STRUCTURAL CHARACTERISTICS OF EXPORTS AND IMPORTS OF CROATIAN MANUFACTURING

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UDK 339.5.053(497.5)
JEL Classification F14, F23, L67
Izvorni znanstveni članak

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In this paper the structural characteristics of exports and imports of Croatian manufacturing during the period of transition are analyzed. The main characteristic of the process is a significantly higher average growth rate of imports than exports which has resulted in the creation of a high relative deficit. Results of a correlation analysis show that the products which have comparative advantages at the same time do not have a higher ratio of unit price of export and import. In the trade structure of Croatian manufacturing, inter-industry trade prevails whereas only labor intensive activities and raw-material intensive activities show positive export trends. In the part of the trade structure which has intra-industry type of trade, horizontal specialization and vertical specialization with low value added exports dominate. The greatest deterioration of export competitiveness to EU markets has been recorded in the textile and clothing industry. Index of entropy, indicator of comparative advantages and indicator of horizontal and vertical specialization reveal an insufficient level of trade specialization in domestic manufacturing.

Keywords: export, import, manufacturing

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Paper received on Sept. 17th 2009.

1. The introduction

The purpose of this paper is to provide new understandings about the structural characteristics of exports and imports of Croatian manufacturing. The methodology of the research is based on applying the following indicators of international trade: TEI (Trade Entropy Index), Lafay Index (LFI), RUV (Relative Unit Value Indicator) and Index of Export Competitiveness.

The changes of export structure towards higher value added products are a precondition of growth in export competitiveness. The latest trends on the international markets are characterized by a significant fall in the demand and strengthening of competitive pressure. In this context the ability of the adjustment to new market circumstances is especially important for the achievement of continual growth in production and in exports. Present theoretical knowledge supports open politics of international trade. The liberalization and openness of the markets and global reduction of demand create new challenges for strengthening export competitiveness. The development of Croatian manufacturing in the last two decades is connected with processes of transition and restructuring. Domestic industry was by the end of the 1980s in a better economic situation then most other transition countries of central and eastern Europe which were under greater influence of central planning and with less developed entrepreneurship. With the favourable trade regime of ex-Yugoslavia according to the present EU, relationships developed with advanced European companies. Through licences and own research was realized the production and export of high value added products, especially in machinery and the electrical industry. However, while the most advanced European transition countries, like the Czech Republic and Hungary, realized significant economic growth in the last transition period, Croatia deteriorated in many production activities and lost the advantage which it had compared to the most developed transition countries (Annual Report of Croatian Competitiveness, 2006).

The trends in international trade have been a favourable indicator of the level of the integration of transition countries to EU markets. Trade regime between transition countries was liberalised through the Stabilisation and Association Agreement with the EU in the middle of 1990. It created the opportunities for strong growth of international trade. In comparison with Croatia, the most transition EU countries realized higher average annual export growth rate.[1] The main reasons for the lagging behind are the trends in international trade of

[1] Average export growth rates in Croatia and selected transition EU countries from 1993 to 2007 are: 16.3% in Bulgaria, 13.5% in the Czech Republic, 12.1% in Croatia, 24.4% in Hungary, 21.3% in Poland, 14.9% in Romania, 16.5% in Slovakia and 14.6% u Slovenia (Source: wiiw Handbook of Statistics/ 2008; own calculations).

Croatian manufacturing which has the highest share in total Croatian merchandise exports.[2]

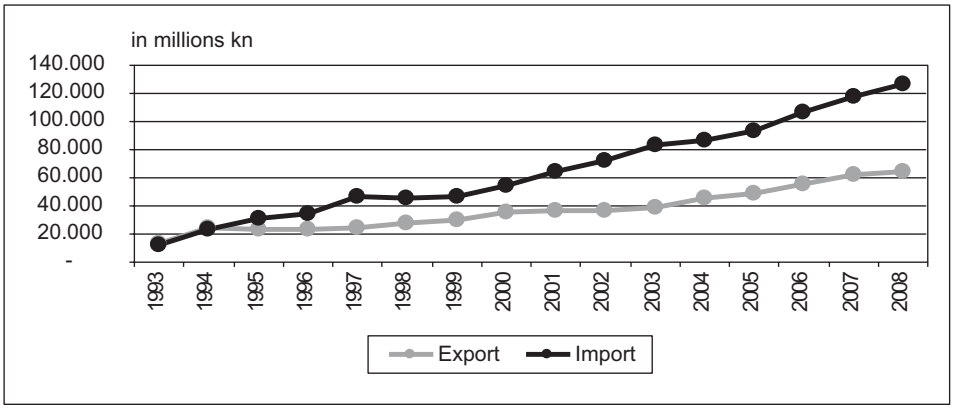
In the second part of the paper, the basic trends of Croatian manufacturing in international trade are analyzed. The third part of the paper is dedicated to quantitative analyses where the export and import structure, comparative advantages, horizontal and vertical specialization, export and import by countries and export competitiveness are analyzed. This is followed by a conclusion.

2. Analysis of export and import trends of Croatian manufacturing

The Croatian economy during the transition was characterized by the process of deindustrialization where the share of industry in the structure of gross domestic product was significantly reduced.[3] Also, the share of manufacturing which is

Graph 1.

EXPORT AND IMPORT OF CROATIAN MANUFACTURING
FROM 1993 TO 2008



Source: Republic Croatia – Central Bureau of Statistics.

[2] The export share of manufacturing in total Croatian export in 2007 was 93.4%, and import share was 85.1% (Source: Republic Croatia – Central Bureau of Statistics).

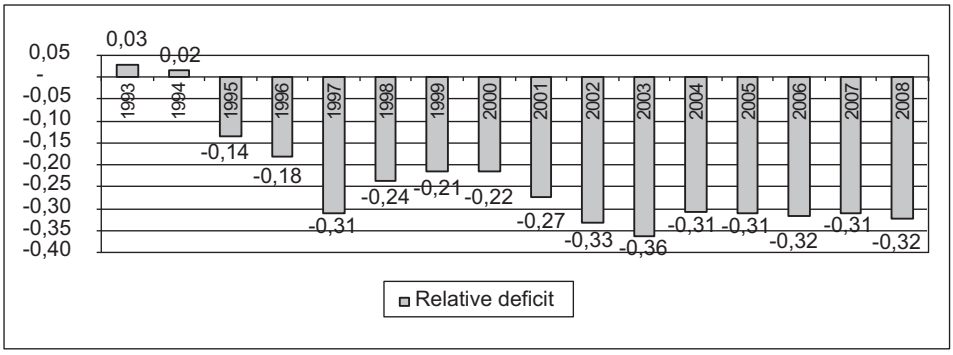
[3] The share of the industry in GDP in 1995 was 28.4%, and in 2007 20,5% (Source: Republic Croatia – Central Bureau of Statistics).

the most important component of total industry production was reduced.[4] In spite of these trends, manufacturing is the most important determinant of economic growth. The growth of the openness and liberalization of domestic markets have had strong impacts on import growth from 1993 to 2008 (graph 1).

Also, export growth was recorded, but it was much less than import growth. Average annual export growth rate from 1993 to 2008 was 11.4%, and the average annual import growth rate was 16.9%. These trends resulted in the growth of a trade deficit. The distance between the curves of export and import on graph 1 increases during the observed period. It shows the widening of the trade deficit. The analysis of relative deficit[5] shows that a positive trade balance was only found at the beginning of the observed period (graph 2).

Graph 2.

RELATIVE DEFICIT OF CROATIAN MANUFACTURING
FROM 1993 TO 2008



Source: Republic Croatia – Central Bureau of Statistics; own calculations.

The analysis of the deficits by individual economic sectors enables more detailed insight into the volume, structure and change of the deficit during the observed period. The following sectors show a trade surplus: manufacture of tobacco products, manufacture of wood and products of wood, manufacture of coal,

[4] Manufacturing creates more than 80.0% of total gross value added of the industry (Source: Republic Croatia – Central Bureau of Statistics).

[5] Relative deficit is defined as $\frac{x-m}{x+m}$, where x is the value of merchandize export, and m the value of merchandize import.

refined petroleum products and nuclear fuel and manufacture of other transport equipment (shipbuilding industry).

Other economic sectors have a trade deficit. The highest relative trade deficit was recorded in the manufacture of motor vehicles, trailers and semi-trailers. The obtained results in 2007 are significantly worse than 1993 where as many as 10 economic sectors had a trade surplus. Only three sectors recorded an improvement of trade balance from 1993 to 2007:

- tanning and dressing of leather, manufacture of luggage, handbags;
- manufacture of machinery and equipment and
- manufacture of office machinery and computers.

The sectors which had a trade surplus in 1993 and in 2007 a trade deficit are: manufacture of food products and beverages, manufacture of tobacco products, manufacture of clothing, publishing, printing and reproduction of recorded media, manufacture of other non-metallic mineral products, manufacture of electrical machinery and apparatus, and manufacture of furniture. The greatest deterioration was recorded in traditional domestic export activities: manufacture of clothing, manufacture of furniture and manufacture of wood and wood products.

Table 1.

RELATIVE DEFICITS OF MANUFACTURING BY SECTORS

	2007.	2007.-1993.
D Manufacturing		
15 Manufacture of food products and beverages	-0,25	-0,30
16 Manufacture of tobacco products	0,66	-0,29
17 Manufacture of textiles	-0,37	-0,24
18 Manufacture of clothing	-0,16	-0,79
19 Tanning and dressing of leather; manufacture of luggage, handbags	-0,12	0,13
20 Manufacture of wood and products of wood	0,14	-0,57
21 Manufacture of pulp, paper and paper products	-0,46	-0,36
22 Publishing, printing and reproduction of recorded media	-0,27	-0,41
23 Manufacture of coal, refined petroleum products and nuclear fuel	0,19	-0,67
24 Manufacture of chemicals and chemical products	-0,40	-0,38

	2007.	2007.-1993.
25 Manufacture of rubber and plastic products	-0,66	-0,40
26 Manufacture of other non-metallic mineral products	-0,13	-0,34
27 Manufacture of basic metals	-0,50	-0,19
28 Manufacture of fabricated metal products, except machinery and equipment	-0,36	-0,20
29 Manufacture of machinery and equipment n. e. c.	-0,46	0,03
30 Manufacture of office machinery and computers	-0,67	0,31
31 Manufacture of electrical machinery and apparatus n. e. c.	-0,08	-0,08
32 Manufacture of radio, television and communication equipment	-0,46	-0,32
33 Manufacture of medical, precision and optical instruments, watches	-0,57	-0,01
34 Manufacture of motor vehicles, trailers and semi-trailers	-0,80	-0,12
35 Manufacture of other transport equipment	0,18	-0,04
36 Manufacture of furniture	-0,21	-0,53

Source: Republic Croatia – Central Bureau of Statistics; COMEXT; own calculations.

Nowadays, Croatian manufacturing is faced with a dramatic reduction of demand and strong competition. The analysis of recent trends contributes to creating a pessimistic expectation about movements of exports in the upcoming period. Namely, industry production was slowly growing in the last few years and after middle of 2008 industrial production has been decreasing. This is the consequence of reduced demand for industry products on international markets. The reduced demand resulted in aggregation of the storage of industrial products in production firms.

In the next part of the paper the changes of export and import structures, comparative advantages, horizontal and vertical specialization, trade by countries and export competitiveness are analyzed.

3. Quantitative analyses

This part of the analysis is related to the analysis of dispersion and concentration, the analysis of comparative advantages, the analysis of horizontal and vertical specialization in the international trade and the analysis of export competitiveness. At the very beginning of the research, the methodology applied is explained.

3.1. Methodology

The data are at the 3-digit level according to the SITC (Standard International Trade Classification) and includes 246 product groups. The analysis is conducted using data for the period from 1993 to 2007. The data are sourced from the Croatian Central Bureau of Statistics and the database Comext.

The empirical analysis of the trade pattern in Croatia was calculated using the following indicators:

- trade entropy index (TEI) for the analysis of the dispersion and concentration;
- Lafay index (LFI) for the analysis of comparative advantages;
- relative unit value indicator (RUV) for the analysis of horizontal and vertical specialization;
- indicator of export competitiveness.

The dispersion and concentration of export and import structure are analyzed applying empirical calculations TEI indicator („Trade Entropy Index“) which is calculated according to the following expression:

$$I_{xi} = \sum_j b_{ij} \ln\left(\frac{1}{b_{ij}}\right) \; ; \quad 0 < b_{ij} < 1; \quad \sum_j b_{ij} = 1$$

where b_{ij} is the share of the export of individual product *i* in total export of manufacturing *j*. The same is valid for imports.

For the analysis of comparative advantages, the Lafay index is used. The Lafay index (LFI) takes into account intra-industry trade flows. In this respect it is superior to both the traditional Revealed Comparative Advantages index of Balassa (1965) and the Beneficial Structural Change index of Bender (2001), (Zaghini, 2005). For a given country, *i*, and for any given product, *j*, the Lafay index is defined as:

$$LFI^i{}_j = 100\left(\frac{x^i{}_j - m^i{}_j}{x^i{}_j + m^i{}_j} - \frac{\sum_{j=1}^{N}\left(x^i{}_j - m^i{}_j\right)}{\sum_{j=1}^{N}\left(x^i{}_j + m^i{}_j\right)}\right)\frac{x^i{}_j + m^i{}_j}{\sum_{j=1}^{N}\left(x^i{}_j + m^i{}_j\right)}$$

where x^i_j and m^i_j are exports and imports of product j of country i, to and from the rest of the world, respectively, and N is the number of traded items. According to the index, the comparative advantage of country *i* in the production of item

j is measured by the deviation of product *j* normalized trade balance from the overall normalized trade balance. The normalization of each sector is obtained by weighting each product's contribution according to its respective importance in trade, that is, the share of trade of product *j* (imports plus exports) on total trade. Given that the index measures each group's contribution to the overall normalized trade balance, the following relation holds: $\sum_{j=1}^{N} LFI_j^i = 0$. Positive values of the Lafay index indicate the existence of a comparative advantage; the larger the value the higher the degree of specialization. Similarly, negative values point to de-specialization.

The RUV indicator was originally developed by Abd-el-Rahman (1991). Later, numerous derivations originated from this indicator (Greenawy, Hine, Milner, 1994). The RUV indicator is useful for the purpose of analyses of horizontal and vertical intra-industry trade. The indicator is based on the unit value of exports and imports. The unit value of exports is calculated as the value of exports divided by the quantity and the unit value of imports as the value of imports divided by the import quantity:

$$1-\alpha \le \frac{UVX_i}{UVM_i} \le 1+\alpha$$

UVX_i refers to the unit value of exports of product groups i, and UVM_i refers to the unit value of imports. Parameter α is a dispersion factor. The value of the parameter can be arbitrarily fixed. In most studies the parameter is assumed to be equal to 0.15 (Algieri 2004; Reganati, Pittiglio, 2005). If the exports and imports unit value differ by less than 15%, then intra-industry trade is horizontal, and if the difference is higher, intra-industry trade is vertical. If the RUV is within the interval (0.85; 1.15) intra-industry trade is horizontal; conversely if it is outside of this interval it is vertical. If the RUV is greater than 1.15, the country is "exporting quality" while if it is smaller than 0.85 the country is "importing quality". Vertical intra-industry trade is assumed to have two components, high quality (HQVIIT) and low quality (LQVIIT). A high share of LQVIIT means that a country is specializing in relatively low-priced export goods in the vertically differentiated sectors. A high share of HQVIIT implies that VIIT takes the form of high-valued exports. Therefore if the relative unit value of a good is below the limit of 0.85, it is considered to be a low quality export. Conversely, if the RUV indicator is over the limit 1.15, it is considered a high quality export. In summary, intra-industry trade (IIT) contains the following components:

$$\text{IIT} = \text{HIIT} + \text{LQVIIT} + \text{HQVIIT}$$

Export competitiveness is analyzed applying the indicator of competitiveness. It is the ratio between exports of the product, *i*, to observed market *c* and total imports of this product from the market *c*:

$$Ic_i(a,c) = \frac{EX_i(a,c)}{\sum_{i=1}^{n} IM_i(c)} \times 100$$

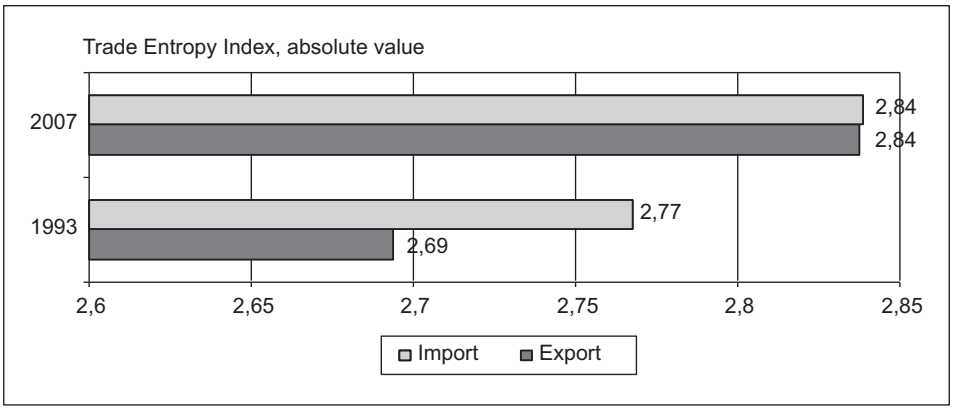
EXi (a, c) is the export of the product, *i*, of country, *a*, to the market *c*. The total import product, *i*, from market, *c*, is $\sum_{i=1}^{n} IM_i(c)$.

3.2. Analysis of dispersion and concentration

The analysis of the export and import structure of manufacturing begins with an analysis of dispersion and concentration. The trend of the dispersion and concentration of exports and imports was determined by the transition process, existing trade connections, and of course the proximity of a strong economic structure – The European Union . However, the dynamic of change of economic structure, the integration and the level of specialization could have significant influence on

Graph 3.

ENTROPY INDEX OF MANUFACTURING IN 1993 AND 2007



Source: Republic Croatia – Central Bureau of Statistics; own calculations.

the higher or lower level of dispersion and concentration. The dispersion and concentration of the manufacturing sectors are analyzed using empirical calculations of the TEI indicator (Trade Entropy Index).

Concerning the entropy index it is noted that imports were more dispersed in 1993 than exports. The level of dispersion of exports and imports in 2007 was on approximately the same level (graph 3). The different dynamics of export and import trends in the individual sectors has resulted in an expected change of export and import structure.

The analysis of export structure shows that the shipbuilding industry is the largest component in the export structure of Croatian manufacturing (table 2).

The share of the shipbuilding industry in total export of manufacturing was 12.6% in 2007. After the shipbuilding industry, the activities which have a share in total exports between 8.0% and 11.0% are:

- manufacture of coal, refined petroleum products;
- manufacture of chemicals and chemical products;
- manufacture of machinery and equipment and
- manufacture of food products and beverages.

Concerning the dynamic of change of the export structure it is noted that production of clothing is recorded as dramatically decreasing in the export structure as a result of the deterioration of export competitiveness. The share of this industry activity was 17.3% in 1993, and 3.5% in 2007. The perspective of this industry activity is troublesome because mostly production is based on the "finishing" business where products are made for a known buyer and according to the given technology from that buyer. There is low value added export, and regard to the strengthening of price competitiveness from the export markets, the perspective is short-term (Buturac, 2007). A similar situation is found in the tanning and dressing of leather. The share of this activity in the total export of manufacturing was 6.9% in 1993, and 2.9% in 2007.

Apart from the textile and clothing industry, a decrease in the share in the total export structure of manufacturing has been recorded in: manufacture of food products and beverages, manufacture of wood and products of wood, manufacture of chemicals and chemical products, manufacture of pulp, paper and paper products, manufacture of furniture.

At the same time, the shipbuilding industry and manufacture of machinery and equipment have noted the greatest increase in share of export structure. The shipbuilding industry increased its share in total exports during the observed period by 8.9%, and the manufacture of machinery and equipment by 4.8%.

Table 2.

EXPORT AND IMPORT STRUCTURE OF CROATIAN MANUFACTURING FROM 1993 TO 2007

	Export structure, %		Import structure, %	
	2007.	2007.-1993.	2007.	2007.-1993.
D Manufacturing	100,0	-	100,0	-
15 Manufacture of food products and beverages	8,1	-1,3	7,1	-1,9
16 Manufacture of tobacco products	0,9	0,2	0,1	0,1
17 Manufacture of textiles	2,7	-0,7	3,0	-1,5
18 Manufacture of clothing	3,5	-13,7	2,6	-1,6
19 Tanning and dressing of leather; manufacture of luggage	2,9	-4,0	1,9	-10,1
20 Manufacture of wood and products of wood	4,3	-1,7	1,7	0,6
21 Manufacture of pulp, paper and paper products	1,9	-1,3	2,7	-1,4
22 Publishing, printing and reproduction of recorded media	0,6	0,4	0,6	0,4
23 Manufacture of coal, refined petroleum products	10,7	0,8	3,8	3,0
24 Manufacture of chemicals and chemical products	9,7	-3,3	11,9	-2,3
25 Manufacture of rubber and plastic products	1,6	-0,1	4,1	1,0
26 Manufacture of other non-metallic mineral products	4,0	0,9	2,7	0,6
27 Manufacture of basic metals	5,5	2,6	8,6	2,9
28 Manufacture of fabricated metal products	4,5	2,3	5,0	1,7
29 Manufacture of machinery and equipment n. e. c.	8,3	4,8	11,8	1,0
30 Manufacture of office machinery and computers	1,1	1,0	2,8	-0,4
31 Manufacture of electrical machinery and apparatus n. e. c.	5,8	1,8	3,6	-0,6
32 Manufacture of radio and communication equipment	3,4	1,8	4,8	2,6
33 Manufacture of medical, precision and optical instruments	1,2	0,5	2,2	-0,3
34 Manufacture of motor vehicles, trailers and semi-trailers	2,2	1,0	10,8	3,6
35 Manufacture of other transport equipment	12,6	8,9	4,6	2,1
36 Manufacture of furniture	4,6	-0,9	3,7	0,7

Source: Republic Croatia – Central Bureau of Statistics; own calculations.

Three sectors of manufacturing have the highest shares in total exports:

- manufacture of chemicals and chemical products;
- manufacture of machinery and equipment and
- manufacture of motor vehicles, trailers and semi-trailers.

Cumulatively, these sectors account for one third of total manufacturing imports. Their individual shares in total imports are between 10.0% and 12.0% (table 2). The lowest share in the import structure is in publishing, printing and reproduction of recorded media which is domestic production and relates to the domestic market. The tanning and dressing of leather recorded the greatest changes in import structure. The share of these activities in the total import of manufacturing was 12.1% in 1993, and 1.9% in 2007. Manufacture of coal, refined petroleum products have noted the greatest increasing in import structure, from 7.2% to 10.8%.

The analysis of the trade structure in manufacturing leads to the conclusion that the dispersion of exports and imports are on the favourable level since none of the sectors do not have total domination in export or import structure. But, although a higher level of the dispersion of exports could have positive impacts on possible losses of the markets, at the same time it could reveal an insufficient level of trade specialization. According to the theory, it is expected from small countries like Croatia trade specialization in the less part of economic sectors in which there are comparative advantages and the opportunities for the strengthening of export competitiveness.

3.3. The analysis of structural changes of exports and imports using the Lafay index

The results from the previous parts of the paper show that the period of transition was characterized by a significant increase in the openness and the volume of international trade.

The key question in this part of the paper is: does an increase in openness in international trade correspond to positive changes in trade structure? A positive change in the trade structure implies a change of comparative advantages towards higher value added sectors and products as well as a higher level of trade specialization. In this part, comparative advantages are analyzed while trade specialization is analyzed in the following part of the paper.

According to the obtained results, comparative advantages can be found in the following sectors: manufacture of food products and beverages; manufacture of tobacco products; manufacture of clothing; tanning and dressing of leather;

manufacture of luggage; manufacture of wood and products of wood; manufacture of coal, refined petroleum products; manufacture of other non-metallic mineral products; manufacture of electrical machinery and apparatus; manufacture of other transport equipment and manufacture of furniture (table 3). Concerning the share in the export structure and the value of LFI index the shipbuilding industry is the most important Croatian export activities. The greatest improvement of comparative advantages have noted in shipbuilding industry and manufacture of machinery and equipment. At the same time, manufacture of clothing has noted the greatest deterioration of LFI index.

Table 3.

LFI INDEX BY MANUFACTURED SECTORS

	LFI index			
	1993.	2000.	2007.	2007.-1993.
D Manufacturing				
15 Manufacture of food products and beverages	0,21	-0,49	0,56	0,35
16 Manufacture of tobacco products	0,35	0,64	1,69	1,34
17 Manufacture of textiles	-0,59	-0,38	-0,17	0,42
18 Manufacture of clothing	6,54	2,74	0,57	-5,98
19 Tanning and dressing of leather; manufacture of luggage	-2,59	0,53	0,60	3,18
20 Manufacture of wood and products of wood	2,45	1,53	2,08	-0,37
21 Manufacture of pulp, paper and paper products	-0,48	-0,72	-0,37	0,11
22 Publishing, printing and reproduction of recorded media	0,03	0,13	0,03	0,00
23 Manufacture of coal, refined petroleum products	4,55	4,71	5,85	1,30
24 Manufacture of chemicals and chemical products	-0,60	-1,03	-1,05	-0,45
25 Manufacture of rubber and plastic products	-0,68	-0,98	-1,04	-0,36
26 Manufacture of other non-metallic mineral products	0,48	0,79	0,78	0,30
27 Manufacture of basic metals	-1,43	-0,99	-1,43	0,00
28 Manufacture of fabricated metal products	-0,50	-0,49	-0,24	0,26
29 Manufacture of machinery and equipment n. e. c.	-3,67	-3,12	-1,67	2,01
30 Manufacture of office machinery and computers	-1,60	-1,27	-0,72	0,89
31 Manufacture of electrical machinery and apparatus n. e. c.	-0,09	0,72	1,44	1,53
32 Manufacture of radio and communication equipment	-0,34	-0,58	-0,69	-0,36
33 Manufacture of medical, precision and optical instruments	-0,93	-0,59	-0,47	0,46
34 Manufacture of motor vehicles, trailers and semi-trailers	-2,95	-5,55	-3,26	-0,31
35 Manufacture of other transport equipment	0,62	4,34	6,78	6,16
36 Manufacture of furniture	1,23	0,07	0,49	-0,75

Source: Republic Croatia – Central Bureau of Statistics; own calculations.

Further to the paper the important question is: how large is the ratio of the unit value of exports and the unit value of imports in those sectors with comparative advantages? Also, the intention is to explore whether the products with comparative advantages have a higher ratio of the unit value of exports and the unit value of imports? For this purpose, in table 4 the first seventeen products at the three digit level of SITC concerning the value of the LFI index are shown.[6] Also, the table includes the ratio of the unit value of exports and imports (RUV) for every product.[7]

Table 4.

THE INDICATOR OF TRADE SPECIALIZATION AND COMPARATIVE ADVANTAGES (LFI) AND INDICATOR OF THE RATIO BETWEEN THE UNIT VALUE OF EXPORTS AND IMPORTS (RUV)

SITC	PRODUCT	LFI	% EXPORTS	RUV
793	Ships, boats	3,62	11,33	0,89
334	Petroleum products	2,56	8,82	1,28
771	Electrical machinery	0,94	2,40	1,65
248	Wood	0,86	2,37	1,07
562	Fertilizers	0,69	1,84	1,00
821	Furniture	0,55	3,07	1,41
061	Sugars, sugar preparations and honey	0,51	1,65	1,81
661	Cement	0,48	1,46	0,61
282	Garbage from iron	0,45	1,05	1,00
571	Polymers from ethylene	0,43	1,35	0,89
288	Garbage from metals	0,39	0,89	1,84
845	Clothing	0,35	1,76	1,25
122	Tobacco	0,34	0,86	2,37
572	Other polymers	0,31	0,81	0,89
098	Miscellaneous edible products and preparations	0,26	1,28	0,73
784	Parts and trailer of road vehicles	0,25	1,25	0,61
851	Footwear	0,24	1,63	2,44

Source: Republic Croatia – Central Bureau of Statistics; own calculations.

The first seventeen products at the three digit level of SITC with regard to the value of LFI [8] index do not have a higher ratio between the unit value of exports

[6] SITC is the shortcut for Standard international trade classification
[7] The subject of the analysis is 252 products at three digit level of SITC
[8] LFI is the shortcut for Lafay index

and imports. The value of the Pearson coefficient of correlation between the LFI index and the ratio of the unit value of exports and imports reveals the absence of a positive correlation among these indicators. It means that the products with a higher LFI index do not have at the same time a higher ratio between the unit value of exports and imports. The main reason for this lies in the fact that a significant number of industrial products with comparative advantage have a small ratio between the unit value of exports and imports (table 4).

The analysis of comparative advantage does not reveal an unambiguous conclusion for overall manufacturing industry. On the one hand, there are products with comparative advantage (47 products), while on the other hand there are products which do not have comparative advantage. At the first sight the unfavourable ratio on behalf the products without comparative advantage does not have to necessary lead to a conclusion about the unfavourable trade structure. The reason is a characteristic of small countries such as Croatia where it is expected that comparative advantages and trade specialization will be found in a smaller number of the products. However, the results of the correlation analysis show that products with a higher level of comparative advantage do not have a higher ratio between the unit value of exports and imports. This point to an unfavourable trade structure. Apart from this, the characteristic of a significant number of manufactured products is the loss of comparative advantage during the transition period. Missing comparative advantages are connected with slow structural adjustments.

The higher increase of exports is recorded in the shipbuilding industry. It has resulted the greatest share of the shipbuilding industry in export structure as well as comparative advantages. The end of the war in Croatia and the region as well as the ratification of free trade agreements with the republics of former Yugoslavia ensure opportunities of higher export to these markets. Here it is easier to sell of domestic products because the above mentioned markets are closer with lesser competition in comparison with EU markets. However, the markets of the republics of former Yugoslavia are also under the influence of the processes of globalization, integration and liberalization. These processes have resulted in heightened competition on those markets. On the other hand, transition countries from eastern Europe are becoming direct competitors for Croatian manufactured products through the opening of EU markets. Croatian manufacturing has decreased its exports to EU markets during the transition period (textile industry, footwear industry, manufacture of furniture). It could be concluded that Croatia has not taken advantage of the opening of EU markets for export growth. At the same time, higher exports to the markets of the former Yugoslav republics was not enough to catch up missing comparative advantage to EU markets.

3.4. The analysis of horizontal and vertical trade specialization

After comparative advantages were analyzed, the export and import structure concerning realized economic benefits from international trade are explored. For this purpose horizontal and vertical specialization are analyzed. Horizontal intra-industry trade occurs when similar products are simultaneously exported and imported, mainly due to product differentiation. Vertical intra-industry trade represents the simultaneous exports and imports of goods within one industry but the products are at different stages of production. Empirical research of intra-industry trade began in the mid 1960s. The first results were exposed by Balassa (1966). The most well known work on intra-industry trade was made by Grubel and Lloyd (1975). This research was then followed by, what we know today as the theory of intra-industry trade (Dixit, Stiglitz, 1977; Krugman, 1980, 1981; Lancaster, 1980; Helpman, 1981). The role and significance of intra-industry trade in the process of globalization and integration of transition economies on international markets is becoming more important than previously. Research in the field of international trade shows that intra-industry is the fastest growing segment in the international trade of transition economies (Aturupane, Djankov, Hoekman, 1997; Kaminski, Ng, 2001). The key question is what happens with the comparative advantages and utility in international trade. Namely, we can ask does an increase in the integration with international markets and growth in intra-industry trade specialization correspond to changes in comparative advantages towards higher value added products? Intra-industry trade can be separated into horizontal and vertical types based on the unit value of exports and imports (Algieri, 2004; Reganati, Pittiglio, 2005). The unit value of exports is calculated as the value of exports divided by the quantity and unit value of imports as the value of imports divided by the import quantity. If RUV is within the interval 0.85- 1.15 intra-industry trade is horizontal, conversely if it is outside of this interval it is vertical.

In table 5 is shown the distribution of the values of the RUV indicator for manufactured products at the three digit level of SITC. It is noted that most manufactured products have a higher unit value of imports than exports (145 from 252). An interesting question is: do the products with higher RUV indicators have a higher share in the export structure?

For this purpose the coefficient of correlation between RUV indicator and the export share is calculated. The obtained value of the coefficient is approximately zero. It reveals the absence of correlation between the above mentioned variables. Also, it means that products which have a higher ratio between the unit value of exports and imports do not necessarily have a higher share in the export structure.

Table 5.

THE DISTRIBUTION OF THE FREQUENCY OF THE RUV

	Frequency	Cumulative frequency	Percent (frequency)	Percent (cumulative)
0,00 < RUV 0,50	54	54	21,43	21,43
0,50 < RUV 0,85	56	110	22,22	43,65
0,85 < RUV 1,00	35	145	13,89	57,53
1,00 < RUV 1,15	27	172	10,71	68,25
1,15 < RUV 2,00	46	218	18,25	86,50
2,00 < RUV 3,00	17	235	6,74	93,25
3,00 < RUV 4,00	4	239	1,59	94,84
4,00 < RUV 5,00	4	243	1,59	96,43
5,00 < RUV 6,00	1	244	0,39	96,82
6,00 < RUV 7,00	0	244	0,00	96,82
7,00 < RUV 8,00	3	247	1,19	98,01
8,00 < RUV 9,00	0	247	0,00	98,01
9,00 < RUV 10,00	1	248	0,39	98,41
RUV> 10,00	4	252	1,59	100,00

Source: Republic Croatia – Central Bureau of Statistics; own calculations.

In table 6 the first twenty manufactured products concerning calculated RUV values are shown. At the same time, for every product its related export share is noted. The analysis of the results leads to the conclusion that the great majority of products belongs to the sphere of labour-intensive products. Also, it is noted that none of the first twenty products have an export share higher than 1%. The products which have the highest share in total export are ships (11.3% of total export). However, ships have a ratio between the unit value of exports and imports less than 1 (RUV=0.83) and from the total number of manufactured products (252), they are in 133rd place.

Table 6.

THE INDICATOR OF THE RATIO BETWEEN UNIT VALUE OF EXPORTS AND IMPORTS (RUV) IN 2007

SITC	PRODUCT	RUV	% EXPORT
848	Clothing	30,43	0,17927
272	Fertilizers	26,39	0,00005
278	Other raw minerals	19,82	0,09498
613	Fur	9,27	0,03013
515	Organic and inorganic compounds	7,48	0,12720
634	Veneers, plywood	7,32	0,96775
681	Silver, platinum	7,07	0,03172
277	Natural abrasives	5,20	0,00006
841	Coats	4,52	0,90678
731	Machinery for production using metals	4,48	0,22798
264	Jute	4,05	0,00001
593	Explosives	4,04	0,00590
265	Textile fibres from vegetable	3,58	0,00001
612	Products from leather	3,41	0,51257
034	Fish	3,37	0,82299
516	Organic chemicals	3,14	0,02463
831	Chests, briefcase	2,99	0,09101
696	Knifes	2,94	0,00962
721	Agricultural machineries	2,87	0,44241
054	Vegetable	2,73	0,06564

Source: Republic Croatia – Central Bureau of Statistics; own calculations.

Finally, the results of trade specialization are summarized in table 7.

Table 7.

THE DISTRIBUTION OF MANUFACTURED PRODUCTS AT THE THREE DIGIT LEVEL OF SITC CONCERNING THE TYPE OF INTERNATIONAL TRADE

Type of trade	Number of products
I. Inter-industry	159
II. Intra-industry	97
A) Vertical intra-industry (RUV<0,85)	41
B) Horizontal intra-industry (0,85<RUV<1,15)	26
C) Vertical intra-industry (RUV>1,15)	31

Source: Republic Croatia – Central Bureau of Statistics; own calculations.

To conclude, for most manufactured products inter-industry trade dominates (159). Intra-industry trade prevails for 97 manufactured products. Vertical specialization with low value added export is found for 41 products, and vertical specialization with high value added export for 31 products. At the same time horizontal specialization dominates for 25 products.

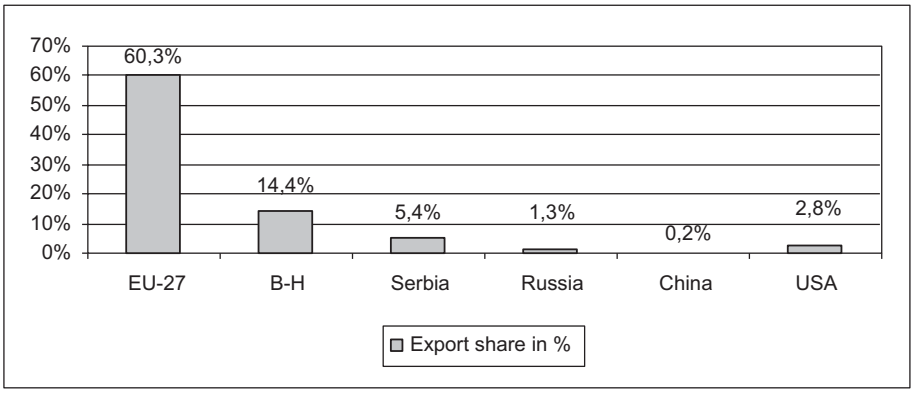
The change of trade structure towards inter-industry trade is partly a consequence of the decreasing of domestic production, the liberalization of domestic markets and a significant growth in imports. Those activities with positive export trends are mostly labour-intensive or raw-materials intensive. Intra-industry trade prevails in those sectors which are included in international production technological chains. This was a good way of continuing with production, increasing employment and exports (manufacture of electric machinery and equipment). A significant part of intra-industry trade is related to the "finishing" activities where earnings are small, and the perspective is short-term (textile industry, footwear industry). In the intra-industry trade structure horizontal specialization and vertical specialization with low value added export prevail (RUV<1.15).

3.5. Trade by countries

After the analysis of comparative advantages and trade specialization the structures of exports and imports by countries are analyzed. It is noted that Croatia exports mostly manufactured products to the European Union (graph 4).

Graph 4.

THE EXPORT STRUCTURE OF MANUFACTURING
BY MAIN TRADE PARTNERS IN 2007



Source: Republic Croatia – Central Bureau of Statistics; own calculations.

The volume of exports by individual EU countries is determined by the geographical distance, the value of GDP of EU countries and existing trade relationships. Croatia typically exports to those countries that are closer and have higher GDP. The most important trade partners are Italy and Germany. Croatia exported in 2007 in these two countries about 50.0% of its total exports to EU. It is interesting to explore which are the most important markets for the main domestic manufactured products ? The main export products and related markets are shown in table 8.

Table 8.

EXPORT DESTINATION OF MANUFACTURED PRODUCTS WITH THE HIGHEST SHARE IN TOTAL EXPORT OF MANUFACTURING IN 2007

SITC	PRODUCT/COUNTRY	EXPORT SHARE (%)
793	Ships	11,3
	Italy.....30,1%	
	Malta.....14,5%	
	Panama.....5,8%	
334	Refined petroleum products	8,8
	Bosnia and Herzegovina.....45,5%	
	Gibraltar.....10,5%	
	Serbia.....7,8%	
821	Furniture	3,1
	Germany.....25,8%	
	Slovenia.....12,0%	
	Italy 11,2%	
771	Electrical machinery	2,4
	Qatar.....26,3%	
	Republic of South Africa.....11,1%	
	The Czech Republic.....4,8%	
248	Wood	2,4
	Italy.....36,3%	
	Slovenia.....7,6%	
	Austria.....5,9%	
542	Medicines	2,2
	USA.....29,2%	
	Russia.....22,4%	
	Bosnia and Herzegovina.....10,0%	

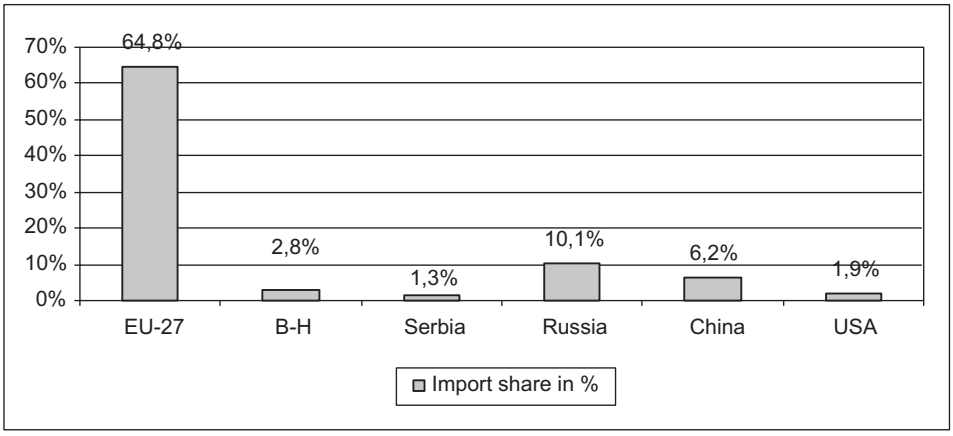
Source: Republic Croatia – Central Bureau of Statistics; own calculations.

The ships, that have the highest share in the total export of manufacturing, are exported mostly to Italy, but also to remote naval countries as Panama. Primary destination for the export of refined petroleum products is Bosnia and Herzegovina, while the export of furniture is oriented to western EU countries (Germany, Italy, Slovenia, Austria). The leading export destination for electrical machinery are somewhat further fields (Qatar, Republic of South Africa). The same situation is with medicines which are mostly exported to the USA and Russia.

The import structure of manufacturing by main partners in 2007 is shown in graph 5. It is noted that Russia and China have a significantly higher share in the import structure than in the export structure. Also, the share of the EU-27 is higher in imports than in exports. Unlike, Bosnia and Herzegovina have significantly higher share in the export structure relative to import structure.

Graph 5.

THE IMPORT STRUCTURE OF MANUFACTURING
BY MAIN PARTNERS IN 2007



Source: Republic Croatia – Central Bureau of Statistics; own calculations.

The opening of western markets, especially EU markets, has not had significant impacts on the export growth of domestic manufacturing. At the same time, Croatian producers have increased their exports to former Yugoslav republics. Surely, the end of the war in Croatia and region as well as the ratification of free trade agreements have stimulated exports to these markets. The main reasons for the easier export to the countries of former Yugoslavia are the lower openness of these countries and less competition on these markets.

3.6. The analysis of the export competitiveness to EU-27 markets

The European Union is the most important export destination for Croatian manufacturing. That is why in this part of the paper the emphasis is on the export competitiveness to EU markets. As an indicator of export competitiveness we use the ratio between the export share of individual product i to observed markets and total import of that product from observed market. The comparison of the export competitiveness between domestic production activities is shown in table 9.

Table 9.

THE INDICATOR OF THE EXPORT COMPETITIVENESS TO EU MARKETS BY CROATIAN ECONOMIC SECTORS FROM 2002 TO 2007

	2002	2003	2004	2005	2006	2007
I.PRIMARY PRODUCTS	0,27	0,29	0,26	0,26	0,24	0,24
Agricultural products	0,53	0,62	0,50	0,66	0,76	0,65
Energy	0,09	0,08	0,09	0,08	0,05	0,07
II. MANUFACTURED PRODUCTS	0,35	0,39	0,45	0,38	0,39	0,45
Machinery	0,20	0,24	0,29	0,26	0,29	0,47
Transport equipment	0,12	0,23	0,50	0,26	0,28	0,28
Chemicals	0,37	0,37	0,42	0,37	0,36	0,38
Textiles and clothing	0,86	0,87	0,77	0,68	0,56	0,52
III. TOTAL	0,33	0,36	0,38	0,35	0,35	0,35

Source: COMEXT, own calculations.

The results show that Croatia did not improve significantly its level of export competitiveness to EU-27 markets from 2002 to 2007. At the same time, the increase of the share of manufacturing in the total manufacturing of EU could lead to the conclusion that export competitiveness has improved. However, it is difficult to conclude unambiguously in terms of overall manufacturing. There are activities which have improved their export competitiveness such as the manufacture of machinery and transport equipment. On the other hand the textile industry showed a deteriorating level of export competitiveness during the observed period. At the same time the share of the chemical industry in total exports to the EU-27 did not change significantly.

For the purpose of getting detailed information about the export competitiveness of domestic manufacturing to EU markets a comparison with other selected transition countries is made (table 10).

Table 10.

THE COMPARISON OF THE INDICATOR OF THE EXPORT COMPETITIVENESS IN CROATIA AND SELECTED TRANSITION COUNTRIES TO EU-27 MARKETS IN 2007

	Albania	Bosnia and Herzegovina	Croatia	Macedonia	Serbia
I.PRIMARY PRODUCTS	0,03	0,10	0,24	0,07	0,22
Agricultural products	0,04	0,18	0,65	0,18	0,63
Energy	0,02	0,01	0,07	0,00	0,01
II. MANUFACTURED PRODUCTS	0,06	0,17	0,45	0,21	0,32
Machinery	0,01	0,11	0,47	0,02	0,17
Transport equipment	0,00	0,17	0,28	0,01	0,13
Chemicals	0,00	0,05	0,38	0,02	0,31
Textiles and clothing	0,20	0,17	0,52	0,60	0,24
III. TOTAL	0,04	0,13	0,35	0,13	0,26

Source: COMEXT, own calculations.

The obtained results lead to the conclusion that the Croatian manufacturing has a significantly better position in terms of EU-27 markets compared to Albania, B-H, Macedonia and Serbia. In all manufacturing sectors the indicator of the export competitiveness is higher than in the selected countries accept in the textile industry where Macedonia has a somewhat higher level of competitiveness.

4. Conclusion

The processes of transition, restructuring, privatization, economic integration and liberalization of markets have determined the movements of Croatian manufacturing in international trade. The growth of the openness and liberaliza-

tion of markets have favored the dynamic growth of imports. At the same time, Croatia did not take advantage of economic integration for export growth. Croatia has a higher level of comparative advantage in trade of: leather products, tobacco, electrical machinery, wood, cement, butter and ships. The results of the correlation analysis show that products with comparative advantages do not realize a higher value added export. Inter-industry trade with positive export trends prevails in labor-intensive or raw-material intensive activities. Intra-industry trade is characterized by horizontal specialization and vertical specialization where a small ratio between unit value of exports and unit value of imports is achieved.

Croatia exports manufactured products mostly to EU markets. The significant export growth to former Yugoslav republics is noted. On the import side there has been a continual growth of Chinese manufactured products especially in the textile and clothing industries. At the same time, Croatian textile and clothing industries have deteriorated dramatically in terms of export competitiveness to EU markets. On the other hand, manufacturing of electrical machinery have significantly improved the export position to EU markets. The indicators of entropy, comparative advantages and trade specialization reveal an insufficient level of specialization of domestic manufacturing in international trade. Those products with comparative advantages do not have at the same time the highest ratio between the unit value of exports and the unit value of imports. This shows the unfavorable trade structure of Croatian manufacturing.

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STRUKTURNA OBILJEŽJA IZVOZA I UVOZA HRVATSKE PRERAĐIVAČKE INDUSTRIJE

Sažetak

U ovom se radu analiziraju strukturna obilježja izvoza i uvoza hrvatske prerađivačke industrije za vrijeme tranzicije. Osnovna je značajka procesa znatno veća prosječna godišnja stopa rasta uvoza nego izvoza što je rezultiralo velikim relativnim deficitom. Rezultati korelacijske analize pokazuju da proizvodi koji imaju komparativne prednosti, nemaju ujedno veći omjer jedinične cijene izvoza i uvoza. U strukturi međunarodne razmjene hrvatske prerađivačke industrije prevladava inter-industrijska razmjena pri čemu pozitivne izvozne trendove bilježe radno intenzivni proizvodi i proizvodi intenzivni sirovinama. U dijelu strukture međunarodne razmjene koji se odnosi na intra-industrijsku razmjenu prevladavaju horizontalna specijalizacija i vertikalna specijalizacija s malom dodanom vrijednosti izvoza. Najveće je pogoršanje izvozne konkurentnosti na tržištu Europske unije zabilježeno kod industrije tekstila i odjeće. Indeks entropije, pokazatelj komparativnih prednosti i pokazatelj horizontalne i vertikalne specijalizacije upućuju na nedovoljnu razinu specijalizacije hrvatske prerađivačke industrije u međunarodnoj razmjeni.

Ključne riječi: izvoz, uvoz, prerađivačka industrija