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 weather 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[1] 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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[1] *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) [2].

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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[2] *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							
The share of exports in GDP (in %)							
	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
The share of imports in GDP (%)							
	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.[3] 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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[3] *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.[4]

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.[5] 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.[6]

Besides Balassa's RCA indicator and Lafay's index, the structure of exports can be analysed by using the CEP (Comparative Export Performance) indicator.[7]

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[4] *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.*

[5] *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).*

[6] *See more details about the use of Lafay's index in Lafay (1992).*

[7] *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
Raw material-intensive goods							
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
Labour-intensive goods							
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
Capital-intensive goods							
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
Easy to imitate research-oriented goods							
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
Difficult to imitate research-oriented goods							
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:

$$RCA_{rel} = \frac{RCA_i - RCA_{uk}}{100} \qquad i = 1,...,5$$

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.

Table 4. Relative RCA indicator in Croatia and selected transition countries from the period 1992 to 2001							
	Croatia	Czech Republic	Hungary	Poland	Romania	Slovenia	Slovakia
Raw material intensive products							
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
Labour intensive products							
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
Capital intensive products							
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
Easy to imitate research-oriented goods							
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
Difficult to imitate research-oriented goods							
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:

where:

$$s = \sqrt{\frac{\sum_{i=1}^{2}(x_a - x_b)_i^2}{N}}$$

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)[8].

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[8] *Export Similarities - ES indicator shows the level of similarites 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 stuctures of exports of county 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.

Table 5. Average deviation of relative RCA indicators of Croatia in relation to each analysed transition country						
	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 successfull 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[9]. 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[10]. 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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[9] *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).

[10] *For more detail analysis of trade specialization in intra-industry trade 3 digit level of data aggregation is required*

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trade[11]. 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

[11] *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
Raw material-intensive goods							
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
Labour-intensive goods							
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
Capital-intensive goods							
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
Easy to imitate research-oriented goods							
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
Difficult to imitate research-oriented goods							
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[12].

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:

$$r = \frac{\sum_{i=1}^{n} x_i y_i - n\overline{xy}}{n\sigma_x \sigma_y}$$

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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[12] *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.
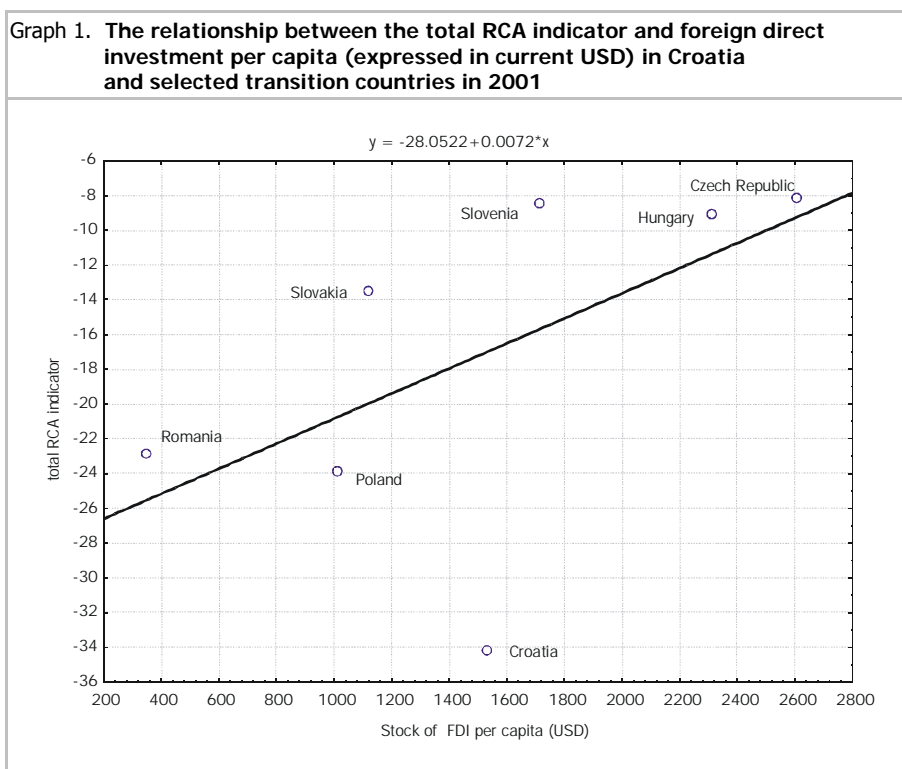
Graph 1. **The relationship between the total RCA indicator and foreign direct investment per capita (expressed in current USD) in Croatia and selected transition countries in 2001**

$y = -28.0522 + 0.0072 * x$

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)[13]. 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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[13] *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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