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# CAUSES OF THE UNOFFICIAL ECONOMY IN NEW EU MEMBER STATES

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ABSTRACT

The aim of the paper is to test the impact of various potential causes of unofficial economy in new member states (NMS). The hypothesis of the paper is that the most significant factors in NMS are the tax burden and the overall institutional environment. Paper uses unofficial economy estimates based on MIMIC and exhaustiveness of national account approaches over a longer period. A panel data method is used in econometric models in which various indicators of the intensity of regulations, tax burden, institutional framework and labour market conditions are used as potential factors able to explain cross-country differences in the sizes and trends in the unofficial economies.

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## I. INTRODUCTION

The presence of an unofficial economy has a significant influence on the official economy, especially in terms of public finance and labor market developments. Theoretically, the unofficial economy has both direct and indirect effects. Direct effects are evidenced by the diminishing ability of the government to collect taxes from economic agents. On the other hand, indirect effects remain predominantly hidden due to the inability of official statistics to accurately measure the extent of economic activity. Lack of exhaustiveness in national accounts estimates results in distortions in international comparisons of macroeconomic indicators. Additionally, in circumstances where unofficial economy developments differ substantially from that of registered GDP, official figures on economic growth could provide misleading information for analysts and policy makers.

In economic literature, various terms and definitions are used to describe the phenomenon of an unofficial economy. Various authors use alternative terms such as: informal economy, underground economy, black economy, undeclared, unreported and unregistered economy. Generally, most definitions agree that the unofficial economy comprises of all currently unregistered productive economic activities: market-based production of goods and services, whether legal or illegal, that escape detection in the official estimates of GDP (Smith 1994). This definition is used, e.g., by Feige (1989), Schneider (1994, 2003, 2005) and Frey and Pommerehne (1984). A broader definition, taken from Del'Anno (2003), Del'Anno and Schneider (2003) and Feige (1989), is: … those economic activities and the income derived from them that circumvent or otherwise avoid government regulation, taxation or observation. For other definition see also Thomas (1999) or Feld and Larsen (2005).

Aim of this paper is to identify the most important causes of unofficial economy (UE) in new member states (NMS), including Croatia which became an EU member in 2013. The structure of this paper is as follows. Following the introductory remarks, the first section of the paper brings a short literature review on the causes of the unofficial economy. In the second section of the paper, an estimate of the unofficial economy is presented for new member states. The third section identifies the main causes of informal economy dynamics in new member states. The last section concludes.

## II. CAUSES OF THE UNOFFICIAL ECONOMY

In economic literature, tax burden is usually identified as the main factor influencing the development of an unofficial economy. In an attempt to increase their income, economic agents could decide to hide a proportion of revenues in order to avoid the payment of taxes. Allingham and Sandmo (1972) examined some static and dynamic aspects of the decision to evade income taxes and found that tax compliance depends on the expected benefits (which are related to marginal tax rate) while costs are derived from the deterrence enacted by the government. Activation of economic units in an unofficial economy thus depends on the auditing activities of tax authorities, the probability of detection and fines for tax evasion determined by the government. If individuals expect that income generated in the unofficial sector by tax evasion is higher than potential fines they could make a decision to engage in UE and vice versa. Higher tax rates are thus directly related to the motivation of the entrepreneurs to truly report a proportion of their income.

Apart from taxation, some authors point to the relation between developments and trends in the official economy. In the upward phase of an economic cycle, economic units are usually more satisfied with rising income from official sources and more concerned with the potential risks of fines related to tax evasion. On the other hand, in the recession period, falling demand has

a direct negative impact not only on the official but also on the unofficial economy and entrepreneurs should choose to engage in the unofficial sector in an attempt to retain the income level held on previous levels. The increases in the unofficial economy can also be explained by other determinants related to various indicators of socio-economic development.

Theoretical causes of the shadow economy according to the relevant literature (Frey and Pommerehne, 1984; Feld, 2010, Schneider and Enste, 2000) can be classified as:

a) Burdens on the official economy;

b) Public sector services;

c) Tax morality and government controls;

d) Labour market conditions;

e) Structural factors.

All of above factors have an impact on the relation between the informal and informal economy. If the tax burden is rising, we can expect a rising share of the unofficial economy. The higher the difference between the total cost of labour in the official economy and after-tax earnings from work, the greater is the incentive to work in the unofficial economy. Empirical evidence on the influence of the tax burden on the shadow economy is provided by Schneider (1994, 2005), Johnson, Kaufmann and Zoido-Lobatón (1998) and Feld (2010). Besides an obvious impact on the disposable income of an economic unit in the case of tax evasion, taxation level affects labour and leisure preferences.

An increase of the unofficial economy can lead to reduced public revenues from taxes which in turn reduces the quality and quantity of public goods and services. Ultimately, this can lead to an increase in the tax rates for firms and individuals in the official sector, quite often combined with deterioration in the quality of the public sector and of the overall government administration, leading to an even stronger incentive to participate in the shadow economy (Feld and Schneider, 2010).

A lower tax morality leads to an increased readiness to become active in the hidden economy. According to some empirical research there is no unique answer on the causality of the relation between tax morale and unofficial economy. Some surveys point to the conclusion that societies with lower levels of tax morality usually record higher levels of informal economy. On the other hand, an increase in the unofficial economy can be the factor behind lower quality of public services with a negative impact on tax morale. Feld and Frey (2007) argue that tax compliance is driven by a psychological tax contract that entails rights and obligations from taxpayers and government authorities. Taxpayers are more inclined to pay their taxes if they consider public services as a satisfactory compensation in return for tax payment. Torgler and Schneider (2007) found that improving social institutions, by enhancing tax morale, the rule of the law, government effectiveness and quality of regulation, as well as reduction of corruption usually results in reduction of unofficial economy. They pointed to the legal structure and property rights as important determinants of the size of unofficial economy. Some authors found significant impact of various historical and geographic features of the countries and their influence on the institutional and political environment and consequently unofficial economy.

A growing intensity of public controls and higher fines reduce the return on hidden activities and therefore has the opposite effect according to Frey and Pommerehne (1984). Johnson, Kaufmann,

and Shleifer (1997) predict that ceteris paribus countries with higher general regulation of their economies tend to have a higher share of the unofficial economy in total GDP. Underground economy is also very often closely linked to corruption (Lovrinčević, Mikulić, Budak 2006).

If labor market conditions are improving in terms of higher labour demand in official sectors, individuals have a stronger negotiation position and demand to be included in social security schemes from employers. If labour demand is weak, individuals are more concentrated on short-term perspective (current income) and neglect the loss of potential social benefits in the future. Additionally, the longer official working time implies higher opportunity costs of taking up additional work in the hidden economy. Unemployment benefits also influence readiness of workers to participate in the official economy. If the wage of illicit work and the financial aid together yield more income than regular and overtime work (taking also into account the costs of detection and punishment and assuming risk neutrality) full-time illicit work as an unemployed person yields ceteris paribus a higher utility (Enste and Schneider 2002). Dell'Anno and Solomon (2006) evaluated a structural relationship between unofficial economy and the unemployment rate in the United States. They found a significant positive relationship between the unofficial economy and unemployment and concluded that this relationship could help to explain the connection between changes in the unemployment rate and output growth. A downturn in the economic official activities leads to a loss of jobs and thus drives part of unemployed persons to participate in the unofficial economy and because of that Okun's law is biased.

The determinants listed so far do not apply to all economies and even all economic sectors in the same way. Rather, there are certain industries (particularly those with low capital intensity) in which a higher probability of work in the hidden economy can be assumed. If a shift in demand increases a relative share of those industries, an overall increase in the share of unofficial economy is expected. Table 1 presents influence on the unofficial economy and relative importance of various determinants. Empirical researches in most cases find tax burden as the most important determinant of unofficial economy, followed by tax morale and quality of state institutions.

**TABLE 1 - FACTORS WHICH INFLUENCE THE SHADOW ECONOMY ACCORDING TO RESULTS OF VARIOUS EMPIRICAL STUDIES**

| *Factors influencing the shadow economy* | *Influence on the shadow economy (in %)* | |
|---|---|---|
| | ***a*** | ***b*** |
| Increase of the tax burden | 35-38 | 45-52 |
| Quality of state institutions | 10-12 | 12-17 |
| Transfers | 5-7 | 7-9 |
| Specific labour market regulation | 7-9 | 7-9 |
| Public sector services | 5-7 | 7-9 |
| Tax morale | 22-25 | |

*a) Average values of 12 studies*
*b) Average values of empirical results of 22 studies.*
*Source: (Feld and Schneider, 2010).*

## III. ESTIMATES OF THE UNOFFICIAL ECONOMY FOR NEW EU MEMBER STATES

In this chapter two independent estimates of the size of unofficial economy for new EU member states are presented. Aim of this comparison is to determine a possible range of UE and to see whether different methods based on various assumptions have, to an extent, similar patterns. We compare the results from two studies which comprise the broadest set of economies over a longer period - MIMIC approach and the exhaustiveness of national accounts approach.

### A. Estimates based on MIMIC approach

The main idea behind the MIMIC approach is to determine the relationship between an unobservable variable (unofficial economy), and a set of indicators related to UE which are available in a standard statistical system. In particular, the MIMIC model compares a sample covariance matrix, i.e. the covariance matrix of observable variables, with the parametric structure imposed by a hypothesized mode (Buehn, Schneider, 2012; Schenider 2012). For this purpose, the unofficial economy is related to the selected indicator variables in a factor analytical model. The relationships between the unobservable variable and the observable explanatory (causal) variables or determinants are specified through a structural model.

In the MIMIC approach there are various factors determining the relative significance of the unofficial economy and its relation to the official economy. List of observable indicators which "cause" UE according to the theoretical papers are described in the following studies: Frey and Pommerehne, 1984; Feld, 2010, Schneider and Enste, 2000; Buehn, Schneider, 2012; Schenider 2012. Despite the wide use of the MIMIC approach, there are some criticisms of the method, especially relating to data transformation, sensitivity to changes of measurement units, the possible dominance of a single causal variable and arbitrary benchmarking (Klarić, 2011).

In this paper we used UE estimates from most recent studies applying the MIMIC approach: Schneider (2012) and Buehn, Schneider (2012). Determinants used as possible causes of unofficial economy in these studies were the following: size of government, share of direct taxation, fiscal freedom, business freedom, unemployment rate, government effectiveness and subnational government employment. In their model, authors used the following variables as possible indicators of the size of UE: currency in circulation, labour force participation rate and GDP per capita. They found that the variables capturing the burden of taxation (in a wide sense), i.e. the size of government and fiscal freedom, unemployment rate and business freedom have the expected signs and are statistically significant. Indicator variables - the labour force participation rate and GDP per capita are also found to be statistically significant and showing the expected signs.

Results of their estimates are presented in Table 2. Estimated unofficial economy size is higher in new member states, an expected result since NMS are lacking behind old EU countries not only in terms of economic development but also regarding overall institutional environment. In both subsamples (NMS and OECD-EU countries) one can notice a decreasing trend in unofficial economy in the 2000-2008 period. Impact of recession is slightly different. While unofficial economy in old EU member countries on average increased in 2009, majority of new member states recorded a growth of unofficial economy in 2009 and slight increase in 2010. From the group of presented economies, the highest share of unofficial economy is estimated in Bulgaria and Romania.

**TABLE 2 - ESTIMATES OF THE UNOFFICIAL ECONOMY BASED ON MIMIC APPROACH IN STUDIES BUEHN, SCHNEIDER (2012) AND SCHENIDER (2012)**

| | *2000* | *2001* | *2002* | *2003* | *2004* | *2005* | *2006* | *2007* | *2008* | *2009* | *2010* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NMS* | 28.6 | 28.3 | 28.0 | 27.7 | 27.4 | 26.9 | 26.4 | 25.7 | 25.3 | 25.3 | 25.2 |
| Bulgaria | 36.9 | 36.6 | 36.1 | 35.6 | 34.9 | 34.1 | 33.5 | 33 | 33.7 | 32.1 | 31.9 |
| Czech Republic | 19.1 | 18.9 | 18.8 | 18.7 | 18.4 | 17.8 | 17.3 | 16.3 | 15.2 | 15.7 | 15.4 |
| Estonia | 32.7 | 32.4 | 32.0 | 30.7 | 30.8 | 30.2 | 29.6 | 29.5 | 29 | 29.6 | 29.3 |
| Hungary | 25.1 | 24.8 | 24.5 | 24.4 | 24.1 | 24 | 23.7 | 23.7 | 23.1 | 23.1 | 23.1 |
| Latvia | 30.5 | 30.1 | 29.8 | 30.4 | 30 | 29.5 | 29 | 27.5 | 26.5 | 27.1 | 27.3 |
| Lithuania | 33.7 | 33.3 | 32.8 | 32 | 31.7 | 31.1 | 30.6 | 29.7 | 29.1 | 29.6 | 29.7 |
| Poland | 27.6 | 27.7 | 27.7 | 27.5 | 27.3 | 26.9 | 26.4 | 25.4 | 24.7 | 24.6 | 23.8 |
| Romania | 34.4 | 33.7 | 33.5 | 32.8 | 32 | 31.7 | 30.7 | 30.8 | 31.5 | 30 | 30.9 |
| Slovenia | 27.1 | 26.7 | 26.6 | 26.7 | 26.5 | 26 | 25.8 | 24.7 | 24 | 24.6 | 24.3 |
| Slovakia | 18.9 | 18.8 | 18.6 | 18.4 | 18.2 | 17.6 | 17.3 | 16.8 | 16 | 16.8 | 16.4 |
| OECD-EU* | 18.6 | 18.4 | 18.4 | 18.5 | 18.4 | 18.4 | 18.2 | 18 | 18 | 18.5 | 18.5 |
| Austria | 9.8 | 9.7 | 9.8 | 9.8 | 9.8 | 9.8 | 9.6 | 9.7 | 9.5 | 9.7 | 10.6 |
| Belgium | 22.2 | 22.1 | 22 | 22 | 21.8 | 21.8 | 21.4 | 20.8 | 20.3 | 20.5 | 20.7 |
| Ireland | 15.9 | 15.9 | 15.9 | 16 | 15.8 | 15.6 | 15.5 | 15.4 | 15.9 | 17.5 | 16.5 |
| Italy | 27.1 | 26.7 | 26.8 | 27 | 27 | 27.1 | 26.9 | 26.8 | 26.7 | 26.5 | 26.7 |
| Netherlands | 13.1 | 13.1 | 13.2 | 13.3 | 13.2 | 13.2 | 13.2 | 13.1 | 12.7 | 12.9 | 13.6 |
| Spain | 22.7 | 22.4 | 22.4 | 22.4 | 22.5 | 22.4 | 22.4 | 22.3 | 22.9 | 24.5 | 23.5 |
| Sweden | 19.2 | 19.1 | 19 | 18.7 | 18.5 | 18.6 | 18.2 | 18 | 17.7 | 17.9 | 18.1 |
| Croatia | 33.4 | 33.2 | 32.6 | 32.1 | 31.7 | 31.3 | 30.8 | 30.4 | 29.6 | 30.1 | 29.8 |

**unweighted average*

*Source: Buehn, Schneider (2012) and Schenider (2012)*

## B. Estimate of non-exhaustiveness of national accounts based on Eurostat approach

In order to ensure the comparability of national accounts in member states, Eurostat developed an appropriate methodology to estimate the size of UE - Eurostat's Tabular Approach to Exhaustiveness. This approach provides a framework for the estimate of the UE that is particularly well suited for transition countries.

According to this approach, a detailed study of national accounts methodology and statistical data sources should be done in order to indentify different types of non-exhaustiveness. All types of non-exhaustiveness are systematically covered and are mutually excluded. The main advantage of this method comes from the possibility of a comparison of different types of non-exhaustiveness adjustments by countries. In general, this method gives the most conservative estimates of the UE size. The classification of non-exhaustiveness types in the national accounts is based on various characteristics of the producer, i.e. the way in which data is obtained from producers. The methodological issues and classification of non-exhaustiveness types in the national accounts is elaborated in Eurostat (2005). Croatian methodology and results were presented in Lovrinčević, Mikulić, Galić Nagyszombaty (2011). According to this method, following types of UE exists:

- N1 Producer should have registered (underground producer)
- N2 Illegal producer that fails to register
- N3 Producer is not obliged to register
- N4 Registered legal person is not included in statistics
- N5 Registered entrepreneur is not included in statistics
- N6 Misreporting by the producer
- N7 Statistical deficiencies in the data

According to the definition, some of non-exhaustiveness types primarily related to the lack of statistical coverage (N3-N5 and N7). Deliberate misreporting because of tax evasion covers types N1, N2 and N6. Unfortunately, methodology and data for all countries are not publicly available in detail and in this empirical study, an estimate for total non-exhaustiveness is used only.

In this chapter, a comparison of UE estimates is presented for new member states except Malta and Cyprus (data based on the Eurostat approach not available). MIMIC approach as presented by Buehn, Schneider (2012) on average resulted in significantly higher estimates in comparison to the Eurostat non-exhaustiveness (NOE) project aimed on inclusion of UE in official national accounts. As can be seen from Table 3, unweighted average for NOE adjustment in new member states was 12% of GDP which is almost double in comparison to old member states (data are available for OECD countries). Buehn and Schneider (2012) based on MIMIC approach found a significantly higher share of unofficial economy in NMS. Their estimate is on average 2.4 times higher than NOE adjustment for NMS. In the subset of old member states the same indicator is 6.4 with a significant dispersion among countries. For Croatia this ratio stands at 3.3 which is close to other NMS economies.

Although differences in results are relatively high, a certain degree of correlation between estimates based on MIMIC and Eurostat approach can be noticed (Figure 1). We can divide NMS in two sets of countries. First set comprise Slovenia, Poland, Estonia, Croatia and Bulgaria and the second Czech, Hungary, Latvia, Romania and Lithuania. There is a clear pattern of strong cor-

relations between NOE and MIMIC estimates within elements of the same group. On the other hand, MIMIC approach gives on average higher estimates for the first group (if exhaustiveness of national accounts is used as benchmark). For example, MIMIC approach estimates approximately the same level of unofficial economy in Estonia and Lithuania while according to Eurostat approach share of UE in Lithuania is almost double in comparison to Estonia. Slovakia is obviously outlier and cannot be classified in before mentioned groups. Either MIMIC estimates for Slovakia are underestimated or NOE results overestimate the level of Slovakian unofficial economy.

**TABLE 3 - COMPARISON OF UE ESTIMATES BASED ON EXHAUSTIVENESS OF NATIONAL ACCOUNTS AND MIMIC APPROACH**

| | *Reference period* | *Adjustment for NOE in national accounts* | *Buehn, Schneider (2012)* | *Ratio Buehn, Schneider (2012) NOE* |
|---|---|---|---|---|
| NMS | | 12.0 | 28.2 | 2.4 |
| Bulgaria | 2001 | 10.2 | 36.6 | 3.6 |
| Czech Republic | 2000 | 7.7 | 19.1 | 2.5 |
| Estonia | 2002 | 9.6 | 32.0 | 3.3 |
| Hungary | 2000 | 11.9 | 25.1 | 2.1 |
| Latvia | 2000 | 14.4 | 29.8 | 2.1 |
| Lithuania | 2002 | 18.9 | 32.8 | 1.7 |
| Poland | 2002 | 7.8 | 27.7 | 3.6 |
| Romania | 2002 | 17.7 | 33.5 | 1.9 |
| Slovenia | 2002 | 6.9 | 26.6 | 3.9 |
| Slovakia | 2002 | 14.6 | 18.6 | 1.3 |
| OECD-EU | | 6,2 | 18,6 | 6,4 |
| Austria | 2001 | 7,9 | 9,7 | 1,2 |
| Belgium | 2002 | 3,0 | 22,0 | 7,3 |
| Ireland | 1998 | 4,0 | 16,1 | 4,0 |
| Italy | 2003 | 14,8 | 27,0 | 1,8 |
| Netherlands | 1995 | 1,0 | 13,3 | 13,3 |
| Spain | 2000 | 11,2 | 22,7 | 2,0 |
| Sweden | 2000 | 1,3 | 19,2 | 14,8 |
| Croatia | 2000 | 10,1 | 33,4 | 3,3 |

**unweighted average.*
*Source: Buehn, Schneider (2012) and Schneider (2012), statistical offices of included countries, Quintano and Mazzocchi (2010).*

More detailed data, differentiated according to the types of non-exhaustiveness for each economy are not available. It would be interesting to investigate the correlation between UE based on MIMIC approach and various types of non-exhaustiveness of national accounts, especially types N1 and N6 which are related to misreporting due to the tax evasion.

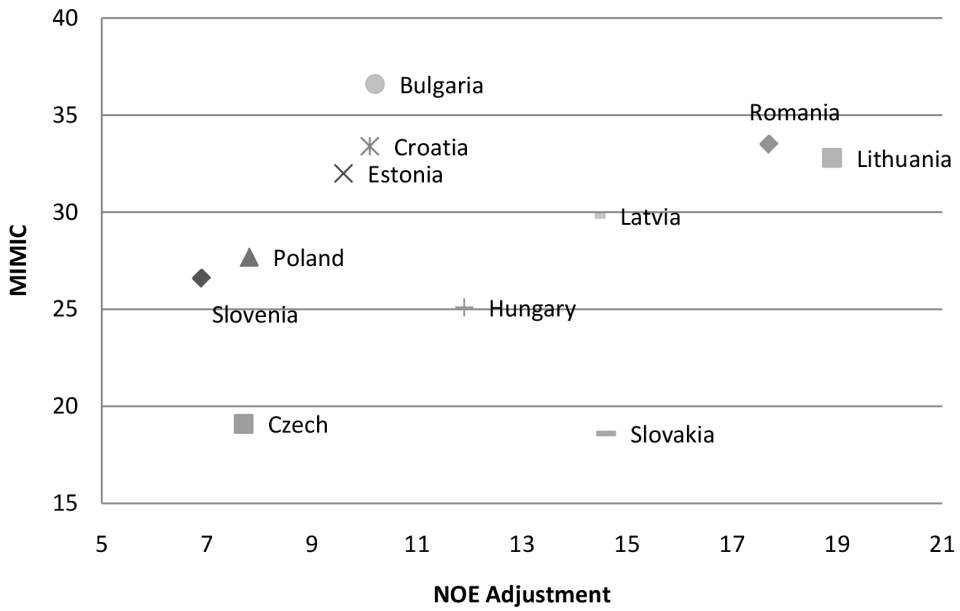


**CHART 1 - COMPARISON OF UNOFFICIAL ECONOMY ESTIMATES IN NEW MEMBER STATES (MIMIC AND NON-OBSERVED ECONOMY ESTIMATED BY EUROSTAT APPROACH)**

*Source: Buehn, Schneider (2012) and Schneider (2012), statistical offices of included countries, Quintano and Mazzocchi (2010).*

## IV. EMPIRICAL MODELLING OF THE DETERMINANTS OF THE UNOFFICIAL ECONOMY IN NMS

In the paper we tested two sets of unofficial economy estimates which cover the longest period for new member states– exhaustiveness of national accounts estimates and MIMIC approach (Buehn and Schneider, 2012).The empirical analysis was based on the estimates of unofficial economy in period 2000-2011 with the new member states (including Croatia) as cross-section units and the panel data method was applied. Due to the fact that countries differ in size some estimation bias might occur. The basic equation estimated in the paper is the following:

$$y_{i,t} = \alpha + \beta X_{i,t} + e_{i,t} \quad (1)$$

where y denotes a dependent variable (unofficial economy, and X a set of explanatory variables (t stands for period 2000-2011, while i = 1 to 11 denotes NMS). Panel data method with fixed effects was applied, and variables in each specification were pre-tested for multicolinearity.

The estimate of unofficial economy (expressed in terms of share in GDP) was treated as dependent variable and two different sets of estimates were used: MIMIC and exhaustiveness of national accounts approach. Set of potential explanatory variables were selected based on findings presented in the literature review. Variables are classified in four different groups and their list and data sources are presented in Table 4.

**TABLE 4 - POTENTIAL CAUSES OF THE UNOFFICIAL ECONOMY**

| *Group of variables* | *Variable* | *Data source* |
|---|---|---|
| Fiscal burden | Revenue, excluding grants (% of GDP) | Worldbank database |
| | Social contributions (% of revenue) | Worldbank database |
| | Tax revenue (% of GDP) | Worldbank database |
| | Taxes on goods and services (% of revenue) | Worldbank database |
| | Taxes on income, profits and capital gains (% of total taxes) | Worldbank database |
| Public sector services; Tax morality and government controls | Fiscal freedom | Heritage foundation |
| | Government spending | Heritage foundation |
| | Index of economic freedom | Heritage foundation |
| | Freedom from corruption | Heritage foundation |
| | Business freedom | Heritage foundation |
| | Corruption perception indeks | Transparency international |
| Labour market condition | Unemployment, total (% of total labor force) | Worldbank database |
| | Labour force participation | Worldbank database |
| Structural factors | GDP growth (annual %) | Worldbank database |
| | GDP per capita, PPP (constant 2005 international $) | Worldbank database |
| | Agriculture, value added (% of GDP) | Worldbank database |
| | Industry, value added (% of GDP) | Worldbank database |
| | Services, etc., value added (% of GDP) | Worldbank database |
| | Exports of goods and services (% of GDP) | Worldbank database |
| | Imports of goods and services (% of GDP) | Worldbank database |
| | Inflation, GDP deflator (annual %) | Worldbank database |

*Source: Worldbank database, Transparency international, Heritage foundation.*

The scope of the variables included in the model are based on theoretical and empirical findings of other authors, as suggested in the literature review. Additionally, some preliminary control of multicolinearity between independent variables is made.

When applying the panel data method, it is necessary to decide between the random effects and fixed effects specification. The procedure requires that both specifications are estimated. In the random effects specification model the number of cross-sections should be higher than the number of coefficients for a between estimator which impact the number of independent variables in the model. In order to test whether fixed effect specification is appropriate, the Hausman test was used. The hypothesis that random effects is preferred due to higher efficiency was not confirmed so fixed effects are used in both specification presented.

The estimation results, including such a specification, are presented in Table 5 with separate columns for unofficial economy based on MIMIC approach and for unofficial economy based on Eurostat approach. Various model specification using different sets of variables (Table 4) as possible explanatory variables is tested and we present only models with best econometric properties. Regarding structural factors, most of models found negative relations between openness (measured by share of export and import in GDP) and unofficial economy but parameters were no significant on the specified level and were not included in selected models. Some specification also point to positive relationship between importance of service sector and unofficial economy but estimated parameter is less significant.

**TABLE 5 - CAUSES OF UNOFFICIAL ECONOMY IN NEW EU MEMBER STATES AND CROATIA**

| ***Variable*** | ***Dependant variable: UE estimates based on MIMIC approach*** | ***Dependant variable: UE estimates based on Eurostat approach*** |
|---|---|---|
| | Estimated parameters | Estimated parameters |
| Constant | 41.036*** (43.01) | 5.34*** (2.94) |
| Government spending | 0.02071 *** (2.92) | 0.196 *** (3.98) |
| Index of economic freedom | -0.1137*** (-5.67) | 0.153*** (4.49) |
| GDP per capita | -0.00041 *** (-13.57) | -0.00029 *** (-5.41) |
| Freedom from corruption | -0.031 ** (-2.21) | -0.075 *** (-3.12) |
| Adjusted R2 | 0.9896 | 0,933 |
| Redundant cross section fixed effects LR test F statistics (p-value) | 386.28*** (0.000) | 92.24*** (0,000) |
| Number of observation | 132 | 132 |

*Source: Author calculation*

*a Triple asterisks mark coefficients significant at a level of 1%; double asterisks, at a level of 5%; single asterisks, at a level of 10%. In parentheses, t-values are given.*

Presented empirical results show correlations found in most previous studies. In both specifications, a high proportion of variation in unofficial economy can be explained by a presented set of independent variables. Government expenses, as broadest indicator of costs government posed to the official economic units, turned to be more significant than revenues in explaining pattern of the unofficial economy in new member states. Despite process of tax harmonisation process according to EU regulations in precession period, there are still significant differences in the structure of taxation in NMS. Government expenditures is actually a composite indicator of overall tax burden while variation in structure of tax revenues makes each individual tax type less significant in explaining UE trends in panel data specification.

We found significant parameter describing a negative relation between GDP per capita level and unofficial economy. More developed countries have recorded lower unofficial economy shares. Because of negative relationships, a conclusion that official and unofficial sector are substitutes in new member states can be drawn. This is comparable to previous research. For example, Botrić, Marić and Mikulić (2004) found the negative correlation between the unofficial economy and the economic growth in transition economies.

Both models also identify corruption as a significant determinant of unofficial economy. Index of freedom from corruption based on Heritage foundation methodology is found to be significant in both estimated equations, where a negative relationship is found. As various studies suggest, lower levels of corruption strongly relate to other variables indicating overall institutional framework: quality of institutions and public services, tax morale and overall trust of citizens in government capacities and accountabilities. Besides lower level of tax burden, institutional improvements can explain significant part of unofficial economy dynamics in NMS. Those results are also in accordance with other studies which found that improving social institutions helps lessen a possible incentive to engage in UE sector (literature review on that matter can be found in Torgler and Schneider, 2007). Some previous studies point to the conclusion that at the macro level these variables can be jointly endogenous. High quality public institutions require commensurately large investments of public revenue raised by taxation while well-functioning institutions increase willingness to pay taxes.

A variable which turned to be significant in both specifications, but with estimated opposite signs of parameter was the Index of economic freedom (published by Heritage Foundation). Economic freedom index ranges from 0 to 100, where 0 is least economic freedom and 100 maximum economic freedom. According to theoretical background and previous studies, a negative relationship between economic freedom and unofficial economy is expected. In principle, higher level of regulation in economy relates to lower index of economic freedom. By activating in the informal sector, economic units can avoid some of regulations they found rigid for their activity. In the first model where MIMIC approach estimates of UE are treated as dependent variable negative signs were found, expectedly. On the other hand, in the second model, parameter for the same variable are estimated to be positive, meaning higher level of economic freedom is related to higher level of unofficial economy. Explanation for the unexpected sign can be the fact that Eurostat approach in total non-exhaustiveness of national accounts includes not only unofficial economy which is consequence of intentional misreporting because of tax avoidance purposes, but also comprises estimation of unrecorded activities which are result of a weak statistical system. More complex reporting obligations of economic units for statistical purposes are negatively related to overall economic freedom but can reduce the extent of unrecorded activities due to statistical factors. On the other hand, counties with higher index of economic freedom might have less complex statistical requirements and because of that higher share of non-exhaustiveness

adjustment for statistical reasons.

## V. CONCLUSION

The existence of an unofficial economy has a negative impact on the official economy, especially in terms of public finance and labour market developments. The exact size of unofficial economy cannot be exactly specified due to the nature of this phenomenon but there are different methods which could give a potential indicator of UE size. We compared estimation results for new member states based on MIMIC approach and Eurostat approach on exhaustiveness of national accounts.

This paper identifies causes of unofficial economy in new EU member states and Croatia. Government expenditures as an overall indicator of tax burden turned to be significant in explaining the variation in the unofficial economy in NMS which is in line with majority of previous research. Because of differences in the structure of taxation, individual types of taxes turned to be less significant in explaining trends in the unofficial economy. A negative relationship between development levels and the size of the unofficial economy is also found. Downturn in the economic official activities leads to a loss of jobs and thus drives part of unemployed into the shadow activities while during economic expansion it is much easier to realize economic goals in the official sector.

Models used in this paper do not give the unique answer on type of relationship between economic freedom and unofficial economy. In one specification we found expected relationship in which higher level of economic freedom is related to lower level of unofficial economy. In model based on estimates of UE according to the results of exhaustiveness of national accounts approach, we found unexpected types of relationships. Explanation can be found in the methodology of non-exhaustiveness of national accounts approach which combines adjustment for economic and statistical purposes.

According to our results, lower level of corruption can lead to the decreasing significance of the unofficial economy. Since various studies indicate that there is a strong relationship between corruption and other variables connected to overall institutional framework we can conclude that quality of institutions and public services, tax morale and overall trust of citizens in government capacities and accountabilities are also important factors of UE trends although not explicitly included in the presented model.

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