figure from 2001 refers to CARDS first year funding. \*\* The figure from 1994 includes the total allocated funds under ECHO from 1991 to 1994. \*\*\* Including Demining and Tempus 2000.

## 2 General Characteristics of the Methodology Used in this Analysis

In order to evaluate the impacts generated by various EU financial mechanisms and obtain information about their economy-wide effects, we decided to apply simulation using an Input-Output (I-O) model. An I-O table, which provides a detailed snapshot of I-O linkages within the economy, can be used to predict the consequences of any planned and potential changes in demand for an economy's output.<sup>3</sup> In this respect, it was deemed to be a useful tool in assessing the potential impact of external shocks to the economy, such as EU budgetary transfers following accession. The immediate results of such an analysis provide information about additional output created by increased final demand. The effects of the simulated policies on final demand (components of the "shock vectors") are presented in Table 5.

Once all the vectors of final demand have been estimated, the I-O model is applied to assess overall impacts in terms of income, employment and output produced by different scenarios.

Some general characteristics of the available national I-O table and the assumptions of this methodology are noted before presenting the aforementioned relevant scenarios.

<sup>3</sup> The main virtue of the I-O model is its ability to provide multipliers indicating linkages between sectors of the economy. Nevertheless, these results have to be taken with caution, due to restrictive assumptions underlying the I-O technique (static character, linear production function, no impact of scale economies, no substitution, infinitely elastic supply).

## 2.1 Characteristics and Aggregation of National I-O Table Used in Impact Analysis

The national I-O table used dates from 1997, and has been derived using the RAS method, based on the direct requirements matrix from the year 1987. This was the last year when a national I-O table was calculated based on collected data and the other relevant information needed to construct such a table.

I-O table	Croatia
Number of sectors	Symmetric 60x60
Technology assumption	Industry-technology assumption Product-by-product
Valuation	Basic values, current prices
Year	1997
Intermediate flows	Domestic

As mentioned in the previous section, the estimated vectors of final demand are used for impact analysis, hence an allocation of EU funds based on sectors of economic activity is required. A precise sectoral allocation of EU funds across 60 sectors of economic activity would be difficult to perform. Therefore, since the analysis is illustrative, and for the sake of giving relevant and observable results, the national table was aggregated into 15 sectors.<sup>4</sup>

## 2.2 General Assumptions of the Analysis Presented in the Following Section

Before presenting the results of the analysis, its assumptions, which represent some of the limitations of the I-O approach, should be noted:

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<sup>4</sup> Aggregation into the fourteen sectors that are most frequently used in national statistics and a fifteenth sector including other sectors with a significant number of employees. These sectors are: Agriculture; Manufacture of Food Products; Textiles and Clothing; Wood Products; Chemical and Metal Products; Machinery and Motor Vehicles; Furniture; Other Manufacture; Electricity, Water and Gas; Construction; Trade and Hotels; Transport; Financial Services and Real Estate; Public Administration, Education and Health Services.

- the scenario analysis is static, and calculates the effects of different EU policy instruments on basic economic variables of the national economy, measured as delta change compared to the baseline scenario (current situation);
- therefore, only the effects of inflow of funds from each EU policy instrument in each separate year have been measured, and calculations of cumulative effects were not performed;
- the analysis does not refer to a specific year, but rather to an annual inflow of funds and its effects on the national economy and its current economic structure;
- this analysis predicts the possible impact of EU funds on the national economy as net inflows, neglecting national co-financing and later (post-accession) contributions (obligatory national payments) to the EU budget.

### 3 Analysed EU Policy Instruments and Relevant Scenarios for Impact Analysis

EU policy instruments can be divided first of all based on different programme periods, and then based on different policies referring to different objectives and priorities. This paper presents the amounts projected for Croatia for each programme period analysed: from the CARDS programme currently active in Croatia, the pre-accession instruments that were available to the former EU candidate (EU 10) countries, and the main categories of Community expenditures under different headings.

#### 3.1 EU CARDS Programme and Pre-Accession Assistance

An impact analysis using the I-O model has been carried out based on different scenarios regarding the various policy instruments that will be available to Croatia in the pre-accession period<sup>5</sup> and the currently available CARDS funding.

The policies considered are listed in Table 3. A description of policy instruments and a corresponding financial breakdown are given below.

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<sup>5</sup> The average annual amounts for allocation of funds to Croatia under Pre-Accession Strategy instruments in the period 2005-2006 were used to make these calculations. The amounts targeted for Croatia are available at:

[http://europa.eu.int/comm/enlargement/report\\_2004/pdf/strategy\\_paper\\_en.pdf](http://europa.eu.int/comm/enlargement/report_2004/pdf/strategy_paper_en.pdf)



	Average annual amounts	
	in millions EUR	in thousands HRK
Currently available		
CARDS	63.0	475.65
Pre-accession		
ISPA	30.0	226.5
Phare	80.0	604.0
SAPARD	12.5	94.4
TOTAL - pre-accession	122.5	924.9
TOTAL (pre-acc. + CARDS)	185.5	1,400.55

Source: Authors' calculations based on different documents available at <http://europa.eu.int/enlargement>  
EXR EUR 1 = HRK 7.55

### CARDS Programme

A new programme called CARDS (Community Assistance for Reconstruction, Development and Stabilisation) was adopted by Council Regulation (EC) No 2666/2000 of 5 December 2000. The programme's wider objective is to support participation by the countries of the Western Balkans (Albania, Bosnia and Herzegovina, Croatia, Serbia and Montenegro, and the Former Yugoslav Republic of Macedonia) in the Stabilisation and Association process (SAP).<sup>6</sup>

Community assistance focuses on democratic stabilisation, economic and social development, justice and home affairs, assistance in public administration reform and implementation of the SAA, the environment and natural resources.

Through the CARDS programme, the European Commission has allocated a budget of €189 million to Croatia for the period 2002-2004, to support the country's efforts towards European integration<sup>7</sup>. Croatia received €60 million from the 2001 budget, which represents a more than threefold increase over previous years.

Ongoing EU support for Croatia under the CARDS programme was included in the analysis, since it is still not clear whether this will be replaced by pre-accession policy

<sup>6</sup> The Stabilisation and Association Process is the cornerstone of the European Union's policy in the region (the Western Balkans). It seeks to promote stability within the region while also facilitating its closer association with the European Union. A key element of the SAP for countries that have made sufficient progress in terms of political and economic reform and administrative capacity is a formal contractual relationship with the EU, which takes the form of a stabilisation and association agreement.

<sup>7</sup> The CARDS 2002-2004 Multiannual Indicative Programme for Croatia is given in the Annex, Table A1.

instruments, or will continue to be granted to Croatia until the end of 2006. The existing financial framework of CARDS in Croatia has been analysed, with average three-year amounts used in the impact analysis.

#### Pre-Accession Instruments<sup>8</sup>

In order to assist countries that have applied to become members of the European Union in carrying out the reforms required for membership and preparing themselves to benefit from EU funds upon accession, the EU provides financial assistance as part of its Pre-Accession Strategy through three different programmes: SAPARD, ISPA and Phare.

The SAPARD programme supports agricultural and rural development, and comes under the responsibility of the Directorate-General for Agriculture. The programme envisages implementation of four measures: (i) support for investments in agricultural holdings (33.5% of funds); (ii) support for investments in the food processing industry (38.3%); (iii) support for economic diversification of farms (tourism and crafts) (13.4%); and (iv) support for development of the rural infrastructure (13.7%). The remaining 1% of funds is designated for technical assistance. In the analysed scenario, 100% absorption of these funds is envisaged.

The second form of pre-accession support is the ISPA programme, which deals with large-scale investment support in the environment and transport. This programme is meant to be a predecessor to the type of investments carried out by the Cohesion Fund. As indicated by the ISPA reports for EU 10, about 54% of total expenditures are designated for investments in the environmental infrastructure. Most of the remaining support (45%) goes to investments in the field of transport, mainly upgrading the railway network.

The Phare programme applies to acceding countries and candidate countries from Central and Eastern Europe, and principally involves institution-building measures (with accompanying investments) as well as measures designed to promote economic and social cohesion.

As a candidate country, Croatia should benefit from all three pre-accession financial instruments. Taking into account the need to adequately prepare Croatia for accession,

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<sup>8</sup> Total average annual amounts of pre-accession funds distributed among the former ten candidate countries are given in the Annex, Table A2.

on 6 October 2004 the Commission recommended that €105 million (€80 million for Phare and €25 million for ISPA) be allocated to Croatia in 2005, and €140 million in 2006 (€80 million for Phare, €35 million for ISPA and €25 million for SAPARD).

If we compare the amount of funds allocated to countries that were previously eligible for such support (the former ten candidate countries) to those recommended for Croatia, the latter are seen to be as expected. Bearing this in mind, the amount of pre-accession support could be estimated on the basis of a comparison to these ten countries.

The allocation of funds to these countries was based on different geographical and economic indicators explained in several EU documents. These indicate that the allocation of ISPA and Phare funds is mainly based on a country's population and GDP per capita. For SAPARD fund allocation, the weights used are agricultural land area, farming population and GDP per capita. If we use these indicators for a correlation between Croatia and the former ten candidate countries, we find that Slovakia is the one most like Croatia. Consequently, the possible amount of Phare, ISPA and SAPARD funds for Croatia could be estimated by means of a correlation with Slovakia<sup>9</sup>.

The weights that could be used for projecting Phare and ISPA funds inflow are the average annual amounts of these funds per capita in Slovakia, while for SAPARD they are the average annual amounts allocated via this instrument per one hectare of agricultural land in Slovakia. Annual budgets could also be estimated, assuming that the EU's annual budget for these funds is flexible and can vary in small ranges, and that Croatia, as a candidate country, has a status equal to that of the ten former candidate countries.

The results of projections of these funds under the aforementioned assumptions are as follows. For ISPA, funds inflow amounted to €38 million per year, which is 20% larger than the recommended average two-year amount of €30 million. As the annual budget for ISPA was 1.040 billion Euros, and the annual amounts for candidate countries depended on the number of projects signed per country and the European Commission's estimate of eligible value, the total annual amount of the ISPA budget for candidate countries varied over a three-year period (2000-2003). Therefore, it has been assumed that variations of the projected figures could be expected based on changes in the annual ISPA budget.

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<sup>9</sup> See Grčić, Mrnjavac and Petković (2004, pp. 10-11).

The resulting average annual allocation of projected Phare funds is €54 million. The recommended average annual amount for a two-year period is €80 million. These figures differ by 32%, the recommended amount being larger probably because of Croatia's need for accelerated progress towards membership and economic and social cohesion, as well as institution-building.

SAPARD funding is projected at €8.7 million per year, based on the total area of agricultural land. As the share of agricultural employment and agriculture in the GDP using these indicators for projecting SAPARD funds is two times higher for Croatia, it is normal to expect the amount to be even higher. This is confirmed by the recommended annual allocation amount of €12.5 million for a two-year period.

This example of comparison with Slovakia's pre-accession fund availability yields an annual total of €100 million for Croatia, while the recommended amount is €105 million for 2005 and €140 million for 2006, for an average annual amount of €122.5 million. According to the estimate of inflows of funds presented and analysed here, it is logical to project post-accession funds on the basis explained in this section.

### 3.2 Financial Framework for EU - EU Funding

Following accession, new EU countries are entitled to various community funds. Most EU funding is not paid directly by the European Commission, but rather via the national and regional authorities of the member states. This is the case for payments under the Common Agricultural Policy as well as most payments under structural policy financial instruments (European Regional Development Fund - ERDF, European Social Fund - ESF, European Agricultural Guidance and Guarantee Fund - EAGGF and Financial Instrument for Fisheries Guidance - FIFG), which, in money terms, make up the great bulk of EU funding.

The main categories of Community expenditures are divided into headings; each of these headings carries an amount of appropriations and payment commitments for each year (see Table 4, which gives estimates of these expenditures for Croatia).

SOURCE	in millions EUR	in thousands HRK
EAGGF- Market measures	39.41	297,519.1
EAGGF- Compensatory Direct Aids	65.25	492,603.5
EAGGF - Rural development	83.43	629,896.5
Total heading 1	188.09	1,420,019.1
Structural Funds	170.42	1,286,701.2
Cohesion Fund	45.52	343,691.1
Total heading 2	215.94	1,630,392.3
TOTAL	404.03	3,050,411.4

Source: Authors' calculations based on data available from [http://europa.eu.int/comm/budget/pdf/financialfrwk/copenhagen\\_package/webtablesEN.pdf](http://europa.eu.int/comm/budget/pdf/financialfrwk/copenhagen_package/webtablesEN.pdf)  
EXR EUR 1 = HRK 7.55

For the analysis given in this paper, the 2004-2006 EU programming period was taken as the benchmark for projections of Community expenditures to Croatia.<sup>10</sup> Post-accession funds are projected using the same weights presented in the previous section for illustrative estimates of pre-accession funds. The average two-year (2005 and 2006) amount of EU budgetary resources for Slovakia was taken into consideration, with average annual amounts for Croatia being projected using the population ratio between Croatia and Slovakia.

The corresponding EU budget appropriations for payments under internal policies (heading 3) and the projected annual amount of EAGGF market measure expenditures were not included in this impact analysis.

As regards *Structural Funds*, EU assistance concentrates on a limited number of priorities and measures. The first priority is designated for 'promotion of the productive sector and competitiveness', and is to be delivered via five measures financed by the *ERDF*: (i) innovative environment; (ii) promoting the development of tourist destinations; (iii) improving the enterprise support environment; (iv) economic infrastructure; and (v) public services related to development of the economic infrastructure.

The second priority deals with 'knowledge, human resource development and employment', and will be delivered via four measures financed by the *ESF*: (i)

<sup>10</sup> The Financial Framework for Enlargement 2005-2006 - Indicative allocation of payment appropriations: Copenhagen Package, used as the basis for projections, is given in the Annex, Table A4.

developing and promoting active labour market policies; (ii) facilitating social inclusion; (iii) lifelong learning; and (iv) fostering entrepreneurship and adaptability.

The third priority is given to 'restructuring agriculture, forestry and fisheries'. It will be delivered via five measures financed from the Guidance section of the EAGGF and two measures financed from the Financial Instrument for Fisheries Guidance (FIFG). The *EAGGF Guidance*-assisted measures foreseen are: (i) improving processing and marketing of agricultural products; (ii) investments in agricultural holdings; (iii) diversification of agricultural activities and activities close to agriculture; (iv) investments in forests to improve the economic and ecological value of forests and (v) marketing of quality agricultural and food products. The *FIFG*-assisted measures foreseen are: (i) modernisation of existing fishing vessels and small-scale coastal fisheries and (ii) development of aquaculture, processing and marketing.

It is envisaged (from EU 10 Country Reports) that 55% of total public expenditures will be related to ERDF measures, with allocations to ESF, EAGGF Guidance, and FIFG measures amounting to 30%, 14%, and 1% of total public expenditures, respectively. These shares have been taken into consideration when estimating their effect on various sectors in terms of changing the final demand vector. The total amount of structural funds for Croatia is estimated to be €170.42 million.

Activities eligible for support from the *Cohesion Fund* are defined within an overall development strategy for transport and environment. The amount for which Croatia could be eligible, as estimated in this paper, is €45.52 million. This strategy provides coherent and integrated information about planned investments in the transport and environment sectors, and defines participation by the Cohesion Fund in these investments. Total expenditures from the Cohesion Fund attribute 50% to transport and 50% to environmental projects. The bulk of expenditures from the Cohesion Fund in the field of transport pertains to railways (62%), whereas investments in motorways and ports amount to 32% and 5%, respectively. Environmental investments from the Cohesion Fund pertain to waste management (49%) and water management (51%).

The *EAGGF* can be divided into three main components: *direct payments*, *market interventions* and *guarantee-type rural development measures*. The total estimated amount for Croatia under this heading is calculated at €188.09 million.

*Direct payments* are treated in the scenarios in a simplified way. It was decided that the analysis would simulate the two extreme options of fully decoupled payments (all direct payments go to household incomes in agriculture) and fully coupled payments (all payments go to investments in agriculture). These two extreme cases provide a framework which reveals the differing effects of coupled and decoupled payments.

Compared with previous reforms of the CAP, the introduction of decoupled payments<sup>11</sup> implies a radical change of instruments and a fundamental change in the institutional framework governing EU agriculture.<sup>12</sup>

*Market interventions* are also part of the *EAGGF - Guarantees*. These measures are about to be implemented within the framework of the Common Markets Organisation (CMO).

Certain rural development measures, i.e. the 'CAP Accompanying Measures', are allocated under the *EAGGF - Guarantees / Rural Development* heading. Considerable funds available for the implementation of these measures are allocated via the following: (i) compensatory allowances for farming in Less Favoured Areas – LFA; (ii) agro-environmental measures; (iii) early retirement schemes; and (iv) adaptation of farms to EU standards.

#### The Definition of Relevant Scenarios

The impact analysis starts with scenarios, which allow us to investigate the additional, or marginal, effect of each of the different scenarios and accession components. The scenarios represent one point in time and one special situation regarding fund availability, and the results derived by the I-O model show the separate impact of each such scenario on the current economic structure captured in the I-O table.

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<sup>11</sup> The CAP reform adopted by EU farm ministers on 26 June 2003 completely changed the way the EU supports its farm sector. Coupled direct payments were mainly oriented towards supporting agricultural production, and were strongly linked with the programme benefit and the decision on production volume i.e. market conditions. They have been replaced by the new CAP (decoupled direct payments), which is geared towards consumers and taxpayers, while giving EU farmers the freedom to produce what the market wants. Theoretically, decoupled payments do not change market returns and, therefore, do not favour investments in farming relative to off-farm investments. However, if farmers are facing financial stress or credit constraints, payments may stimulate investments which would not otherwise materialise, by providing farmers with the necessary liquidity or collateral.

<sup>12</sup> The data on CAP reform may be found at:

[http://europa.eu.int/comm/agriculture/capreform/index\\_en.htm](http://europa.eu.int/comm/agriculture/capreform/index_en.htm)

The scenarios performed in this analysis of the effects on economic development are as follows:

**Scenario 1 - CARDS**

- represents the current situation and includes only the inflow of CARDS funds;

**Scenario 2 - pre-accession assistance**

- takes the amount of pre-accession funds inflow into the impact analysis;

**Scenario 2a - Scen. 1 + Scen. 2**

- an alternative to Scenarios 1 and 2, including the cumulative use of pre-accession funds and currently allocated CARDS funds<sup>13</sup>;

**Scenario 3 - “partial absorption” of funds**

- this scenario assumes EU accession but a lower level of absorption of funds (in comparison to Scenario 4). Pre-accession support is omitted from this scenario since a country (region) cannot be eligible for support from both pre-accession and full-membership-related policy instruments.

*The assumed absorption levels are:*

*EAGGF - Guarantees: 0.85 direct payments - assumed to be fully coupled, 0.7 rural development (Guarantees); Structural Funds: 0.5 EAGGF Guidance, 0.5 ERDF, 0.5 ESF; Cohesion Fund: 0.5.*

**Scenario 3a**

- a variant of scenario 3 which assumes that direct payments are *fully decoupled*, and therefore the total amount is transferred towards the final demand of households;

**Scenario 4 - “full absorption” on accession**

- this is the most optimistic scenario, stemming from the assumption that all available funds will be absorbed by the country. This scenario does not take pre-accession funds into consideration, and the impact analysis refers to the effect of “post-accession” funds inflow on the current baseline situation. The direct payments are considered to be *fully coupled*;

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<sup>13</sup> By financing support to Croatia from pre-accession aid, the corresponding appropriations originally foreseen under the CARDS programme for 2005 and 2006 can be removed, but there are still ongoing projects under CARDS from previous years (2002, 2003 and 2004) that will be used during the programming period 2005-2006.



#### Scenario 4a

- this is a version of scenario 4, with the assumption that direct payments are *fully decoupled*.

##### 3.3.1 Sectoral Allocation of Funds Under Each Defined Scenario Increase of Final Demand

By now it has been made clear that when the output multiplier vector is calculated, the overall change in production due to a one-unit variation in the final demand can be quantified. In spite of restrictive assumptions, the I-O analysis represents an effective tool to quantify the impact on output and, by extension, on income and employment resulting from a change in final demand relative to a given sector. Therefore, for further analysis we require vectors of final demand. For each scenario the total change in final demand was calculated; the next step was the distribution of different EU expenditure typologies among sectors represented within the national I-O table.

Each policy instrument was allocated to the specific sectors towards which they are primarily oriented according to the main fund objectives (see Section 3.2). Concerning policy support to investments (i.e. structural funds), it was necessary to identify the sector's policy priorities and measures addressed to them. Then, using specific ratios from the EU's sectoral allocations for each instrument, the distribution of funds among sectors was completed.

When direct payments were considered, it was necessary to distinguish decoupled from coupled direct payments. In the first case, it was assumed that farmers would spend income buying goods and services or investing in other sectors. The simplest solution for allocating direct payments employed in this paper was to suppose that farmers would spend all their money buying goods and services. In the second case, it was supposed that all income would be spent on investment in the agricultural sector.

The estimated sectoral increase of final demand due to projected EU funds inflow is presented in Table 5 according to the relevant scenarios, while the distribution of funds among sectors per each policy instrument analysed is given in the Annex, Tables A5 - A6.

**Table 5. Projections of the change in final demand  
- specific scenarios for Croatia (FD)**

Sectors	Scenario 1	Scenario 2	Scenario 2a	Scenario 3	Scenario 3a	Scenario 4	Scenario 4a
1 Agriculture	0.00	3,208.75	3,208.75	150,773	135,799	199,827.4	182,210.5
2 Manufacture of Food Products	0.00	0.00	0.00	93,433	90,749	127,188.6	124,030.1
3 Textiles and Clothing	0.00	0.00	0.00	0	13,471	0.00	15,848.7
4 Wood Products	0.00	0.00	0.00	0	0	0.00	0.00
5 Chemical and Metal Products	0.00	0.00	0.00	70,541	60,587	85,579.8	73,868.4
6 Machinery and Motor Vehicles	0.00	30,195.28	30,195.28	117,656	94,847	153,748.7	126,914.6
7 Furniture	0.00	0.00	0.00	0	12,890	0.00	15,164.9
8 Other Manufacture	59,125.0	1,495.84	60,620.84	117,656	59,204	153,748.7	84,982.4
9 Electricity, Water and Gas	24,250.0	0.00	24,250.00	25,781	42,908	38,964.1	59,113.8
10 Construction	105,000.0	162,183.44	267,183.44	678,355	636,483	1,196,247.6	1,146,987.3
11 Trade and Hotels	18,750.0	0.00	18,750.00	4,066	27,368	8,132.0	35,545.8
12 Transport	0.00	101,925.00	101,925.00	132,639	117,211	235,439.9	217,288.4
13 Financial Services and Real Estate	0.00	21,866.69	21,866.69	156,278	199,481	302,477.4	353,304.9
14 Public Administration, Education and Health Services	265,375.0	604,000.00	869,375.00	127,659	132,054	251,538.1	256,709.5
15 Other	0.00	0.00	0.00	0.00	51,785	0.00	60,923.0
TOTAL	472,500	924,875	1,397,375	1,674,837	1,674,837	2,752,892	2,752,892

Notes: In thousands HRK.  
EXR EUR 1 = HRK 7.55

## 4 Results of the Impact Analysis

### 4.1 Effects on National Output Level

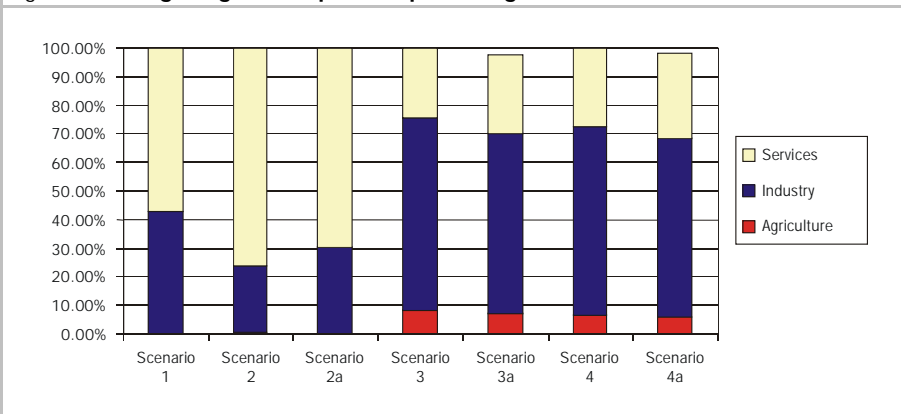
The most straightforward output of a scenario analysis with the I-O model is change in gross output by sectors. The main results representing change in gross output as a percentage of total effects for the main sectoral aggregates (agriculture, industry, services) are presented in Figure 1.<sup>14</sup>

This illustrates well the results in terms of the sectoral structure of total output change per each defined scenario.

The results suggest that in the pre-accession period an output increase will occur in the services sector. This is due to projected inflow of funds under the CARDS and Phare programmes and the objectives which these cover.

<sup>14</sup> More detailed results, i.e. change in gross output in absolute terms and the percentage of total effects for the main sectoral aggregates, are presented in the Annex, Table A7.

Figure 1. Change in gross output as a percentage of total effects



Source: Authors' calculations based on EU funds inflow defined in scenarios (see Annex, table A7).

After this period, possible accession brings a change in the structure of effects. A significant drop compared to pre-accession period occurs in terms of effects on services. The share of services in terms of the change in gross output decreases to half its initial value. The post-accession period shows an increase in the share of industrial output, with construction showing a similar share in industry's total output change. The highest change is in the share of agricultural output, which increases from zero to eight percentage points.

Besides an absolute increase of output compared to the year of the available I-O table, the model provides insight into relative changes in aggregate output. Results for the main sectoral aggregates are presented in Table 6, whereas more detailed results are presented in the Annex, Table A8.

Table 6. Simulation results: percentage changes in total output by policy scenarios

Sector	Scenario 1	Scenario 2	Scenario 2a	Scenario 3	Scenario 3a	Scenario 4	Scenario 4a
Agriculture	0.00%	0.02%	0.02%	1.10%	1.00%	1.46%	1.34%
Industry	0.23%	0.24%	0.47%	1.35%	1.25%	2.18%	2.07%
of which construction	0.86%	1.33%	2.19%	5.56%	5.22%	9.81%	9.40%
Services	0.47%	1.23%	1.70%	0.76%	0.86%	1.43%	1.55%
Other	0.00%	0.00%	0.00%	0.00%	0.19%	0.00%	0.23%
TOTAL	0.26%	0.50%	0.76%	0.97%	0.97%	1.61%	1.61%

Source: Authors' calculations.

As expected given the relatively limited change in final demand caused by the CARDS and ISPA, SAPARD and PHARE programmes, no considerable economic impacts were detected as a consequence of the pre-accession programmes co-financed by the EU (Scenarios 1, 2 and 2a). This resulted even under the unrealistic assumption of a 100% absorption of available funds. As a matter of fact, only the construction sector exhibited a significant (0.86% and 1.33%) increase of gross output (mainly due to large-scale infrastructure investment projects that would be supported by ISPA). The highest increase was shown by the service sector, due to the higher amount of funds allocated to such sectors, especially public administration, education and health services. The conclusion drawn from the results of these three vectors of output change is that the sectors with an important influence on overall economic performance are Public Administration, Education and Health Services; Construction; Transport; Electricity, Water and Gas; and Other Manufacture.

Taking into account a pessimistic assessment of the expected absorption capacity of various funds (Scenario 3), the projected increase in aggregate output is 0.97%. Performance by agriculture and industry is projected to surpass the aggregate output increase (1.10% and 1.35% respectively).

The results of post-accession inflow of funds with a full absorption level (Scenarios 4 and 4a) show an almost double increase in total output compared to partial absorption of funds. The highest increase is again anticipated to come from the construction sector, whose output is projected to grow by 9.81% as a consequence of EU public expenditures. Most of this is due to infrastructure investments supported by the Cohesion Fund.

If the direct payments concerned are fully decoupled (Scenario 3a and Scenario 4a), the results indicate that levels of total output increases are the same, but that they differ in terms of sector. Only the service sector exhibits a slightly higher output increase in Scenario 3a, while the others show a somewhat decreased output change. The situation in Scenario 4a is somewhat different. An increase is seen in service sectors compared to Scenario 4 with coupled direct payments.

## 4.2 Employment and Income Effects

Besides the impacts of the analysed budgetary transfers on output growth, this research was also extended towards an assessment of employment and income dynamics.

The reasoning behind this approach is based on the assumption that a change in output automatically also implies a change in labour input and, thus, in income. Since labour productivity may differ among various sectors, it may be expected that changes in labour input will behave correspondingly. However, this assessment contains some highly restrictive assumptions, such as no technical progress (implying constant labour productivity) and infinite elasticity of the labour supply; the reported results should therefore be regarded with great caution.

The projected effects on income and employment are presented in Table 7 in both absolute and percentage terms of change from the initial situation. Detailed sectoral percentage changes of income and employment are presented in the Annex, Tables A9-A10.

TOTAL Effects	Scenario 1	Scenario 2	Scenario 2a	Scenario 3	Scenario 3a	Scenario 4	Scenario 4a
Employment by persons	4,065.86	8,009.56	12,075.43	10,024.38	9,958.99	17,028.00	16,951.06
in %	0.41%	0.81%	1.22%	1.01%	1.01%	1.72%	1.71%
Income in thousands HRK	290,485.52	464,376.44	908,612.44	542,647.36	556,457.16	936,549.80	952,796.62
in %	0.46%	0.99%	1.45%	0.87%	0.89%	1.49%	1.52%

Source: Authors' calculations.

Average yearly inflows of pre-accession funds into the national economy generate increases in employment of 0.81% and in income of 0.99%, while the inflow of funds under Scenario 2a generates an increase in employment of 1.22% and in income of 1.48%. This shows that increased employment is actually accompanied by a slightly higher increase in income during this period.

Under the post-accession scenarios, these changes show a different pattern. The increase in employment is followed by an increase in income which is, however, somewhat lower, i.e. the reverse of the situation in the pre-accession period.

#### 4.2.1 Comparisons of Impact Effects Between Croatia, Slovenia and Romania

The results presented in the previous section can be compared to results in other countries involved in the aforementioned REAPBALK project. These comparisons have been made between only two different periods (scenarios), namely, one referring to pre-accession inflow of funds, and the other to full absorption of EU funds inflow, and pertain to the change of output in these countries.

Sector	Pre-accession assistance			Post-accession - coupled direct payments		
	Croatia	Romania	Slovenia	Croatia	Romania	Slovenia
Agriculture	0.02%	0.79%	0.11%	1.46%	11.61%	2.21%
Industry	0.24%	0.99%	0.43%	2.18%	5.22%	1.59%
of construction which	1.33%	43.05%	1.99%	9.81%	27.77%	5.97%
Services	1.23%	1.50%	0.10%	1.43%	9.28%	1.69%
Other	0.00%			0.00%		0.00%
TOTAL	0.50%	1.10%	0.28%	1.61%	7.01%	1.65%

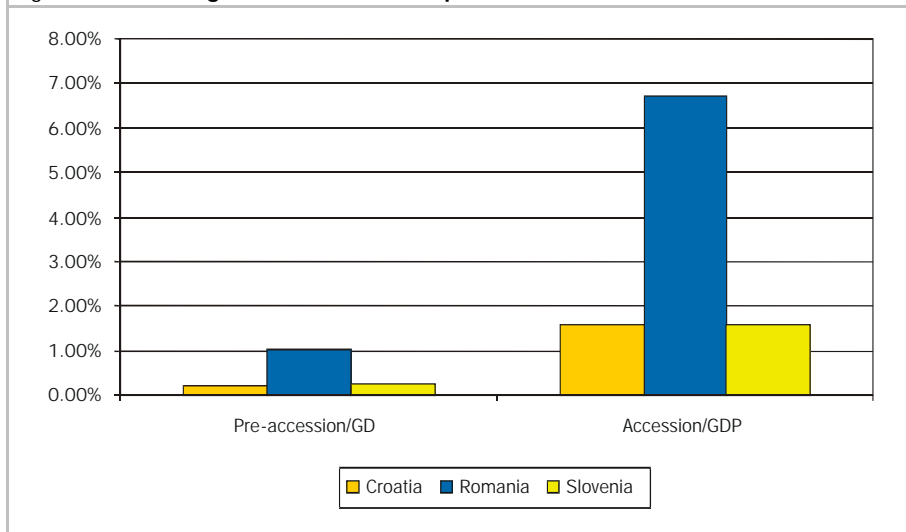
Source: *Impact Analysis of Different Scenarios, Deliverable no. 12a of REAPBALK research project.*

The results in Table 8 reveal that the influence on output change in Slovenia for the pre-accession period is almost two times lower than in Croatia. The higher output increase generated in Romania was expected due to the high level of annual inflow of funds from SAPARD and ISPA.

The post-accession period shows the same indices. Slovenia and Croatia show nearly the same increase in aggregate output change, while Romania shows a five times higher increase in total output compared to its initial one. This is understandable if we compare the relative annual amounts that Romania receives from EU funds to those available for Croatia and Slovenia.

The amounts allocated to these countries before and after accession follow the same distribution pattern. Figure 2 shows that the amounts of funds available to Croatia and Slovenia represent nearly the same proportion of their GDP, despite the fact that Croatia has a 50% lower GDP p.c. At the same time, this financial support constitutes a large share of the Romanian GDP, and therefore the expected impacts are much stronger. The explanation for such a difference lies in the fact that GDP is not the only indicator used for fund allocations.

Figure 2. **Percentage shares of EU funds per national GDP**



Source: Authors' calculations.

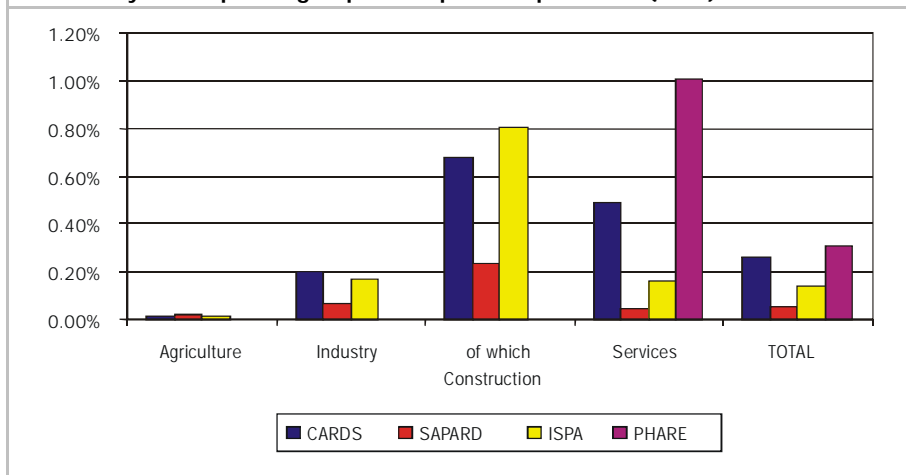
#### 4.3 Distribution Effects on Economic Variables by Policy Instrument

In order to estimate the magnitude of effects and their distribution among economic sectors, we have estimated the impact of individual financial mechanisms separately. This is especially useful in order to check the multiplicative effects of individual commonly financed policies.

##### 4.3.1 Distribution Effects of Pre-Accession Inflow of Funds

This section indicates what change of economic sector output can be expected as the result of a change in FD in total economy (new plan of FD) due to an individual financial mechanism under the Pre-Accession Strategy.

Figure 3. **Distribution effects on economic sector output by four separate groups of EU public expenditure (in %)**



Source: Authors' calculations.

The effects of pre-accession funds on sectoral output level vary according to different policy instruments. The CARDS programme has the highest impact on the change of output. In terms of sector, this is the period in which services exhibit the highest output increase, due especially to CARDS and PHARE funds.

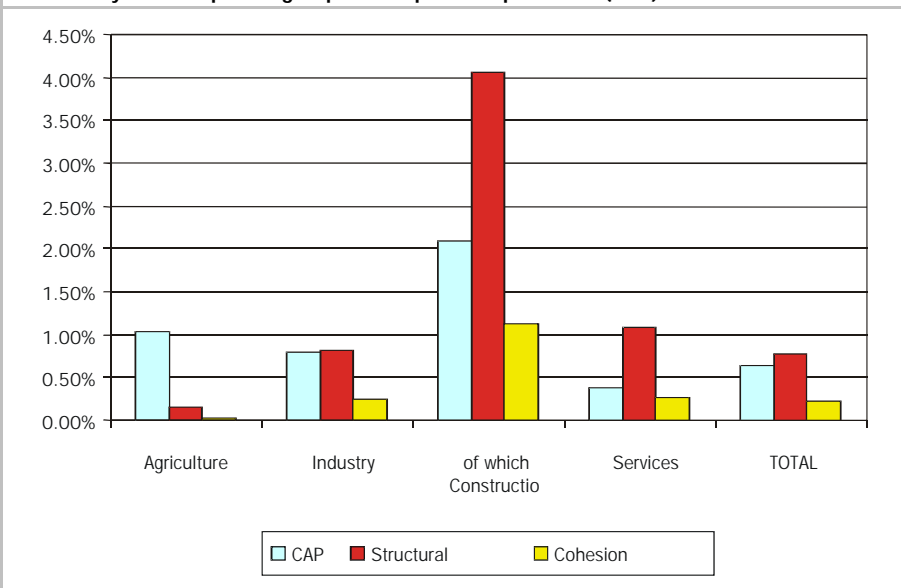
SAPARD funds, which are mainly oriented towards agriculture, impact the increased agricultural output level, but are too small to have a substantial influence on the total level of output increase. Their intensity is even higher in the industry and service sectors than in agriculture, reflecting SAPARD's objective of developing the rural infrastructure. The intensity of ISPA effects is highest in the industry sector, where construction shows the most benefits of the output increase.

#### 4.3.2 Distribution Effects of EU Funds Inflow

Following accession, Structural Fund expenditures show the strongest impact on increased total national output. Nevertheless, the magnitude of impacts on the overall output increase appears to be fairly similar for both CAP expenditures and Structural Funds (see Figure 4).



Figure 4. **Distribution effects on economic sector output by three separate groups of EU public expenditure (in %)**



Source: Authors' calculations.

However, there is a significant difference with regard to the sectors targeted by these two sources of EU expenditure. Structural expenditures bring the biggest impacts on output growth in the construction sector, while agriculture exhibits only a minor output increase, the agricultural output increase being induced mainly by CAP expenditures.

Considering the overall magnitude of output increase impacts due to Cohesion Fund inflows, the service sector appears to have the most favourable effects of expenditures under this instrument. However, industry also exhibits favourable effects due to Cohesion Funds, with construction showing the highest increase.

#### 4.4 Policy Implications - Remarks on the Potential Effect of European Funds Inflow on the National Economy

Following completion of this study, some policy implications of individual mechanisms are noticeable.

CARDS and Phare have similar objectives (institution-building and *acquis*-related investment) and thus a similar influence on the output increase is expectable.

ISPA provides financial support for investment in the areas of the environment and transport, in order to speed up acceding countries' compliance with European legislation in force in these two sectors, and brings the most favourable effects to the construction sector.

SAPARD aims to support efforts made by candidate countries to prepare for participation in the Common Agricultural Policy and the Single Market. This involves two major and explicit operational objectives:

- to help solve priority and specific problems in agriculture and rural development,
- to contribute towards implementation of the *acquis communautaire* (the entire body of Community legislation) concerning CAP and other agricultural priorities.

Therefore, its impact should not be noticeable only in the agricultural sector. The results show that it extends to effects on the industry and service sectors as well, especially because of the aforementioned SAPARD operational objectives.

The study of post-accession funds underlines the fact that operations oriented towards structural changes have the highest potential impact on the overall output increase. The analysis of CAP effects shows that investments in agriculture have to be made in correlation with investments in infrastructure and new technologies in productive sectors. Cohesion funding has a minor influence on industry output compared to structural funds, and exhibits the lowest distribution effects.

## 5 Conclusions

This paper has attempted to quantify the effects of EU funds on the national economy using an Input–Output methodology. Provided that the national I-O table has been estimated accurately enough, the theoretically implausible assumptions of this model are, in many respects, overshadowed by its empirical realism and simplicity. With this in mind, we can claim that this approach to modelling policy expenditures channelled into the economy through the final demand vector does indeed yield approximately true values for increases in sectoral output and employment. It cannot be argued that such an

inflow of funds into the economy, allowing for an appropriate level of absorption, results in positive multiplicative effects. Nor can it be argued that the effects of EU funds measured by an I-O methodology would indeed have roughly the same static impacts on certain sectors as those shown by our analysis.

In this respect, the I-O methodology and its results bring useful and valuable insights into the beneficial pattern of policy expenditures across various sectors of the national economy. Funds targeted at achieving greater economic convergence have been earmarked mainly for infrastructure. Considerable funds have been allocated to agriculture and, to a much lesser extent, to business support and investment in human capital. In other words, particularly high public investments are being channelled into labour-intensive sectors (construction, agriculture) which are characterised by relatively low labour productivity. A simulation of this expenditure through the methodological framework of an I-O model reveals that impacts are then allocated throughout sectors more equally.

The results suggest that the funds analysed here can make a significant contribution towards the national economy's overall output increase *following accession*, whereas this cannot be said of pre-accession funds. In this respect, the significance of pre-accession funds can be assessed primarily in terms of preparing implementation structures for the successful absorption of funds. Nevertheless, the favourable post-accession effects should also be regarded with some caution. Following accession, the structure of the national budget will change (limited public expenditures, 'transfer' of existing public investments and policies to the Community level). This can lead to somewhat less favourable impacts than those revealed by the model's results. Taking into account the strict convergence criteria that new member countries must comply with in order to enter the Euro Zone, the problem of successful absorption of EU funding can be additionally adversely affected by the need to provide adequate national funding.

Another comparative analysis (Section 4.2.1) of EU fund impacts on three different countries leads to the conclusion that EU post-accession funding has more favourable effects on output and employment dynamics in less developed countries. The reason for this lies in the great amount of funds targeted at countries characterised by a substantial need for fulfilment of *acquis* requirements and for financial support to help them towards greater European integration. In the case of Croatia, the analysis shows that funds for which Croatia could be eligible based on its level of development and the structure of its economy would not significantly change its level of development and its pace on the

path towards EU integration. The absorption capacity of the Croatian economy could additionally reduce these effects, and consequently they should be taken with caution.

Additional analysis regarding the magnitude and distribution of the effects of various sources of EU public expenditures (Section 4.3) also brings some curious results with a certain relevance to policy. This holds especially true in the case of agricultural expenditures, where the results (expectedly) show a relatively low impact on the overall output increase, but reveal, on the other hand, that only about 1-1.5% of this increase is attributable to agriculture. However, the high multiplicative effects of agricultural expenditures serve as a significant corrective to popular opinion about the low redistributive effects of agricultural expenditures.

It may be said that more substantial effects on economic development can be expected from changes in the economic structure which the I-O method is unable to estimate. Although the I-O approach can generate some imprecise results, the illustrative emphasis on the results in this paper can provide us with a descriptive basis for the future planning of development strategies.

We should recall EC President Romano Prodi's statement that "the pace of further movement of the Western Balkans countries towards the EU lies in their own hands, and will depend on each country's performance in implementing reforms, thus respecting the criteria set by the Copenhagen European Council of 1993 and the Stabilisation and Association Process conditionality". To make the achievement of full membership possible, it is imperative to develop an EU integration programme which would treat accession not only as a goal, but also as a means of carrying out all necessary reforms in the interest of Croatia's citizens.<sup>15</sup>

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<sup>15</sup> This approach is adopted in the annual National Programmes for the Integration of the Republic of Croatia into the European Union (NPPEU), which serve as a the central management tool for directing the Government's activities in the area of European integration, and represent a framework for combining annual planning, establishing short-term goals and monitoring the integration process in various sectors, in line with a strategic approach based on Croatia's obligations and its own capacities and national interests.

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## Annex

Priority	Programme	Annual allocations (€ million)			Total allocations
		2002	2003	2004	2002-2004
1. Democratic Stabilisation	1.1. Return of refugees and internally displaced persons	14.0	15.0	13.0	42.0
	1.2. Civil society	2.0	2.0	2.0	6.0
2. Economic and Social Development	2.1. Trade	3.0	2.5	2.0	7.5
	2.2. Investment climate	9.0	6.15	8.5	23.65
	2.3. Social cohesion (including Tempus)	6.0	8.85	6.0	20.85
3. Justice and Home Affairs	3.1. Modernisation of justice	4.0	4.0	4.0	12.0
	3.2. Policing and organised crime	2.0	3.0	3.0	8.0
	3.3. Integrated border management (Regional funding)	4.0	5.0	14.0	23.0
4. Administrative Capacity Building	4.1. Public administration reform	6.0	6.0	6.5	18.5
	4.2. National, regional and local development	2.0	3.0	3.0	8.0
	4.3. Public finance	4.0	2.8	3.0	9.8
5. Environment and Natural Resources		3.0	3.7	3.0	9.7
TOTAL		59.0	62.0	68.0	189.0

Source: [http://europa.eu.int/comm/europeaid/projects/cards/pdf/croatia\\_strategy\\_paper.pdf](http://europa.eu.int/comm/europeaid/projects/cards/pdf/croatia_strategy_paper.pdf);  
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COUNTRY	PHARE	ISPA	SAPARD
Slovenia	28.73	15.600	6.3
Bulgaria	136.57	104.000	52.1
Romania	260.07	311.7	171.0
Hungary	99.83	88.400	38.1
Slovakia	65.87	46.800	18.3
Czech Republic	82.40	70.200	22.1
Estonia	31.23	28.600	12.1
Latvia	35.57	41.600	21.9
Lithuania	74.00	52.000	29.8
Poland	409.93	348.400	168.7
TOTAL	1224.2	1107.3	540.4

Source: Countries' General Annual Reports on Pre-Accession assistance; authors' calculations of average annual amounts.

COUNTRY	Population in million		GDP in billions (current US\$)		GDP p.c. in PPS US\$		Area	
	2001	2002	2001	2002	2002	2003	Surface (in sq. km)	Agricultural (in hectares)
Slovenia	2	2	18.8	21.1	17.762	18.624	20.250	486.000
Bulgaria	7.9	7.9	13.6	15.6	6.366	6.639	110.910	5,498.000
Romania	22.4	22.4	39.7	44.4	6.976	6.842	238.391	14,874.000
Hungary	10.1	10.2	51.8	65.8	12.728	13.369	93.030	5,853.000
Slovakia	5.4	5.4	20.5	23.7	12.314	12.172	49.036	2,444.000
Czech Republic	10.2	10.2	57.2	69.6	15.300	15.200	79.000	4,282.000
Estonia	1.4	1.4	5.5	6.4	10.900	10.740	45.227	986.000
Latvia	2.4	2.4	7.7	8.4	8.300	8.450	64.600	2,540.000
Lithuania	3.5	3.5	11.9	13.8	8.400	8.108	65.301	3,489.000
Poland	38.6	38.6	183	187.7	9.500	9.530	312.685	18,397.000
Croatia	4.4	4.4	19.5	22.4	8.118	8.860	56.542	1,162.612

Source: State Statistical Bureau, EUROSTAT, Country profile table available at: <http://www.worldbank.org/data/countrydata/countrydata.html>

	Slovakia 2004-2006	Total EU 10 2005	Total EU 10 2006	Total (2 years)
1. Agriculture				
1a. - Common Agricultural policy				
Market measures	97.3	857.9	857.9	1,715.8
Compensatory Direct Aids	161.1	1,464.4	1,464.4	2,928.8
Total 1a.	258.5	2,322.4	2,322.4	4,644.8
1b. Rural development	206.0	1,772.7	1,772.7	3,545.4
Total heading 1	464.5	4,095.0	4,095.0	8,190.0
2. Structural allocations after capping	0.0			
Structural Fund	420.8	2,924.9	2,924.9	5,849.8
Cohesion Fund	112.4	1,081.0	1,081.0	2,162.0
Total heading 2	533.2	4,005.8	4,005.8	8,011.6
3. Internal policies	0.0			
Existing policies	77.9	708.2	708.2	1,416.4
Nuclear safety	30.0	105.7	105.7	211.4
Institution building	11.7	89.7	89.7	179.4
Schengen	31.8	270.6	270.6	541.2
Total heading 3	181.5	1,174.1	1,174.1	2,348.2
Total Appropriations for Payments	1,179.6	9,274.9	9,274.9	18,549.8

Source: European Commission 2003a: Financial framework for enlargement 2004-2006 - Indicative allocation of Commitment and payment appropriations - COPENHAGEN PACKAGE; available at [http://europa.eu.int/comm/budget/pdf/financialfrwk/copenhagen\\_package/webtablesEN.pdf](http://europa.eu.int/comm/budget/pdf/financialfrwk/copenhagen_package/webtablesEN.pdf)



<b>Sectors</b>	<b>CARDS</b>	<b>SAPARD</b>	<b>ISPA</b>	<b>PHARE</b>
Agriculture	0.00	3,208.75	0.00	0.00
Manufacture of Food Products	0.00	0.00	0.00	0.00
Textiles and Clothing	0.00	0.00	0.00	0.00
Wood Products	0.00	0.00	0.00	0.00
Chemical and Metal Products	0.00	0.00	0.00	0.00
Machinery and Motor Vehicles	0.00	30,195.28	0.00	0.00
Furniture	0.00	0.00	0.00	0.00
Other Manufacture	59,125.00	1,495.84	0.00	0.00
Electricity, Water and Gas	24,250.00	0.00	0.00	0.00
Construction	105,000.00	37,608.44	124,575.00	0.00
Trade and Hotels	18,750.00	0.00	0.00	0.00
Transport	0.00	0.00	101,925.00	0.00
Financial Services and Real Estate	0.00	21,866.69	0.00	0.00
Public Administration, Education and Health Services	265,375.00	0.00	0.00	604,000.00
Other	0.00	0.00	0.00	0.00
<b>TOTAL</b>	<b>472,500.00</b>	<b>94,375.00</b>	<b>226,500.00</b>	<b>604,000.00</b>

Source: Authors' calculations.

<b>Sectors</b>	<b>EAGGF guarantee DP coupled</b>	<b>EAGGF guarantee DP decoupled</b>	<b>EAGGF Guidance</b>	<b>ERDF</b>	<b>ESF</b>	<b>Cohesion Fund</b>
Agriculture	180,407.3	162,790.3	19,420.18	0.00	0.00	0.00
Manufacture of Food Products	112,250.0	109,091.5	14,938.60	0.00	0.00	0.00
Textiles and Clothing	0.0	15,848.7	0.00	0.00	0.00	0.00
Wood Products	0.0	0.0	0.00	0.00	0.00	0.00
Chemical and Metal Products	83,339.0	71,627.6	2,240.79	0.00	0.00	0.00
Machinery and Motor Vehicles	130,015.5	103,181.4	7,469.30	16,263.90	0.00	0.00
Furniture	0.0	15,164.9	0.00	0.00	0.00	0.00
Other Manufacture	130,015.5	61,249.2	7,469.30	16,263.9	0.00	0.00
Electricity, Water and Gas	31,494.8	51,644.5	7,469.30	0.00	0.00	0.00
Construction	364,208.6	314,948.3	74,693.00	585,500.5	0.00	171,845.6
Trade and Hotels	0.0	27,413.9	0.00	8,131.95	0.00	0.00
Transport	56,125.0	37,973.5	7,469.30	0.00	0.00	171,845.6
Financial Services and Real Estate	25,195.9	76,023.3	5,975.44	187,034.9	84,271.21	0.00
Public Administration, Education and Health Services	9,448.4	14,619.9	2,240.79	0.00	239,848.8	0.00
Other	0.0	60,923.0	0.00	0.00	0.00	0.00
<b>TOTAL</b>	<b>1,122,500.0</b>	<b>1,122,500.0</b>	<b>149,386.0</b>	<b>813,195.2</b>	<b>324,120.0</b>	<b>343,691.1</b>

Source: Authors' calculations.

**Table A7. Simulation results: total effects of the EU expenditures on the gross output in Croatia**

Sector	Unit	Scenario 1	Scenario 2	Scenario 2a	Scenario 3	Scenario 3a	Scenario 4	Scenario 4a
Agriculture	thous . HRK	0.00	5,642.18	5,642.18	265,115.60	238,785.07	351,371.10	320,394.01
	%	0.00%	0.33%	0.22%	8.11%	7.30%	6.47%	5.89%
Industry	thous . HRK	375,501.84	401,013.37	776,515.21	2,212,369.40	2,050,060.09	3,586,187.47	3,395,235.34
	%	43.13%	23.69%	30.29%	67.70%	62.65%	66.00%	62.43%
of which								
Construction	thous . HRK	232,324.74	358,849.76	591,174.50	1,500,938.64	1,408,293.51	2,646,837.40	2,537,843.13
	%	61.87%	89.49%	76.13%	67.84%	68.70%	73.81%	74.75%
Services	thous . HRK	495,082.32	1,286,062.40	1,781,144.72	790,284.37	896,187.71	1,495,740.68	1,620,332.85
	%	56.87%	75.98%	69.49%	24.18%	27.39%	27.53%	29.79%
Other	thous . HRK	0.00	0.00	0.00	0.00	87,131.65	0.00	102,507.82
	%	0.00%	0.00%	0.00%	0.00%	2.66%	0.00%	1.88%
TOTAL	thous . HRK	870,584.15	1,692,717.95	2,563,302.10	3,267,769.37	3,272,164.52	5,433,299.25	5,438,470.01
	%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Source: Authors' calculations.

**Table A8. The impact of the new FD on output level in national economy by sectors**

Sectors	Scenario 1	Scenario 2	Scenario 2a	Scenario 3	Scenario 3a	Scenario 4	Scenario 4a
1 Agriculture	0.00%	0.02%	0.02%	1.10%	1.00%	1.46%	1.34%
2 Manufacture of Food Products	0.00%	0.00%	0.00%	0.93%	0.90%	1.27%	1.23%
3 Textiles and Clothing	0.00%	0.00%	0.00%	0.00%	0.20%	0.00%	0.24%
4 Wood Products	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
5 Chemical and Metal Products	0.00%	0.00%	0.00%	0.29%	0.25%	0.36%	0.31%
6 Machinery and Motor Vehicles	0.00%	0.10%	0.10%	0.41%	0.33%	0.53%	0.44%
7 Furniture	0.00%	0.00%	0.00%	0.00%	0.44%	0.00%	0.52%
8 Other Manufacture	0.84%	0.02%	0.86%	1.68%	0.84%	2.19%	1.21%
9 Electricity, Water and Gas	0.74%	0.00%	0.74%	0.79%	1.32%	1.20%	1.81%
10 Construction	0.86%	1.33%	2.19%	5.56%	5.22%	9.81%	9.40%
11 Trade and Hotels	0.11%	0.00%	0.11%	0.02%	0.15%	0.05%	0.20%
12 Transport	0.00%	1.41%	1.41%	1.84%	1.62%	3.26%	3.01%
13 Financial Services and Real Estate	0.00%	0.20%	0.20%	1.44%	1.83%	2.78%	3.25%
14 Public Administration, Education & Health Services	1.32%	3.01%	4.33%	0.64%	0.66%	1.25%	1.28%
15 Other	0.00%	0.00%	0.00%	0.00%	0.19%	0.00%	0.23%
TOTAL	0.26%	0.50%	0.76%	0.97%	0.97%	1.61%	1.61%

Source: Authors' calculations.

**Table A9. The impacts of the new final demand on the national income**

Sectors	Scenario 1	Scenario 2	Scenario 2a	Scenario 3	Scenario 3a	Scenario 4	Scenario 4a
1 Agriculture	0.00%	0.04%	0.04%	2.04%	1.84%	2.70%	2.46%
2 Manufacture of Food Products	0.00%	0.00%	0.00%	0.89%	0.86%	1.21%	1.18%
3 Textiles and Clothing	0.00%	0.00%	0.00%	0.00%	0.22%	0.00%	0.26%
4 Wood Products	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
5 Chemical and Metal Products	0.00%	0.00%	0.00%	0.32%	0.27%	0.39%	0.33%
6 Machinery and Motor Vehicles	0.00%	0.12%	0.12%	0.48%	0.39%	0.63%	0.52%
7 Furniture	0.00%	0.00%	0.00%	0.00%	0.50%	0.00%	0.59%
8 Other Manufacture	1.12%	0.03%	1.15%	2.22%	1.12%	2.91%	1.61%
9 Electricity, Water and Gas	0.73%	0.00%	0.73%	0.78%	1.30%	1.18%	1.79%
10 Construction	0.92%	1.43%	2.35%	5.97%	5.60%	10.53%	10.09%
11 Trade and Hotels	0.09%	0.00%	0.09%	0.02%	0.13%	0.04%	0.17%
12 Transport	0.00%	1.37%	1.37%	1.79%	1.58%	3.17%	2.93%
13 Financial Services and Real Estate	0.00%	0.20%	0.20%	1.44%	1.83%	2.78%	3.25%
14 Public Administration, Education & Health Services	1.32%	3.01%	4.33%	0.64%	0.66%	1.25%	1.28%
15 Other	0.00%	0.00%	0.00%	0.00%	0.18%	0.00%	0.21%
TOTAL	0.46%	0.99%	1.46%	0.87%	0.89%	1.49%	1.52%

Source: Authors' calculations.

**Table A10. The impacts of the new final demand on the national employment**

Sectors	Scenario 1	Scenario 2	Scenario 2a	Scenario 3	Scenario 3a	Scenario 4	Scenario 4a
1 Agriculture	0.00%	0.03%	0.03%	1.42%	1.27%	1.88%	1.71%
2 Manufacture of Food Products	0.00%	0.00%	0.00%	0.97%	0.94%	1.32%	1.29%
3 Textiles and Clothing	0.00%	0.00%	0.00%	0.00%	0.20%	0.00%	0.24%
4 Wood Products	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
5 Chemical and Metal Products	0.00%	0.00%	0.00%	0.40%	0.34%	0.48%	0.41%
6 Machinery and Motor Vehicles	0.00%	0.21%	0.21%	0.84%	0.67%	1.09%	0.90%
7 Furniture	0.00%	0.00%	0.00%	0.00%	0.48%	0.00%	0.56%
8 Other Manufacture	0.86%	0.02%	0.88%	1.71%	0.86%	2.23%	1.23%
9 Electricity, Water and Gas	0.69%	0.00%	0.69%	0.73%	1.22%	1.10%	1.68%
10 Construction	0.91%	1.41%	2.32%	5.90%	5.53%	10.40%	9.97%
11 Trade and Hotels	0.08%	0.00%	0.08%	0.02%	0.12%	0.03%	0.15%
12 Transport	0.00%	1.13%	1.13%	1.48%	1.30%	2.62%	2.42%
13 Financial Services and Real Estate	0.00%	0.20%	0.20%	1.44%	1.83%	2.78%	3.25%
14 Public Administration, Education & Health Services	1.32%	3.01%	4.33%	0.64%	0.66%	1.25%	1.28%
15 Other	0.00%	0.00%	0.00%	0.00%	0.28%	0.00%	0.33%
TOTAL	0.41%	0.81%	1.22%	1.01%	1.01%	1.72%	1.71%

Source: Authors' calculations.

<b>SOURCE</b>	<b>Pre-accession assistance</b>		
	<b>Croatia</b>	<b>Romania</b>	<b>Slovenia</b>
SAPARD	12.5	171.0	11.45
ISPA	30	311.7	42.03
<b>TOTAL</b>	<b>42.5</b>	<b>482.7</b>	<b>53.48</b>
	<b>After accession - coupled direct payments</b>		
Structural Funds	170.42	1,327.00	100.62
Cohesion Fund	45.52	664.00	52.45
EAAGF direct payments	65.25	294.00	96.68
EAAGF rural development	83.43	808.0	94.05
<b>TOTAL</b>	<b>364.62</b>	<b>3,093</b>	<b>343.8</b>

*Source: Impact Analysis of Different Scenarios, Deliverable no.12a of REAPBALK research project; authors' calculations based on Relevant National and Regional Scenarios, the Deliverable no 11 of REAPBALK research.*

# **YES! (Young Economists' Session)**

# Monetary Transmission Mechanisms in Transition Economies

Maruška Čenić\*

## Abstract

This paper gives a historical and theoretical overview of the different channels of monetary transmission mechanisms in order to provide the necessary background required for the illustration of cross-country transmission mechanism differences. The specific details of transmission mechanisms of monetary policy in emerging economies are discussed in more detail in order to emphasize the relative importance of different transmission channels on the behavior of monetary policy, often aimed at different monetary targets. The paper encompasses the similarities and differences between monetary transmission in selected emerging economies with special reference to Croatia and in doing so, it addresses challenges that the central banks of transitional economies face in the context of different policies used.

**Keywords:** transition economies, monetary policy, transmission mechanism, central bank

**JEL Classification:** E31, E44, E52

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# 1 Introduction

The history of the debate concerning the impacts of the monetary policy on the economy is certainly very long. Views diverge even about the transmission process in individual industrialized nations, the subject of decades of theoretical and empirical research; the process in developing countries is even more uncertain. As more central banks of Central and Eastern Europe (CEE) move towards inflation targeting and prepare themselves for the entrance in the European Monetary Union (EMU), the knowledge of monetary policy transmission mechanisms becomes crucial for the appropriate design and implementation of the monetary policy.

The aim of this poster is to summarize the particular issues differentiating the analysis of monetary transmission in Central and Eastern Europe from the same analytical framework applied to developed economies. By doing so, the poster identifies specific aspects and questions regarding monetary transmission mechanisms that are relatively unexplored and need to be addressed in order to enhance the transmission process.

The poster starts with the categorization of channels of monetary transmission. Then the poster describes the transition economies framework in greater detail. A special paragraph is dedicated to alternative views in monetary transmission. Finally, the poster explains the differences between the existing analytical framework applied to developed economies and economies in transition by emphasizing important stylized facts and their particular influence on each transmission channel.

## 2 Monetary Transmission Channels

There are many categorizations of monetary transmission channels in the existing literature. Each channel that is specified in this poster has been subject to extensive academic debate. In this poster the approach given by De Bondt (De Bondt, 2000) is followed.

This categorization divides monetary transmission mechanism into five different channels as illustrated in Figure 1 presented in the poster. For the sake of simplicity, Figure 1 ignores the feedback mechanisms from real economy to monetary policy, the fact that different channels of transmission can be closely interrelated and the fact that different countries have a different mix of channels.

The first monetary transmission channel is called *direct monetary transmission*. An increase in money supply results in surplus of cash balances and over time in an expansion in aggregate spending. Direct transmission could also be viewed as a part of real balances effect which connects the monetary with the commodity sector (Handa, 2000).

The second group of monetary transmission channels consists of *interest rate channels*. The monetary authorities are able to directly control official interest rates, determining the money market rates, which in return affect aggregate spending by increasing or decreasing investment and consumption expenditures. Lower interest rates lead to lower cost of capital, especially important for investment decisions. Substitution effect favors current consumption over savings if interest rates decline while income effect affects disposable income and thus spending through the influence of interest rates on net wealth.

The first two channels have been thoroughly discussed in the literature over the years and their exact specification differs between different schools of economic thought.

Apart from the changes in money and interest rates, monetary policy decisions are transmitted into the real sector via *asset price channels* where asset prices are divided into exchange rate, equity (stock and bond) prices and real estate prices. Exchange rate channel during a monetary expansion leads to a decrease of domestic interest rates (relative to the foreign ones) followed by currency depreciation. This causes a rise in net exports and hence output. Tobin's  $q$  and wealth effects are important for other asset price channels. Tobin's  $q$  is defined as market value of the firm divided by the replacement cost of capital. Expansive monetary policy can raise the equity price, making Tobin's  $q$  of firms higher and cost of new capital relatively cheaper and thus boosting investment spending. The framework of Tobin's  $q$  can also be applied straightforwardly to other assets such as land and houses. The wealth effect implies that changes in monetary policy stance can affect the above mentioned asset prices, thus raising wealth of economic agents holding specific assets, which will in turn increase spending possibilities.

Relatively more recent channel discussed in the literature is called the *credit channel*. It focuses on financial market imperfections, namely asymmetric information phenomena, as an essential factor of propagation and amplification of initial monetary policy shocks. Frictions on credit markets create imperfect substitutability between different sources of financing. The cost spread between self-financing and credit, called the external finance



premium (EFP), reflects the cost due to financial imperfections. The higher the EFP, the lower the investment and consumption spending.

Bank lending channel supposes that monetary tightening which drains deposits from the banking system has a direct effect on banks loan supply. Apart from being forced to cut their loans supply, banks generally increase their lending rate which in turn raises EFP and slashes output. Increase in lending rates is a way in which banks try to compensate for borrowers inclination to exhibit stronger adverse selection and moral hazard behavior during monetary contraction. Balance sheet channel looks at credit channel of monetary transmission from a borrowers' perspective. Monetary policy expansion for example, strengthens borrowers' net worth by a rise in equity, house and land prices or by a rise in firms' cash flow caused by a decline in nominal interest rates. EFP declines at this point because higher net worth reduces opportunistic behavior by borrowers so that banks are willing to lower lending rates, thus affecting aggregate spending decisions.

The fifth and the last monetary transmission channel distinguished relates to expectations and uncertainty. The impact of monetary policy depends on the extent to which they have been anticipated by economic agents. Unanticipated changes will have relatively strong effects. Monetary authorities' control over monetary conditions is determined by their ability to influence market expectations, and in particular, inflationary expectations. The formation of expectations crucially depends on policy credibility, which takes a long time to build.

### 3 Monetary Transmission in Transition Countries; the Basic Framework

From the break-up of communist block in early 1990s until the present, Central and Eastern Europe countries have undergone a full spectrum of monetary policy setups, including different nominal anchors and balances between rules and discretion that have been introduced across the region. This was done in the specific transition environment characterized with many structural changes along with the building of market economy institutions, the creation of two-tier banking system, gradual adoption of prudential standards and turbulent political processes. So when we place categorization of transmission mechanisms of monetary policy described above in a transitional context, the uncertainty about how this context will affect transmission process increases, while conclusions drawn from comparing industrialized with CEE countries have to be taken

with much caution. The transitional framework differs so much that some of the channels specified in Figure 1 presented in the poster are probably still precluded from existence. Following this line of discussion the logical question follows: Are monetary transmission channels the same for industrialized and transition economies and if no, how different are they? Is the standard transmission mechanism analysis able to give satisfying answers that can be used as guidelines for effective conduct of monetary policy in transition economies and what are some of the special conditions shared across the region that could undermine or prevent effective monetary policy transmission? The following section of this poster will try to address these issues.

#### 4 Treatment of the Money Supply Variable

The debate on how exactly money affects the economy is as old as the history of economic thought. Without getting into complexities of the issue, I will address only small part of academic discussion that revolves around the issue of endogeneity of money. The mainstream economics tries to investigate the effects of money on the economy partially through the analysis of monetary transmission channels, whereby taking Figure 1 or some similar categorization of monetary transmission channels as granted. Under existing monetary transmission mechanism theory, supply of money is thus considered exogenous, under direct control of central bank and the posited arrow of causation goes from central banks' induced changes in the money base, to changes in intermediate variables such as interest rates, credit or exchange rate to changes in prices, output, employment or wages. Even the name "monetary transmission mechanisms" seem to reflect the exogenous money supply (Moore, 2001; Dow, 1996). This theoretical approach is the result of an even more fundamental issue: neoclassical omission to integrate money in a satisfactory way into general equilibrium analysis. The comparative statics applied to general equilibrium system starts the analysis with real exchange economy into which money is introduced as separable variable (Dow, 1996). One of the propositions brought in order to reexamine this linear, one-way transmission process is that the supply of money could be endogenously credit driven or that they can depend much upon the way we treat investment and savings functions, instead of being exogenous (Moore, 2001).

Since, virtually every analysis on monetary transmission conducted so far in CEE, including Croatia, was exercised according to neoclassical methodology, resulting with little or ambiguous proof of existence of any effective channel of monetary transmission,

having methodological alternatives in this case could be useful, by providing additional methods to answer many unanswered questions.

Claiming (as in case of many studies done in CEE) that as we move through time and business cycles, the robustness of models will increase, provides no real comfort, since the same methodology cannot often provide a clear answer in developed economies where shortness of time series is not an issue.

## 5 The Causes of Differences in Monetary Transmission Between Developed and Transition Economies

Some authors like Ganeev et al. (Ganeev et al., 2002) claim that after more than a decade of reforms, the environment in which monetary policy was conducted was far from even approximating neoclassical conditions. So with respect to formal analysis of monetary transmission in CEE countries two important observations need to be emphasized.

The first is that some specific constraints may render traditional policy tools applied in CEE less effective than a neoclassical environment would suggest. During transition, the institutions which are important for monetary transmission are underdeveloped by definition, while processes like budgetary deficits, the collapse of the financial system, euroization, and inflationary expectations linked to exchange rate movements could hamper the transmission process if they were at times dominant.

The second observation is that transition is a very dynamic phenomenon, subject to constant qualitative changes resulting in structural breaks in the time series, making available data unreliable. This occurrence could in turn undermine the efficiency of analysis conducted under any methodological approach, not just the neoclassical one.

In the next section, the poster discusses in greater detail some factors that might influence the monetary transmission process.

## 5.1 Euroisation, Currency and Asset Substitution

Available empirical evidence implies that the both currency substitution and unofficial euroisation in CEE countries are rather high (Feige, 2002; Aarle and Budina, 1995; Piontkivsky, 2003).

The higher the level of currency substitution in a country, the less effective the traditional set of monetary policy tools at the disposal of respective central bank. Actions of the monetary authorities pertaining to money market interest rates, reserve requirements and refinancing may in turn have negligible effect on inflation and output in comparison with the actions aimed at influencing the behavior of agents with the respect to currency structure of their assets.

Asset substitution phenomenon can drastically affect the real estate price if the exchange rate were to change, thus resulting in uncontrolled shocks to asset channel of monetary transmission.

Broader phenomenon encompassing both currency and asset substitution is known as euroisation. Unofficial euroisation is important phenomenon for most of the CEE countries; with the highest in Croatia, followed by Romania, Ukraine and Russia (Billmeier and Bonato, 2002; Piontkivsky, 2003).

The transmission process mechanism in a eurised system will depend not only on the substitutability between domestic and Euro assets, but also on substitutability between domestic Euro and foreign Euro assets, considered as less than perfect in transition economies due to the higher risk associated with uncertainty. The lower the substitution between domestic Euro and foreign Euro assets, the less the monetary transmission channel will resemble that of a non-eurised economy and monetary transmission process will therefore have less predictable and effective results (BIS Policy Papers, 1998). Besides affecting the efficacy and predictability of the monetary transmission process, high level of euroisation can determine the choice of a monetary target (Piontkivsky, 2003), thus limiting the decision freedom of central bank and can also as has happened in the Croatian case, create balance sheet mismatches and credit quality shocks (Kraft, 2002) and domestic demand shocks (BIS Policy Paper, 1998). Also, when domestic residents are net debtors to the rest of the world, as is the case in many emerging countries, a large appreciation of exchange rate may lead to improved balance-sheet positions that could give rise to expansion of domestic demand which is larger than the

relative price effect of appreciation that would tend to reduce domestic demand for relatively more expensive domestic goods (BIS Policy papers, 1998).

### 5.1.1 Effects on Monetary Transmission Channels

Given the relatively high levels of unofficial euroisation in CEE economies one would expect a great exchange rate pass-through on prices. However, previous studies have not shown such a relationship (Darvas, 2001). Studies focusing on determining whether exchange channel could affect real sector variables through monetary transmission channels still need to be done.

Considering Croatia's record of extensive level of euroisation (Croatian economy is the most euroised economy amongst CEE countries), one could expect an even greater exchange rate pass-through on prices and output. Especially since the estimates obtained from study done by Friege (Freige, 2002) show higher level of both currency substitution and unofficial euroisation for Croatia than for Argentina (country known for its chronic lack of confidence in monetary authorities) which originated before Croatia attained its monetary independence.

However, existing studies (Kraft, 2002; Billmeier and Bonato, 2002) show no evidence of exchange rate pass-through on consumer prices and only a small exchange rate pass-through on producer price, thus implying an ineffective exchange rate channel in Croatia.

Finally, sudden Kuna depreciation would worsen banks leverage ratios if positions are held unheeded, and would also raise the level of credit defaults due to the foreign currency indexation of extended credit and pronounced moral hazard and adverse selection problems, which the banks would offset by raising lending rates and credit supply cut, thus affecting aggregate spending and output through credit channel of monetary transmission.

Overall, there has been very little interest in academia to investigate euroisation in greater detail, currency and asset substitution phenomenon and especially how they can affect monetary transmission process and even alter its results.

## 5.2 Inflation and Inflation Expectations

Many emerging countries suffered or are still suffering from high inflation. In many cases, when experiencing high and variable inflation, exchange rate changes were viewed as a signal of future price movements, thus linking exchange rate movements with inflationary expectation through indexation of wages, rents and prices. In such a potentially volatile environment, even minor changes in monetary policy stance that would affect exchange rate might in turn produce real effects that are opposite to those conventionally expected by monetary authorities. A loosening in monetary policy through exchange rate depreciation, if it prompts concerns of a new surge in inflation, may lead to sharp increases in prices, all but the very short-term interest rates, decline in equity prices and hence output reduction. So in these countries loosening of monetary policy, followed by mutually-reinforcing surges in inflation expectations and exchange rate depreciation can have contractionary effect, not expansionary, which would seem more logical on first sight (BIS Policy Papers, 1998; Lang and Krznar, 2004). Not only can these situations produce aggregate demand shocks, they might also result in significant aggregate supply shocks. For example, a loosening of the monetary policy through or followed by depreciation of the exchange rate can result in supply-side shock through an increase in domestic currency import costs and hence induce firms to raise their domestic producer prices even in absence of any expansion of aggregate demand. On the other hand, wages and prices could move even before movements in import costs find their way through the cost structure, affecting aggregate demand and finally output. Obviously, inflation expectations have to be kept in mind while deciding on monetary policy actions.

### 5.2.1 Effects on Monetary Transmission Channels

Firstly, when inflation is high and variable, the level of real interest rates becomes very uncertain, thus diminishing the importance of interest rate channel in monetary transmission mechanism. Also, if inflation expectations are high and volatile, it might be difficult to identify which part of interest rate reflects the real interest rate (thus affecting interest rate channel) and which part is the inflation risk premium. Furthermore, in a highly inflationary environment, the maturity of financial instruments shrinks and long-term, non-indexed assets disappear. In this context, asset prices channels of monetary transmission become much less important. Thirdly, both reductions in banks deposits and

desire by banks to match asset-liabilities maturity, severely restricts the role of credit channel in financing consumption and investments.

While examining inflationary expectations one must remember that every country is a separate case. Most of the CEE countries have successfully managed to stabilize inflation. Those who moved to inflationary targeting are probably managing to eliminate inflationary expectations from the minds of economic agents. Those who experienced high inflation in the past and are still trying to regain the credibility of central banks policies by choosing a nominal exchange rate anchor or target some other monetary variable probably might have latent expectations still in place. The exact timing of the transition from latter to former is still not clear (BIS Policy Paper, 1998). Inflationary expectations, working through expectations channel can have a drastic impact on certainty of monetary transmission of the country in question. Giving general definitions and conclusions about expectations channel of monetary policy transmission is an ungrateful task, since every country has its own, somewhat specific, expectations models according to which economic agents base their behavior on. That could also explain why academic research in this field is very scarce.

### 5.3 Financial Market Development

One of the single biggest challenges for CEE countries is the development of financial markets. Vast academic research that has been done in this area often highlights significant differences between industrialized countries financial markets as opposed to transition countries (Piontkovsky, 2003). Financial and real estate market responses to monetary policy are likely to be particularly uncertain in emerging markets economies, where financial markets tend to be shallower and less competitive. Shallow financial markets result in higher transaction costs and bid-ask spreads, thus making the cost of debt and equity for the firms significantly higher. In addition, small group of players can often move the market. Market participants may have less experience in pricing assets correctly and less access to timely and accurate information on firms seeking financing (BIS Policy Papers, 1998). Lack of transparency in transition economies which are bank oriented might especially hurt bank lending relationships, since borrowing is very difficult to monitor in such a context. The resulting moral hazard and adverse selection behaviors give rise to financial accelerator mechanism, that in theory runs through the credit channel of monetary transmission (Bernanke, 1995) which can in turn cause

asymmetric effects of monetary policy transmission over the business cycle and across different groups of lenders and borrowers.

### 5.3.1 Effects on Monetary Transmission Channels

Underdeveloped financial market of a country reduces the degree of freedom that its central bank has at its disposal. In that case, monetary authorities cannot than use asset price channels (wealth channel and Tobins q effect) which assume economies accustomed to direct capital financing, because in transition economies this channel is still precluded from existence. Since firms generally borrow from banks, not from financial markets, while households do not typically invest their savings in financial market instruments, monetary impulses can not be transferred to prices or real variables trough asset prices channel. On the other hand, credit channels in transition economies should, following this line of reasoning, be amplified because asymmetric information phenomenon is probably more pronounced and harder to control. Financial sector structural problems can have strong influence on the interest rate levels in the economy, with Croatia as a perfect example (Lang and Krznar, 2004). Not only do interest rate deformations prevent us from knowing much about monetary policy stance, but also such deformations preclude interest channels of monetary transmission from working at all. Ganev et al. (2002) also point out that in situations where financial market is illiquid, constant large deficits (often run by governments in emerging economies) could in turn result in interest rate hikes that would leave monetary authorities with no real control over interest rate pass-through on private investments.

BIS study concludes that even if the channels of monetary transmission are stable and well understood, the great volatility of financial market conjoined with macroeconomic performance volatility may loosen the linkage between monetary policy impulses and future economic outcomes.

## 6 Conclusion

Emerging market specificities greatly condition the analysis of monetary transmission mechanism process. The differences between industrialized economies and emerging economies are at times so great that the same monetary policy actions can result in completely different economic outcomes. Constant changes in the economic structure and greater macroeconomic volatility make the mix of transmission channels changeable



and uncertain, while specific condition that exist in emerging economies greatly affect the workings of the individual channels.

Therefore, it is clear that any dogmatism concerning how monetary policy works would be misplaced. The channels of monetary transmission continue to evolve, in case of transition economies, in unexpected ways. Policy-makers need to keep alert to these changes, while researchers should continue their line of inquiry in the direction of many complex factors influencing the effectiveness of monetary policy transmission.

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# Minimum Mean Variance Portfolio of Croatian Stocks

Tanja Broz\* and  
Tomislav Ridzak\*\*

## Abstract

The purpose of this paper is to apply and test the concept of minimal mean variance models to Croatian market. The minimum mean variance models are one of the core ideas behind modern portfolio theory. These types of models are based on a trade-off between risk and return. We are going to apply and test the model using data for Croatian securities. The idea is to form a sensible portfolio using theoretical postulates of minimum mean variance portfolio models. Furthermore, we are going to compare the returns on our portfolio with the market returns. Then we will conclude whether it is possible and sensible to apply this model on small market with short history, as is the case with the Croatian market. The stocks that will be taken into consideration will be chosen according to liquidity criteria. So, we are not including stocks that are traded irregularly, but stocks that have some liquidity and transparency.

**Keywords:** capital market, portfolio, risk, return

**JEL Classification:** C29, G11

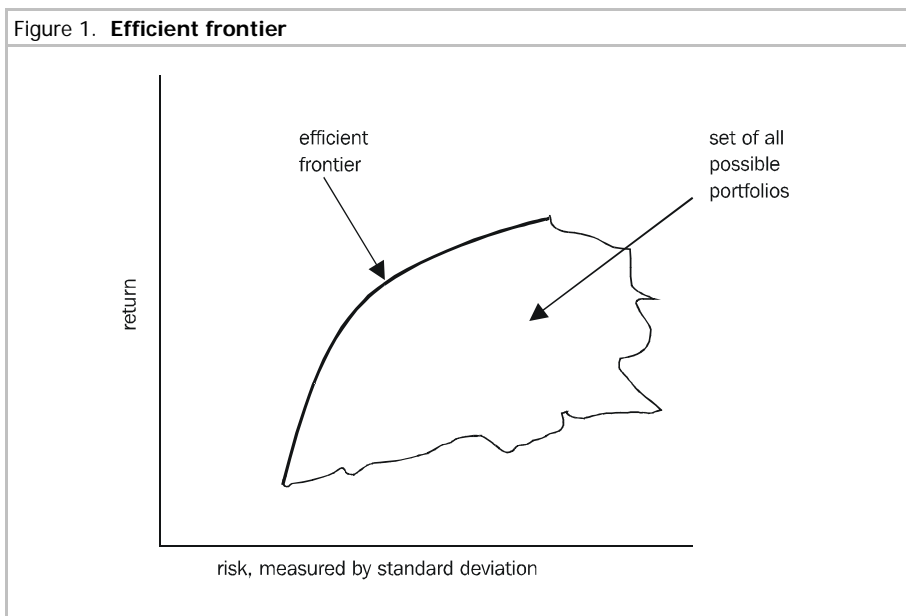
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# 1 Theory Behind the Calculations

*Efficient frontier* was first discovered by Harry Markowitz in Portfolio selection (Markovitz, 1952). The portfolios on an efficient frontier have certain special properties. For a given level of return, the portfolio on the efficient frontier has the lowest possible risk. And vice versa, for a given level of risk portfolio on efficient frontier has the highest possible return.



Source: Markovitz (1952) adapted by the authors.

The efficient frontier can be found using algorithms used by Elton and Gruber (Elton and Gruber, 1995). We are not going to rewrite them here, but just state their basic theoretical postulates.

In the simplest case, where there is no **constraint on short sales or risk-less lending and borrowing** the idea is to maximize the function:

$$\theta = \frac{R_p - R_f}{\sigma_p}, \text{ subject to the constraint } \sum_{i=1}^n x_i = 1,$$

Where:  $R_p$  is average return on portfolio  
 $R_f$  is risk free rate  
 $\sigma_p$  is portfolio's variance  
 $x_i$  weight of asset i in portfolio

and  $\sum_{i=1}^n x_i R_i = R_p$

By maximizing the function for varying  $R_f$  we can trace out the entire frontier. If we do **not allow short sales**, but still allow risk-less lending and borrowing, there is one additional constraint:

$x_i \geq 0$  for all i.

Our goal for this research is to make optimal risky portfolio from Croatian stocks and to see whether it performed better than market portfolio (we used CROBEX index as market portfolio). Croatian market is very small compared to the developed markets, so it is interesting to see how the portfolio theory applies to Croatia.

## 2 Stocks Selection Process

We chose the most liquid 18 stocks from both Zagreb and Varaždin Stock Exchange. Due to the Law on public firms, introduced in 2003, companies that have more than 100 shareholders or more than 30 million kuna were forced to list their stocks on the stock exchange. For this reason, some companies that were very interesting to investors became listed. The interest for these stocks can be seen from their trading volumes as well as from rise in stock prices. However, this event also constrained our research because our time series became rather short. Since some of the companies that we chose became listed only in the first half of 2003 we had to take all stock prices from that period in order to calculate correlation and covariance matrix. Still, we had to leave out the stock with the second highest turnover in first half of 2004 - Adris stock - due to short time that this stock has been listed on the Zagreb Stock Exchange. Also we had to leave out Varaždinska bank, because this bank was merged with Zagrebačka bank and its stocks stopped trading on the stock exchanges (1 stock of Zagrebačka bank was exchanged with 8 stocks of Varaždinska bank), Kerametal because there was only one transaction in the first half of 2004 and due to that transaction Kerametal ended in the first ten most traded stocks. Similar to this stock was Maraska, which had only a few big transactions on the Varaždin Stock Exchange. As an approximation of market portfolio

in Croatia we used CROBEX index (the official index of Zagreb Stock Exchange stocks), which we used to compare with our calculated optimal portfolio.

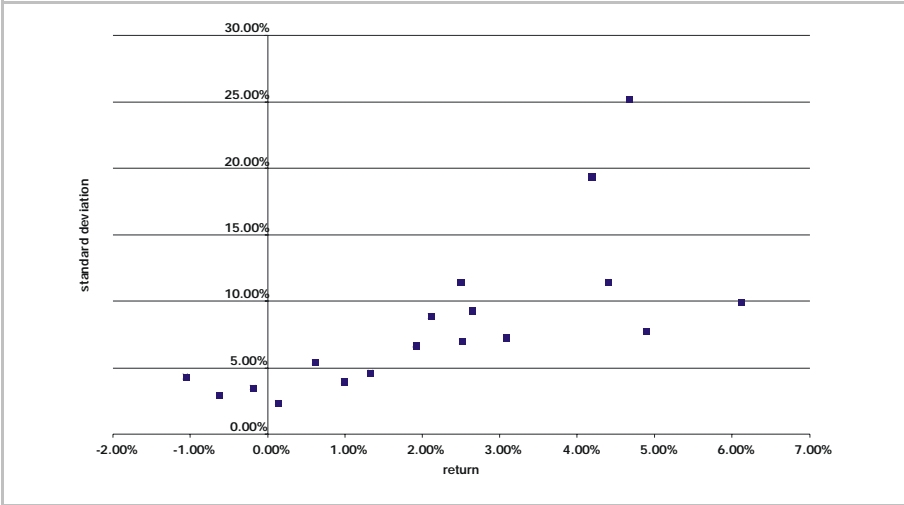
Table 1. **Stocks from Zagreb and Varaždin stock exchange that we used**

<b>Name of the company</b>	<b>Ticker</b>
Croatia osiguranje	CROS-R-A
Elka	ELKA-R-A
Končar	KOEI-R-A
Kraš	KRAS-R-A
Privredna banka Zagreb	PBZ-R-A
Plava laguna	PLAG-R-A
Pliva	PLVA-R-A
Podravka	PODR-R-A
Zagrebačka banka	ZABA-R-A
Sunčani Hvar	SUNH-R-A
Karlovačka banka	KABA-R-A
Rivijera Poreč	RIVP-R-A
Istraturist	ISTT-R-A
Proficio	PRFC-R-A
Dom holding	KORF-R-A
Slavonski ZIF	SLPF-R-A
SN Holding	SNHO-R-A
Ericsson Nikola Tesla	ERNT-R-A

### 3 Calculation

The data used was for the 16 months from which we calculated average monthly returns, standard deviations, and correlation and covariance matrixes. We took end of the month stock prices from March 2003 until June 2004. In order to get optimal portfolio we needed to chose risk free assets and therefore we chose 3 month Treasury bill from the end of June 2004, which was then 3,95 percent.

Graph 1. Return versus standard deviation for historical data of 18 stocks



Next step was finding weights of stocks in optimal portfolio from historical data. Using Mathematica 5.0 we calculated weights for unconstrained optimal portfolio, but since in unconstrained optimal portfolio it is allowed to short sell and long buy stocks, and in Croatia it is not possible to short sell stocks, we decided to use only constrained optimal portfolio in our analysis. We used Excel spreadsheets for this constrained portfolio optimisation. Optimal weights that we calculated did not pay attention on a discrete number of stocks, so these portfolio weights would serve best for investment funds.

Table 2. **Weights of stocks in the constrained optimal portfolio**

Ticker	Weight
CROS-R-A	14.5%
ELKA-R-A	15.2%
KOEI-R-A	0.9%
KRAS-R-A	1.2%
PBZ-R-A	6.0%
PLAG-R-A	12.7%
PLVA-R-A	2.4%
PODR-R-A	3.2%
ZABA-R-A	0.3%
SUNH-R-A	1.4%
KABA-R-A	0.2%
SNHO-R-A	12.4%
KORF-R-A	0.3%
PRFC-R-A	1.1%
ERNT-R-A	6.6%
SLPF-R-A	12.5%
RIVP-R-A	8.8%
ISTT-R-A	0.0%

Average monthly return for optimal portfolio was 3.58 percent and standard deviation 3.94 percent (one point at the efficient frontier, with risk free rate of 3.95 percent). CROBEX had a lower average monthly return of 0.6 percent and slightly lower standard deviation of 3.25 percent. After that, we calculated the price of a single portfolio unit from the beginning of the period (March 31 2003) until the end of the period (June 31 2004) and we found out that price of our portfolio unit in the beginning of period was 490.5 HRK and in the end was 795.1 HRK, which translates to 62.1 percent increase in 16 months. Meanwhile, CROBEX increased by 8.5 percent.

Table 3. **Prices of constrained optimal portfolio and CROBEX index (historic data)**

Date	Price of the optimal portfolio unit at the end of each month	CROBEX
31.3.2003	490.5	1056.3
30.4.2003	499.2	1120.3
30.5.2003	720.9	1147.3
30.6.2003	650.6	1161.2
31.7.2003	693.3	1137.3
29.8.2003	732.4	1169.1
30.9.2003	642.7	1093.2
31.10.2003	691.8	1141.4
28.11.2003	761.9	1187.6
31.12.2003	784.8	1185.1
30.1.2004	800.0	1197.6
27.2.2004	800.7	1177.3
31.3.2004	747.0	1160.8
30.4.2004	768.6	1175.5
31.5.2004	747.5	1136.5
30.6.2004	795.1	1146.5
Overall return	62.1%	8.5%

After calculating the data for historic period in order to find out which portfolio to 'buy', we moved on to see 'future' performance. Since the time period was so short, we left only two months to track performance of portfolio in the 'future'. We assumed that we bought our portfolio on July 1 2004 and we tracked the performance of portfolio on a daily basis until August 31 2004. Average daily return in this period was 0.39 percent, while CROBEX's average daily return was 0.11 in the same period. Standard deviation was 1.04 and 0.82 percent, respectively. The price of one unit of our optimal portfolio at the beginning of period was 796.2 (July 1 2004) and in the end (August 31 2004) was 846.4, which is a 6.3 percent increase in this two month period or 44.3 annualized. CROBEX increased in the same period by 4.7 percent or 31.7 annualized.



Changes in portfolio prices and CROBEX can be seen on Graph 1.

Graph 2. Prices of single portfolio unit and CROBEX transformed in base indices

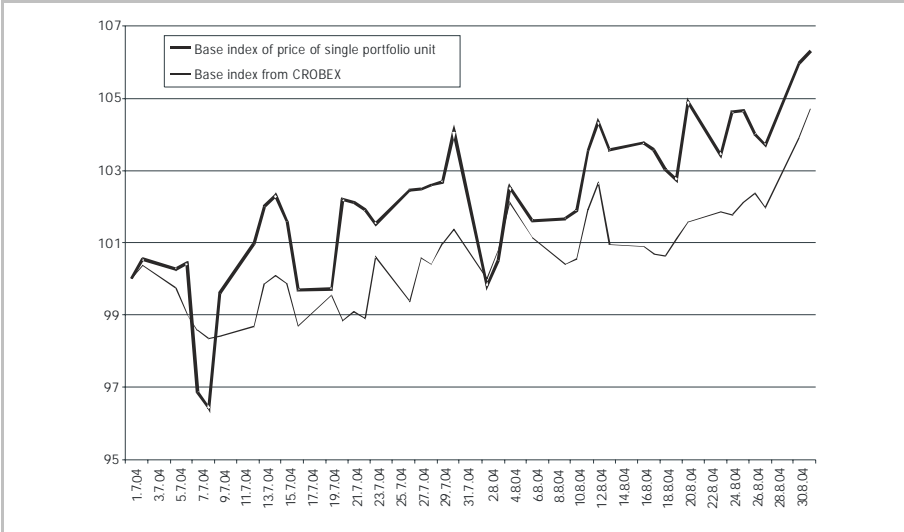


Table 4. Prices of constrained optimal portfolio and CROBEX index ('future' data)

Date	Price of single portfolio unit	CROBEX
1.7.04	796.2	1171.6
2.7.04	800.5	1175.8
5.7.04	798.4	1168.8
6.7.04	799.6	1159.9
7.7.04	771.3	1154.9
8.7.04	767.6	1152.2
9.7.04	793.1	1153.0
12.7.04	804.1	1156.3
13.7.04	812.2	1170.1
14.7.04	814.6	1172.6
15.7.04	809.0	1170.0
16.7.04	793.8	1156.2
19.7.04	794.0	1166.2
20.7.04	813.8	1157.8
21.7.04	813.1	1160.9
22.7.04	811.5	1158.5
23.7.04	808.2	1178.5
26.7.04	815.7	1164.3
27.7.04	816.0	1178.5
28.7.04	816.9	1176.4
29.7.04	817.7	1182.9
30.7.04	828.6	1187.6
2.8.04	794.7	1171.7

3.8.04	800.4	1180.8
4.8.04	816.5	1196.4
6.8.04	809.1	1185.0
9.8.04	809.4	1176.3
10.8.04	811.2	1178.0
11.8.04	824.3	1194.1
12.8.04	830.8	1202.6
13.8.04	824.8	1182.8
16.8.04	826.3	1182.1
17.8.04	824.6	1179.5
18.8.04	820.4	1179.1
19.8.04	818.1	1184.7
20.8.04	835.3	1190.0
23.8.04	823.4	1193.3
24.8.04	833.0	1192.4
25.8.04	833.3	1196.3
26.8.04	828.0	1199.4
27.8.04	825.8	1194.8
30.8.04	843.6	1217.4
31.8.04	846.4	1226.7
Overall return	6.3%	4.7%

As can be seen, our optimal portfolio had higher return than market portfolio. But, as return is not the only measure of portfolio performance we used the Sharpe measure. We got 0.37 for optimal portfolio and 0.13 for CROBEX, which shows that our portfolio performed better in this two month period than the market average (the optimal portfolio has higher risk premium return per unit of total risk than CROBEX).

## 4 Conclusion

The idea behind this work was to use well-known theory and to apply it on data for Croatian stocks.

Since we had only 16 monthly data, for the reasons explained in the text, it is questionable whether this model is applicable to Croatia. In our opinion this is too short of a time series to bring about any valid conclusions. Nonetheless, while we were working on this paper we developed a sound understanding of theory behind the Markowitz's portfolio selection process, and learned how to use it on real data. For the purpose of this work we managed to develop a Mathematica program for unconstrained case, but for the constrained case we had to use Excel's solver function. In the future we will try to find the way to solve constrained optimization problem with Mathematica and compare it with Excel results.

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# Well-being and EU Integration

Dávid Takács\*

For some time in the economic literature well-being is more and more often used instead of welfare. While welfare refers primarily to material issues, well-being is a more complex approach to measure an individual's quality of life. The paper's main goal is to estimate the consequences of Hungary's EU accession in terms of people's subjective well-being. In the absence of up to date data I could only rely on objectively measurable economic indicators, changes in every-day life circumstances and expectations about integration in the analysis. On the other hand, I intended to provide an insight into the field of the so-called economics of happiness. I refer to the development of utility theory that is closely connected with welfare economics or more precisely its shift toward the economics of well-being.

**Keywords:** subjective well-being, welfare economics

**JEL Classification:** F02, I31

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# 1 Introduction

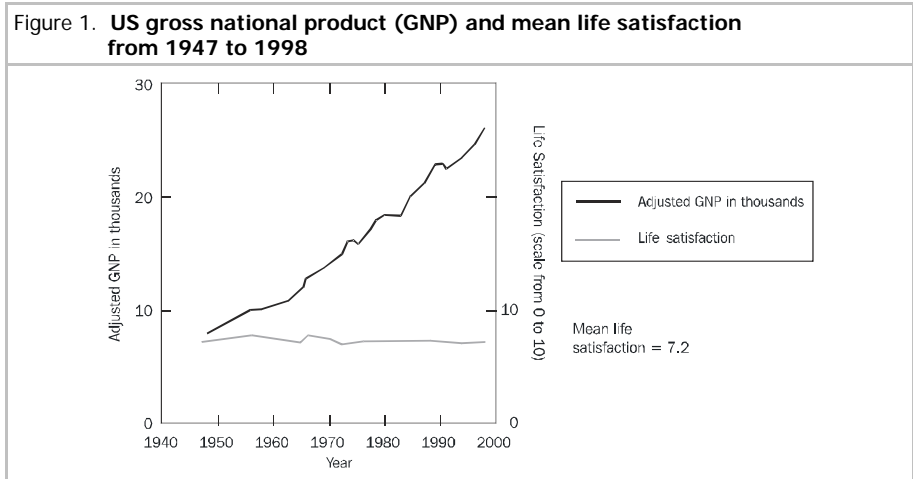
May 1, 2004 saw Hungary and nine other accession countries joining the European Union, which means that one of the major objectives of Hungarian politics and nation after the change of the system has been fulfilled. In their every-day life people tend to talk and speculate about the consequences of the membership. Some are looking forward to it rather optimistically while others express their doubts. So what kind of changes are we going to encounter? Do these changes make us better off? What kind of difficulties are we going to have to cope with? Such questions are very up to date nowadays. In this paper I am focusing on perhaps the most important question that people might ask: does integration make us happier or not? I consider this question from the point of view of economics. According to this, happiness is an economic term and can be (or at least its factors can be) measured usefully. This specific field of economics – the well-being studies or the economics of happiness – is debated and developing rapidly. There are no clear-cut conceptions of happiness or methods of measuring it and new scientific achievements come to light very often. Nevertheless, a distinction must be made between two approaches to happiness. One tries to measure happiness by objective criteria while the other is totally based on subjective self-reports of individuals. In this paper I am presenting the two different conceptions on the example of accession in the course of a comparative analysis. The focus of this work remains in Hungary. Because of the small distance in time there are very few data that could be used for evaluation. Therefore most of my assumptions are based on expectations.

## 2 Welfare vs. Well-being

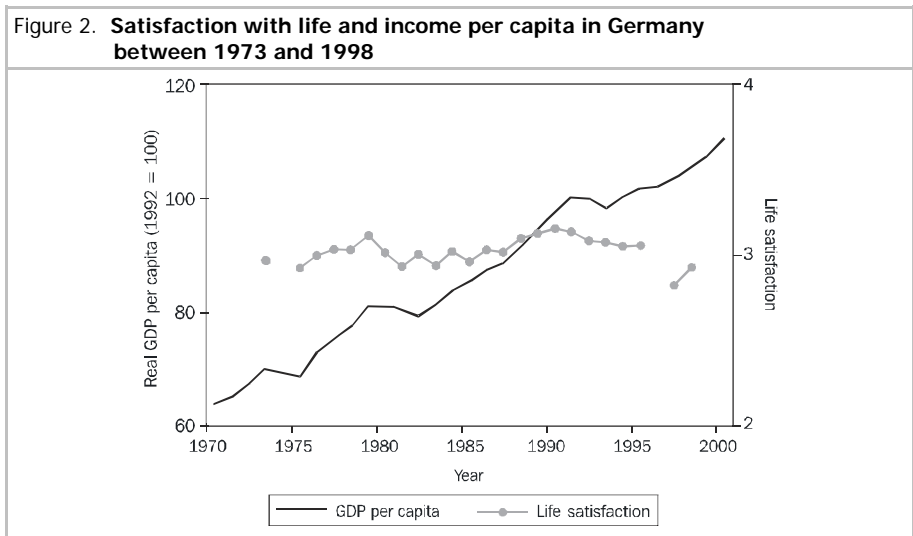
The most robust finding of the well-being research is that while the national income of the developed countries in the last fifty years increased rapidly the overall life satisfaction of people did not change at all.

These and similar facts moved scholars to develop new concepts other than just considering economic indicators to assess people's quality of life. One of the most important new approaches of that kind is the concept of subjective well-being (SWB). Measurement of SWB is based on retrospective self-reports of the subjects about their entire life or a longer period of their life. As Diener points out: subjective well-being (SWB) refers to how people evaluate their lives, and includes variables such as life satisfaction and marital satisfaction, lack of depression and anxiety, and positive moods

and emotions (Diener, Suh, and Oishi, 1997). There are three important hallmarks of SWB: 1. it covers the entire range of well-being from agony to ecstasy. 2. SWB is defined in terms of the internal experience of the respondent. 3. SWB focuses on longer-term states, not just momentary moods. SWB is a wide-spread method of estimating the quality of human life, statistics of SWB have been made for decades. SWB serves as a proxy for assessing individual utility (experienced utility, see later). In the next sections we take a look at the same question from the utility theory perspective.



Source: Diener and Seligman (2004).



Sources: Eurobarometer, Penn World Tables and OECD.

### 3 Theoretical Framework

The central theme of this paper is happiness. Considering happiness from the economist's point of view, utility is the basic term to think of. Taking utility in a broader sense, as utility is attached not just to a concrete event but to a certain period of an individual's life, we come to subjective well-being. Other social studies have played a significant role in developing the concept of subjective well-being. The latter can be measured by standard surveys: the subjects give subjective evaluations according to questions like: to what extent are you satisfied with a certain event that extends over time or a period of your life?

Some psychological results urged Kahneman and Tversky to come up with a new concept of subjective well-being: the so called objective happiness. They argued that the above mentioned concept of well-being was based on a memory or it was measured by a memory-based method. This also means that evaluation is always made retrospectively. For this concept of measuring happiness they used the term "remembered utility". Instead of that Kahneman et al. introduced a method that is based on real time measures which they called a "moment-based approach". This led to the concept of experienced utility. With the extension of the latter they came to the so-called objective happiness.

A very important finding of Kahneman et al. is that the values of remembered utility measured by a memory-based method and the values of experienced utility measured by a moment based method very often do not coincide with each other. They provided an exact evidence for that by means of a number of clinical experiments. The reason for such deviation is that the human mind applies such heuristics that are able to distort the subjects' retrospective evaluation of a particular event to be evaluated. According to the preceding, it is possible that when comparing two different periods (sequences) of pleasure and pain the first one may prove to be worse in terms of experienced utility measured moment by moment, but at the same time this first event is preferred according to a memory-based method because of its greater remembered utility. Thus a situation that is ranked better objectively can be ranked behind subjectively (or vice versa). This paradox – identified by Kahneman et al. – urged them to develop a concept of objective happiness in order to evaluate longer periods of time by a moment-based method. This much more objective way of measuring utility could be used instead of or besides the conventional concept of subjective well-being.

That leads to the phenomenon of the so-called treadmill effects. One of the most interesting findings of the well-being research is that life circumstances – which can be measured more or less objectively – make only a small contribution to the variance of an individual’s happiness. Inherited personal characteristics and psychological traces play a much more decisive role in the subjective well-being. This also means that people tend to attach a great effect on utility to significant changes in their life circumstances but this change in utility is diminishing after a period of adjustment, which is the essence of treadmill effects. Formerly the term “hedonic treadmill” was used. According to that, the adaptation level of an individual follows the change in life conditions. Simply put, people get used to the new conditions. Opposed to that, Kahneman et al. have introduced the term satisfaction treadmill where an improvement of life circumstances is followed by an increase of the aspiration level of the individual. So after a period of time the experienced utility of an event that has a higher objectively measured value is falling back to a normal level of utility.

To observe treadmill effects, an event is needed that has a great effect on people’s lives or at least is expected to have such a great effect. In such a situation the human mind works according to the so-called snapshot model. That means that one mentally creates a representative moment and estimates its utility. This utility is then projected to every moment of the event or to a longer period of time. In most cases the moment of change stands for the representative moment (the snapshot) which is crucial in estimating the global utility of the event or a longer period of time. Such an event can be winning the lottery, moving to another place or joining the European Union.

In this paper the EU integration is regarded as a “snapshot”, as an event of utmost importance. On the one hand, there is no question that accession is a huge event in our nation’s history. But on the other hand, doubts arise as to whether May 1 can be used as a representative moment. One of the reasons for these doubts is that people might think that integration affects the country on the social level rather than on the individual one. This can be accepted to some extent because most of the consequences actually occur on the social level (like harmonizing law and standards, participating in the EU decision making process, common policies etc.) and people are not directly affected by them. But on the one hand, there are consequences that have a direct effect on particular groups of individuals. Let us think of e.g. passing the border more easily, people involved in foreign trade who do not have to pay customs duty or entrepreneurs selling EU flags. On the other hand, there are social or macroeconomic consequences that affect people directly as well. Free trade within the Union affects prices, as a member of a greater



economic integration our national economy encounters a number of consequences which sooner or later affect people's economic situation. Thus it can be stated that accession is affecting people's lives both indirectly and directly. Another reason for doubts is that expectations of Hungarians towards the EU are rather ambivalent. It has to be emphasized that expectations are not unanimously positive. Generally people anticipate favorable changes in the long term but there are fears as well in people's mind concerning job security, prices, etc. To sum up, there is no doubt about the great significance of accession, and therefore it can be examined as a good example of a potential satisfaction treadmill and also as a good example to demonstrate the above mentioned paradox of the well-being studies, i.e. the fact that objectively and subjectively measured values of subjective well-being do not always coincide.

Considering the methodology of the well-being studies, it must be stated that the above mentioned objective happiness is only a theoretical category and not a concise approach that can be measured in practice. Nevertheless, testing of the basic principle – deviation of objective and subjective measures – can be realized. Another problem is that observing treadmill effects takes time: years or at least months. Macroeconomic and subjective well-being statistics concerning the period after May 1 are not yet available. Despite these problems, the comparison of objective facts that influence subjective well-being and scientific expectations, economic forecasts about these with subjective expectations about well-being after accession can be made without harming the essence of that particular well-being paradox.

## 4 Assessment of Well-being: An Objective Approach

According to the conception of my paper, well-being has two sides. First there are the objective factors which determine an individual's well-being, but there is also the other side, the subjective one which "overrules" the objective side. Thus a certain combination of objective factors can be evaluated differently by different individuals.

Let us take a look at the objective factors. First of all the country's macroeconomic indicators should be considered. Hungary's leading statistical agency (KSH – Hungarian Central Statistical Office) has just released its latest study about the country's economic situation in the first quarter of 2004. The report is enthusiastic. The GDP in the first quarter of this year was 4.2 per cent higher than in the same period 2003. This result goes significantly beyond the most optimistic expectations as well. Moreover, what is also

very important is that this economic boost is not consumption based but is due to expansion of investments and export. Certain points need to be emphasized. This kind of growth seems sustainable because it is based on investment and export. This is also supported by the fact that road construction has also increased, which gives reason for optimism because one of the most important factors of economic development in the 1990s was the motorway construction. Both exports and investment has increased by 19 per cent.

Only a modest increase can be registered in terms of domestic consumption. Another very important fact – which has a more obvious effect on well-being – is that real wages have also kept growing. The first quarter of this year has also seen a 20 per cent increase of investments in the economic sector concerning real estate and flat building, which is of similar importance as the preceding. Unemployment has decreased except among the group of young people between 15-24 years of age. In connection with the above mentioned, it has to be stressed that investments in the field of social insurance have also increased.

Finally the question of prices has to be considered. The reason why prices were left behind is that the inflation statistics for May are already available. Consumer prices were 7.6 per cent higher in May than a year earlier and almost 1 per cent (0.9) higher than in April, which has been this year's inflation peak so far (experts anticipate decreasing inflation in the next period). The reasons for that peak are independent from EU integration. The two main factors are the increasing prices of oil and seasonal foods.

With respect to prices it has to be noted that this has been one of the most sensitive issues in connection with the economic consequences of accession. A significant fear of increasing prices due to integration was noticeable (see later) among citizens. After May 1, price changes can be seen in food markets. The price of imported branded spirits has unambiguously decreased because of abolishment of the serious custom duties. Also, the prices of milk, cheese, flour and cooking-oil have declined as a consequence of the EU accession because of cheaper import products.

Another very interesting finding concerning inflation after accession has to be highlighted. It is almost like a self-fulfilling prophecy. As people expect prices to go up they tend to buy all the necessary goods earlier. The expanded consumer demand causes inflation. As a result prices do really increase.

Taking into consideration further consequences that can be evaluated objectively, we come to the extended mobility of labour. Despite the restrictions of a number of older EU member-countries, Hungarian citizens find it easier to take a job in the EU. According to the Employment Office in Hungary which deals with EU issues, about 40-60 people request information about working in the EU every day, while there are 22,000 vacant jobs in the older member countries (18,000 in Great Britain), primarily for truck drivers, cooks, butchers and people involved in the health service.

Hungary, like other joining countries, has access to EU funds. According to the National Development Agency, more than 100 tenders have already been completed successfully.

Apart from economic consequences, other factors have to be taken into account as well. A truly pragmatic matter is the passing of the border. As usual there are always two sides of the coin. The spokesman of the border guards said that passing the EU border is becoming quicker and easier. But difficulties do appear, at least in the short term, if drivers take the wrong lane - they have to get used to the new order. On the other hand, crossing the non-EU borders takes more time and inconvenience as a result of preparing for the Schengen system that will be introduced there later.

A much more sublime matter is that Hungary can take part in the EU decision making process. From May 1 our representatives can vote in the EU Council and as a result of the EU Parliament elections in June Hungary can delegate 24 members to the European Parliament.

After a brief survey of the objective factors of well-being of Hungarians after accession, we may conclude that there is no need for anticipating any significant change that would make us worse off or at least there are no signs of such negative tendencies yet. Consequently, an improvement of the subjective well-being of people living in Hungary is to be expected in the future.

## 5 Assessment of Well-being: A Subjective Approach

In the following we take a look at the subjective factors of well-being of Hungarian citizens: how they evaluate subjectively their own situation after EU accession. As mentioned earlier, the latest Hungarian subjective well-being surveys are not yet available. Nevertheless, subjective expectations about EU membership can be detected according to the results of the recent public opinion surveys.

In this respect – the subjective one – the picture is a bit more ambiguous, as will be seen later on. The general attitude of Hungarians towards their EU membership is positive in absolute terms and relative to the other joining countries as well:

- 45 per cent think that EU membership is a good thing, 32 per cent are neutral and 15 per cent think it is a bad thing.

*Source: Gallup Market Research Company*

The situation changes a bit if we take into account the global expectations of Hungarians about the country's economy after accession.

- 15 per cent of Hungarians think that the country's economic situation will improve in the next 12 months, 31 per cent think that it will not change significantly and 47 per cent expects a worsening.

*Source: Gallup Market Research Company*

Seeing these results, the above mentioned ambiguity becomes obvious: people generally think of the EU integration as a positive thing, but this is not really reflected in the economic expectations. This is very interesting knowing that the expected economic conditions play a decisive role in judging the consequences of the EU accession or any other event. Let us therefore take a look at a detailed analysis of economic expectations.

Negative expectations have been recorded concerning prices. According to recent public opinion surveys (March 2004), 72 per cent of Hungarians anticipated that prices would increase after accession. Nevertheless, the trend is positive because the same figure was 77 per cent six months earlier and 86 per cent a year earlier.

<b>Table 1. Do you agree that prices will rise after accession?</b>			
<b>Percentage of answers that agree</b>			
	<b>March 2003</b>	<b>October 2003</b>	<b>March 2004</b>
Rise of prices	86	77	72

*Source: GfK Market Research Institute.*

Concerning unemployment, 28 per cent anticipate better conditions for job security. The statistics are similar in terms of the percentage of people expecting growing unemployment. The figure is about 50 per cent and it has been stable over time. Hungarians are also pessimistic about the standard of living: only 28 per cent think that it

will be better (with similar questions, the figures of different research companies range from 22 to 28 per cent). That is all about the pessimistic economic expectations.

As opposed to the preceding, 63 per cent think that economy will grow faster after accession. Moreover, for the following question the index of positive opinion is 155 (maximum 200): During the five years following the accession of your country to the EU, do you expect your own economic situation to improve or deteriorate?

A direct effect of the accession – a rather positive one – can be observed in connection with the consumer confidence index, which is increasing after two years of deterioration.

Time of survey	Consumer's confidence index
June 2002	197
October 2002	192
December 2002	183
March 2003	175
June 2003	171
September 2003	155
December 2003	146
March 2004	172

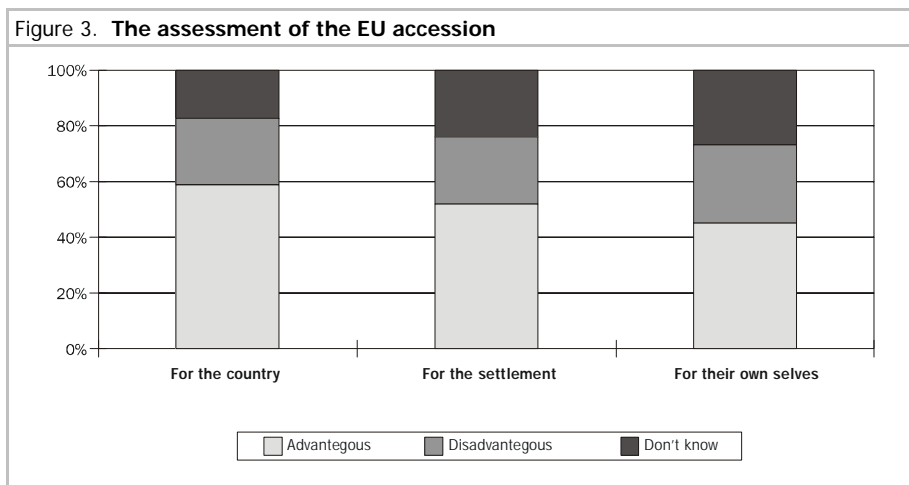
Source: GfK Market Research Institute.

Concerning some characteristics of Hungarian expectations about the accession, it can be stated that younger generation is generally more optimistic, which is not a great surprise. Another remarkable feature of this issue is that people of higher qualifications have more optimistic expectations about the Union. This can be clearly seen in the table below:

Question	8 years of Elementary or less	Vocational school	GCSE / High school diploma	College, university	National average
During the five years following the accession of your country to the EU within a year, do you expect your own economic situation to improve or deteriorate?	142	155	161	176	155

Source: GfK Market Research Institute.

The results to be shown next may resolve – at least to some extent – the above mentioned ambiguity about the accession. Surveying the general assessment of the integration, researchers found an interesting continuum of expectations ranging from neutral to rather optimistic. People think that integration is advantageous for the country as a whole. They think it is less advantageous for their settlement (town, village or region). People are the most pessimistic with regard to the consequences for themselves and their family. So optimism observed on the social level is deteriorating more and more on the individual level. That is why, in my opinion, the expectations of Hungarians are quite ambiguous.



Source: Gallup Market Research Institute

## 6 Summary

In the paper I have surveyed the most important factors that are very likely to influence the subjective well-being of Hungarians after accession to the European Union. I applied two approaches in order to detect those factors. First I considered the consequences that can be measured objectively. I highlighted the macroeconomic indicators, but some non-economic factors have been dealt with as well. In that respect the picture is rather positive.

After that I took a look at what people anticipate subjectively. As a result, I realized that Hungarian expectations about the accession are rather ambiguous. There are positive tendencies which – in my opinion – are due to the positive development of objective

factors. But there are also negative tendencies which may be signs of the traditional pessimism of Hungarians, but also of a treadmill effect in the future.

An indirect evidence of a treadmill effect is clearly observable. As the table below shows, the countries that wish to join the EU but are not able to do so yet have very high confidence indices, while others that have already achieved this goal have become used to it and – as a consequence of a plausible treadmill effect – have lower indices.

<b>Table 4. Indices of Confidence in the European Union in the surveyed countries; percentage</b>	
<b>Country</b>	<b>Percentage</b>
Turkey	153
Romania	142
<b>Hungary</b>	<b>132</b>
Cyprus	130
Bulgaria	126
Lithuania	116
Estonia	118
Poland	115
Croatia	115
Malta	114
Latvia	113
Slovenia	105
Czech Republic	98
Slovakia	97

*Source: GfK Market Research Institute.*

For a further analysis with more detailed and up-to-date data we have to wait until the consequences will have become more obvious and people will have adapted to the changes. So time will tell.

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# The Impact of Bank Ownership on Balance of Payments Through the Income Account in Croatia

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## Abstract

High foreign participation in the banking sector and the increasing level of balance of payments deficit characterize the Croatian economy. This paper examines the relationship between bank ownership and balance of payments in Croatia. The market structure of the banking sector has undergone significant changes in many countries over the past ten years. These changes are consequences of a number of factors and processes such as financial deregulation, the establishment of the European Monetary Union and globalization which started in the 1980s, and to which banks have to adapt. The change of bank ownership structure from state ownership to foreign-bank ownership is particularly important in Croatia. Between 1996 and 2003, the share of assets held by foreign banks increased drastically. In 2003 more than 90 percent of the banking sector's total assets were foreign-owned. At the same time, balance of payment deficit was steadily increasing. During this time, Croatia has had a consistent current account deficit largely reflecting the balance of goods account due to the increasing imports, especially consumers' products. In this poster presentation we try to answer the question whether bank ownership structure in Croatia might have an impact on the balance of payments.

**Keywords:** banking sector, ownership structure, balance of payments

**JEL Classification:** G21, H62

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*The views expressed here are those of the author and do not represent those of the Institute of Economics, Zagreb and the Raiffeisenbank Austria d.d. Zagreb.*

# 1 Introduction

The Croatian banking system is characterised by a high degree of foreign ownership. The wave of foreign bank entry is a characteristic of all transition countries with the dynamic of this change being the only difference, but overall all of the countries in transition were faced with similar problems. In most of the transition countries, banks were predominantly state owned towards the end of the 1980s. The banks in question were large state owned banks that approved loans to specific sectors of state interest. The loans in question were primarily loans given to state firms that were unable to pay their debts, so the losses of the banks accumulated. Since the state determined the loan seekers, banks were not in the position to assess risks, so a fair amount of the credits would not be returned and the state would eventually write them off. Firms were the main sector credited by banks, while the population and products accumulated savings and services that were not used in developing that particular sector<sup>1</sup>. Since a number of banks in that period began to fail, it became essential that banks were market-oriented, restructured and transferred to private ownership. Liberalisation of the banking system began in 1993 in Croatia with the adoption of the Act on Banks and Savings banks.

The main purpose of this paper is to point out the connection between the consolidated balance of banks and the balance of payments<sup>2</sup> and to provide guidelines for the analysis on the connection between banks in Croatia and the current account deficit. The focus of the analysis will lie in the influence of foreign banks on the current account deficit because there is a large disproportion between large banks, most of which are foreign owned and small banks. This paper will not look at whether the situation would be different if the largest banks remained domestically owned, as is the case in Slovenia but rather the situation in which 91 percent of the assets of the banking system are in foreign ownership. This paper only analyses the influence of banks on the income account of balance of payments. On the other hand, there will be some points made about the possible impact of the banks on the current account deficit through goods accounts.

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<sup>1</sup> See Keren, M. and Ofer, G. (2002).

<sup>2</sup> *The balance of payments of the Republic of Croatia is composed in accordance with the methodology recommended by the International Monetary Fund (International Monetary Fund: Balance of Payments Manual, fifth edition, 1993) in national currency (HRK) and in US dollars (USD). It is composed of two accounts; accounts of current transactions (which is composed of four accounts: goods, services, income and current transfers) and capital transaction accounts (which is composed of the following accounts: direct investments, portfolio investments and other investments).*

The paper consists of five chapters. A chapter on the changes in the structure of bank ownership and the analysis of consolidated balance of banks follows the first introductory chapter. An analysis of the current account balance of payments is made in the third chapter. In the fourth chapter, the connection between the consolidated balance of banks in Croatia and the current account balance of payments is described and attempts are made to estimate if and to what measure Croatian banks contribute to the balance of payments deficit increase through the income account. In this part of the paper, banks' commitments toward foreign banks and non-residents will be especially analysed, in other words foreign liabilities of banks as a statement that has an influence on the balance of payments. This will be followed by a conclusion and recommendations for further research.

## 2 The Banking System of Croatia

The first foreign bank entered the market in 1994. Foreign banks achieved a higher growth of shares in total assets in 1998 and 1999. The portion of assets of domestic owned banks in total assets of the banking system fell from 78.4 percent in 1996 to 3.5 percent in 2003.<sup>3</sup> By the end of 2003, almost 91 percent of the banking system's assets were foreign owned.

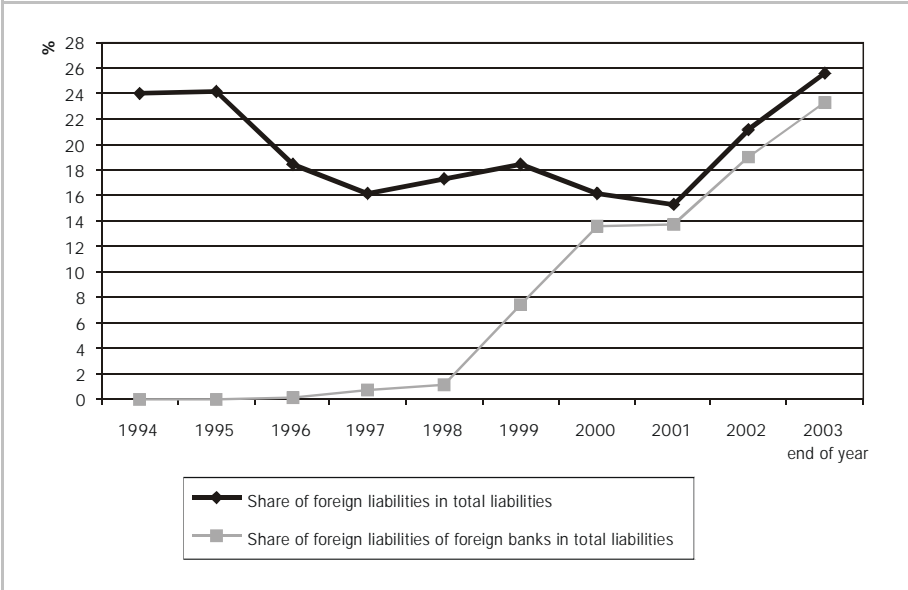
Data from the consolidated balance of banks at the end of 2003 indicate that banks accumulate 25.6 percent of total assets from non-residents (21.2 percent at the end of 2002).

From graph 1 it is evident that from 1997 onward, the Croatian banks were using a significant amount of funds from foreign sources but that percentage drastically decreased in 1997. The reason for that was the decrease of foreign liabilities, i.e. the decrease in the amount of loans accepted by foreign banks in mid 1997. The structure of banks' foreign liabilities was dominated by foreign liabilities in foreign currency and 77.35 percent of foreign liabilities comprised of the banks' commitments towards foreign banks. The share of foreign liabilities in the banking system's total liabilities statement oscillated significantly between 1994 and 2003.

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<sup>3</sup> *Changes such as the conversion of some banks to savings banks during 2001 influenced that increase in the assets of domestic owned banks, but not a significant change of its share in the assets.*

Graph 1. Share of banks' foreign liabilities in total liabilities

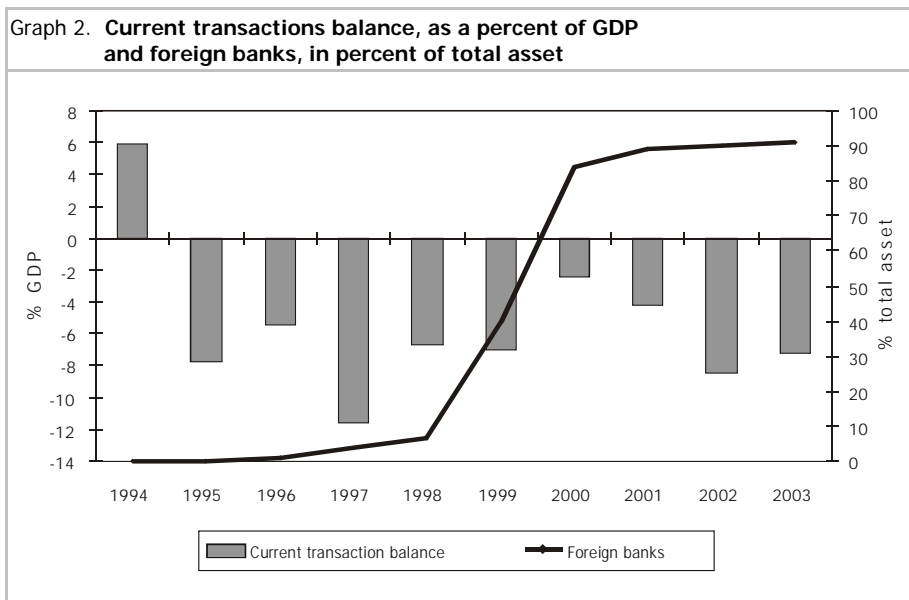


Source: Croatian National Bank.

In 2002 indebtedness to foreign sources began to increase drastically and Croatian banks started using significant funds from foreign sources (mostly loans from foreign banks). Since some data is lacking due to non-reporting of relevant data by banks for this analysis in their annual reports, an estimation of the share of foreign banks' liabilities in the total liabilities of the banking system was made. An estimation of the movement of the share of foreign liabilities of foreign banks in the total liabilities was made on the assumption that the foreign banks' share in particular segments of liabilities was estimated on the basis of the foreign banks' share in the total assets of the banking system. Since the share of foreign owned banks' assets was growing during the observed time period, it is expected that the share of foreign liabilities of foreign banks in the total liabilities will tend to grow.

### 3 Analysis of the Current Account Balance of Payments in the Republic of Croatia from 1994 to 2003

During the last nine years Croatia has recorded a continued deficit in current account transactions. The deficit is a result of the exchange of goods of Croatia with foreign countries. In the observed period the exchange balance was positive only in 1994. The surplus in 1994 was a result of the decrease in domestic demand during the war. The largest recorded current account transactions deficit was in 1997, 2002 and 2003 (see graph 2).



Source: Central Bureau of Statistics, Croatian National Bank.

In the observed period between 1994 and 2003, the annual growth rates of imports were higher than growth rates of exports (in almost all of the years). Besides the constant deficit on the goods account, was a constant deficit recorded on the income account<sup>4</sup>. In 1998, a significant deficit increase has been recorded (compared with the deficit growth rate achieved during the period between 1995 and 1998).

<sup>4</sup> The income account includes data from the foreign payments statistics on compensation of employees, payments on the basis of interest, income from foreign direct and portfolio investment ect., see Croatian National Bank: Annual Reports Statistics.

In the 1997, the current account deficit reached its peak of USD 2.3bn or almost 12 percent of GDP. This was the biggest current account deficit ever recorded. In the next three years it decreased mainly due to a modest decline of imports, as a result of a downward trend in consumption (partially due to the decreasing credit expansion), banking crisis, restrictive measures of monetary policy and external factors, such as Asian and Russian crises. Besides these factors, several foreign policy events<sup>5</sup> were behind positive movements of Croatian exports. In 2000 the deficit was decreased by HRK 11.3bn or by USD 1.9bn. With share of 2.4 percent of GDP it was the lowest in the whole period in question. However, it should be pointed out that deficit would have been even smaller had Croatia registered deterioration of its income account from 1998, mainly caused by increased interest payments on external debt, which had been growing since 1996. Income deficit amounted to USD 406.7 million in 2000, which represents a rise of about USD 287 million since 1997.

In the following years further deterioration of the current account were recorded. In the year 2002 it peaked at USD 1.92bn (HRK 5.28bn) or 8.5 percent GDP, and parallel to increases in the merchandise trade deficit that reached USD 5.2bn. One of the factors that contributed to this movement was the greater demand for goods (and consequently imports) and credit expansion, as well as increasing level of foreign debt. After 2002, resources for the financing of demand for commercial banks credits had been found in foreign sources. This situation motivated the Croatian National Bank to take some restrictive measures in order to slow down the expansion of foreign debt, which was registered in the capital account and which became a significant source of financing for the current account deficit.

Similar movements continued in 2003 and resulted in a record merchandise trade deficit of USD 7.9 billion, and the current account deficit of USD 2.04 billion (HRK 53.25 billion) or 7.2 percent of GDP. Besides the negative impact of a negative balance in goods account, a surplus of expenditures over revenues recorded in the current account was also strongly affected by the growth in net outflows from the income account, which almost entirely resulted from increased expenditures incurred on the basis of reinvested profit from equity investments.

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<sup>5</sup> *EU lifted quantitative restrictions on certain Croatian exports, the Stability Pact and accession to the WTO.*

Data relating to last year show that a strong growth in goods imports, which marked the year 2002, was not curbed. A rise in banks' loans together with an increased credit activity of the leasing companies helped to maintain the purchasing power of the Croatian citizens at a relatively high level.<sup>6</sup>

## 4 The Impact of Foreign Banks on the Current Account Balance of Payments

In 1995, the deficit of the balance of payments goods account was compensated with the surplus of services and current transfers accounts. Since 1995 until the present, a surplus on these accounts was not enough to cover the deficit on the goods account. Therefore, financing of the continuous current account deficit is covered with capital and financial transactions, that is, with the inflow of direct foreign investments and indebtedness of all sectors abroad. In the observed time period Croatia therefore became a net capital importer due to total domestic savings being lower than total investments.

Namely, in 1995, after the war, Croatian economy began its recovery with the decrease in domestic consumption and surplus of balance of payments current account. This also resulted in the GDP growth due to domestic demand, consumption and investment. During 1995 and 1996, a source of finance became the non-indebted capital (from official sources and repatriated foreign savings of citizens, that is, foreign currency payments).

In the 1997 and 1998 current accounts deficit was mainly financed with the borrowings from non-residents of all sectors. Favourable judgement of the Croatian credit worthiness by international institutions contributed to this and made it possible for Croatia to access international sources under favourable conditions. In 1998, foreign direct investments became a main source of financing for the current account deficit. Between 1999 and 2001, net direct investments completely covered the current account deficit, mainly because of the increase of investment in the banking sector and telecommunications. Capital revenue coupled with restructuring and bank privatisation caused the increase in deposits. All of this accelerated the credit expansion. Untenable expansion of private consumption and investments in the years when the highest level of current account deficit was recorded (in the year 1997, 2002 and 2003) was financed with a strong credit growth and rise in public consumption. After a few years of having a high deficit levels

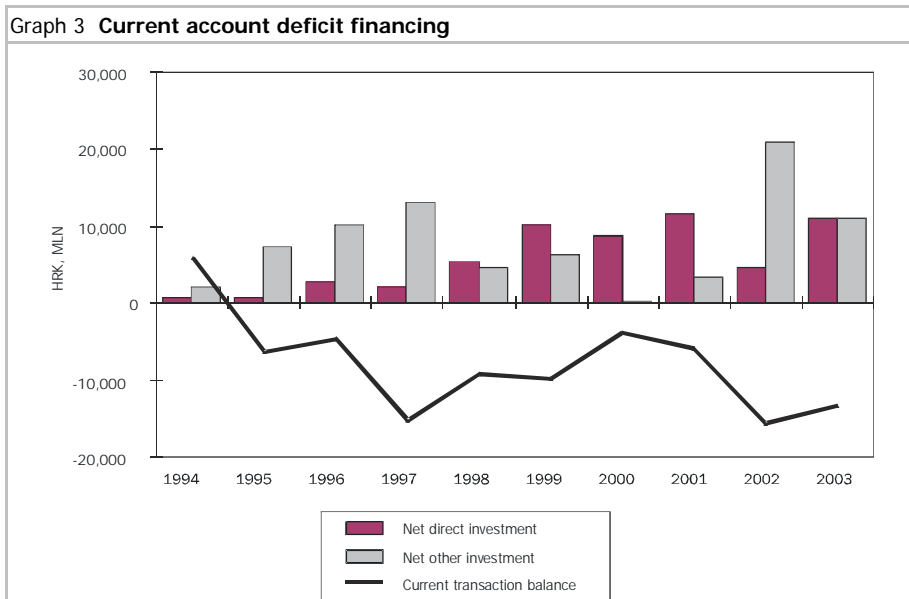
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<sup>6</sup> See *Croatian National Bank, Annual Report 2003*.



and strong increase in external debt, the Croatian National Bank undertook restrictive measures. These measures resulted in a decrease of the current account deficit. In all three observed years (1997, 2002 and 2003) high deficit growth was recorded on the item consumer goods in the merchandise trade. In addition, the growing domestic demand was accompanied by inadequate and insufficient production of certain goods.

In the 2002 net direct investments decreased significantly compared to previous years. This is in part a result of lower income (lack of privatisation of big companies), and in part a result of higher expenditures (domestic investments abroad). In the same year, the current account deficit was partly financed by other investments. Other investments reached a higher level than the total amount of direct investments<sup>7</sup>. Share of borrowing from non-residents in other investments was very high, especially on item deposits from physical and legal entities in Croatian banks. The reason for such a high level of these deposits is the higher interest rates level in Croatian banks than in other countries, where the headquarters of these banks are situated. Within the other mentioned investments, international indebtedness played an important role as well as deposits of non-residents in Croatian banks because of the higher interest rates in Croatia than in the countries where the banks' owners are situated.



Source: Croatian National Bank, Croatian Bureau of Statistics.

<sup>7</sup> Other investments were in 2002 1.83 bn USD or 13.6 bn HRK higher than net direct investments.

To ascertain the impact of foreign banks on the balance of payment current account deficit, three main bank data are considered - foreign banks' aggregate profit after taxes, interest payments on debt and data from consolidated bank accounts (table 1).

**Table 1. Foreign banks contributions to balance of payments current account**

	Foreign banks' aggregate net profit	Net assets/liabilities to non-residents, only foreign banks	Interest payments on debt	Total payments on debt	Total surplus/deficit of balance of payments current account	Foreign banks contributions to deficit of balance of payments current account
	HRK, mln	HRK, mln	HRK, mln	HRK, mln	HRK, mln	percent
1994	0.00	6.05	0.44	0.44	5,735.60	0.00
1995	-9.75	11.71	0.89	0.89	-6,266.00	0.01
1996	12.74	-0.81	0.00	12.74	-4,671.20	0.27
1997	121.44	-95.37	0.00	121.44	-15,184.90	0.80
1998	112.52	227.73	10.03	122.55	-9,239.20	1.33
1999	496.61	1,918.82	70.68	567.29	-9,953.00	5.70
2000	1,587.71	-1,598.44	0.00	1,587.71	-3,894.00	40.77
2001	759.75	-9,780.35	0.00	759.75	-6,052.70	12.55
2002	1,874.34	8,155.66	325.61	2,199.95	-15,676.60	14.03
2003	2,290.37	13,239.73	375.68	2,666.05	-13,320.30	20.01

Source: author's calculation based on the figures from Financial agency and Croatian national bank.

In this part of the article, the main assumption is that foreign banks take all their net profit (profit after taxes) out of the country. As a consequence, the profit together with interest payment on debt results in a negative influence on balance of payments. Net profits figures are incomplete because the data about operating banks in Croatia vary according to different sources. In the article we used data from the Financial agency because data from the Croatian National Bank on individual banks is not available and relevant. The next item used in the analysis is the difference between foreign assets and liabilities (variation between claims on non-residents and liabilities to non-residents). Due to the unavailability of data on individual banks in the Croatian National Bank, this data needs to be estimated. Data about the total amount of a bank's credits can be found in the bank's balance sheet, but amount of credit received from non-residents cannot be calculated. Therefore, the estimation is made with the assumption that the share of the foreign banks in every item of the banks' accounts liabilities is estimated by the share of foreign banks in total assets of banking system. The third factor included in the analysis is interest paid by foreign banks on borrowing from non-residents. Annual Euribor is used as the referent interest rate, but increased for 0.5 percent annually, which is used as an estimated extra interest rate that Croatian banks pay because of their credit rating. The

total payment on debt item is calculated as the sum of aggregate net profit and interest payments. At the end of the analysis we calculated the total contribution of foreign banks to the balance of payments current account deficit.

From the data shown in table 1, it is noticeable that the contribution of the factors included in analysis of the balance of payments current account deficit is high after the year 2000. The highest level of foreign bank contribution was reached in 2000 when foreign banks for the first time achieved high net profit levels. Until 1995, contribution of foreign banks to the balance of payments current account deficit was near zero. Up until that year, only one foreign bank was active in Croatia and in 1995 that foreign bank suffered losses. Shareholders of that foreign bank financed the loss, not the government. Therefore the banks' losses did not contribute to the current account balance deficit payments. High level of net profit had a negative influence on the current account balance deficit payments in the year 2002 and 2003. At the end of 2003 total contribution of foreign banks through income account amounted to 20.29 percent of current account balance deficit payments.

## 5 Conclusion and Recommendations for Further Research

Similarly to other transition countries, Croatia was and still is on its way toward a market-oriented economy. During that period it was important that banks were oriented towards the market, restructured and transferred to private ownership. In recent years, judging by the share of capital assets, it is clear that the Croatian banking system is predominantly foreign owned. Parallel to the expansion of foreign banks on the domestic market another matter of debate is the current account balance deficit. The aim of this paper was drawing a connection between the two. The largest contributor to the deficit in question (based on indicators and hypotheses) is the point when foreign banks achieved a high level of profit for the first time in 2000. However, it is noticeable that banks indirectly contributed to the expansion of the current account deficit. The structural problems on the supply side, low savings and favourable interest rates enabled credit expansion of banks. This raises the question of whether domestic banks would act the same way. Considering the fact that a bank is above all a profit institution, they would.

It should not be ignored that apart from the mentioned contributor to the current account balance deficit, there are other contributors that have not been observed such as

repatriated profit and indebtedness of registered banks that have a negative and positive influence on the banks' balance of payments. One of the most negative aspects mentioned is the high growth of bank crediting in Croatia. The amounts of approved loans to an individual sector are the incentives to growth of personal consumption and investment and in the Croatian case, to imports as well. The fact remains that until foreign banks entered, the Croatian market for consumer loans was undeveloped; accessibility to capital for investing into the economy increased and that crediting growth is the most frequent way of achieving expansion of banks and their market share. Loans to firms dominate the loan structure from 1994 to 2003, but in 2003 the sector changed and for the first time the population had more loans granted than firms<sup>8</sup>.

Therefore, it can be concluded that from the time of entry of foreign banks into Croatia until the present when they are still strengthening their marketing positions, the main agitator for achieving a larger market share through crediting is increasing population crediting. This is linked to the growth of personal consumption and imports into Croatia. The analysis of the population loan structure shown confirms the thesis that banks in Croatia initiate personal consumption of the population through crediting. 11.2 percent of total loans in the first trimester of 2003 were credits for automobiles, therefore, imported goods. The remaining loans (48.1 percent of total loans), that are the most important statement, consist mostly of unspecified loans that influence consumption. All of this contributes to the deficit growth of the current account balance.

Continuing the current account deficit entails a capital inflow the balance of payments capital account, but these inflows have to be maintained through current income account that grows larger each year. Even though foreign owners of banks have opted for reinvesting profit in Croatia until now, it can be expected that in the future there will be a repatriation of profit, which will influence the current transaction account even more. These conclusions raise the question of long-term sustainability of this situation; the solution lies in higher savings, improving and restructuring the supply side of the Croatian economy and directing new funds into profitable investments.

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<sup>8</sup> *During all the period, credits to the population have bigger growth rates than credits to the enterprises. In 2003 the first mentioned rose by 21.7percent yoy while the credits to the enterprises rose by 2.13percent.*

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# The Analysis of Profit and Cost Centres in the Value Chain - A Case of the Croatian Wood Manufacturing Company -

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## Abstract

This paper explores the importance of the value chain concept by analysing profit and cost centres in a selected wood manufacturing company in Croatia. First, we performed a SWOT analysis of Croatian wood industry with a brief overview of financial reporting practice. Then, a model is constructed by applying the basic principles of IAS accounting postulates on segment reporting and joint venture. It suggests financial reporting form that could facilitate value added tracking within the wood manufacturing company and the industry as a whole.

**Keywords:** value chain, wood manufacturing industry, financial reporting, Croatia

**JEL Classification:** D24

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# 1 Introduction

Wood cluster issue, though very popular among policy makers in Croatia, has remained a rather fashionable topic instead of being a tool for the reorganisation, reconstruction and competitiveness enhancement of the wood manufacturing industry. Cluster is a type of industrial organisation that implies a strong partnership between policy makers and manufacturers. It is designed to overcome problems and meet the market criteria of competitiveness. Although the cluster as a model has been applied successfully in several European countries such as Finland, Sweden, Italy, Austria, Slovenia, its ever-lasting idea of partnership has been exploited in Latin American economies and other states as well.

Research papers that examine the role of cluster have been rather rare in Croatia. Nevertheless, there are initiatives for cluster creation in some sectors, particularly in struggling wood manufacturing industry whose share in GDP is now a meagre 1,5%<sup>1</sup>. This paper starts with a brief SWOT analysis of Croatian wood manufacturing and proceeds with an insight into current financial reporting practice. However, the aim of the paper goes beyond generally accepted financial reporting practice through exploring the role of financial reporting in value added chain, and positive multiplication effects it could generate not only for wood industry but Croatian industry as a whole.

## 2 Data and Methods

The data used here includes both annual financial statements and physical data of Croatian wood manufacturer, which remains anonymous for the purpose of this research<sup>2</sup>.

The hypothesis we formulate is as follows: financial reports in Croatia are outdated and without information on production process and value added products of the company. As such, they, in our opinion, cannot serve as a sound basis for neither financial reporting nor decision making within the wood cluster. Therefore we tried to combine physical and financial data in the model constructed in order to propose a possible move to activity-based accounting practice.

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<sup>1</sup>*Industrijska strategija*, [www.vlada.hr/Download/2003/10/09/pog15.pdf](http://www.vlada.hr/Download/2003/10/09/pog15.pdf), pp. 7-8.

<sup>2</sup> *We are grateful to the company's staff for providing us with the information we requested.*

### 3 SWOT Analysis and Current Financial Reporting Practice Overview

Problems and perspectives of the Croatian wood industry are mainly pinpointed in the analysis of strengths, weaknesses, opportunities and threats (Table 1).

Table 1. <b>SWOT analysis of Croatian wood industry</b>
<b>STRENGTHS</b>
Valuable hardwood species
FSC certification of forests
81.5% forests in state ownership
Strengthening of the road network and key port of Rijeka in proximity
Traditionally good reputation of Croatian wood and some wooden products
<b>WEAKNESSES</b>
Obsolete technology
No permanent training of workers to acquaint them with new technology
Lack of working and investment capital for R&D
Bureaucratic procedures and unfavourable loan terms
Strong dependence on suppliers and thus vulnerability to FX rate changes
Low income and low motivation of forest industry workers
High transport costs
Excess capacity of saw mills as opposed to capacities in later phases of production
Unattractive and no space-friendly design of final products
<b>Uninformative financial statements and lack of good financial reports presentation</b>
Lack of promotional activities
High re-export of Croatian prime round wood
Inadequate and old-fashioned legislation
Lack of organised long-term reforestation policy
<b>OPPORTUNITIES</b>
Flexible order-oriented production for construction and publishing industry, shipbuilding, tourism and agriculture
Strong demand for high quality wooden products in Asia, Western Europe and the USA
Horizontal and vertical integration within the industry
<b>Strengthening industrial partnerships by timely and more detailed financial records presentation</b>
Organised supply market in partnership with the state
Full capacity utilisation by jointly organised import of insufficient raw materials
Rural areas development and employment growth
Regular market analysis and value added creation commensurate with consumer needs and fashion trends
Better cooperation with R&D institutions
Sustainable and domestic production-friendly forest management establishment
<b>THREATS</b>
Ever-changing public strategies for forest management
Rural depopulation
Demand increase for tropical wood species
Lack of confidence in public policies
Inadequate training programmes
Acid rains and pests endangering forest treasure, particularly softwood

Starting with the common statement that “the chain is as strong as its weakest part” we aim to propose the change of financial reports preparation for each cluster member to facilitate the value added monitoring within the wood cluster. Before moving on to activity-based financial reporting, that is to be proposed, a brief explanation of current financial reporting practice in Croatia is given, with focus on some of its key drawbacks.



The existing domestic financial reporting is based on International Accounting Standards and The Accounting Law<sup>3</sup>. Accordingly, the companies are obliged to present their financial records once a year in an officially set form, which varies depending upon the size of the company. The information is grouped under broad asset, liability, cost and revenue categories that contain only lump sums and do not separate the activities that generate value added from those that tend to lose it. This is especially true when SME sector is concerned.

The fact that it often takes a couple of months for financial statements to be published makes the financial records worthless in terms of useful information for any purpose but tax considerations. Consequently, the majority of financial statement users end up without worthy information. This particularly holds true for business partners who have difficulty in spotting business allies or products of a special interest.

The company whose internal organisation and financial reports we examined for the analysis in this paper is a middle-size wood manufacturer, with parquetry as a main production line and oak parquet as principal value added product. The most recent income statement of the Company (Table 2) is, at the same time, the sample of current income statement presentation practice.

Our comment on such a form of income statement is summarised as follows:

- Geographically divided sales serve as the basis for segment reporting; yet they do not provide insight into the core value added business activities.
- Such a reduced form of financial statements for SMEs gives only the rough idea of whether the company achieved gain or loss in the reporting period.
- Additionally, the fact that such reports have to be presented just once a year and only occasionally audited, puts further a doubt into their relevance and reliability.

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<sup>3</sup> *Official Gazette of the Republic of Croatia, No. 53/91, 33/92* [www.nn.hr](http://www.nn.hr)

No.	Description	2001	2002	2003
1	Operating revenues	22,204,458	24,375,145	22,611,489
1.1	Revenues from product sale in the country	12,761,782	13,284,341	10,184,310
1.2	Revenues from product sale abroad	9,113,676	9,280,931	9,975,416
1.3	Revenues from goods sale in the country	0	28,042	7,628
1.4	Revenues from goods sale abroad	0	1,764,529	2,033,605
1.5	Other revenues	329,000	17,302	410,530
2	Operating expenses	20,977,809	23,044,299	21,604,304
2.1	Change in inventory value	-2,034,476	873,998	510,612
2.2	Cost of raw materials	12,605,920	11,275,312	9,312,551
2.3	Cost of goods sold	1,296,142	1,601,957	1,875,297
2.4	Services and other expenses	1,182,380	1,609,235	1,387,950
2.5	Labour cost	5,198,346	5,040,405	5,169,637
2.6	Depreciation	1,068,219	967,083	1,091,772
2.7	Administrative and general costs	1,661,278	1,676,309	2,256,485
3	Financial revenues	504,572	126,201	120,225
4	Financial expenses	1,332,019	1,412,283	1,231,388
5	Extraordinary revenues	325,575	140,112	430,205
6	Extraordinary expenses	289,082	44,702	33,169
7	Total revenues (1+3+5)	23,034,605	24,641,458	23,161,919
8	Total expenses (2+4+6)	22,598,910	24,501,284	22,868,861
9	Income (loss) before tax	435,695	140,174	293,058
10	Income tax (20%)	87,139	28,035	58,612
11	Other taxes than income tax	0	0	0
12	Net gain (loss)	348,556	112,139	234,446
13	Dividend	0	0	0
14	Retained earnings	348,556	112,139	234,446
15	Number of employees	98	94	93

## 4 Model Description

Following the principle that physical data cannot be separated from financial data in the production company, we aim to combine information at hand in our lengthened model of the income statement (Table 3).

Table 3 presents the potential income statement model for a specific cluster member. The selected company is already internally organised into profit and cost centres with Sales as both profit and cost centre, and Production and Management and Administration departments as pure cost centres. However, to obtain the desired information on value added products, the Sales centre is further divided into smaller organisational units.

Conceptually, the basic principles of segment reporting are applied, as prescribed in the International Accounting Standard (here on IAS) No.14, with business segment, e.g. products according to production phases, as the primary one, and the geographical segment, e.g. domestic and foreign sales, as the secondary one (see column I, table 3).

According to IAS 14, a segment is reportable if a majority of its revenue is earned from sales to external customers, and if its revenue is 10 per cent or more of total revenue; or if its result (either profit or loss, whichever is the greater in absolute amount) is 10 per cent or more of the combined result of all segments. Moreover, the total revenue attributed to reportable segments must be at least 75 per cent of the total consolidated revenue. If it is less than 75 per cent, additional segments are identified as reportable segments until at least 75 per cent of total revenue is included in reportable segments<sup>4</sup>.

Table 3 follows the pattern of functional income statement presentation as shown by column I, except that all revenues and costs are split between profit/cost centre Sales and cost centres Production and Management and Administration. The mark N/A within the table stands instead of the data that are not available, while the hyphen marks the fields that should not be fulfilled or that cannot be calculated, e.g. m2 and m3 sales quantities in column XII.

Columns II to XI and column XIII represent the production workflow according to production phases, e.g. sawn timber, sawn-mill elements and parquetry. This analytics combines the inventory categories from the balance sheet (not included in the paper), in both physical and financial terms, with the income statement items such as cost of goods sold (row 34).

Although the table looks somewhat confusing at the first sight, the text on the grey background relies on pure income statement items whereas the text on the white background enables the tracking of the physical and financial flow of production, from the raw materials entering the production process through their transformation into the final product backlogs at the end of each production phase.

Due to the lack of data at hand it is assumed that there are no starting inventories of raw materials at the beginning of the first production phase, e.g. sawn timber (see column II, rows 3, 6). The second assumption is that the company itself produced sufficient quantity of final products that are to be sold in the next period or used as the starting inventories for the next production phase as shown in column XIII.

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<sup>4</sup> *Web Summaries IAS 14: Segment Reporting*,

[http://www.iasb.org/uploaded\\_files/documents/8\\_63\\_ias14-sum.pdf](http://www.iasb.org/uploaded_files/documents/8_63_ias14-sum.pdf).

<sup>5</sup> *Web Summaries IAS 31*, [http://www.iasb.org/uploaded\\_files/documents/8\\_63\\_ias31-sum.pdf](http://www.iasb.org/uploaded_files/documents/8_63_ias31-sum.pdf).

Table 3. A model of income statement for value added products monitoring

No.	Production process / Income statement items	Raw material inventory at the period- beginning	Raw material purchase in the period- beginning	Raw material cost in the period	Total raw material available for production in the period	Total raw material costs in the period	% of total raw materials produced in the previous phase of production	Total finished products inventory at the period- beginning	Total quantity of finished goods in the period	Total quantity produced as a % of entering raw materials	Total sales in the period	Total quantity available for sale or next phase at the period-end	Total quantity sold as a % of total finished products	Total amount	Total capacity utilisation in the period	Capacity utilisation as a % of total capacity available
	I	II	III	IV	V	VI(I+IV)	VII	VIII	X	XI	XII	XIII (IX+X- XII)	XIV (XII(X+X))	XV	XVI	XVII
		m3	kn	m3	kn	kn	kn	%	m3/m2	%	m3/m2	m3/m2	%	m.kn	m3	%
1	SALES (2+9+16)	7,566	N/A	12,883	N/A	20,449	N/A	-	8,522	73.2%	3,363	5,159	39.5%	N/A	N/A	N/A
2	SAWN TIMBER (3+6)	0	N/A	11,635	N/A	11,635	N/A	0	4,240	73.8%	440	3,800	10.4%	N/A	N/A	N/A
3	Oak	0	N/A	5,749	N/A	5,749	N/A	-	-	-	25	-	0.6%	N/A	-	-
4	Domestic	-	-	-	-	-	-	-	-	-	415	-	9.8%	N/A	-	-
5	Foreign	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	Beech	0	N/A	5,886	N/A	5,886	N/A	0	4,282	72.7%	2,923	1,359	68.3%	N/A	N/A	N/A
7	Domestic	-	-	-	-	-	-	-	-	-	692	-	16.2%	N/A	-	-
8	Foreign	-	-	-	-	-	-	-	-	-	2,231	-	52.1%	N/A	-	-
9	SAWN-MILL EL. (10+13)	4,737	N/A	0	N/A	4,737	N/A	422	2,558	54.0%	151	2,829	5.1%	N/A	N/A	N/A
10	Oak	3,477	N/A	0	N/A	3,477	N/A	82.0%	323	1,915	55.1%	0	2.238	0.0%	N/A	N/A
11	Domestic	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	Foreign	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	Beech	1,260	N/A	N/A	N/A	1,260	N/A	29.4%	643	51.0%	151	591	20.4%	N/A	N/A	N/A
14	Domestic	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	Foreign	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	PARQUETRY (17+27+30)	2,829	N/A	1,248	N/A	4,077	N/A	N/A	141,802	-	130,317	25,247	83.8%	20.2	N/A	N/A
17	Oak all classes (18+21+24)	2,238	N/A	1,102	N/A	3,340	-	174.4%	13,761	118,462	128,435	3,788	97.1%	N/A	-	-
18	1. class (32,4m2/m3)	N/A	N/A	N/A	N/A	2,752	-	-	13,761	89,165	102,926	0	100.0%	N/A	-	-
19	Domestic	-	-	-	-	-	-	-	-	-	-	-	-	N/A	-	-
20	Foreign	-	-	-	-	-	-	-	-	-	-	-	-	N/A	-	-
21	2. class (48,9m2/m3)	N/A	N/A	N/A	N/A	405	N/A	N/A	19,805	-	17,013	2,792	85.9%	N/A	N/A	N/A
22	Domestic	-	-	-	-	-	-	-	-	-	-	-	-	N/A	-	-
23	Foreign	-	-	-	-	-	-	-	-	-	-	-	-	N/A	-	-
24	3. class (51,2m2/m3)	N/A	N/A	N/A	N/A	183	N/A	N/A	9,370	-	8,496	874	90.7%	N/A	N/A	N/A
25	Domestic	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	Foreign	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Table 3. A model of income statement for value added products monitoring - continued

No.	Production process / Income statement items	Raw material inventory at the period- beginning	Raw material cost at the period- beginning	Raw material purchase in the period	Total raw material cost in the period	Total raw materials available for production in the period	Total raw material costs in the period	% of total raw materials produced in the previous phase of production	Finished products inventory at the beginning period-	Total quantity of finished goods in the period	Total quantity produced as a % of entering raw materials	Total sales in the period	Total quantity available for sale or next production phase at the period-end	Total quantity sold as a % of total finished products	Total amount	Total capacity utilisation in the period	Capacity utilisation as a % of total capacity available
	I	II	III	IV	V	VI(I+IV)	VII	VIII	IX	X	XI	XII (2+9+1 6)	XIII ((X+X)- XII)	XIV (XII/(X+X))	XV	XVI	XVII
		m3	kn	m3	kn	m3	kn	%	m3/m2	m3	%	m3/m2	m3/m2	%	m.kn	m3	%
49	SALES&MNGMT DIV EXPENSE(65+58+61+64)	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	-	-
50	LABOUR COST	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	-	-
51	Sales division	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	-	-
52	Management div.	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	-	-
53	DEPRECIATION	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	-	-
54	Sales capacities	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	-	-
55	Management buildings	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	-	-
56	OVERHEADS	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	-	-
57	Sales division	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	-	-
58	Management div.	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	-	-
59	SERVICES EXPENSES	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	-	-
60	Sales	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	-	-
61	Management Div.	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	-	-
62	FINANC. REVENUES	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	-	-
63	FINANC. EXPENSES	-	-	-	-	-	-	-	-	-	-	-	-	-	0.12	-	-
64	INCOME FROM CONT OPERATIONS (1-33- 49+62-63)	-	-	-	-	-	-	-	-	-	-	-	-	-	1.231	-	-
65	INCOME TAX	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	-	-
66	NET RESULT FROM OPERATIONS	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	-	-
67	NET RESULT FROM DISCONTOPER.	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	-	-
68	EXTRAORDINARY RESULT NET OF TAX	-	-	-	-	-	-	-	-	-	-	-	-	-	0.293	-	-
69	ADJUSTMENTS FOR ACCOUN. PRINC. CHANGE NET OF TAX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

The total quantity in column XIII, e.g. row 3, reduced by starting raw materials inventory for the second production phase, e.g. column II, row 10, equals the total finished products inventory at the end of the second production phase or at the beginning of the next production phase, as evidenced by column IX, row 10. Columns XVI and XVII are deliberately included for the monitoring of total capacity utilisation during the normal working hours of the factory. The excess capacity utilisation reveals the possible problems in the supply chain; the same being one of main problems in the Croatian wood manufacturing industry.

For easier analysis of the physical workflow, numbers are included in percentages, whereas financial data are given for easier cost evidence. The foreign and domestic market sales are taken into account only in columns XII, XIV and XV. When the products are sold, the cost of raw materials used for their production should be transferred into cost of goods sold as can be seen in the row 34. Yet the category of production costs is much broader as it includes not only the cost of goods sold, but also the R&D expense, depreciation expense of production capacities, labour cost, overheads as well as services such as maintenance of production capacities.

After the costs for Sales and Management and Administration division as well as financial revenues and expenses, the emphasis is put on the income from continuing operations as it is the category that is the most meaningful, as far as regular production, sales and administration activities are concerned.

In such a model of income statement, financial data are not only combined with physical but they also set the sound basis for decision making in both real and financial terms. Not only the sales profitability in both domestic and foreign market is measured revealing which products obtain the most value added, but also the degree of product finalisation, the capacity utilisation, the inventory management process and consequently the demand for end-product types. Moreover, this model might also be a controlling instrument for products of low finalisation grade export.

The model benefits are even more expanded on an aggregate level. Simple consolidation of the income statements for all cluster members, with the physical and financial data of all production phases in the industry, gives the opportunity to the State as a key supplier and partner in the wood value chain to introduce the legal and practical measures either targeted to some subdivisions of the wood industry or to the industry as a whole.

The role of partnership is stressed further as a platform for various SMEs integration in the same or different phases of production. This way of financial presentation, especially if provided on a frequent basis, enables the business-networking concept, commonly known as joint ventures, to take place. Joint ventures can be classified as jointly controlled operations, jointly controlled assets and jointly controlled entities. As prescribed by IAS No. 31, a venturer recognises its interest in a jointly controlled operation by recognising in its financial statements on a proportional basis the assets that it controls, its share of liabilities or expenses incurred jointly, and any income from the sale or use of its share of the joint output<sup>5</sup>. By adding the joint venture entities in the income statement consolidation on the aggregate level, some significant errors in aggregate accounting and statistics can be omitted. Needless to say, a venturer discontinues proportionate consolidation from the date that it ceases to have joint control over a jointly controlled entity.

Thanks to temporary performance capabilities of IT technology, more complicated financial reporting is more time-friendly oriented. There are numerous studies that address the need for timely information by addressing the issue of quarterly, semi-annual and annual reporting, but this paper is focused exclusively on decision-making benefit.

Growing number of companies are introducing the concept of quarterly reporting even though they are not obliged to, to stress their role in the industry and gain investors' confidence. Despite the fact that most Croatian wood manufacturers are not listed on the stock exchange or are not regularly traded, e.g. only 7 companies are listed on the Zagreb Stock Exchange<sup>6</sup> and 14 companies at the Varaždin Stock Exchange<sup>7</sup>, the more frequent financial reporting would be highly beneficial for mutual confidence establishment between the State and manufacturers in the wood cluster.

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<sup>6</sup> <http://www.zse.hr/quotation.php?sessionId=-1>

<sup>7</sup> <http://www.vse.hr/kotacije/popis>



## 5 Conclusion

In this paper we address the importance of having more informative, detailed and updated financial reporting within Croatian wood industry cluster. We set the hypothesis that financial papers in Croatia do not provide enough information on production process and value added products in a certain company. Therefore, we tried to combine physical and financial data of a Croatian wood manufacturer and construct a model that may serve as a proposal for members of Croatian wood industry cluster to move to activity-based accounting practice.

The findings of this paper should be thought of as a preliminary contribution to the issue of the importance of the value chain financial reporting. It is of a high importance to point out that this paper's attention was not to conduct pre and post experiment and show the result, yet to propose a model that could possibly be implemented in wood industry value chain financial reporting. The model introduced confirmed our hypothesis and therefore represents a path to more informative and updated financial reports and provides potential associates with clearer picture of profits and costs in the wood manufacturing chain. Pre-experiment and post-experiment can serve as an extension of this paper for future research.

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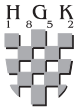
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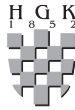


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