Intra-Industry Trade and Revealed Comparative Advantage: Empirical Analysis of New Members State`s Economic Competitiveness (EU-8) on a Single Market between 2000 and 2007

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This article analyzes changes in the intensity of intra-industry trade between the new Member States (EU-8) and the EU-15 in the period of 2000-2007. The authors claimed that the results should help to assess adaptation processes which had taken place in these countries before and after the accession to the EU. By analysis of revealed comparative advantage and horizontal and vertical intra-industry trade further research examines the real adjustment processes in terms of EU-8 state economic competitiveness, which occurred during the pre- and post-accession period in order to prepare them to maximize the benefits of the Single European Market. Shares of intra-industry trade, and their dynamics was calculated on the basis of the Grubel and Lloyd`s intra-industry trade (IIT) index. Analysis of the competitiveness of goods from EU-8 in a trade with the EU-15 was based on the Balassa`s revealed comparative advantage index, RCA. Three trade types (one-way, two-way trade in similar products, two-way trade in vertically differentiated products) indictors were calculated using the Freudenberg and Fontagné methodology.

Keywords: intra-industry trade comparative advantage, EU enlargement, state economic competitiveness

1. Introduction

Intra-EU trade is based mainly on intra-industry specialization – which basically rely on factor substitutability rather than on factor complementarity. Moreover, intra-industry trade is a dominant form of exchange on the Single European Market (SEM) and the new Member States of the EU-8 group continue to show relatively low level of GDP per capita and the technological gap in relation to the EU-15 countries. Therefore, it seems vital to observe the adaptation processes in the EU-8 countries to the SEM in the area of intra-industry division of labor intensification.

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That is particularly important because of proved relation between the intensity of the share that a country or a group of countries take in the international division of labor – measured by the level of intra-industry trade and the efficiency of production factors allocation (Pluciński 2001; Zielińska-Głębocka 1996).

In this respect it seems important to examine to what extent trade flows between the new EU Member States (EU-8) and the EU-15 countries were the result of the development of intra-industry specialization. The share of intra-industry trade (IIT) and revealed comparative advantage (RCA) indicators reflect changes in the level of the competitiveness of transition economies, as well as the status of countries` adaptation to the global market in terms of intra-industry division of labor (Misala 2007). This article analyzes changes of trade structure between the EU-8 and the EU-15 in the period of 2000-2007 on the basis of those indicators to assess real adjustment processes in terms of EU-8 state economic competitiveness, which occurred during the pre- and post-accession period in order to prepare them to maximize the benefits of the SEM.

2. Methodology

The analysis based on the IIT and RCA indicators was conducted at 6-digit CN codes level[3] (Cieślik 2003) for total trade and by 5 groups reflecting the intensity of using production factors (1. material-intensive, 2. labor-intensive, 3. capital-intensive, 4. technology-intensive goods, easy to imitate, 5. technology-intensive goods, difficult to imitate)[4] (Misala 1992; Wysokińska 2001). The analysis of EU-8 and EU-15 trade specialization by three trade types (one-way, two-way trade in similar products - HIIT, two-way trade in vertically differentiated products - VIIT) was based on indicators calculated at 8-digit CN codes level due to requirement of product unit value calculation[5] (Śledziewska-Kołodziejska 1998; Michałek-Śledziewska-Kołodziejska 2000).

Shares of intra-industry trade, and their dynamics was calculated on the basis of the Grubel and Lloyd`s intra-industry trade (IIT) index. It shows the share of

[3] This corresponds to the theoretical concept of the industry, and meets the condition that only the highest level of data disaggregation allows the comparison of the same products and is able to reflect the actual degree of overlap between exports and imports, i.e. the real level of intensity of intra-industry trade. Since the primal objective of this study is an analysis of indicators` changes in time, the level of aggregation does not play the most significant role.

[4] This analysis was based on a study of the structure of international trade with emphasis on the intensity of using production factors proposed by: J. Misala and Z. Wysokińska.

[5] The researchers of horizontal and vertical intra-trade underline that it should be analyzed at the level of the product as the best guarantee of avoiding problems associated with empirical aggregation of sectoral data is the sufficiently detailed data.

intra-industry exchange in the total trade taking place within the industry i of the country j, i.e.:

$$IIT_{ij} = \frac{(X_{ij} + M_{ij}) - \left|X_{ij} - M_{ij}\right|}{(X_{ij} + M_{ij})}.$$

where Xij and Mij are respectively the value of exports and imports for the industry i in the trade with the country j.

This indicator is a relative measure receiving values from the interval [0, 1]. If IITij = l, then it is assumed that all trade is of intra-industry characteristics, i.e., Xij = Mij. If, however, IITij = 0, exports and imports do not overlap each other within the industry i, which means that intra-industry trade do not occur, i.e. either Xij = 0 or Mij = 0 (Cieslik-Śledziewska 2003; Czarny 2002; Misala 1985; Misala-Pluciński 2000; Molendowski 2006; Molendowski 2007).

The analysis of the competitiveness of goods from EU-8 in a trade with the EU-15 was based on the Balassa`s revealed comparative advantage index, RCA. It allows to simultaneously take into account the position of the goods from the analyzed countries and the presence of competitors from other countries in a given market. This study was to show for which commodity groups the EU-8 countries have an advantage in exports to the EU-15.

RCA index is defined here as the advantage of the export share of the good n from the county j in the world exports of this good on the EU-15 market above the share in total exports of the country j above the total world exports to the EU-15. The following formula was used for the calculation[6] (Balassa 1965):

$$RCA_n^j = \frac{\dfrac{X_n^{\ j}}{X_n^{\ extraUE-15}}}{\dfrac{X^{\ j}}{X^{\ extraUE-15}}}$$

where: X - exports to the EU-15 market; n - commodity group measured at the CN-6 level, j - the country; extra EU-15 - EU-15 external trade.

This index has the following interpretation: when the index takes values higher than 1, the country has comparative advantage in exports of products belonging to the tested group against foreign countries. If the value is less than 1,

[6] This formula is based on the RCA B. Balassa index which originally has the following form:
RCA = (Xij : Xi) : (Xj : X), where:
Xij — value of exports of the commodity group i from country j;
Xj — walue of total exports from country j;
Xi — value of world exports of the commodity group i;
X — value of total world exports.

then there is the opposite situation – the country does not posses comparative advantage (Jagiełło 2003; Marczewski 2003; Mroczek-Rubaszek 2003).

Three trade types (one-way, two-way trade in similar products, two-way trade in vertically differentiated products) indictors were calculated using the Freudenberg and Fontagné methodology (Fontagné-Freudenberg 1997).

Flows in each particular CN-8 industry (product) were identified as two-way trade if their minimal value represented at least 10% of maximum flows, or met the condition:

$$\frac{Min(X_{kk'it}, M_{kk'it})}{Max(X_{kk'it}, M_{kk'it})} > 10\%$$

where: X – eksports; M – imports; k – country; k' – partner country; i – product; t – year.

Flows were qualified as two-way trade in similar products (horizontal diversification) if there was a fulfillment of two conditions: the one relating to two-way trade and, at the same time, an additional condition relating to similar products. According to the latter condition, products being part of trade flows are considered as similar if the unit value of imports and exports change less than 15%. So, the products are treated as quality substitutes (vertical differentiation) if they have similar prices and they meet the following condition:

$$\frac{1}{1{,}15} \leq \frac{UV^{X}_{kk'it}}{UV^{M}_{kk'it}} \leq 1{,}15$$

where UV– is a product unit value.

3. Changes in the intensity of intra-industry trade

Multilateral intra-industry trade indexes were calculated for total trade between EU-8 and EU-15 countries and for the mutual trade of EU-8 countries in 2000-2007 (see: Table 1).

The analysis of IIT indicators confirms that during the analyzed period for most of EU-8 countries these indices have increased significantly both in mutual trade and trade with EU-15 countries.

The biggest growth took place in Latvia (where the share of intra-industry trade in 2007 was 69,4% higher than in 2000). In Estonia and Poland IIT indexes were higher by about one-forth (respectively 25,2% and 23,9%) and by one-sixth in Slovakia and Hungary (20,6% and 15,3%). The slowest rate of IIT increase in the analyzed period was in Slovenia, the Czech Republic and Lithuania. **Therefore, it might be clearly stated that between 2000 and 2007 there was a significant**

increase in the share of intra-industry trade of all EU-8 counties with EU-15. Moreover, calculated IIT indicators show that regardless of the upward trend in the intensity of intra-industry trade, still the biggest part of exchange between EU-8 and EU-15 continues is of inter-industry characteristics.

Comparative analysis was conducted for IIT indicators in EU-8 mutual trade. Results for the period 2000-2007 shows that the highest growth occurred in Lithuania, Slovenia and Latvia (by 69,4%, 59,3% and 51,4%). In turn, the Slovakian share of intra-industry trade in 2007 was 46,8% higher than in 2000. Growth in the other countries of the EU-8 group (in Czech Republic, Estonia, Poland and Hungary) was in the range from 28,9% to 11,6%. To sum up, **in 2000-2007 there was a significant increase in intra-industry trade between EU-8 countries**.

It is also important that growth rates of IIT indicators for 2000-2007 in EU-8 mutual trade (an increase of 29,6%) proved to be higher than the dynamics of these indicators in exports and imports of the EU-8 with EU-15 (an increase of 13,0%). The average increase of IIT indicators in recent years before the accession (2000-2003) was 10,5% in EU-8 mutual trade and 4,6% in the EU-8 trade with the EU-15, in the first years after accession (2004-2007) respectively 8,2% and 0,3% . This indicates that after the accession of the EU-8 countries to the EU growth rates of IIT indicators in trade between EU-8 and EU-15 had a greater slowdown than in the EU-8 mutual trade.

Table 1. Grubel and Lloyd`s intra-industry trade (IIT) indexes of EU-8 countries in trade with EU-15 and in mutual EU-8 trade in 2000-2007 (%)[a]

	Country	2000	2001	2002	2003	2004	2005	2006	2007	Dynamics		
										2007/ 2000	2003/ 2000	2007/ 2004
UE-8 and UE-15	**Czech Rep.**	46,3	47,1	47,5	47,1	50,1	48,3	48,7	48,1	103,8	101,7	96,0
	Estonia	22,5	24,9	26,2	27,7	30,3	30,3	26,7	28,2	125,2	122,9	93,1
	Lithuania	16,3	11,8	13,9	18,7	16,8	15,9	17,4	16,4	100,8	114,9	97,9
	Latvia	8,5	9,6	9,3	9,8	11,2	15,0	13,9	14,4	169,4	114,9	128,1
	Poland	33,1	33,2	35,2	36,8	38,7	38,9	40,0	41,0	123,9	111,3	106,0
	Słovakia	27,0	29,5	29,6	30,4	33,2	31,6	30,1	32,6	120,6	112,6	98,3
	Slovenia	35,8	36,7	36,2	37,2	36,8	36,7	38,5	38,4	107,3	103,9	104,5
	Hungary	35,9	36,4	35,6	34,0	39,2	39,3	40,2	41,4	115,3	94,9	105,4
UE-8 mutual trade	**Czech Rep.**	39,1	40,3	41,5	43,2	45,9	49,1	50,4	50,4	129,0	110,6	109,7
	Estonia	35,8	35,2	32,9	31,5	35,0	39,3	40,1	40,0	111,6	88,0	114,4
	Lithuania	24,3	25,0	30,6	32,0	34,7	38,5	40,4	41,1	169,4	131,5	118,7
	Latvia	29,4	28,8	28,4	29,0	34,4	45,2	44,5	44,5	151,4	98,9	129,2
	Poland	38,2	40,4	41,8	41,1	42,7	44,3	44,1	44,4	116,3	107,5	103,9
	Słovakia	30,9	35,1	37,2	38,2	40,8	41,8	44,3	45,3	146,8	123,9	111,1
	Slovenia	17,6	15,4	15,9	18,3	22,4	26,5	28,4	28,0	159,3	104,2	125,1
	Hungary	35,5	34,9	37,8	36,2	43,2	43,4	42,4	44,0	123,8	101,9	101,7

[a] Indicators calculated at 6-digit CN codes level

Source: Comext: Intra- and extra- EU trade Data, Eurostat, 2008. Own calculations.

Source: Own calculations based on Comext: Intra- and extra- EU trade Data, Eurostat, 2008.

Thus, we come to the conclusion that - compared with four years before the accession - in the analyzed period after accession (2004-2007) there were more favorable structural changes in the EU-8 mutual trade than in trade of these countries with the EU-15. This comes up mainly from the fact that before the accession the scope of trade liberalization – being a result of regional free trade agreements – between EU-8 countries was narrow in comparison with that between each of these countries and the European Union - which in turn was the result of the implementation of the provisions of Association Agreements. Removal of barriers to EU-8 mutual trade after their accession to the EU, therefore, created a foothold for the rapid increase in the level of intra-industry trade.

The share of intra-industry trade between EU-8 and EU-15 countries and the EU-8 mutual trade for almost all eight analyzed countries is still relatively low. IIT indicators exceeded 50% only for Czech Republic (in 2004 – 50,1% for trade with the EU-15 and in the years 2006 and 2007 – 50,4% in trade with other EU-8 countries).

While analyzing IIT indicators in both EU-8 trade with EU-15 and EU-8 mutual trade - apart from the leader in both groups, the Czech Republic - several groups of countries might be distinguished. In the EU-8 trade with the EU-15:

- Poland, Slovenia and Hungary had the highest share of intra-industry trade (between 33,1% - 35,9% in 2000 and 38,4% - 41,3% in 2007);
- IIT indicators for Slovakia and Estonia were at the average level (between 22,5% - 27,0% in 2000 and 28,2% - 32,6% in 2007);
- the lowest IIT indicators were in Lithuania and Latvia (shares of intra-industry trade between 8,5% - 16,3% in 2000 and 14,4% - 16,4% in 2007).

Further analysis of indicators for the EU-8 mutual trade put an emphasis of the following:

- average values of IIT indicators i.e. between 24,3% - 38,2% in 2000 and 40,0% - 45,3% in 2007 were in Estonia, Lithuania, Poland, Slovakia and Hungary;
- much lower values were in Slovenia – IIT indicators: 17,6% in 2000 and 28,0% in 2007.

The lowest IIT rates in Slovenia in the EU-8 mutual trade and in Lithuania, Latvia and Estonia in trade between EU-8 and EU-15 might put an emphasis on the fact that these countries have not yet adequately developed their intra-industry links. This may result from traditional orientation of Slovenian companies to EU-15 markets. On the other hand, for companies from Baltic states their experience in trade with other EU-8 countries (with similar level of development) should play an important role in shaping their subsequent relationship with the EU-15.

4. Intra-industry trade of selected CN product groups

In order to complement the analysis of IIT indicators for each country the distribution of these indicators for selected product groups was studied. To this end, IIT indicators were calculated for each CN section (Table 2, 3, 4 and 5).

One of the main conclusions derived from this analysis was the identification of section groups with the highest or lowest IIT values. In trade between EU-8 and EU-15, the most often occurring sections (from 6 to 8 countries) with higher IIT indicators than the IIT for total trade of each country were:

a) in the year 2000:

- plastics and rubber, articles thereof (section VII) – in all 8 countries,
- footwear, headgear, etc. (section XII) – in 7 countries,
- machinery and mechanical appliances, electrical equipment (section XVI) – in 6 countries,

b) in the year 2004:

- plastics and rubber, articles thereof (section VII) – in all 8 countries,
- base metals and articles of base metal (section XV) – in all 8 countries,
- footwear, headgear, etc. (section XII) – in 7 countries,
- transport equipment (section XVII) – in 7 countries,
- miscellaneous manufactured articles (section XX) – in 7 countries,

c) in the year 2007:

- plastics and rubber, articles thereof (section VII) – in all 8 countries,
- base metals and articles of base metal (section XV) – in 7 countries,
- miscellaneous manufactured articles (section XX) – in 7 countries.

In EU-8 mutual trade, the most often occurring sections (from 6 to 8 countries) with higher IIT indicators than the IIT for total trade of each country were:

a) in the year 2000:

- wood and articles of wood (section IX) – in 7 countries,
- products of chemical industry (section VI) – in 6 countries,
- plastics and rubber, articles thereof (section VII) – in 6 countries,
- footwear, headgear, etc. (section XII) – in 6 countries,
- machinery and mechanical appliances, electrical equipment (section XVI) – in 6 countries,
- miscellaneous manufactured articles (section XX) – in 6 countries,

b) in the year 2004:

- plastics and rubber, articles thereof (section VII) – in 7 countries,
- footwear, headgear, etc. (section XII) – in 7 countries,
- pulp of wood, paper, cardboard, etc. (section X) in 6 countries,
- transport equipment (section XVII) – in 6 countries,
- miscellaneous manufactured articles (section XX) – in 6 countries,

c) in the year 2007:

- plastics and rubber, articles thereof (section VII) – in 7 countries,
- transport equipment (section XVII) – in 7 countries,
- foodstuffs, etc. (section IV) – in 6 countries,
- footwear, headgear, etc. (section XII) – in 6 countries,
- miscellaneous manufactured articles (section XX) – in 6 countries.

The abovementioned listing confirms that 3 sections: VII (plastics and rubber, articles thereof), XII (footwear, headgear, etc.) and XX (miscellaneous manufactured articles) remained stable in the group of sections with the highest IIT values in the exchange between EU-8 and EU-15 countries in 2000, 2004 and 2007 and in EU-8 mutual trade in 2004 and 2007.

Table 2. Grubel and Lloyd`s intra-industry trade (IIT) indexes of EU-8 countries in trade with EU-15 and in mututal EU-8 trade in the year 2000 (at 6-digit CN codes level, in %)

CN Sections[a]		Countries[b]								Number of countries with the highest IIT in each section[c]
		CZ	**ES**	**LT**	**LV**	**PL**	**SK**	**SI**	**HU**	
UE-8 with UE-15	IV.	22,1	8,3	6,1	**10,9**	18,3	17,4	18,9	29,0	1
	VI.	17,3	9,5	2,4	3,6	12,4	7,0	19,0	22,5	0
	VII.	**51,5**	**29,6**	**17,2**	**16,3**	**35,0**	**38,9**	**43,2**	**42,3**	8
	VIII.	29,1	20,5	**21,6**	**9,4**	**39,6**	**30,9**	27,9	24,3	4
	IX.	32,9	9,3	7,1	2,2	29,8	19,2	33,4	26,2	0
	X.	**48,7**	14,6	9,8	7,7	28,5	17,5	**37,6**	24,6	2
	XI.	40,6	**23,8**	**19,1**	**13,8**	20,0	19,0	**53,5**	31,5	4
	XII.	**56,3**	**34,8**	**53,8**	**24,7**	**50,6**	21,3	**59,3**	**37,5**	7
	XIII	42,5	**23,2**	10,9	6,4	**37,5**	20,3	25,7	33,7	2
	XV.	**47,1**	**26,6**	14,9	8,4	**41,3**	25,7	**39,4**	**41,9**	5
	XVI.	**54,1**	**26,0**	12,2	**9,6**	**34,2**	**38,1**	35,3	**38,1**	6
	XVII.	**50,1**	16,6	**16,7**	6,2	**52,9**	23,2	**41,9**	**36,1**	5
	XVIII.	**48,1**	**33,2**	**33,7**	7,3	**34,3**	23,8	34,6	**48,8**	5
	XIX.	38,9	0,0	1,5	5,9	7,2	**52,5**	0,0	0,2	1
	XX.	45,9	**32,9**	16,1	**25,7**	**36,2**	**40,0**	34,7	**44,5**	5
	Total	***46,3***	***22,5***	***16,2***	***8,5***	***33,1***	***27,0***	***35,8***	***35,8***	
Number of sections with higher than total average IIT value		7	8	6	7	9	5	6	7	
UE-8 mutual trade	IV.	**52,9**	26,7	**30,4**	27,2	26,4	**48,4**	**19,8**	21,2	4
	VI.	32,6	**39,0**	**30,4**	**62,5**	**41,7**	**40,0**	5,8	**39,3**	6
	VII.	**52,1**	**62,2**	**49,7**	26,8	**41,5**	29,6	**29,3**	**37,9**	6
	VIII.	28,0	25,7	17,8	25,9	24,5	**43,2**	6,1	21,9	1
	IX.	**46,4**	**41,2**	**45,6**	**36,9**	**50,5**	**38,1**	**18,2**	31,6	7
	X.	38,8	27,7	**25,3**	**31,0**	**47,6**	**38,5**	16,8	**49,6**	5
	XI.	34,5	31,4	**30,5**	20,7	34,4	29,6	**20,9**	**43,0**	3
	XII.	**48,4**	**70,6**	**27,9**	15,4	32,4	**53,3**	**55,3**	**57,9**	6
	XIII	35,6	15,3	**43,5**	17,2	**38,3**	**39,5**	11,1	**43,1**	4
	XV.	**39,9**	26,1	**36,1**	22,5	36,9	21,4	15,2	**37,4**	3
	XVI.	**46,9**	**37,1**	**34,1**	26,3	**48,3**	**37,5**	**19,3**	28,8	6
	XVII.	33,7	**38,2**	**32,5**	13,3	**51,0**	**36,3**	**53,0**	29,7	5
	XVIII.	33,6	10,3	**37,2**	17,5	32,5	**38,4**	8,1	**38,0**	3
	XIX.	28,1	0,9	1,5	19,8	14,1	**38,6**	0,0	0,0	1
	XX.	**41,6**	**53,2**	**41,5**	21,4	31,3	**50,0**	**21,7**	**48,1**	6
	Total	***39,0***	***35,8***	***24,2***	***29,3***	***38,2***	***30,8***	***17,5***	***35,5***	
Number of sections with higher than total average IIT value		7	7	13	3	7	12	8	9	

[a] Without sections, where due to their nature it is difficult to apply intra-industry trade. It considers: AGRICULTURAL RAW MATERIALS (sections I-III), MINERAL PRODUCTS (section V), NATURAL OR CULTURED PEARLS, PRECIOUS OR SEMI–PRECIOUS STONES, PRECIOUS METALS, METALS CLAD WITH PRECIOUS METAL, AND ARTICLES THEREOF; IMITATION JEWELLERY; COIN (XIV) and WORKS OF ART, COLLECTORS' PIECES AND ANTIQUE (XXI).

Section marking:
IV. PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES
VI. PRODUCTS OF THE CHEMICAL OR ALLIED INDUSTRIES
VII. PLASTICS AND ARTICLES THEREOF; RUBBER AND ARTICLES THEREOF
VIII. RAW HIDES AND SKINS, LEATHER, FURSKINS AND ARTICLES THEREOF; SADDLERY AND HARNESS; TRAVEL GOODS, HANDBAGS AND SIMILAR CONTAINERS; ARTICLES OF ANIMAL GUT (OTHER THAN SILKWORM GUT)
IX. WOOD AND ARTICLES OF WOOD; WOOD CHARCOAL; CORK AND ARTICLES OF CORK; MANUFACTURES OF STRAW, OF ESPARTO OR OF OTHER PLAITING MATERIALS; BASKETWARE AND WICKERWORK
X. PULP OF WOOD OR OF OTHER FIBROUS CELLULOSIC MATERIAL; RECOVERED (WASTE AND SCRAP) PAPER OR PAPERBOARD; PAPER AND PAPERBOARD AND ARTICLES THEREOF
XI. TEXTILES AND TEXTILE ARTICLES
XII. FOOTWEAR, HEADGEAR, UMBRELLAS, SUN UMBRELLAS, WALKING STICKS, SEAT–STICKS, WHIPS, RIDING–CROPS AND PARTS THEREOF; PREPARED FEATHERS AND ARTICLES MADE THEREWITH; ARTIFICIAL FLOWERS; ARTICLES OF HUMAN HAIR
XIII. ARTICLES OF STONE, PLASTER, CEMENT, ASBESTOS, MICA OR SIMILAR MATERIALS; CERAMIC PRODUCTS; GLASS AND GLASSWARE
XV. BASE METALS AND ARTICLES OF BASE METAL
XVI. MACHINERY AND MECHANICAL APPLIANCES; ELECTRICAL EQUIPMENT; PARTS THEREOF; SOUND RECORDERS AND REPRODUCERS, TELEVISION IMAGE AND SOUND RECORDERS AND REPRODUCERS, AND PARTS AND ACCESSORIES OF SUCH ARTICLES
XVII. VEHICLES, AIRCRAFT, VESSELS AND ASSOCIATED TRANSPORT EQUIPMENT\\
XVIII. OPTICAL, PHOTOGRAPHIC, CINEMATOGRAPHIC, MEASURING, CHECKING, PRECISION, MEDICAL OR SURGICAL INSTRUMENTS AND APPARATUS; CLOCKS AND WATCHES; MUSICAL INSTRUMENTS; PARTS AND ACCESSORIES THEREOF
XIX. ARMS AND AMMUNITION; PARTS AND ACCESSORIES THEREOF
XX. MISCELLANEOUS MANUFACTURED ARTICLES

[b] CZ-Czech Republic, ES-Estonia, LT-Lithuania, LV-Latvia, PL-Poland, SK-Slovakia, SI-Slovenia, HU-Hungary

[c] Incorporates sections in which the IIT index was higher than the average index for each country (bold).

Source: Own calculations based on Comext: Intra- and extra- EU trade Data, Eurostat, 2008.

To sum up, an important trend characteristic for the analyzed period is the unchanged or smaller number of sections with the highest IIT values in the period after the accession rather than in the period before the accession. Moreover, the highest IIT values both in pre- and post-accession period occurred in less than half of the analyzed sections in EU-8 mutual trade and external trade between EU-8 and EU-15.

In the next stage of the analysis of the distribution of IIT indicators by CN sections the concentration in the sections with the highest values of the IIT indicators was studied (relevant data are summarized in the last rows of Table 2, 3, 4 and 5). It seems interesting that the conclusions from the analysis of EU-8 mutual trade differ from those derived from the analysis of trade between EU-8 and EU-15.

In trade between EU-8 and EU-15 in 2000-2003 concentration of trade with the highest values of the IIT indicators in the lower number of sections CN occurred in Poland and the Czech Republic. In four countries (Estonia, Slovakia, Latvia and Lithuania) the number of these sections has not changed, in case of two countries (Hungary and Slovenia) trade with the highest values of IIT spread on more sections. In the post-accession period (2004-2007) the concentration in fewer sections occurred in three countries (again, this was Poland, but also Latvia and Slovenia). Trade with the highest values of IIT spread on lower number of sections in the three countries (Czech Republic, Lithuania, Slovakia) and in two countries (Estonia and Hungary) the number of sections with the highest rates stood still.

Table 3. Grubel and Lloyd`s intra-industry trade (IIT) indexes of EU-8 countries in trade with EU-15 and in mututal EU-8 trade in the year 2003 (at 6-digit CN codes level, in %)

CN Sections[a]		Countries[b]								Number of countries with the highest IIT in each section[c]
		CZ	**ES**	**LT**	**LV**	**PL**	**SK**	**SI**	**HU**	
UE-8 with UE-15	IV.	30,49	10,95	8,13	**9,93**	27,82	18,01	15,55	24,55	1
	VI.	18,86	13,24	3,41	3,78	17,50	8,43	23,73	28,46	0
	VII.	**49,64**	**37,61**	**20,11**	**20,38**	**41,91**	**33,95**	**41,36**	**46,05**	8
	VIII.	29,57	**27,70**	**22,70**	5,75	**37,91**	23,05	32,38	24,70	3
	IX.	33,50	10,26	9,39	2,14	26,42	22,80	34,33	**35,44**	1
	X.	**53,10**	20,76	5,07	**9,81**	31,34	18,93	**43,30**	22,31	3
	XI.	42,22	24,00	17,31	**17,04**	21,41	22,68	**49,92**	27,01	2
	XII.	**63,92**	**38,14**	**42,56**	8,99	**47,56**	16,46	**57,96**	**35,42**	6
	XIII	45,42	**28,20**	11,43	7,25	**39,64**	24,38	27,50	**34,79**	3
	XV.	**48,44**	**35,54**	**19,48**	**13,19**	**45,33**	**36,31**	**39,97**	**39,72**	8
	XVI.	**51,65**	**37,64**	14,74	**10,05**	**37,70**	**32,52**	**40,12**	30,68	6
	XVII.	**53,62**	20,76	**39,10**	5,43	**55,17**	**36,96**	**39,10**	**53,88**	6
	XVIII.	**52,87**	**40,76**	**31,17**	9,55	**50,63**	27,48	36,72	**42,18**	4
	XIX.	31,34	0,28	1,44	1,13	6,55	**31,24**	0,00	**41,34**	2
	XX.	44,83	**29,52**	17,15	**30,15**	31,72	20,73	36,66	**43,99**	3
	Total	***47,12***	***27,70***	***18,71***	***9,76***	***36,85***	***30,44***	***37,19***	***34,04***	
Number of sections with higher than total average IIT value		7	8	6	7	8	5	7	9	
UE-8 mutual trade	IV.	**55,81**	29,80	**43,02**	**31,95**	34,89	**53,36**	15,39	29,64	4
	VI.	**44,34**	**38,04**	**36,04**	**60,27**	39,37	**41,02**	4,94	35,46	5
	VII.	**54,83**	**47,30**	**41,66**	**29,08**	**46,98**	**44,20**	**39,32**	**43,27**	8
	VIII.	26,33	22,52	**40,88**	**30,62**	**46,66**	**46,56**	9,83	**52,95**	5
	IX.	41,02	**40,18**	**33,18**	28,66	36,72	**40,05**	**20,83**	35,63	4
	X.	43,18	**33,00**	27,83	**30,25**	**53,03**	**44,23**	**20,34**	**39,66**	6
	XI.	34,85	30,59	**36,53**	25,22	37,16	**43,07**	**18,58**	**47,85**	4
	XII.	33,91	**58,17**	**43,50**	24,79	39,84	**58,20**	**38,78**	30,33	4
	XIII	38,53	12,25	**38,06**	15,67	**47,25**	**45,69**	16,60	**48,34**	4
	XV.	**46,77**	**32,33**	**32,70**	**29,97**	37,29	25,31	**20,96**	**45,88**	6
	XVI.	**46,63**	**39,08**	**38,70**	**34,51**	**50,29**	37,96	**20,12**	33,82	6
	XVII.	30,54	**45,57**	**63,41**	17,09	35,36	38,10	**36,87**	32,85	3
	XVIII.	35,67	19,48	**41,24**	23,82	30,97	**38,78**	14,15	33,72	2
	XIX.	21,93	13,70	23,46	8,40	7,06	22,66	0,00	**44,35**	1
	XX.	**52,70**	**47,03**	**61,86**	**29,71**	35,61	**49,55**	**26,82**	**46,09**	7
	Total	***43,20***	***31,54***	***31,95***	***29,04***	***41,06***	***38,24***	***18,30***	***36,21***	
Number of sections with higher than total average IIT value		6	9	13	8	5	11	9	8	

a;b,c Marking of section and countries - as in Table 2.

Source: Own calculations based on Comext: Intra- and extra- EU trade Data, Eurostat, 2008.

Table 4. Grubel and Lloyd`s intra-industry trade (IIT) indexes of EU-8 countries in trade with EU-15 and in mututal EU-8 trade in the year 2004 (at 6-digit CN codes level, in %)

CN Sections[a]		Countries[b]								Number of countries with the highest IIT in each section[c]
		CZ	**ES**	**LT**	**LV**	**PL**	**SK**	**SI**	**HU**	
UE-8 with UE-15	IV.	30,5	25,0	11,0	**17,5**	31,4	21,4	15,7	26,0	1
	VI.	20,0	12,8	3,2	3,0	19,4	8,3	25,0	30,9	0
	VII.	**52,0**	**35,5**	**20,7**	**21,4**	**41,9**	**35,2**	**37,6**	**47,2**	8
	VIII.	36,3	**38,7**	**28,0**	8,8	**39,1**	28,9	34,1	31,6	3
	IX.	36,6	12,4	12,1	2,6	27,9	20,7	**42,0**	36,5	1
	X.	**57,4**	25,6	8,3	10,4	33,2	18,9	**47,0**	29,3	2
	XI.	**54,5**	**34,7**	**22,1**	**24,7**	29,0	26,0	**39,5**	30,8	5
	XII.	**67,6**	**52,1**	**33,5**	**13,8**	**42,4**	25,2	**44,6**	**49,4**	7
	XIII	45,6	23,8	13,9	**13,6**	**42,5**	28,9	27,0	31,6	2
	XV.	**50,4**	**35,6**	**28,6**	**12,4**	**46,9**	**41,2**	**42,1**	**42,1**	8
	XVI.	**51,5**	**38,4**	15,9	9,9	37,2	**35,1**	**38,6**	37,5	4
	XVII.	**63,3**	21,6	**23,6**	**11,3**	**59,9**	**39,1**	**41,7**	**56,6**	7
	XVIII.	49,6	**38,3**	**38,8**	7,2	**43,6**	23,9	31,1	**43,7**	4
	XIX.	48,7	4,5	2,3	3,1	3,3	27,1	13,7	**52,8**	1
	XX.	**52,6**	**34,1**	**19,1**	**23,8**	29,5	**36,7**	**42,0**	**50,4**	7
	Total	***50,0***	***30,3***	***16,7***	***11,2***	***38,6***	***33,1***	***36,7***	***39,2***	
Number of sections with higher than total average IIT value		8	8	8	8	7	5	9	7	
UE-8 mutual trade	IV.	**58,4**	**37,1**	**49,5**	**38,6**	37,5	**45,5**	11,4	39,4	5
	VI.	**47,4**	31,5	34,4	**60,2**	40,7	32,6	10,8	37,6	2
	VII.	**53,6**	**51,0**	**42,8**	30,5	**49,3**	**44,7**	**35,8**	**49,8**	7
	VIII.	33,7	29,5	**54,9**	**38,3**	**44,7**	37,9	6,8	36,6	3
	IX.	44,9	**42,6**	**37,5**	29,1	32,4	37,4	16,1	37,2	2
	X.	**47,3**	**43,5**	34,1	**39,7**	**51,4**	**41,3**	**22,6**	37,7	6
	XI.	42,1	30,7	**42,7**	28,2	37,8	**48,3**	19,2	**47,5**	3
	XII.	**63,1**	**65,6**	**54,4**	**38,9**	38,9	**62,5**	**44,0**	**46,3**	7
	XIII	41,4	18,6	**39,2**	16,8	**50,6**	**45,9**	13,8	**51,5**	4
	XV.	44,4	**43,5**	34,0	28,9	41,7	30,6	**25,3**	**45,1**	3
	XVI.	**46,3**	**35,0**	**48,5**	32,5	**47,3**	39,9	19,4	41,9	4
	XVII.	39,6	**53,8**	**39,1**	18,0	**53,8**	**46,3**	**51,1**	**52,3**	6
	XVIII.	40,7	27,2	**38,9**	20,3	23,5	27,4	9,1	28,5	1
	XIX.	37,3	0,2	**35,0**	15,5	22,5	18,1	0,3	36,3	1
	XX.	**53,9**	**54,7**	**63,5**	27,6	36,2	**46,8**	**28,9**	**46,8**	6
	Total	***45,9***	***34,9***	***34,6***	***34,4***	***42,7***	***40,7***	***22,3***	***43,2***	
Number of sections with higher than total average IIT value		7	9	12	5	6	8	6	7	

a;b,c Marking of section and countries - as in Table 2.

Source: Own calculations based on Comext: Intra- and extra- EU trade Data, Eurostat, 2008.

Table 5. Grubel and Lloyd`s intra-industry trade (IIT) indexes of EU-8 countries in trade with EU-15 and in mututal EU-8 trade in the year 2007 (at 6-digit CN codes level, in %)

CN Sections[a]		Countries[b]								Number of countries with the highest IIT in each section[c]
		CZ	**ES**	**LT**	**LV**	**PL**	**SK**	**SI**	**HU**	
UE-8 with UE-15	IV.	36,1	16,5	**18,1**	**16,9**	**42,4**	25,1	17,2	31,4	3
	VI.	21,8	14,6	3,9	5,2	27,2	9,2	30,4	33,5	0
	VII.	**48,8**	**28,9**	**19,3**	**22,6**	**46,4**	**44,1**	**46,5**	**44,9**	8
	VIII.	**56,2**	**38,3**	**30,8**	8,0	39,8	18,9	25,1	27,4	3
	IX.	38,6	20,4	12,3	5,9	29,9	**38,9**	33,0	**42,2**	2
	X.	**58,0**	20,5	**18,3**	13,6	32,4	17,7	**46,4**	35,4	3
	XI.	**53,2**	**43,9**	**33,3**	**36,6**	38,5	**36,1**	28,2	38,3	5
	XII.	**61,2**	**45,4**	14,4	7,0	33,8	**34,5**	**56,8**	**44,0**	5
	XIII	**56,7**	23,0	**17,5**	11,3	**44,9**	**41,5**	37,3	36,4	4
	XV.	**50,1**	**38,3**	**33,3**	**26,8**	**47,8**	**42,2**	**41,4**	39,0	7
	XVI.	**60,7**	**33,3**	16,2	11,2	**43,1**	**38,7**	36,7	**43,0**	5
	XVII.	43,3	18,8	7,6	7,9	**54,0**	28,3	**47,6**	**50,7**	3
	XVIII.	**50,8**	**35,2**	**36,5**	6,2	35,6	12,5	36,6	**48,6**	4
	XIX.	43,2	7,0	**16,7**	0,0	0,5	0,0	4,3	22,5	1
	XX.	**51,6**	**35,3**	**26,4**	**31,8**	27,3	**47,9**	**38,7**	**48,9**	7
	Total	***48,0***	***28,2***	***16,4***	***14,3***	***41,0***	***32,6***	***38,4***	***41,3***	
Number of sections with higher than total average IIT value		10	8	10	5	6	8	6	7	
UE-8 mutual trade	IV.	**62,8**	**43,3**	**60,6**	**62,9**	41,0	**46,1**	9,9	**45,0**	6
	VI.	47,6	31,0	35,5	**57,4**	43,5	34,9	14,3	37,2	1
	VII.	**56,8**	**53,0**	37,0	**48,6**	**50,0**	**52,1**	**37,4**	**44,2**	7
	VIII.	**53,8**	**61,4**	**48,1**	**52,9**	41,8	44,6	**52,3**	43,0	5
	IX.	**51,5**	**50,0**	**40,0**	**46,4**	38,4	43,8	**32,2**	32,4	5
	X.	**51,8**	28,5	33,3	**45,9**	**52,3**	40,8	9,8	39,6	3
	XI.	**53,2**	34,5	**49,0**	42,6	**51,9**	**56,3**	**35,2**	39,1	5
	XII.	**74,1**	**55,0**	**67,3**	42,4	**68,7**	**58,2**	**45,0**	26,0	6
	XIII	46,5	28,0	39,9	24,7	**47,4**	**47,2**	18,1	39,2	2
	XV.	**50,3**	**41,7**	**43,9**	31,3	**46,6**	40,8	**39,0**	**44,5**	6
	XVI.	43,1	**58,0**	**48,6**	42,8	39,3	34,3	25,9	**45,7**	3
	XVII.	44,4	**57,6**	**47,6**	**58,5**	**60,6**	**55,0**	**40,9**	**57,9**	7
	XVIII.	42,4	**47,3**	**52,1**	**45,6**	**47,8**	41,4	14,5	**44,9**	5
	XIX.	20,6	0,0	**41,4**	0,0	0,1	38,3	0,0	15,1	1
	XX.	**59,1**	**55,0**	**68,3**	44,0	35,2	**53,1**	**36,9**	**50,4**	6
	Total	***50,3***	***39,9***	***41,1***	***44,4***	***44,4***	***45,3***	***27,9***	***43,9***	
Number of sections with higher than total average IIT value		9	10	11	8	8	7	8	7	

a;b,c Marking of section and countries - as in Table 2.

Source: Own calculations based on Comext: Intra- and extra- EU trade Data, Eurostat, 2008.

By contrast, analysis of the EU-8 mutual trade between 2000-2003 indicated strong tendency to trade concentration with the highest IIT indexes in an increasingly lower number of CN sections. It occurred in four countries (Czech Republic, Poland, Slovakia, Hungary). Number of sections did not change only in Lithuania, and in three countries (Slovenia, Latvia and Estonia) trade with the highest IIT indexes spread out in more sections. However, this trend reversed in the years after accession. Then, in five countries (Czech Republic, Estonia, Latvia, Poland and Slovenia) trade with the highest IIT values spread out in more sections, than in pre-accession period. In Hungary, the situation remained unchanged, and only in Lithuania and Slovakia concentration occurred in the lower amount of sections.

Throughout the analyzed period (2000-2007) both in EU-8 mutual trade and in trade between EU-8 and EU-15 there was a reinforcement in the tendency to increase the intensity of intra-industry trade in an increasing number of CN sections. Concentration of trade with the highest values of IIT indexes in increasingly lower number of CN sections occurred only in Latvia and Poland - in trade with the EU-15 countries and in Lithuania, Slovakia and Hungary - in a mutual exchange within the EU-8 group.

5. Intra-industry trade by 5 groups of the intensity of using production factors

In order to analyze the relationship between the intensity of intra-industry trade flows in pre- and post-accession period and the transformation in the external trade structure between EU-8 countries and EU-15 the analysis of IIT indicators by 5 groups of the intensity of using production factors was conducted. Appropriate calculations are summarized in Table 6.

The comparison of IIT indicators in total trade between EU-8 and EU-15 with the indicators for each of 5 groups of the intensity of using production factors, as well as with the structure of external trade by these groups allows to indicate that in the period between 2000-2007 there were significant transformations in the level of intra-industry trade.

In 2000, material-intensive products (group 1) in most of the analyzed countries were characterized by the lowest IIT indicators (with the exception of the Lithuania and Poland, where the lowest indicators at that time were recorded in group 3 and 4). At the same time, these goods were not playing important role in EU-8 – EU-15 trade flows. In exports, only for Lithuania and Latvia its share significantly exceeded the total export share for whole EU-8 group (10%) and accounted for 35% and 50% accordingly. Total import share of this commodity group for EU-8 was in 2000 the lowest (only 8%) in comparison to other analyzed groups.

Table 6. EU-8 external trade with EU-15

Country	Groups[a]	IIT (%)			Change[b]	RCA			EX_i/EX (%)			IM_i/IM (%)		
		2000	2004	2007		2000	2004	2007	2000	2004	2007	2000	2004	2007
Czech Republic	**1**	28,5	25,4	**25,0**	***87,7***	0,3	0,2	**0,2**	7,4	5,6	**8,5**	7,1	6,5	**10,7**
	2	47,4	55,2	**57,0**	120,1	1,5	1,2	**1,3**	30,4	24,5	**26,8**	23,3	22,5	**23,6**
	3	45,7	51,2	**43,6**	95,3	2,4	2,0	**2,1**	25,8	23,3	**31,7**	20,2	20,2	**25,2**
	4	36,6	34,7	**35,2**	***96,3***	0,5	0,8	**0,6**	8,3	14,9	**6,3**	17,3	17,7	**15,9**
	5	54,2	58,6	**58,7**	108,3	1,1	1,4	**1,9**	28,1	31,1	**26,1**	32,1	33,1	**24,6**
	Total	***46,3***	***50,1***	***48,1***	*103,8*						-			
Estonia	**1**	7,1	12,8	**21,7**	303,2	0,8	0,7	**0,8**	18,6	18,8	**26,9**	10,1	9,5	**13,1**
	2	29,1	34,2	**36,1**	124,2	1,5	1,8	**1,7**	31,3	35,7	**35,9**	24,8	24,1	**21,6**
	3	13,5	21,3	**17,4**	128,5	0,2	0,5	**0,6**	1,9	5,9	**9,3**	15,7	21,8	**34,6**
	4	24,3	36,8	**10,6**	43,8	2,1	1,1	**0,2**	38,4	21,9	**2,3**	15,5	16,9	**9,0**
	5	25,7	32,6	**34,4**	134,0	0,4	0,6	**1,3**	9,8	13,9	**17,3**	33,8	27,7	**21,7**
	Total	***22,5***	***30,3***	***28,2***	*125,2*						-			
Hungary	**1**	17,7	27,7	**22,1**	124,7	0,3	0,3	**0,3**	6,1	6,4	**10,3**	4,2	6,3	**9,9**
	2	37,1	41,4	**43,3**	116,7	0,8	0,6	**0,6**	17,0	12,7	**13,7**	23,8	20,1	**20,2**
	3	35,9	48,3	**45,1**	125,4	1,3	1,0	**1,3**	14,0	11,2	**19,2**	16,1	17,6	**24,7**
	4	39,5	33,6	**37,7**	**95,4**	1,5	1,4	**0,9**	28,1	26,7	**10,2**	20,7	17,5	**14,0**
	5	35,4	39,6	**38,8**	109,6	1,2	1,3	**2,4**	29,9	27,3	**32,7**	35,2	38,5	**31,3**
	Total	***35,9***	***39,2***	***41,4***	*115,3*						-			
Lithuania	**1**	14,4	7,6	**11,2**	**77,8**	1,4	1,6	**1,1**	35,3	39,3	**40,2**	12,6	9,1	**10,1**
	2	19,4	22,8	**29,2**	**150,3**	2,3	1,9	**1,6**	45,8	38,4	**35,1**	29,8	24,1	**19,7**
	3	6,0	12,1	**8,8**	147,1	0,2	0,3	**0,4**	2,4	3,7	**6,8**	20,0	22,6	**32,8**
	4	10,9	13,0	**10,5**	96,2	0,2	0,2	**0,9**	3,2	4,5	**9,7**	17,6	19,4	**18,6**
	5	17,7	23,6	**18,1**	102,6	0,5	0,6	**0,5**	11,9	13,9	**7,3**	19,9	24,9	**18,8**
	Total	***16,3***	***16,8***	***16,4***	*100,8*						-			
Latvia	**1**	2,8	3,8	**7,8**	**280,6**	2,1	1,7	**1,4**	50,4	43,8	**49,7**	11,9	11,1	**11,4**
	2	15,1	21,1	**27,1**	179,0	1,9	1,8	**1,2**	38,3	37,0	**25,4**	30,2	26,8	**24,8**
	3	4,2	7,4	**8,9**	209,1	0,6	1,1	**0,8**	6,5	12,9	**12,5**	18,0	20,2	**32,0**
	4	4,2	4,0	**9,0**	**217,7**	0,1	0,1	**0,3**	1,3	1,0	**3,3**	17,4	17,4	**9,3**
	5	10,9	12,4	**10,1**	92,7	0,1	0,2	**0,4**	3,4	5,2	**4,8**	22,6	24,5	**22,5**
	Total	***8,5***	***11,2***	***14,4***	*169,4*						-			
Poland	**1**	21,9	23,8	**33,8**	**154,1**	0,6	0,6	**0,5**	14,0	14,6	**18,1**	8,3	8,2	**13,8**
	2	34,5	39,7	**43,0**	124,9	1,8	1,5	**1,4**	36,4	30,0	**29,2**	25,9	22,4	**22,1**
	3	43,5	51,7	**47,9**	110,3	2,0	2,0	**1,7**	21,1	23,7	**26,3**	20,1	21,9	**25,7**
	4	18,6	20,3	**28,4**	**152,9**	0,4	0,3	**0,4**	7,0	6,5	**4,5**	19,7	18,9	**16,8**
	5	36,2	41,8	**42,5**	117,2	0,9	1,2	**1,6**	21,5	25,3	**21,8**	25,9	28,5	**21,6**
	Total	***33,1***	***38,7***	***41,0***	*123,9*						-			
Słovenia	**1**	10,0	11,7	**21,1**	**210,0**	0,1	0,1	**0,3**	3,3	3,7	**9,0**	13,8	13,6	**19,3**
	2	44,8	42,9	**43,1**	**96,3**	1,8	1,5	**1,2**	36,3	30,5	**25,2**	25,2	22,7	**21,2**
	3	37,5	41,6	**44,5**	118,9	2,7	2,6	**2,7**	29,0	30,8	**41,3**	24,0	24,5	**27,7**
	4	24,9	24,9	**36,0**	**144,6**	0,2	0,3	**0,5**	4,5	5,3	**5,2**	13,9	15,7	**13,0**
	5	36,9	40,6	**36,5**	98,9	1,1	1,4	**1,4**	26,8	29,7	**19,4**	23,1	23,5	**18,7**
	Total	***35,8***	***36,8***	***38,4***	***107,3***						-			
Slovakia	**1**	17,5	24,4	**31,3**	179,0	0,3	0,3	**0,2**	7,3	7,6	**8,5**	7,2	6,4	**9,4**
	2	28,5	35,7	**44,4**	155,7	1,3	1,2	**1,0**	26,6	24,2	**21,6**	22,7	21,0	**20,7**
	3	21,3	34,6	**27,9**	131,3	3,6	3,0	**3,1**	38,9	35,1	**46,9**	24,1	25,8	**27,6**
	4	25,1	22,4	**23,9**	**95,3**	0,4	0,5	**0,6**	7,2	10,1	**6,2**	14,5	14,4	**13,1**
	5	36,5	36,5	**34,8**	95,1	0,8	1,0	**1,1**	19,6	22,8	**14,9**	31,5	32,4	**29,1**
	Total	***27,0***	***33,2***	***32,6***	*120,6*						-			
UE-8 with UE-15[c]	**1**	19,3	21,4	**26,9**	**139,4**	0,4	0,4	**0,4**	10,2	10,0	**13,8**	7,7	7,7	**11,9**
	2	37,3	42,9	**45,8**	122,8	1,4	1,2	**1,2**	29,1	24,4	**25,0**	24,5	21,7	**21,2**
	3	38,1	46,3	**41,0**	107,6	2,0	1,8	**1,9**	21,3	21,2	**28,6**	19,6	20,9	**25,6**
	4	30,1	28,6	**30,5**	**101,3**	0,7	0,7	**0,6**	13,4	13,9	**6,3**	18,2	17,3	**14,8**
	5	40,0	44,9	**43,7**	109,3	1,0	1,2	**1,7**	24,7	26,6	**23,2**	29,2	30,6	**23,4**
	Total	***35,5***	***40,0***	***40,1***	*113,0*		-				-			

a Group marking: 1. material-intensive, 2. labor-intensive, 3. capital-intensive, 4. technology-intensive goods, easy to imitate, 5. technology-intensive goods, difficult to imitate.
b indicators where dynamics between 2004-2007 was higher than between 2000-2004 is marked with bolded font
c IIT indicators for trade between EU-8 and EU-15 were calculated as a weighted average where the weight is a share of the country turnover in total turnover of the whole group.
Source: Own calculation based on Comext: Intra- and extra- EU trade Data, Eurostat, 2008. and Z. Wysokińska, Dynamiczne współzależności wymiany handlowej krajów Europy Środkowej i Wschodniej w świetle teorii integracji i wymiany międzynarodowej, Wydawnictwo Uniwersytetu Łódzkiego, Łódź 1995.

Labor-intensive goods from group 2 had the highest IIT values (from 19% to 47%) in the half of analyzed countries (Estonia, Latvia, Lithuania, Slovenia) - average IIT of EU-8 for this product group was relatively high (37%). At the same time they played a significant role in the external trade of all 8 countries (first place in the case of exports from 4 countries - Czech Republic, Lithuania, Poland, Slovenia and import to 4 countries - Lithuania, Latvia, Poland, Slovenia) in trade with the EU-15 (export and import shares of EU-8 group of countries accounted for 29% and 24%).

Capital-intensive goods (group 3) were characterized by the highest IIT only in Poland (43%), and in most countries (except Poland and Czech Republic) this indicator leveled on lower position than for the total trade. Total exports and imports shares of EU-8 group for this product group accounted for 21% and 20% - were thus on average level.

In group 4 (technologically intensive goods, easy to imitate) in most countries (except Czech Republic and Hungary; in case of Hungary this group was characterized by the highest IIT value - 39%) these indicators had much lower values (between 4% and 25%) than for the total trade of EU-8 group (30%). These products played a relatively minor role in trade between EU-8 and EU-15 (shares: 13% in exports and 18% in imports).

It is worth to emphasize that the goods technologically intensive, difficult to imitate (group 5) only in Hungary were characterized by lower values of IIT than for the total trade of EU-8 group. These commodity group was distinguished by the highest IIT (40%) for total EU-8 trade with EU-15. At the same time they played a dominant role in imports of most of analyzed countries from EU-15 (with the exception of Slovenia and Lithuania – 3rd place and Latvia 2nd place).

To sum up, **in 2000 in most of EU-8 countries the relatively highest IIT indexes characterized their trade with the EU-15 in labor-intensive goods (group 2) and products technologically intensive, difficult to imitate (group 5). The lowest IIT values were indicated in group 1 (material-intensive goods). Export flows of EU-8 countries to the EU-15 were dominated by low-processed products, imports – by products with modern technology and in these commodity groups there were indicated the most favorable conditions for the growth of intra-industry trade**.

In the analyzed period until 2007 the share of intra-industry trade in all 8 countries increased significantly (the highest growth rates were in Latvia: 169% and Estonia: 129%). However, the dynamics of these indicators in 2000-2007 in different groups of the intensity of using production factors was differentiated. Comparing these indicators for various groups of commodities with these for total trade in individual countries, they grew much faster in Czech Republic in groups 2 and 5, Estonia in groups 1, 2, 5, Hungary and Slovakia in groups 1, 2, 3 , Lithuania in groups 2, 3, 5, Latvia in groups 1, 2, 3, 4, Poland in groups 1, 2, 4, and Slovenia in groups 1, 3, 4. It is also worth to mention that in the analyzed group of EU-8 countries indicators for certain groups decreased: in the Czech Republic (group 1, 3, 4), Estonia and Hungary (group 4), Lithuania (group 1 and 4), Latvia (group 5), Slovenia (group 2 and 5), Slovakia (group 4 and 5). Poland was the only country where all the indicators for the period 2000-2007 increased.

As a result, in the year 2007 goods from group 2 were still characterized by the highest IIT indicators in case of half of the analyzed countries. These goods were also important in exports (25%) and imports (21%) for whole EU-8 group. Moreover, in Lithuania and Slovenia IIT indicators for labor-intensive goods increased faster after the accession (their dynamics in 2004-2007 was higher than in 2000-2004).

Material-intensive goods (group 1) for all EU-8 countries were characterized in 2007 by lower IIT values (indicators between 7% - 33%) than IIT indicators for total trade in each country. The average intra-industry trade share for EU-8 group was also the lowest for this group of products (27%).

In group 3 (capital-intensive goods) IIT indicators in most countries were lower than for total trade (with the exception of Hungary, Poland and Slovenia - the first place). These goods, however, played in 2007 the biggest role in external trade of EU-8 with EU-15 (the highest shares in imports: 26%, and in exports: 29%).

Technology-intensive goods, easy to imitate (group 4) were not so significant in EU-8 trade with EU-15 (very low share of exports: 6% - the last place in all countries except Lithuania, and relatively low share of imports: 15%). Simultaneously, in all EU-8 countries IIT indicators in this group were lower than for total trade.

Technology intensive goods, difficult to imitate from group 5 were characterized in 2007 the second highest (right after group 2) average IIT indicator (44%). What is more, in most countries IIT indicators for this group was higher than for total trade (except Hungary, Latvia and Slovenia) and in the case of Czech Republic the highest at all. These products played an important role in EU-8 external trade with EU-15 (both exports and imports shares valued 23%).

It should be noted that between 2000-2007 there was definite increase of the importance of group 2 (labor-intensive goods) in intra-industry trade between EU-8

and EU-15 – IIT indicators in 2000 were in the range of 15% to 47%, in 2007 between 27% and 57%. Quite big significance of technology-intensive goods, difficult to imitate (group 5) was kept during this period. At the same time, despite an increase of IIT indicators (in 2000 in the range of 2% - 28%, in 2007 between 7% and 33%) material-intensive goods from group 1 did not change its position as the least significant in intra-industry trade between EU-8 and EU - 15. On the other hand, in this period the greatest improvement in terms of share in EU-8 imports and exports to and from EU-15 were recorded in groups 1 and 3 (material- and capital-intensive goods).

The observed changes seem to support the thesis that the improvement in intra-industry trade of EU-8 with EU-15 in 2000-2007 was largely the result of changes in the structure their external trade. In most of these countries the pace of change of IIT indicators in different groups of the intensity of using production factors differed significantly from the pace of changes of these indicators for total trade. Moreover, in the case of group 1 (material-intensive goods) and group 4 (technology-intensive goods, easy to imitate) IIT indicators in most of EU-8 countries increased faster after accession than in pre-accession period (their dynamics in 2004-2007 were higher than in 2000-2004). Thus we came to the conclusion that for these two product groups – material-intensive and technology-intensive goods, easy to imitate – changes in conditions for trade after the accession to the Single European Market had the most beneficial effect on their growing importance in intra-industry division of labor.

6. The analysis of RCA and IIT indicators between EU-8 and EU-15

Basic causes of low intensity of EU-8 intra-industry trade with EU-15 come from the asymmetry of demand factors (differences in GDP per capita) and supply factors (technology gap), which still exists between these two groups of countries. This is confirmed by the analysis of trade flows between EU-8 and EU-15 by RCA indicators (presence of comparative advantage indicates the competitiveness of the analyzed economy in each product group and is regarded as a determinant of intra-industry flows) and export and import shares of the various commodity groups of the intensity of using production factors.

On the basis of calculation results compiled in table 6 for the whole group of EU-8 countries in pre- and post-accession period the following trends were indicated:

- despite increasing IIT indicators and growing imports and exports shares to and from EU-15 material-intensive goods (group 1) in 2007 were still characterized by inter-industry specialization (IIT <50%). In addition, EU-8 countries did not reveal comparative advantage and the RCA index for this group remained at a low level (0.4) throughout the analyzed period;

- external trade flows in labor-intensive goods (group 2) were of inter-industry characteristics. The weighted average IIT indicator for this group in trade between EU-8 and EU-15 was, however, in 2007 the highest (46%) among all five analyzed commodity groups and showed an upward trend despite the declining (but still higher than 1) RCA indicator. EU-8 countries maintained revealed comparative advantage in trade in these commodities with EU-15, but exports and imports shares in 2000-2007 decreased;
- in case of capital-intensive goods (group 3) revealed comparative advantage of EU-8 countries remained at a relatively high level (despite a slight decline during the period RCA indicator hovered around the level of 1.95) and this commodity group increased also imports and exports shares, which together resulted in increased participation in intra-industry trade;
- the analysis of EU-8 external trade with EU-15 in goods from group 4 (technologically intensive products, easy to imitate) did not indicate an improvement in their competitiveness. What is more, exchange of these products still was of inter-industry characteristics (weighted average IIT indicator in 2007 was 30%). The lack of comparative advantage was deepening together with export and import shares;
- trade in technologically intensive, difficult to imitate goods (group 5) was also characterized by inter-industry specialization (IIT average indicator in 2007 was 43%) with growing in IIT values. EU-8 countries maintained and strengthened their revealed comparative advantage in trade with EU-15, but import and export shares were decreasing.

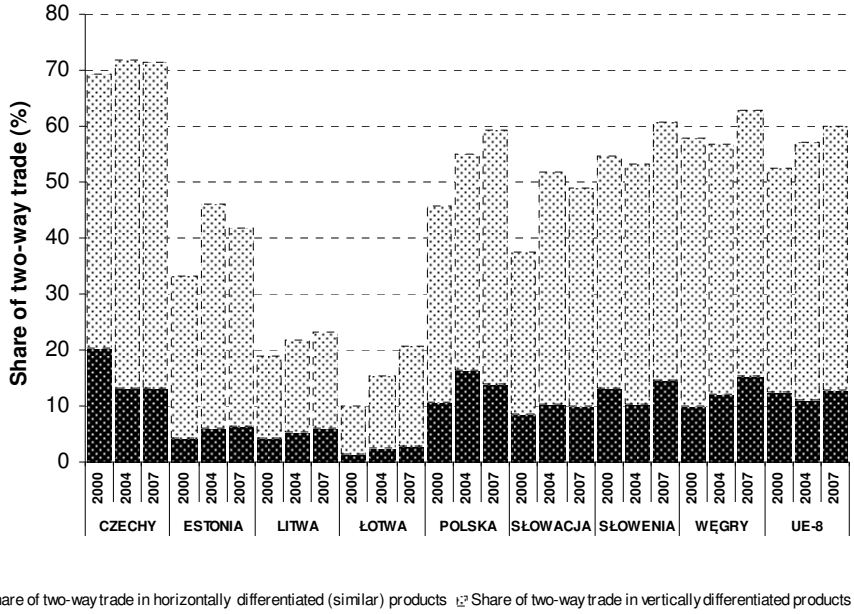
Reasons of low intensity of EU-8 intra-industry trade with EU-15 during the analyzed period were confirmed by the results of empirical analysis. As indicated by the analysis of growth of export and import shares in each group, new member states still did not bridge the technology gap - they increased only in group 1 (material-intensive goods) and 3 (capital-intensive goods) which are not characterized by the highest level of technological advancement. Adaptation processes to the SEM rules did not cause significant changes in trends of group 4 (technologically intensive goods, easy to imitate). Nevertheless, **some positive trends also shown up, which mean improving the EU-8 states` economic competitiveness and the substitutability of their economies inside the EU – intra-industry nature of the exchange enhanced by the upward trend of IIT values in all groups, and revealed comparative advantages in groups 2, 3 and 5**.

7. The analysis of EU-8 and EU-15 trade specialization by three trade types

On the basis of the results of calculations made for EU-8 trade with EU-15 in 2000, 2004 and 2007 (figure 1) it can be stated as follows:

- two-way trade included in 2007 already 60,0% of EU-8 trade with EU-15, with a remarkable increase even before the accession (52.5% in 2000 and 57.3% in 2004). It was however differentiated across countries – the largest in the Czech Republic, Slovenia, Poland and Hungary (59% - 71%), slightly smaller in Slovakia and Estonia (49% and 41%), and the smallest in Latvia and Lithuania (20% and 23%). Analyzing the dynamics of two-way trade shares for each country, it should be noted that in case of Latvia, Lithuania and Poland the improvement of indicators occurred both before and after accession. In turn, for the Czech Republic, Estonia and Slovakia a characteristic was the increase of indicators prior to accession and decrease in post-accession period. In other countries, so in Hungary and Slovenia, these indicators decreased before and increased after the accession;
- EU-8 intra-industry trade with EU-15, both before and after accession, was dominated by vertically differentiated good – so these flows were shaped mainly by the exchange of products that differ in quality;
- in post-accession period there was a significant increase in exchange of similar products (horizontally differentiated) - in 2007 it exceeded 21% of two-way trade between EU-8 and EU-15.

Figure 1. Two-way trade between EU-8 and EU-15 in the years 2007, 2004 and 2000 (%)



Source: Own calculations

EU-8 two-way trade with EU-15 in 2000-2007 was dominated by products of different quality, what proves the vertical specialization. However, after the accession there was increase in two-way trade in horizontally differentiated products (close quality substitutes). This may provide the emergence of the consumer preferences convergence process within the SEM and that increased effect of creation of intra-industry trade between EU-8 and EU-15 becomes apparent.

8. Conclusions

This paper was meant to analyze changes in the intensity of intra-industry trade between the new Member States (EU-8) and the EU-15 in the period of 2000-2007. The analysis focused on pre- and post-accession period indicated the following:

- significant increase of EU-8 intra-industry trade flows in almost all countries with EU-15. Levels of IIT indicators also presented that despite the upward trend in intra-industry trade still the main form of exchange between EU-8 countries and EU-15 was of inter-industry characteristic;

- meaningful increase of intra-industry trade flows in EU-8 mutual trade. Compared to the period before the accession, after that (between 2004-2007) there were more positive structural changes in the intra-EU-8 trade than in trade between EU-8 and EU-15. It seemed that this was due to the fact that before the accession the scope of trade liberalization resulting from the regional free trade agreements between EU-8 countries was lower than between EU-8 and EU-15. The removal of barriers to mutual trade of the EU-8 countries in 2004 had therefore a major impact on the formation of intra-industry flows among them;
- unchanged or smaller number of CN sections with the highest IIT values after the accession rather than in pre-accession period. Moreover, the highest IIT values both in pre- and post-accession period occurred in less than half of the analyzed CN sections in EU-8 mutual trade and external trade between EU-8 and EU-15;
- the tendency to increase the intensity of intra-industry trade within an increasing number of CN sections was significantly reinforced, both in the intra-EU-8 trade and in trade between EU-8 and EU-15. This process was accompanied by increased IIT indicators in the greater part of CN sections, especially that were characterized by the lowest IIT indicators in 2000;
- both in EU-8 external trade with EU-15, as well as in trade between the EU-8 countries there were sections of various countries with decreased IIT indicators in 2000-2007;
- the analysis of dynamics of intra-industry indicators within particular CN sections showed that within EU-8 mutual trade and trade between EU-8 and EU-15 its values in most sections before the accession (2000-2003) was higher than that in post-accession period (2004 -2007). Moreover, more often IIT dynamics after the accession was higher in EU-8 mutual trade than in trade between EU-8 and EU-15;

Further analysis examined the real adjustment processes in terms of EU-8 state economic competitiveness, which occurred during the pre- and post-accession period in order to prepare them to maximize the benefits of the Single European Market. The study confirmed that in the years 2000-2007:

- improvement of IIT indicators in trade between EU-8 and EU-15 was largely the result of transformations in the structure of commodity trade between these countries. In most EU-8 countries the pace of changes of IIT indicators in each groups of the intensity of using production factors differed significantly from that for total trade. In the case of group 1 (material-intensive goods) and group 4 (technology-intensive goods, easy to imitate) IIT indicators in most of EU-8 countries increased faster after accession than in pre-accession period (their dynamics in 2004-2007 were higher than in 2000-2004), thus, for these two product groups – material-intensive and technology-intensive goods, easy to imitate – changes in conditions for trade after the accession to the Single European Market had the most beneficial effect on their growing importance in intra-industry division of labor;

- upward trend in the intensity of intra-industry trade in most commodity sections and aggregates should be regarded as a positive direction of changes in the process of real adjustment of producers from the EU-8 to the requirements of the EU-15 market;
- trade in vertically differentiated products is still the major element of two-way trade flows between EU-8 and EU-15, simultaneously there was an increase in the share of two-way trade in horizontally differentiated products (close quality substitutes), which might provide the emergence of the consumer preferences convergence process within the Single Market and that increased effect of creation of intra-industry trade between EU-8 and EU-15 becomes apparent;
- the analysis of IIT and RCA indicators in trade between EU-8 and EU-15 showed positive trends, which in long term may result into increased competitiveness of the EU-8 countries within the EU. This, in turn, should facilitate better use of all positive effects resulting from the advantages of the single market.

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