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Changes in Intra-industry Competitiveness of the New Member States (EU-10) Economies During the Crisis, the Years 2009-2011

Abstract

The global financial crisis, mostly triggered by external factors, interrupted the trend toward enhanced strength of the EU-10 economies, which was the outcome of the solid structural reforms carried out in the pre-accession era. In this regard, this article investigates the following research problem: what have been the changes in intra-industry competitiveness of the new member states (EU-10) economies during the crisis, and to what degree have the positive adaptive processes taking place in the structures of their economies before and after their accession to the EU - which reflected the extent of their preparations for full integration with the single EU market - been influenced by this crisis?

This paper aims to present the main results of our analysis of changes in the trade flows of the examined countries in the initial years after the accession (2003-2008), and subsequently during the crisis (2009-2011). It especially focuses on presenting the main tendencies in intra-industry trade development in mutual trade among the new member states and with the EU-15 countries, and the main changes in a vertical and horizontal intra-industry specialization.

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1. Introduction

The main concepts constituting the basis of the theory of economic competitiveness demonstrate, *inter alia*, that intra-industry trade indicators are significant quantity measurement criteria of a competitive position. J. Misala and E. Pluciński (2000, p. 75) demonstrated that "the level of international competitiveness of a country or an industry is always a relative category, and it depends on intensity and on the structure of intra-industry trade."

The concept of the evolution of comparative advantages and international competitiveness proposed by T.Ozawa (1992) indicates that the modern world economy triggers possibilities of structural changes and upgrading the competitiveness level, especially when countries implement a liberal economy policy and open up their economies. Trade liberalization initiates structural changes, and the character of these changes is measured by intra-industry trade.

Therefore, there is a link between regional trade liberalization and an intra-industry division of labor. E. Molendowski (2007, p.212) emphasizes that "the indicator of intra-industry trade intensity is one of the most significant factors displaying the actual level of adaptation to the requirements of the single market." Moreover, an analysis of intra-industry specialization types, which comprise the vertical and horizontal structures of intra-industry trade, allows to determine the stage of competitiveness development of a particular economy.

The new member states (EU-10) followed a path of gradual trade liberalization and economic integration at the global and regional levels, opening up their economies, since the beginning of transformation process in the 1990s. Analyses of the intensity levels of changes in the intra-industry trade of Central and Eastern European countries, included in numerous research works, has proved that their competitiveness vis a vis intra-industry division of labor has systematically increased since the beginning of political and economic changes in 1989[1] This trend continued in the years preceding the accession and the initial years of their membership in the European Union. There was a significant increase in intra-industry trade with the EU-15 countries in the trade of almost all new member states, as well as a dynamic development of export and import and a substantial rise in the intra-industry exchange of mutual trade among the

[1] Compare: Caetano, Galego (2006), Firdmuc, Djablik (2003), Gabrisch, Segnana (2002, 2003), Gabrisch (2006), Kandogan (2003), Hoekman, (1996), Kamiński (2001), Ferto, Soos (2006), Wysokińska (1995), Pluciński (2004, 2005), Misala, Pluciński (2000); only about the Baltic countries: Tiits, Jüriado (2006), Bernatonytė, Juškienė (2008), Fainštein, Netšunajev (2009); only about the CEFTA group: Cernosa (2007), Molendowski (2007); about Hungary: Gacs (1994); about Poland: Michałek, Śledziewska-Kołodziejska (2000), Bijak Kaszuba (2003), Cieślik (2003), Czarny, Śledziewska (2008, 2009), Klimek (2006) and E. Kawecka-Wyrzykowska (2009).

countries of this group themselves. Dismantling the barriers which had hindered their mutual trade had a significant impact, after their accession to the EU, on shaping intra-industry trade among these countries[2].

The global financial crisis, the first symptoms of which appeared as early as in the year 2007 and which unfolded rapidly in the subsequent year, was felt relatively swiftly in all the countries of Central and Eastern Europe. This was reflected by the deterioration of the main business activity indicators (such as a GDP growth rate, unemployment rate, inflation rate, and budget deficit)[3]. It also seems that the crisis appeared in the economies of the new member states at a most unexpected moment. It was mostly triggered by external factors and did not allow to maintain the trend toward enhancing the strength of the EU-10 economies, which was the outcome of solid structural reforms carried out in the pre-accession era. Therefore, it is crucial to examine the changes in intra-industry competitiveness of the new member states' (EU-10) economies during the crisis and the degree to which the positive adaptive processes taking place in the structures of their economies before and after their accession to the EU, which reflected the extent of their preparations for full integration with the single EU market, was impeded by the crisis.

This article mainly deals with a presentation of the most important results of our analysis of changes in trade flows of the examined countries in the initial years after the accession (2003-2008), and during the crisis (2009-2011). It especially focuses on presenting the main tendencies in intra-industry trade development in the mutual trade among the new member states, and with the EU-15 countries, and the main changes in a vertical and horizontal intra-industry specialization.

2. Methodology of the analysis

Our analysis of intra-industry trade intensity was conducted on the basis of the aggregated, multilateral Grubel and Lloyd`s index, calculated at the 6-digit CN codes level:

[2] See Molendowski, Polan (2009).

[3] Compare: Molendowski, Polan (2010).

$$IIT = \frac{\sum_i (\sum_j X_{ij} + \sum_j M_{ij}) - \sum_i \left| \sum_j X_{ij} - \sum_j M_{ij} \right|}{\sum_i (\sum_j X_{ij} + \sum_j M_{ij})}$$

where X_{ij} and M_{ij} are respectively the values of export and import for the industry i in the trade with the country j.

This index allows for calculation of a country's share of intra-industry trade of all products, not only with a chosen trade partner, but also taking into account its foreign trade as a whole, or with a certain group of countries. The indicator is a relative measure and receives values from the interval [0,1]. If IIT_j = l, it is assumed then that trade as a whole trade is of an intra-industry character, i.e. $X=M$. If, however, $IIT = 0$, export and import do not overlap with each other within the industry, which means that intra-industry trade does not occur[4].

Intra-industry specialization is generally divided into trade of products differentiated vertically and horizontally. Horizontal differentiation (HIIT) is usually regarded as offering various products of the same quality, and vertical differentiation (VIIT) means offering the same products or their close substitutes of a different quality. Greenaway, Hine and Milner's (1994,1995) conception explains that the basis for singling out intra-industry trade of a horizontal and vertical type is shaping so-called unit values of certain products. The hypothesis that the relation between export-import prices reflects quality differences, which are the key factor in intra-industry vertical trade, constitutes the basis of the assumed criteria.

Trade which fulfills the following conditions can be regarded as horizontal intra-industry trade (HIIT)[5]:

$$1-\alpha \le \frac{UV_{i,t}^{kk',x}}{UV_{i,t}^{kk',m}} \le 1+\alpha,$$

whereas trade meeting the following criteria can be regarded as vertical intra-industry trade (VIIT) :

$$\frac{UV_{i,t}^{kk',x}}{UV_{i,t}^{kk',m}} \le 1-\alpha \text{ lub } \frac{UV_{i,t}^{kk',x}}{UV_{i,t}^{kk',m}} \ge 1+\alpha,$$

[4] See: Molendowski (2007, p.48), Molendowski, Polan (2009, p.10).

[5] Compare: Hine, Greenaway, Milner (1998, pp.75–76).

where:

$x = \frac{UV_{i,t}^{kk',x}}{UV_{i,t}^{kk',m}}$ – a relation between an export unit value and an import unit value,

α – the indicator of deviation of relative export unit values ($x = \frac{UV_{i,t}^{kk',x}}{UV_{i,t}^{kk',m}}$). It is usually assumed that α = 0,15[6].

Table 1. List of methods of intra-industry trade measurement versus product differentiation

	horizontal (H)	vertical (V)	total (T)
Grubel and Lloyd index	$\frac{BT^H}{GT^H}$ level of horizontally differentiated intra-industry trade	$\frac{BT^V}{GT^V}$ level of vertically differentiated intra-industry trade	$\frac{BT^H + BT^V}{GT^H + GT^V}$ level of intra-industry trade
Greenaway, Hine and Milner	$\frac{BT^H}{GT^H + GT^V}$ ratio of intra-industry horizontal trade to total trade	$\frac{BT^V}{GT^H + GT^V}$ ratio of intra-industry vertical trade to total trade	$\frac{BT^H + BT^V}{GT^H + GT^V}$ level of intra-industry trade

Notes: Total trade: GT=(X + M), Balanced trade: BT=(X + M)- |X - M| = 2*Min*(X,M)

Source: own study, based on Fontagné, Freudenberg (1997, p. 39).

When the relation between export prices and import prices is smaller than 0.85, it indicates that a country sells goods abroad of lower quality and imports goods of better quality from abroad (i.e., vertical intra-industry trade of low quality - VIIT *low quality*). However, when such a relation is larger than 1.15, the country imports goods of lower quality and exports goods of better quality (i.e., vertical intra-industry trade of high quality - VIIT *high quality*)[7].

[6] Fontagne, Freudenberg, Peridy (1997), assume the value 0,.25.

[7] It is sometimes impossible to determine a relative unit value of export, and thus to determine an intra-industry trade type. It may be a consequence of lack of data concerning export or import, or two-way trade expressed in physical units. Compare: Ambroziak (2010).

The GHM indicator was applied to calculate shares of horizontal and vertical intra-industry trade in the research presented in this article. Fontagné, Freudenberg and Periday (1997, p. 38) point out that the GHM index (Greenaway, Hine and Milner's), which is an adapted version of the IIT Grubel and Lloyd's indicator, allows for the calculation of intra-industry trade of horizontally and vertically differentiated products, and introduces two additional components: the ratio of intra-industry vertical and horizontal trade to the total trade (see: Table 1), in order to obtain a similar result of the GL index value to total trade. Therefore, for the industry j:

$$GHM_j = GHM_j^{horizontal} + GHM_j^{vertical} = 1 - \left(\frac{\left|X_j^H - M_j^H\right| + \left|X_j^V - M_j^V\right|}{X_j - M_j} \right) =$$

$$= 1 - \left(\underbrace{\frac{X_j^H + M_j^H}{X_j + M_j}}_{\text{share of horizontally differentiated trade}} \cdot \underbrace{\frac{\left|X_j^H - M_j^H\right|}{X_j^H + M_j^H}}_{\text{the Balass index for horizontally differentiated trade}} + \underbrace{\frac{X_j^V + M_j^V}{X_j + M_j}}_{\text{share of vertically differentiated trade}} \cdot \underbrace{\frac{\left|X_j^V - M_j^V\right|}{X_j^V + M_j^V}}_{\text{the Balass index for vertically differentiated trade}} \right)$$

3. Changes in intensity of intra-industry trade

Values of multilateral indexes of intra-industry trade, calculated for the total trade of particular EU-10 countries with the EU-15 and for the mutual trade of the EU-10 countries during the initial years after the accession (2003-2008) and during the crisis (2009-2011) are shown in Table 2 below.

Both the parallel import and export of products within the same industries carried out by particular EU-10 countries with the EU-15 countries and their mutual trade remained at a relatively low level during the examined period. IIT indexes of the share of intra-industry exchange with the EU-15 countries exceeded 50% only for the Czech Republic (51.2%) in 2011. Only four countries: the Czech Republic (56.1%), Slovakia (53.8%), Latvia (53.0%) and Hungary (51.0%) had a larger share of intra-industry trade than inter-industry trade in the mutual trade among EU-10 countries.

Examination of values of intra-industry trade indexes, both for the EU-10 trade with EU-15 and the mutual trade of EU-10, as compiled in Table 4, shows that these indexes, both for the EU-10 group as a whole and for most of the

examined countries definitely rose during the analyzed period. Charts 1 and 2 are graphic confirmations of this clear trend.

Table 2. The EU-10 countries' intra-industry trade with the EU-15 as well as their mutual trade in the years 2003-2011

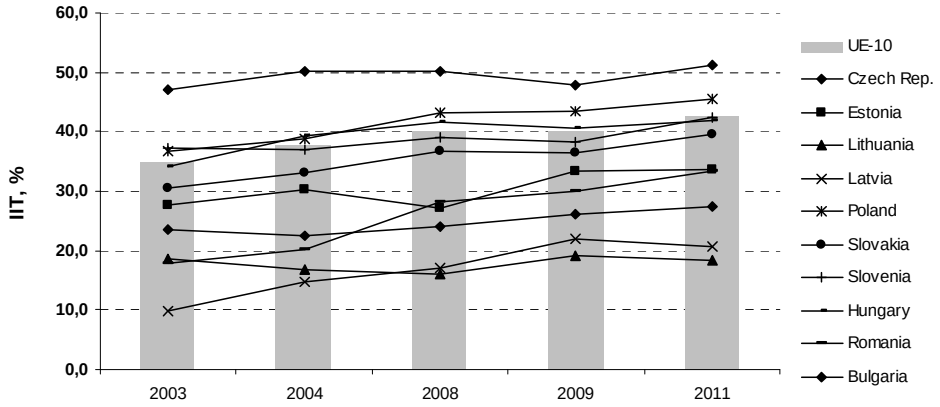
Countries		2003	2004	2008	2009	2011	Dynamics 2003-2011	Average annual changes		
								2003-2011	2003-2008	2009-2011
EU-10 with EU-15	Czech R.	47.1	50.1	50.2	47.8	51.2	108.6	1.0	1.3	0.7
	Estonia	27.7	30.3	27.0	33.3	33.7	121.8	2.5	-0.5	7.7
	Lithuania	18.7	16.8	16.1	19.2	18.4	98.5	-0.2	-3.0	4.7
	Latvia	9.8	14.8	17.2	22.1	20.6	211.1	9.8	12.0	6.2
	Poland	36.8	38.7	43.2	43.3	45.4	123.3	2.6	3.2	1.7
	Slovakia	30.4	33.2	36.8	36.6	39.6	130.2	3.4	3.9	2.5
	Slovenia	37.2	37.0	39.1	38.3	42.4	114.1	1.7	1.0	2.8
	Hungary	34.0	39.2	41.7	40.7	41.9	123.0	2.6	4.1	0.2
	Romania	17.8	20.3	28.3	30.0	33.4	187.4	8.2	9.6	5.8
	Bulgaria	23.5	22.4	24.1	26.0	27.5	117.0	2.0	0.5	4.6
	EU-10	*34.9*	*37.9*	*40.0*	*40.2*	*42.6*	*122.1*	*2.5*	*2.8*	*2.1*
Mutual EU-10 trade	Czech R.	43.2	45.9	52.6	53.6	56.1	129.9	3.3	4.0	2.2
	Estonia	31.5	35.0	39.7	43.1	38.0	120.4	2.3	4.7	-1.5
	Lithuania	32.0	34.7	39.7	42.7	46.5	145.5	4.8	4.4	5.4
	Latvia	29.0	34.4	43.9	49.9	53.0	182.5	7.8	8.6	6.5
	Poland	41.1	42.7	44.8	44.7	47.6	115.9	1.9	1.8	2.0
	Slovakia	38.2	40.8	48.6	49.6	53.8	140.6	4.4	4.9	3.4
	Slovenia	18.3	21.9	31.5	32.2	36.7	200.4	9.1	11.5	5.2
	Hungary	36.2	43.2	46.4	45.7	51.0	140.8	4.4	5.1	3.2
	Romania	23.7	25.0	27.8	33.7	39.7	167.8	6.7	3.3	12.6
	Bulgaria	23.5	27.8	26.0	31.5	31.8	135.0	3.8	2.0	6.9
	EU-10	*37.0*	*40.2*	*44.3*	*45.9*	*49.3*	*133.3*	*3.7*	*3.7*	*3.7*

Source: Comext DVD: Intra- and extra- EU trade data. Annual data – Supplement 2/2012, Eurostat, 2012. Own calculations.

An analysis of the EU-10 exchange with the EU-15 reveals that the highest growth dynamic of intra-industry trade intensity occurred in Latvia and Romania (where the share of intra-industry trade in 2011 increased from 2003 by 111.1% and 87.4% respectively). With the exception of Lithuania, the EU-10 countries also had relatively low indexes both in 2003 and in 2011. Lithuania was the only country whose IIT index value fell during this period, from 18.7%

to 18.4%. The share of intra-industry trade grew in Slovakia by 1/3 (30.2%), and by more than 1/5 in Poland, Hungary and Estonia (respectively 23.3%, 23% and 21.8%) during the examined period. In the case of Bulgaria and Slovenia the index was higher in 2011 by 17% and 14.1% respectively. The share of intra-industry trade grew in all ten countries but the slowest growth took place in the Czech Republic (by 8.6%). However, it is worth indicating that the Czech economy had the largest share of intra-industry trade, both at the beginning and at the end of the examined period (IIT respectively amounted to 47.1% in 2003 and 51.2% in 2011).

Chart 1. Changes in the indexes of the EU-10's intra-industry trade with the EU-15 in the years 2003, 2004, 2008, 2009 and 2011

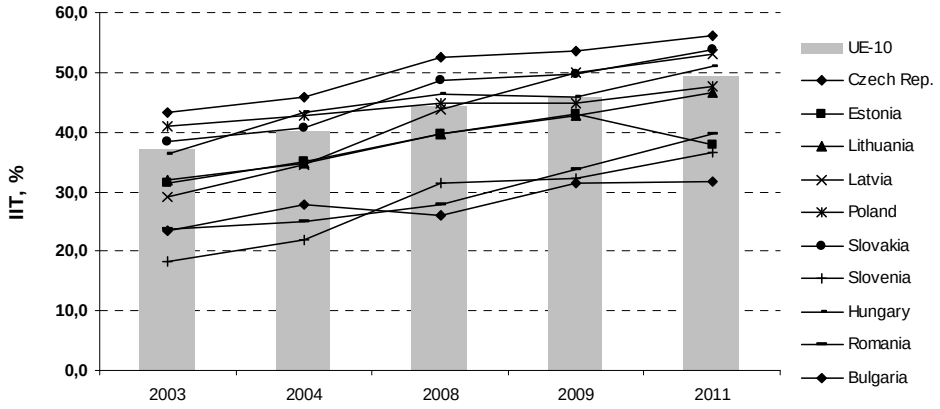


Source: Own study, based on the data compiled in Table 2.

Between 2003 and 2011 a significant increase occurred in the share of intra-industry trade in the trade of almost all EU-10 new member states with the EU-15 countries. Analysis of the obtained results also allows to draw the conclusion that, independently of the clear growth trend in intra-industry trade intensity, inter-industry trade is still a significant form of an exchange between the EU-10 and EU-15 countries.

Analyzing the development of the share indexes of intra-industry trade in the mutual exchange among the EU-10 new member states in the years 2003-2011, it is worth emphasizing that Romania had the highest rate of increase in the IIT indexes values (by 100.4%).

Chart 2. Changes in the intra-industry trade indexes concerning the mutual trade among the EU-10 countries in the years 2003, 2004, 2008, 2009 and 2011



Source: Own study based on the data compiled in Table 2.

In the case of Latvia and Romania. the index rose by 2/3 (growth of 82.5% and 67.8% respectively), and for Lithuania, Slovakia and Hungary – by nearly ½ (growth of 45.4%, 40.8% and 40.6% respectively), whereas in the case of Bulgaria and the Czech Republic the intra-industry trade share was almost 1/3 larger in 2011 than in 2003. The lowest dynamic of growth of the index value occurred in Estonia and Poland – where the index grew by 20.4% and 15.4% respectively. Summing up, a significant increase in inter-industry trade's share in the mutual trade among all EU-10 countries was visible in the years 2003-2011.

It is worth noting that in the years 2003-2011 the rate of growth of intra-industry trade share indexes in the mutual exchange of the EU-10 proved to be higher than the dynamic of these indexes concerning the EU-10 countries' trade with EU-15 (the growth of the IIT indexes for the EU-10 in their mutual trade amounted to 33.3%, compared to 22.1% of their exchange with EU-15). It is interesting to note that four countries - Estonia, Latvia, Poland and Romania - had bigger growth in their IIT indexes in their trade with EU-15 than with the EU-10 countries in the years 2003-2011.

Table 3. Average annual changes in export and import of the EU-10 countries with the EU-15, and in the mutual trade among the EU-10 countries (%)

Countries		Export			Import		
		2011/2003	2008/2003	2011/2009	2011/2003	2008/2003	2011/2009
EU-10 with EU-15	Czech Rep.	12.60	14.19	9.49	10.91	13.94	5.09
	Estonia	10.56	9.38	12.96	9.68	12.68	3.93
	Lithuania	11.43	12.88	8.57	9.99	12.98	4.25
	Latvia	7.38	7.87	6.40	9.81	12.14	5.28
	Poland	12.88	15.55	7.74	11.69	16.04	3.47
	Slovakia	14.48	18.88	6.15	12.42	15.39	6.70
	Slovenia	9.13	10.68	6.08	7.89	11.86	0.35
	Hungary	6.72	7.69	4.82	7.30	10.19	1.75
	Romania	11.08	10.66	11.92	11.98	17.52	1.68
	Bulgaria	12.51	12.85	11.82	11.08	15.84	2.13
	EU-10	*11.32*	*13.01*	*8.02*	*10.56*	*14.28*	*3.47*
Mutual EU-10 trade	Czech Rep.	14.97	20.45	4.75	16.52	20.77	8.47
	Estonia	15.92	21.40	5.68	24.04	30.85	11.48
	Lithuania	20.07	25.54	9.83	22.18	32.44	3.99
	Latvia	26.71	33.16	14.73	17.27	23.72	5.36
	Poland	17.47	23.30	6.61	15.69	20.34	6.92
	Slovakia	18.22	22.69	9.77	19.79	26.26	7.83
	Slovenia	17.77	24.36	5.63	10.75	14.26	4.04
	Hungary	20.97	28.47	7.27	16.71	20.73	9.06
	Romania	25.52	31.77	13.90	23.01	33.08	5.10
	Bulgaria	27.99	33.76	17.19	22.56	34.62	1.58
	EU-10	*18.42*	*24.08*	*7.85*	*18.05*	*23.95*	*7.09*

Source: Comext DVD: Intra- and extra- EU trade data. Annual data – Supplement 2/2012, Eurostat, 2012. Own calculations.

In order to examine whether the global crisis and the slump in commercial exchange in 2009 (see Table 4) affected changes in the competitiveness of the intra-industry economies of the new member states (EU-10), average annual changes in the index values of intra-industry trade with the EU-15 countries and the mutual trade among the EU-10 countries have been analyzed. The results obtained for the EU-10 group as a whole (see Table 4) allow us to conclude that within the framework of the mutual trade among the EU-10 countries, the changes in values of export and import induced by the crisis did not have

a significant impact on the trends toward the further development of intra-industry trade shaped in the initial years after the accession. The average annual growth rate of the IIT index for the years 2009-2011 was 3.7% and equaled to the growth rate for the years 2004-2008. This means that the mutual trade among the EU-10 countries increased evenly during the entire period examined. It is worth emphasizing that an analysis of the results obtained for particular countries shows that in the case of six countries (the Czech Republic, Estonia, Latvia, Slovakia, Slovenia, Hungary), the changes in the exchange structure arising from the crisis were reflected by a slowdown in the pace of intra-industry trade growth in relation to the initial years after the accession, i.e. a slump in the average annual growth rate of the IIT indexes in the years 2009-2011 in comparison with the 2004-2008 period. Average annual growth rates of share indexes for intra-industry trade were higher than those from the years 2004-2008 in the four remaining countries (Lithuania, Poland, Romania, Bulgaria) in the period examined from the beginning of the crisis.

The results of our examination of the changes in average annual growth rates of the IIT indexes of the new member states EU-10 in their commercial exchange with the EU-15 countries in the analyzed period (2003-2011) indicate that a result of the crisis was a slowdown in the pace of growth of intra-industry trade in the years 2009-2011, in comparison with the 2003-2008 period. The average annual growth rate for the entire EU-10 group for the years 2009-2011 amounted to 2.1% and was lower than the growth rate calculated for the years 2004-2008 (2.8%). In the case of six countries (the Czech Republic, Latvia, Poland, Slovakia, Hungary, Romania) there was a decrease in the average annual growth rate of the IIT indexes in the years 2009-2011 in comparison with the 2004-2008 period. On the other hand, in the case of the four remaining countries (Estonia, Lithuania, Slovenia, Bulgaria) the average annual growth rate of their share indexes of intra-industry trade in the years 2009-2011 were higher than those obtained in the 2004-2008 period.

The analysis conducted of the share indexes of intra-industry trade has confirmed that the world economic crisis affected more negatively the dynamic of development of the EU-10 intra-industry trade with the EU-15 countries than their mutual trade.

4. The main changes in vertical and horizontal intra-industry specialization

In 2011 intra-industry trade encompassed 42.6% of the commercial exchange of the new member states (EU-10) with the EU-15 countries. A majority of two-way trade encompassed exchange of vertically differentiated

products (the VIIT index for the EU-10 amounted to 31.0%), and the trade of high and low quality goods split almost equally (the VIIT of low quality amounted to 15.5% and the VIIT of high quality amounted to 15.4%). The new member states exchange of similar products (horizontal specialization) with the EU-15 amounted to 11.6% of their total commercial exchange in 2011.

The level of intra-industry trade was differentiated in particular EU-10 countries – the highest taking place in the Czech Republic, Poland, Slovenia, Hungary and Slovakia (39.6% - 51.2%), lower in Estonia, Romania and Bulgaria (27.5% - 33.7%), and the lowest level occurring in Lithuania and Latvia (18.4% and 20.6% respectively). On the basis of our calculation of the results of the indexes of vertical (VIIT) and horizontal (HIIT) intra-industry specialization for the EU-10 countries' trade with EU-15 for the years set forth in Table 4, Chart 3, the following value ranges of particular indexes for this group of countries can be determined:

- for the Czech Republic, Poland, Hungary, Slovakia and Slovenia: the range of VIIT was [29.4% - 38.2%], and the range of the HIIT level [79.4% - 16.0%];
- in the case of Estonia, Romania, Bulgaria, the range of VIIT was [21.9% - 27.6%] and the range of the HIIT level [5.6% - 6.6%];
- for Lithuania and Latvia the range of VIIT was [15.0% - 16.4%]; and the range of the HIIT level [3.5% - 4.2%].

Table 4. Types of intra-industry specializations in the EU-10 countries' trade with the EU-15 in the years 2003, 2004, 2008, 2009, 2011 (for 6-digit codes CN, in %)

Country	Years	Inter-industry	Intra-industry				
			Total IIT	Vertical (VIIT)			Horizontal (HIIT)
				Total	High quality	Low quality	
EU-10	2003	65.1	34.9	26.6	9.3	17.3	8.2
	2004	62.1	37.9	29.8	13.4	16.4	8.0
	2008	60.0	40.0	29.6	11.8	17.8	10.4
	2009	59.8	40.2	29.4	14.4	15.0	10.8
	2011	57.4	42.6	31.0	15.4	15.5	11.6
Estonia	2003	72.3	27.7	24.5	10.9	13.6	3.2
	2004	69.7	30.3	26.0	11.9	14.2	4.2
	2008	73.0	27.0	21.2	8.6	12.6	5.8
	2009	66.7	33.3	26.8	9.9	16.9	6.5
	2011	66.3	33.7	27.6	12.4	15.2	6.1

Latvia	2003	90.2	9.8	8.6	1.8	6.9	1.1
	2004	85.2	14.8	11.8	3.9	7.9	3.0
	2008	82.8	17.2	14.3	4.9	9.4	2.9
	2009	77.9	22.1	18.5	4.8	13.8	3.5
	2011	79.4	20.6	16.4	5.9	10.5	4.2
Lithuania	2003	81.3	18.7	13.0	4.8	8.2	5.7
	2004	83.2	16.8	14.3	4.3	10.1	2.5
	2008	83.9	16.1	14.0	4.8	9.2	2.1
	2009	80.8	19.2	16.0	7.2	8.9	3.2
	2011	81.6	18.4	15.0	6.5	8.5	3.5
Poland	2003	63.2	36.8	25.4	6.4	19.0	11.5
	2004	61.3	38.7	30.6	13.7	16.9	8.1
	2008	56.8	43.2	31.5	11.5	20.0	11.7
	2009	56.7	43.3	29.3	14.1	15.1	14.1
	2011	54.6	45.4	29.4	12.7	16.7	16.0
Czech Rep.	2003	52.9	47.1	37.2	13.2	24.0	9.9
	2004	49.9	50.1	39.9	19.4	20.5	10.2
	2008	49.8	50.2	37.1	17.4	19.7	13.0
	2009	52.2	47.8	34.5	19.9	14.6	13.2
	2011	48.8	51.2	38.2	20.3	17.8	13.0
Slovakia	2003	69.6	30.4	24.2	10.2	13.9	6.3
	2004	66.8	33.2	25.7	10.4	15.2	7.5
	2008	63.2	36.8	31.7	12.3	19.3	5.1
	2009	63.4	36.6	30.9	14.0	16.9	5.7
	2011	60.4	39.6	29.8	16.4	13.4	9.8
Hungary	2003	66.0	34.0	25.7	11.2	14.6	8.3
	2004	60.8	39.2	28.9	13.6	15.3	10.3
	2008	58.3	41.7	28.3	12.7	15.6	13.4
	2009	59.3	40.7	30.2	15.7	14.5	10.6
	2011	58.1	41.9	32.5	19.8	12.7	9.4
Romania	2003	82.2	17.8	15.1	4.5	10.6	2.8
	2004	79.7	20.3	17.6	5.9	11.7	2.6
	2008	71.7	28.3	22.1	7.8	14.2	6.2
	2009	70.0	30.0	24.8	10.4	14.4	5.2
	2011	66.6	33.4	26.9	12.2	14.7	6.6

Bulgaria	2003	76.5	23.5	20.7	7.8	12.9	2.8
	2004	77.6	22.4	20.0	6.9	13.1	2.4
	2008	75.9	24.1	19.9	5.7	14.2	4.2
	2009	74.0	26.0	20.0	7.0	13.0	6.1
	2011	72.5	27.5	21.9	9.7	12.3	5.6
Slovenia	2003	62.8	37.2	31.4	11.7	19.7	5.8
	2004	63.0	37.0	29.0	11.9	17.0	8.0
	2008	60.9	39.1	26.2	7.9	18.3	12.9
	2009	61.7	38.3	29.0	9.4	19.6	9.3
	2011	57.6	42.4	31.9	13.1	18.7	10.6

HIIT: Inter-industry trade of horizontally differentiated products

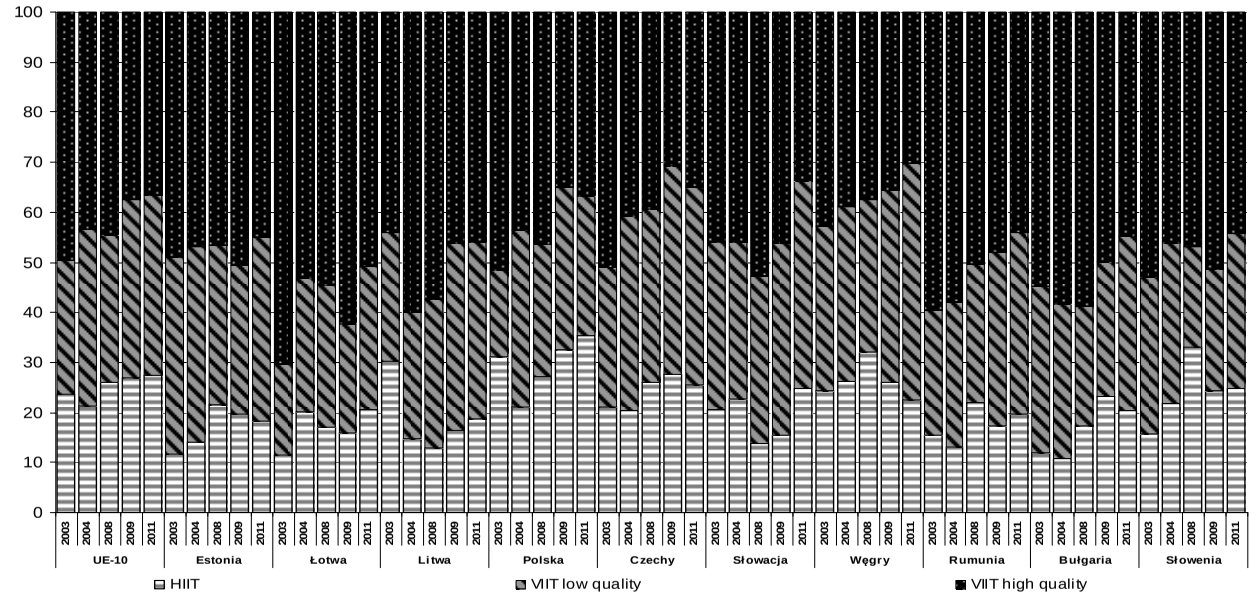
VIIT: Inter-industry trade of vertically differentiated products

Source: Comext DVD: Intra- and extra- EU trade data. Annual data – Supplement 2/2012, Eurostat, 2012. Own calculations.

In 2011, among all the EU-10 countries Poland was characterized by the highest level of specialization in intra-industry trade of similar products (horizontal differentiation) with the EU-15 countries (HIIT at the level of 16.0%), whereas the Czech Republic had the highest level of exchanging products which were quality substitutes (vertical differentiation). Within the second type of specialization, the Czech Republic was simultaneously at the forefront in the export of better quality goods and import of lower quality goods (the *high quality* VIIT index at the 20.3% level of the total trade), whereas Slovenia was at the forefront of intra-industry vertical trade of low quality, as it sold the EU-15 countries more low quality goods and imported better quality products from these countries (the *low quality* VIIT index amounted to 18.7%) than any other new member state.

The average annual changes in the values of intra-industry trade with the EU-15 countries, with a division into intra-industry specialization types, have been analyzed to complement the analysis of changes in the competitiveness of the intra-industry economies of the new member states (EU-10). Our research results presenting the average annual growth rates of the high quality VIIT, low quality VIIT, and HIIT indexes for the years 2003-2011 have been compiled in Table 5.

Chart 3. Intra-industry specialization types of the EU-10's trade with the EU-15 in the years 2003, 2004, 2008, 2009 and 2011 – shares in %, IIT = 100%



Source*:* own calculations based on the data compiled in Table 4.

Table 5. Average annual changes (in %) in values of indexes of the EU-10 countries' intra-industry trade with the EU-15 within particular specialization types

Countries	high quality VIIT			low quality VIIT			HIIT		
	2003-2011	2003-2008	2009-2011	2003-2011	2003-2008	2009-2011	2003-2011	2003-2008	2009-2011
Czech Rep.	5.6	5.8	5.3	-3.7	-3.9	-3.3	3.4	5.6	0.0
Estonia	1.7	-4.6	13.1	1.4	-1.5	6.3	8.4	12.5	1.8
Lithuania	3.8	-0.2	10.8	0.4	2.3	-2.7	-6.0	-18.2	18.5
Latvia	16.1	22.2	6.5	5.4	6.5	3.7	18.2	21.3	13.1
Poland	9.0	12.4	3.5	-1.6	1.0	-5.8	4.3	0.4	11.0
Slovakia	6.1	3.8	10.0	-0.5	6.8	-11.5	5.8	-4.0	24.4
Slovenia	1.5	-7.6	18.5	-0.6	-1.4	0.8	7.8	17.2	-6.3
Hungary	7.4	2.6	16.0	-1.7	1.4	-6.7	1.5	9.9	-11.0
Romania	13.3	11.9	15.8	4.2	6.1	1.1	11.4	17.4	2.0
Bulgaria	2.7	-6.0	18.9	-0.6	1.9	-4.6	8.9	8.1	10.2
EU-10	*6.5*	*4.9*	*9.3*	*-1.4*	*0.5*	*-4.4*	*4.4*	*4.8*	*3.7*

Source: Comext DVD: Intra- and extra- EU trade data. Annual data – Supplement 2/2012, Eurostat, 2012. Own calculations.

The results obtained for the EU-10 group as a whole indicate that structural transformations in their commercial exchange with the EU-15 countries, which among other things resulted from the world economic crisis (in the years 2009-2011), were reflected by a change in the development tendency of individual types of intra-industry specializations (discernible in the initial years after the accession, i.e. 2003-2008):

- in the case of low quality horizontal specialization, in the examined period after the outbreak of the crisis there was a reversal of the growth trend for the VIIT from the initial years after the accession (the average annual growth rate for the years 2004-2005 being at the level of 0.5%). This type of specialization share fell by an annual average of 4.4% in the years 2009-2011. The low quality VIIT indexes for the Czech Republic dropped in both periods examined (the average annual growth rates amounted to -3.9% for the years 2004-2008 and -3.3% for the 2009-2011 period). Only in the case of Slovenia did the share of such specialization diminish annually before the crisis, only to grow in the years 2009-2011 (average annual growth rates at the level -1.4% and 0.8% respectively). In the case of five countries (Lithuania, Poland, Slovakia, Hungary, Bulgaria) there were positive average growth rates in the years 2004-2008, but negative ones in the 2009-2011 period, and in the two remaining countries (Latvia and Romania) there

was a slump in the growth rate, which resulted in lower average annual growth rates in both examined periods;

- there was a slowdown in the pace of growth of intra-industry trade of similar products (horizontal specialization) in relation to the initial years after the accession – a slump in the average annual growth rate of the IIT indexes in the years 2004-2008 from the level of 4.8% to 3.7% in comparison with the 2009-2011 period. It is worth mentioning while analyzing the situation in particular countries that tendencies convergent with the trend indicated for the EU-10 group as a whole occurred in as many as seven countries (the Czech Republic, Estonia, Latvia, Slovenia, Hungary, Romania, Bulgaria), whereas in the case of the three remaining countries (Latvia, Poland and Slovakia), there was a significant acceleration in the growth of the share of intra-industry horizontal specialization type in the years 2009-2011 in comparison with the initial years after the accession (2004-2008);
- the intra-industry exchange of vertically differentiated products of high quality in the examined period 2009-2011 exhibited higher average annual growth rates of share indexes of intra-industry trade than those obtained in the years 2004-2008 (a rise from the level of 4.9% to 9.3%). In as many as seven countries (Estonia, Lithuania, Slovakia, Slovenia, Hungary, Romania, Bulgaria) there was a significant acceleration of this specialization type. represented by significant growth of the high quality VIIT indexes (two-digit, average annual growth rates for the years 2009-2011). There was a slowdown in the growth rate in comparison with the initial years following the accession in Poland, the Czech Republic and Latvia.

5. Conclusions

In summary, it is worth highlighting that between 2003 and 2011 a significant increase took place in the share of intra-industry trade in the overall trade of almost all EU-10 new member states with the EU-15 countries. Independently of the clear tendency of intra-industry trade intensity to grow, inter-industry trade has remained a significant form of exchange between the EU-10 countries and the EU-15 countries. The analysis of IIT shares in overall trade has confirmed that the world economic crisis affected more negatively the rate of development of the EU-10's intra-industry trade with the EU-15 countries than it did their mutual trade.

The EU-10 intra-industry trade with EU-15 in the years 2003-2011 was mainly dominated by quality differentiated products, which indicates a vertical

specialization. After the accession, the share of horizontally differentiated products in two-way trade (close quality substitutes) grew more quickly. This may indicate an ongoing process whereby consumer preferences become more similar within the single market, and the effect of creating intra-industry exchange among the analyzed countries grows. A dynamic examination of changes in shares of individual intra-industry specialization types in the initial years after the accession (2003-2008) in comparison with the period following the onset of the global economic crisis (2009-2011) has proved the thesis that the positive adaptive processes which took place in the structures of the economies of the EU-10 after their accession to the EU, and which reflected the extent of their preparations for the full integration with the single EU market, were disrupted.

In the period after 2009, there was a shift in the share of intra-industry exchange of horizontally differentiated products of low quality towards more intensive trade development of horizontally differentiated products of high quality. However, there were limitations placed on the pace of horizontal specialization development, which is intra-industry trade of similar products, as an effect of the changes in the EU-10's trade structure with EU-15 as a result of the crisis. Yet growth in the share of such an intra-industry specialization is exactly most needed as far as maximization of advantages arising from the EU-10's participation in the single European market is concerned.

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Streszczenie

ZMIANY KONKURENCYJNOŚCI WEWNĄTRZGAŁĘZIOWEJ GOSPODAREK NOWYCH PAŃSTW CZŁONKOWSKICH (UE-10) W OKRESIE KRYZYSU, W LATACH 2009-2011

Kryzys gospodarczy wywołany głównie czynnikami zewnętrznymi, nie pozwolił na utrzymanie tendencji wzmacniających siłę gospodarek krajów UE-10, będących efektem rzetelnie przeprowadzonych reform strukturalnych w okresie przedakcesyjnym. W artkule podjęto więc następujący problem badawczy: jak w czasie kryzysu postępowały zmiany konkurencyjności wewnątrzgałęziowej gospodarek nowych państw członkowskich (UE-10) oraz w jakim stopniu zakłócone zostały pozytywne procesy dostosowawcze, jakie dokonały się w strukturach ich gospodarkach przed i po akcesji do UE, odzwierciedlające stopień przygotowań do ich pełnej integracji z jednolitym rynkiem UE. W artykule przedstawiono najważniejsze wyniki analizy zmian strumieni handlu analizowanych krajów w pierwszych latach po akcesji (w latach 2003-2008) oraz w okresie kryzysu (2009-2011). Szczególna uwaga została wrócona na wskazanie najważniejszych tendencji w rozwoju handlu wewnątrzgałęziowego nowych państw członkowskich w handlu wzajemnym oraz w handlu z państwami UE-15, a także głównych zmian pionowej i poziomej specjalizacji wewnątrzgałęziowej.