

Intra-industry Trade as a Measure of Specialisation Changes in the EU-10 Countries in 1995–2014¹

Introduction and Objectives

Statistics reveal high growth in the foreign trade of the 10 Member States of Central and Eastern Europe (the CEECs or the EU-10)² having joined the EU after 1 May 2004, since the beginning of their transition, including the post-accession period.³ Trade has been an important mechanism of integration of the CEECs into the European Union's common market.⁴ In this paper we want to see whether the impressive quantitative trade changes are associated with developments in the pattern of trade specialisation of those countries. In particular, we want to address the issue of trends in intra-industry trade (IIT, also referred to as two-way trade) which shows the extent to which simultaneous exports and imports of products belonging to the same industry occur.

There are several reasons to explain our interest in intra-industry trade:

1. IIT is considered to be more beneficial than inter-industry trade. IIT allows for more trade benefits than inter-industry trade. The reason

* Prof. dr hab. **Elżbieta Kawecka-Wyrzykowska** – Szkoła Główna Handlowa w Warszawie, Kolegium Gospodarki Światowej, e-mail: ekawec@sgh.waw.pl.

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² Cyprus and Malta are excluded from analysis, not because geographically they are not situated in Central and Eastern Europe but on account of the fact that they have been market economies for many years and have not experienced radical transition to significantly affect their development. Croatia is excluded as it joined the EU much later (in 2013) and its trade changes are not comparable with those of the EU-10 countries.

³ *Poland's 10 years in the European Union 2014*, Ministry of Foreign Affairs, Warsaw 2014, pp. 73–80.

⁴ E. Dautovic, L. Orszaghova, W. Schudel, *Intra-Industry Trade Between CESEE Countries and the EU 15*, “Working Paper Series, European Central Bank”, no. 1719/2014.

is that in the case of IIT producers concentrate on a limited number of products which leads to an increase in output due to savings on fixed costs (exploitation of economies of scale). IIT also stimulates innovation because producing a greater variety and number of goods reduces the costs of knowledge accumulation.⁵

2. IIT is considered to be less disruptive than inter-industry trade as the adjustments in production to ongoing competition and reallocation of productive factors take place within the same industry (according to the so-called smooth adjustment hypothesis⁶). This aspect of IIT is important to all countries, but in particular to catching-up economies which face more adjustment challenges than highly developed countries. In other words, increasing IIT reduces adjustment costs.

3. Theoretically, it is assumed that a rising share in vertical intra-industry trade of products of relatively higher quality (hereinafter referred to as high quality VIIT) in exports than in imports indicates increasing quality competition (at the expense of diminishing price competition).

4. At the same time, a growing share of IIT in horizontally differentiated products (horizontal intra-industry trade, abbreviated as HIIT) implies structural convergence of economies. The theory explains that the higher the HIIT the more similar and the more developed the trading partners are. This, in turn, is an important consideration in terms of convergence process (catching up) of the trading partners and of a successful catching-up process. Thus, the level of and growth in horizontal IIT can be treated as one of the indicators of the extent to which the EU-10 countries are 'similar' to the EU-15 (in terms of their incomes and development levels).⁷

5. The IIT approach also allows us to evaluate the preparedness of applicant countries to join the euro area and to assess the stability of the euro zone. According to the theory, the higher the share of intra-industry trade the greater the synchronisation of business cycles is, which is considered to be one of the key conditions for successful monetary integration. For

⁵ R.J. Ruffin, *The Nature and Significance of Intra-industry Trade*, Economic and Financial Review, 4th Quarter, 1999.

⁶ H. Faustino, N. Leitão, *Intra-industry trade and labor costs: The smooth adjustment hypothesis*, "Working Papers", no. 17/2009.

⁷ Such an interpretation is not always correct. In countries abundant in one or more natural resources (Canada and Finland in timber, Norway in natural gas) relatively high shares of inter-industry trade in their total trade may not necessarily mean lower development levels of those countries. The above, however, does not apply to the countries under analysis: none of them is affluent in major natural resources (S. Richter, *Comments on Chapter 2 and 3*, in: *Five Years of an Enlarged EU. A Positive Sum Game*, eds. F. Keereman, I. Szekely, Springer Verlag, Berlin 2009, p. 57).

this reason, the IIT intensity is an important indicator of a country's stability within a monetary union. Also, it is of particular importance to the EU Member States still staying outside the euro zone, in order to assess where they are on the path to convergence with the euro-zone countries. On account of the limited scope of this article, this thread is not pursued further.

The analysis covers the period 1995–2014, i.e. recent 20 years. We compare developments in the trade of the whole group and in individual EU-10 countries with three groups of their main partners: with the EU-15, with the EU-10 (mutual trade of the EU-10 countries) and with the rest of the world.

The study aims to present changes in the intensity and composition of the intra-industry trade of the EU-10 and to assess the resulting changes in the nature of specialisation in those countries as well as the scale of progress made by specific CEECs. In addition, by analysing HIIT we want to evaluate changes in the degree of the convergence of the EU-10 economies with the three groups of countries under examination.

The paper is structured as follows. Section 2 contains the main methodological information. Section 3 briefly summarises the theoretical framework on IIT. Section 4 reviews the empirical literature on IIT developments in the EU-10 countries. Section 5 discusses changes in the intensity of VIIT and HIIT in the EU-10 countries and the next one (6) describes changes in patterns of IIT specialisation in individual EU-10 countries. Section 7 concludes.

Methodology and Data Sources

The calculations are based on the standard Grubel-Lloyd index.⁸ It allows to compute the share of two-way trade in the total trade in an industry (Box 1).⁹ This index is based on bilateral trade flows at the 4-digit level of HS classification (referred to as an industry). Next, bilateral indices for individual countries were aggregated into total trade indices (across industries and by group of partner countries). The Grubel-Lloyd index takes a minimum value of zero when there are no products in the same

⁸ H.G. Grubel, P.J. Lloyd, *Intra-Industry Trade: The Theory and the Measurement of International Trade in Differentiated Products*, Macmillan, London 1975, pp. 21–36.

⁹ In practice, the computation of indices poses a number of methodological problems. Those are related, especially, to the so-called geographical bias in the measurement of the intensity of intra-industry trade, sectoral bias, or the exclusion of the overall trade imbalance (L. Fontagné, M. Freudenberg, *Intra-Industry Trade: Methodological Issues Reconsidered*, “CEPII Working Papers”, no. 1/1997). Therefore, it is more important to analyse the scale of changes in the IIT index over time rather than its absolute level.

industry that are simultaneously imported and exported and a maximum value of 1 (or 100%) when all trade is intra-industry.

Box 1. Measuring intra-industry trade

A standard Grubel-Lloyd index (GL) measures IIT according to the following ratio

$$GL = \sum_{i=1}^n w_i GL_i = \sum_{i=1}^n \frac{X_i + M_i}{\sum_{i=1}^n (X_i + M_i)} GL_i = \frac{\sum_{i=1}^n (X_i + M_i) - \sum_{i=1}^n |X_i - M_i|}{\sum_{i=1}^n (X_i + M_i)}$$

Where:

GL_i : intra-industry trade index for industry i (4-digit HS level)

w_i : share of trade in products of industry i in the total trade

X_i (M_i): exports (imports) of products of industry i from (to) a given country or group of countries to (from) a given country or group of countries

n : number of industries

Source: H.G. Grubel, P.J. Lloyd, *op.cit.*, pp. 20–23.

In order to calculate the horizontal and vertical IIT, the Greenaway et al. approach, as modified by Fontagné and Freudenberg, was used.¹⁰ According to this methodology, the distinction between HIIT and VIIT is based on the assessment of product quality. To assess different qualities, unit values are applied. The underlying assumption is that relative prices are likely to reflect relative qualities of products.¹¹ When unit values of products are close (usually it is assumed that the export and import unit values differ by less than 15%), they are considered to be horizontally differentiated (two-way trade of varieties). Otherwise, traded products are vertically differentiated (two-way trade of qualities). When the ratio of the unit value in export to the unit value in import is below the 0.87 thresh-

¹⁰ D. Greenaway, R. Hine, C. Milner, R. Elliot, *Adjustment and the Measurement of Marginal Intra-Industry Trade*, "Weltwirtschaftliches Archiv", vol. 130, no. 3/1994; L. Fontagné, M. Freudenberg, *op.cit.*

¹¹ While this approach is commonly adopted in the literature, it must be noted that relative prices do not properly reflect quality differences. Richter argued that especially in the case of the new Member States a poor image inherited from the communist era might lead to misinterpretations in this field. He gave the example of Skoda cars produced after the Volkswagen had taken over the Czech factory. These cars were of excellent quality but relatively cheap because otherwise customers would not have bought them. Those vehicles were still considered to be of poor quality like the cars of the 'old' Skoda (S. Richter, *op.cit.*, p. 57).

old¹² it is considered to characterise low quality products (sold at a lower average price – low quality vertical IIT). When the respective index is above 1.15 it is treated as an indicator of high quality products (sold at a higher average price – high quality vertical IIT).

The source of data on trade flows used for calculation of IIT was COMTRADE – trade data base expressed in USD. Only this data base allowed to analyse the intensity of IIT for the period covered in this paper (1995–2014).¹³

Theoretical Framework

The phenomenon of IIT was initially noticed in the 1960s in trade among the members of the integration blocks: the Benelux and the European Economic Community. A substantial share of trade inside those blocks consisted of similar products. This phenomenon seemed to be at odds with the traditional theory basing on different factor endowments and comparative advantages and resulted in an intense discussion. According to the traditional Heckscher-Ohlin theory, the source of trade benefits are differences between countries (dissimilar factor endowments, different costs of production), therefore their economies should specialise in different types of products. However, trade in question concerned similar products of the same industries and took place despite the lack of significant differences in factor endowments between countries which were at comparable development levels.

The first papers covering the issue of parallel export and import of products within the same industry were presented individually by Verdoorn, Drèze, Balassa.¹⁴ Later research revealed IIT in relations between various other countries. The important publication of Grubel and Lloyd¹⁵ on the concept and measurement of intra-industry trade stimulated enormous interest in this type of trade specialisation.

As already mentioned, IIT is usually divided into trade in vertically and horizontally differentiated goods (in short: vertical and horizontal-

¹² According to the modification of Fontagné and Freudenberg (op.cit.), HIIT occurs if $\frac{1}{1+\alpha} \leq x \leq 1+\alpha$, low quality VIIT, if $x < \frac{1}{1+\alpha}$ and high quality VIIT, if $x > 1+\alpha$, where x – ratio of the unit value in export to the unit value in import and $\alpha = 15\%$.

¹³ The Eurostat-Comext data basis only allows comparative analysis from 1999.

¹⁴ P.J. Verdoorn, *The Intra-Block Trade of Benelux*, in: *Economic Consequences of the Size of Nations*, ed. E.A.G. Robinson, Macmillan, London 1960, pp. 291–329; J. Drèze, *Lex exportation intra-C.E.E. en 1958 et la position Belge*, “Recherches Economiques de Louvain”, vol. 27/1961; B. Balassa, *Tariff reductions and Trade in Manufactures Among Industrial Countries*, “American Economic Review”, vol. 56, no. 3/1966.

¹⁵ H.G. Grubel, P.J. Lloyd, op.cit.

trade, abbreviated as VIIT and HIIT respectively). The importance of the above division is that the two types of trade vary in nature and are explained by differing theories of international trade.

Theory explains that vertical IIT is an exchange of final goods with different qualities and prices (e.g. Italy exports high-quality clothing and imports low-quality clothing) or an exchange of final and intermediate goods produced in the same industry, driven mainly by different factor endowments (e.g. exchange of car seats for engines, thus reflecting exchange of cheap unskilled labour for highly qualified personnel). Consequently, we expect vertical IIT to be more intensive between countries at different levels of economic development, i.e. between developing and developed economies, than between developed countries. Less developed countries usually specialise in those stages of production in which they have comparative advantages, e.g. cheap, unskilled labour. The theoretical model of vertically differentiated products was developed mainly by Falvey and Kierzkowski¹⁶ as well as by Flam and Helpman.¹⁷ These studies showed the significance of differences in technology and R&D expenses, income levels and endowments in human capital as factors affecting VIIT. Thus, VIIT, similarly to inter-industry trade, is explained mostly by factor endowment differences.

Horizontal IIT is an exchange of differentiated goods with similar qualities and various other features that are important to consumers. Theoretical models suggest that the more similar countries are in terms of their factor endowments and incomes the higher the share of this type of trade is. Thus, we should expect HIIT to be higher between developed countries than less developed countries. As already mentioned, increasing HIIT implies structural convergence of economies since HIIT is usually correlated with economic similarities. Models of HIIT base on monopolistic competition and product differentiation and were originally developed by Krugman,¹⁸ Lancaster¹⁹ and Helpman.²⁰ They explain that this type of trade is driven,

¹⁶ R. Falvey, *Commercial policy and intra- industry trade*, "Journal of International Economics", vol. 11, no. 4/1981; R. Falvey, H. Kierzkowski, *Product Quality, Intra-Industry Trade and (Im)Perfect Competition*, in: *Protection and Competition in International Trade*, ed. H. Kierzkowski, Blackwell, Oxford 1987.

¹⁷ H. Flam, E. Helpman, *Vertical Product Differentiation and North-South Trade*, "American Economic Review", vol. 76, no. 5/1987.

¹⁸ P.R. Krugman, *Increasing Returns, Monopolistic Competition, and International Trade*, "Journal of International Economics", no. 9/1979; P.R. Krugman, *Scale Economies, Product differentiation, and the Pattern of Trade*, "American Economic Review", no. 70/1980.

¹⁹ K. Lancaster, *Intra-industry trade under perfect monopolistic competition*, "Journal of International Economics", vol. 10, no. 2/1980.

²⁰ E. Helpman, *International trade in the presence of product differentiation, economies of*

on the supply side, by increasing returns to scale and, on the demand side, by diverse consumer preferences for varieties of goods (e.g. cars of similar class and price range).

Review of the Literature

A number of studies have been conducted since the beginning of transition of the CEECs to analyse changes and determinants of IIT. The focus has been usually on CEECs' trade with the EU Members States because the EU is their main trading partner.

A number of authors noticed that before transition the share of IIT had been very low and horizontal IIT was almost non-existent.²¹ However, the rapid growth of IIT between the CEECs and the EU was already observed in the early years of transition.²²

Some researchers concentrated on the main determinants of IIT growth in the CEECs. Fidrmuc and Djablik²³ noticed that trade liberalisation among the CEECs and the EU had resulted in increased IIT intensity.

Many studies pointed to the important role of FDI in intra-industry trade changes. Aturupane et al.²⁴ showed the strong links between FDI and intra-industry trade indices. A similar observation was made by Kaminski.²⁵ Caetano and Galego²⁶ established that determinants of horizontal and vertical IIT within the enlarged Europe differed, although both had a statistically significant relationship with a country's size and foreign direct investment. The paper by Dautovic et al.²⁷ found some common factors driving intra-industry trade between the EU-15 as the main trad-

scale and monopolistic competition: A Chamberlin-Heckscher-Ohlin approach, "Journal of International Economics", vol. 11, no. 3/1981.

²¹ C. Aturupane, S. Djankov, B. Hoekman, *Horizontal and vertical intra-industry trade between Eastern Europe and the European Union*, "Weltwirtschaftliches Archiv", vol. 135, no. 1/1999.

²² J. Gacs, *The Economic Interpenetration between the EC and Eastern Europe: Hungary*, "European Economy", no. 6/1994; C. Aturupane, S. Djankov, B. Hoekman, op.cit.; B. Hoekman, S. Djankov, *Intra-Industry Trade, Foreign Direct Investment, and the Reorientation of Eastern European Exports*, "Policy Research Working Paper", no. 1652/1996; B. Kaminski, *How Accession to the European Union has Affected External Trade and Foreign Direct Investment in Central European Countries*, "Policy Research Working Paper", no. 2578/2001.

²³ J. Fidrmuc, M. Djablik, *Intra-industry Trade Between the EU and the CEECs – The Importance of FDI in Trade Structure*, East-West Conference, Austrian National Bank, 2003.

²⁴ C. Aturupane, S. Djankov, B. Hoekman, op.cit.

²⁵ B. Kaminski, op.cit.

²⁶ J. Caetano, A. Galego, *In Search for the Determinants of Intra-Industry trade within an enlarged Europe*. "South-Eastern Europe Journal of Economics", no. 2/2007.

²⁷ E. Dautovic, L. Orszaghova, W. Schudel, op.cit.

ing block and the Central, Eastern and South-Eastern European (CESEE) countries. These factors included the corporate tax rate, the flexibility of exchange rate regimes and the quality of political institutions.

The increasing importance of IIT in the trade of all the 12 new EU Member States but one (Malta) was confirmed by the research of Kawecka-Wyrzykowska.²⁸ An increasing share of horizontal and high quality VIIT was also identified. In another study covering the V4 countries the same author concluded that relatively the fastest changes in the pattern of IIT specialisation with the EU-15 had been recorded in Poland. However, the Czech Republic recorded the highest levels of IIT at all times.²⁹

Toporowski³⁰ argues that after the EU enlargement the Visegrad Group countries experienced boosted improvements in their trade patterns, including intra-industry trade and accelerated convergence process. However, once the economic and financial crisis started, the convergence was weakened, albeit not significantly and for a short period only. A similar conclusion was formulated by Molendowski as well as by Molendowski and Polan³¹ with regard to the Visegrad countries' trade (in the years 2004–2012).

A few Polish authors have analysed factors determining IIT developments, usually concentrating on the role of FDI. Contrary to the majority of the studies, a very low interrelationship between FDI and IIT was found in Polish foreign trade by Cieřlik.³² An opposite view was presented by Ambroziak,³³ who identified a statistically significant positive correla-

²⁸ E. Kawecka-Wyrzykowska, *Evolving pattern of foreign trade specialization of the New Member States of the EU: The case of automotive industry*, in: *Five Years of An Enlarged EU*, op.cit., pp. 11–31.

²⁹ E. Kawecka-Wyrzykowska, *Evolving pattern of intra-industry trade specialization of the Visegrad countries*, in: *Five years of the EU Eastward Enlargement – Effects on Visegrad Countries: Lessons for the Future*, ed. E. Kawecka-Wyrzykowska, Warsaw School of Economics, Warsaw 2009, pp. 285–315.

³⁰ P. Toporowski, *The impact of global economic crisis on the intra-industry trade of Visegrad Group Countries and the EU-15*, "International Journal of Management and Economics", no. 33/2012.

³¹ E. Molendowski, *The Visegrad Group Countries – changes in intra-industry competitiveness of their economies during the world financial and economic crisis*, "Procedia – Social and Behavioral Sciences", vol. 110/2014; E. Molendowski, W. Polan, *Changes in Intra-industry Competitiveness of the New Member States (EU-10) Economies During the Crisis, the Years 2009–2011*, "Comparative Economic Research", vol. 16, no. 3/2013.

³² A. Cieřlik, *Multinational firms and international fragmentation of production in Poland*, "Working Papers of International Business", no. 25/2008.

³³ Ł. Ambroziak, *The foreign direct investments (FDI) as a factor of intra-industry trade development in the EU New Member States*. mimeo, ETSG conference, Lausanne 2010;

tion between intra-industry trade (both, of horizontal and vertical types) and foreign direct investment in the Visegrad countries.

Changes in the Dynamics of IIT and Patterns of IIT Specialisation in the Whole Group of the EU-10 Countries

Although inter-industry trade (exchange of goods coming from different industries) still accounts for the majority of trade of the EU-10 countries, its share has been steadily declining in almost all of those countries in the past 20 years (table 1). An exception has been a small increase in the Czech Republic (only in relations with the EU-15) and in Estonia, Latvia and Lithuania (in all the three countries, with non-EU countries). Accordingly, IIT became a more important type of specialisation for almost all the EU-10 countries over the period 1995–2014. The leaders in IIT growth were countries starting from the lowest levels. Those included: Romania (up by 210%), Latvia (by 176%), Bulgaria (by 89%) and Poland (by 83%). For the whole EU-10 group, the IIT share in its total trade increased from 24.3% in 1995 to 32.9% in 2014, i.e. by 35%

The fastest IIT growth was recorded in the trade of the EU-10 countries with ‘the rest of the world’ (non-EU countries – a rise by 73%), mainly because it took place from a very low level: almost 8% of trade with this group of countries in 1995. In 2014, the respective figure reached 13%. The scope of the IIT increase was similar in the case of the EU-15 and EU-10 countries (by 37% and 41% respectively) and as a result, its intensity appeared to be almost the same in trade with both groups of countries in 2014 (41% and 42% in 2014).

Despite the varying dynamics of IIT growth in specific countries, at the end of the period in question the EU-10 ranking in terms of their IIT intensity showed no major changes (graph 1 and table 1). In 1995 the best performer was the Czech Republic (with a particularly high index of 40% of total trade), followed by Hungary, Slovenia and Slovakia (IIT indices exceeding 20%). Twenty years later, the top five countries in terms of participation in IIT were the Czech Republic, Hungary, Poland, Slovenia, Romania (the IIT indices were above 30%). The IIT share in total trade reached almost 30% also in Latvia. Therefore, the leaders were joined by three new countries (in Slovakia the growth of IIT was slightly slower). Strikingly, however, in the period under analysis not only did the Czech Republic not increase its participation in IIT, but there even was a certain

Ł. Ambroziak, *FDI and intra-industry trade: theory and empirical evidence from the Visegrad Countries*, “International Journal of Economics and Business Research”, vol. 4, no. 1–2/2012.

Table 1. Shares of IIT in the total trade of the EU-10 countries in 1995–2014, by type of IIT and by group of trading partners

Country	Year	IIT			Low quality VIIT			High quality VIIT			HIIT						
		EU-15	EU-10	Other	World	EU-15	EU-10	Other	World	EU-15	EU-10	Other	World				
		17.5	15.6	3.8	11.5	10.5	6.0	1.8	5.1	5.6	7.2	1.6	3.3	1.3	2.4	0.4	0.8
Bulgaria	2003	21.9	19.1	6.3	16.2	9.8	5.2	2.1	6.5	8.3	4.1	3.1	5.9	2.7	8.9	0.5	2.3
	2014	28.4	32.3	8.7	21.7	11.4	6.3	1.4	3.9	9.0	10.6	5.0	7.6	5.3	6.3	1.4	3.9
	1995	49.4	39.0	11.7	40.0	37.7	13.8	4.8	26.6	5.8	15.0	3.1	7.1	5.4	9.9	3.3	5.9
Czech Republic	2003	49.7	38.4	11.7	40.1	25.4	11.5	5.6	19.3	17.5	14.5	5.3	14.5	6.7	11.8	0.8	6.3
	2014	47.1	46.7	15.1	38.9	15.1	13.5	6.2	12.5	17.0	18.0	6.9	14.6	14.4	14.4	1.9	11.2
	1995	25.7	20.1	14.1	21.7	7.2	3.3	1.2	5.1	4.3	10.3	6.3	5.5	8.0	3.3	0.4	5.3
Estonia	2003	19.7	20.5	7.6	13.0	8.5	6.6	2.3	5.1	8.6	9.8	4.6	6.1	2.6	4.0	0.7	1.7
	2014	27.7	35.3	6.8	21.4	9.0	10.2	2.3	6.8	8.5	8.4	3.7	6.7	3.6	5.4	0.8	2.9
	1995	32.7	16.4	6.2	23.6	17.5	4.5	3.2	12.2	9.7	10.0	2.4	7.6	5.4	1.9	0.7	3.7
Hungary	2003	35.0	30.6	10.4	28.1	15.5	7.9	3.7	11.6	11.4	14.0	4.2	9.7	7.4	7.3	1.7	5.9
	2014	45.1	44.0	17.8	38.1	14.4	12.8	5.4	11.8	19.7	13.0	8.5	15.6	8.6	12.1	2.0	7.7
	1995	7.9	19.8	11.1	10.8	5.4	7.3	2.6	4.6	1.6	6.2	6.7	4.2	0.8	6.3	0.8	1.5
Latvia	2003	9.8	26.6	7.6	13.0	5.9	9.4	0.0	5.9	2.4	11.1	3.5	4.6	1.5	5.8	1.6	2.4
	2014	22.9	49.5	7.2	29.8	6.7	9.7	2.0	6.8	6.3	13.2	4.2	8.5	2.2	16.5	0.9	7.6
	1995	10.2	22.6	15.6	14.4	3.4	11.6	1.3	3.5	2.1	4.2	9.1	5.7	0.6	2.5	1.3	1.2
Lithuania	2003	17.6	19.2	9.7	14.5	6.3	8.2	2.4	4.9	5.6	6.0	4.8	5.2	5.7	5.0	2.5	4.3
	2014	20.5	40.2	4.7	18.7	9.2	13.4	1.3	7.0	6.7	8.9	2.9	5.7	2.1	14.3	0.5	4.3
	1995	21.5	18.3	4.6	18.1	16.0	9.4	2.8	12.5	3.0	4.2	1.4	3.1	2.5	4.5	0.4	2.4
Poland	2003	35.3	29.8	12.6	29.1	18.6	12.3	3.6	14.2	5.8	8.2	7.3	6.4	10.8	9.0	1.6	8.4
	2014	43.8	37.3	14.6	33.2	20.7	13.3	5.1	14.6	10.5	10.9	5.0	8.7	12.5	13.0	4.5	9.9

	1995	14.7	17.6	2.5	9.9	8.2	10.7	1.3	5.4	3.5	4.9	0.9	2.4	2.7	1.8	0.2	1.5
Romania	2003	20.3	18.0	4.5	15.6	10.1	8.9	2.1	7.7	7.3	4.1	1.7	5.4	2.8	4.6	0.5	2.3
	2014	37.7	39.0	11.0	30.7	12.7	14.0	4.5	10.7	17.1	14.4	5.3	13.4	4.5	6.7	1.0	4.0
Slovakia	1995	18.6	35.0	2.3	21.8	15.8	14.0	1.1	11.8	1.4	13.7	0.9	6.4	1.3	7.3	0.3	3.6
	2003	35.0	35.4	5.3	29.2	13.3	14.8	1.9	11.4	16.2	10.8	2.8	12.2	5.5	9.9	0.7	5.6
	2014	35.0	42.4	7.4	28.5	11.1	10.8	2.9	8.4	17.5	14.5	2.7	12.1	6.3	17.1	1.7	7.8
Slovenia	1995	31.0	8.4	14.2	25.2	18.7	2.8	7.0	14.7	6.2	4.4	4.1	5.6	5.9	1.1	3.0	4.8
	2003	36.8	19.1	14.4	28.6	24.4	8.6	4.9	17.2	6.5	7.0	5.5	6.2	5.8	3.6	3.1	4.8
	2014	42.0	30.8	18.7	32.8	17.4	9.3	7.3	12.9	12.0	10.9	6.3	9.9	11.7	9.3	4.3	8.9
EU-10	1995	30.2	29.5	7.5	24.3	20.7	11.4	3.1	14.8	5.0	11.3	2.7	5.3	4.0	6.6	1.2	3.7
	2003	35.6	30.8	10.0	28.3	17.6	11.0	3.6	13.1	10.6	10.7	4.8	9.1	7.1	8.7	1.4	5.8
	2014	41.4	41.6	13.0	32.9	15.6	12.6	4.6	11.7	14.4	13.6	5.5	11.5	10.1	12.9	2.6	8.3

* due to the lack of comparable data, the first year of analysis for Bulgaria is 1996.

Note: The sum of the above-mentioned three types of IIT (low quality VIIT, HIIT and high quality VIIIT) is not always equal to the intensity of intra-industry trade (IIT) due to the existence of the so-called non-allocated intra-industry trade for which it is impossible to determine the export/import price relationships.

Source: As calculated by Ł. Ambroziak, Ph.D. and W. Polan, M.Sc. within the framework of the grant from the National Science Centre on the basis of the Comtrade database.

decline (by 1.1. p.p.). Nevertheless, the country continued to be the leader with the highest index of IIT in total trade in comparison with other CEECs. According to other studies, that index was similar to the EU-15 average.³⁴ It resulted, among other things, from extensive trade linkages with Germany. The lowest shares of IIT were recorded in 2014 in Lithuania (19% of total trade), Estonia (21%) and Bulgaria (22%).

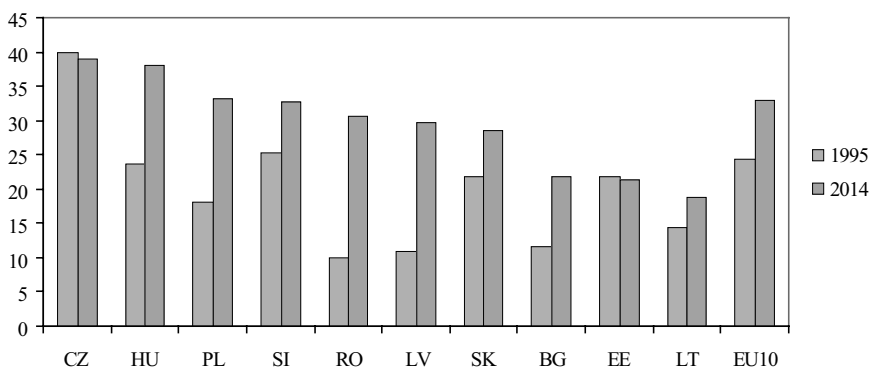


Figure 1. IIT indices in individual EU-10 countries in 1995 and 2014, in % of their total trade

Source: Data of table 1.

As already mentioned, in order to gain a better insight into the type of specialisation, it is useful to break down IIT into vertical IIT (in low and high quality products) and HIIT. In 1995–2014 important changes took place in the proportions of both types of VIIT. The share of VIIT in high quality products (i.e. exports of high quality products and imports of low quality products within the same industries) of the whole EU-10 group increased substantially (from 5% to 12% of total trade), while the percentage of low quality VIIT decreased (from 15% to 12%) – graph 2 and table 1. As a result, in 2014 the share of high quality VIIT was nearly the same as that of low quality VIIT (i.e. almost 12% of the total trade of the EU-10), thus reflecting the scale of improvement in the quality of CEEC exports within IIT (measured by changes in unit values). Strong growth in the importance of this type of trade in the total trade of the EU-10, especially in trade with the EU-15, means that the countries concerned are no longer suppliers of mainly unprocessed products or of low-quality

³⁴ E. Kawecka-Wyrzykowska, *Evolving pattern of intra-industry...*, op.cit., p. 297.

processed goods. They increasingly export products of high quality, sold at higher prices than imported goods.

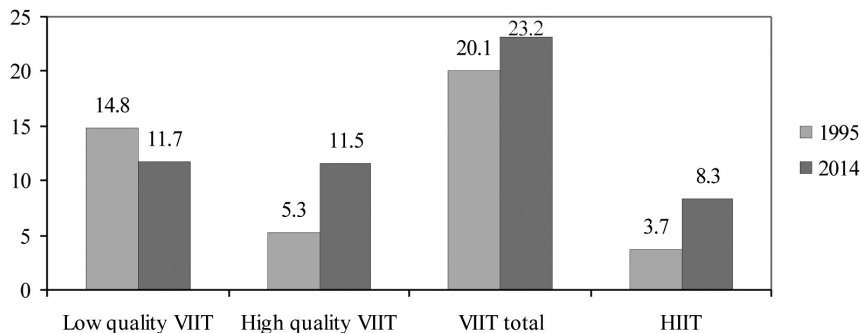


Figure 2. The IIT pattern of the EU-10 in 1995 and 2014, in % of their total trade

Source: Data of table 1.

Another positive trend was a rise in the intensity of HIIT. Its share in the total trade of the group of countries concerned more than doubled, to slightly over 8% of their total trade in 2014 (from below 4% in 1995). The growth was even more rapid in trade with the EU-15. However, in 2014, as in 1995, the level of HIIT was the highest in trade within the EU-10 (figure 2 and table 1).

The trends in trade in 1995–2014 and the proportions found in 2014 are consistent with the theoretical projections. Let us recall that the theory explains horizontal specialisation mostly by similar preferences of customers in the trading countries, also reflecting the income convergence of the countries concerned (i.e. first of all of the EU-10 *vis-à-vis* EU-15). At the beginning of the period in question, the level of such trade was rather low with regard to all the trading partners. It was still much higher in the mutual trade of the EU-10 than in their trade with the EU-15, which suggests greater similarities within that group of countries than between them and the EU-15 (e.g. measured by GDP *per capita*). It is attributable to the fact that in the mid-1990s the EU-10 were at the beginning of their transition from centrally planned to market economies. They were characterised by low (or very low) development levels, particularly in comparison with the EU-15. Over the following 20 years that gap in the level of economic development of the EU-10 relative to the EU-15 narrowed considerably. Products originating in the CEECs were increasingly able

to meet expectations of customers not only in other countries of the region but also in more demanding countries of the EU-15.

Also, the rising intensity of high quality VIIT can be explained, consistently with the theory, by a changing pattern of factor endowments in the CEECs in the period of transition. The increasing role of high-quality and technologically advanced intermediates and final goods in exports (as compared to imports, within individual industries) resulted first of all from fast modernisation of the CEECs. It was caused by a number of factors, such as the elimination of inefficient types of production and the opening-up of the economies to foreign competition (accelerated on account of free-trade agreements concluded with the EEC and other major trading partners in the early 1990s), forcing improvements in production quality. A very important role was played by the FDI inflow and ensuing access to more advanced technologies and know-how. At the beginning of the 21st century positive changes were stimulated by the prospect of EU accession and the related adjustments to the requirements of the European single market, and upon joining the EU – by access to the large single market of the EU, allowing for additional economies of scale, improvements in the efficiency of production, etc.

Of course, the above-mentioned factors underlay broad changes in total foreign trade of the CEECs. They influenced all the EU-10 countries under analysis, but with varying strength and at different times, with dissimilar synergies between them and differentiated impact of other, additional determinants. The starting point was also different for each country. All this resulted in the varying scale of changes and effects achieved by individual EU-10 countries in the 20 years covered.

Changes in Patterns of IIT Specialisation in Individual EU-10 Countries

At the beginning of the period covered (in 1995), the trade of almost all the EU-10 was dominated by trade in low-quality vertically differentiated products (table 1). The exceptions were Lithuania and Estonia, with the shares of high quality VIIT slightly higher than those of low quality vertical trade. The following years witnessed a fall in the intensity of this type of trade in the majority of the CEECs. Only Romania, Poland and the three Baltic States experienced increases in the indices of low quality VIIT in total trade.

At the same time, almost all the EU-10 countries recorded a significant rise in the proportion of high quality VIIT, showing the improved competitiveness of their exports. The steepest growth characterised Romania

(nearly sixfold), but from the lowest level (a 2% share of total trade in 1995). An almost threefold increase was noted in Poland, but also from a low level (3%). The index more than doubled, and from the highest absolute levels at that, in the Czech Republic and Hungary as well as in Slovakia. The dynamics were also similar in Bulgaria and Latvia, but from relatively low levels. The situation in Lithuania was stagnant, whereas Estonia showed a limited rise.

Growth in high quality VIIT usually concerned all the directions of trade. In 2014 the intensity of this type of trade was the highest in trade with the EU-15 countries only in four out of the ten CEECs (in Hungary, Slovakia, Romania and Slovenia). In Estonia and Poland the indices of high quality VIIT were nearly the same in trade with the EU-15 and with the EU-10 partners. Thus, some of the EU-10 countries were able to restructure their exports and meet expectations of more demanding customers of the EU-15 than in the region.

With regard to the participation of the EU-10 in horizontal intra-industry trade (i.e. simultaneous exports and imports of products of similar quality and technology), in the mid-1990s it was limited, mostly up to 4%. Over the following 20 years HIIT showed marked growth in the whole of the EU-10 but Estonia. The most rapid rise in HIIT was recorded in Bulgaria and Latvia, a fivefold increase in the share of this type of trade in their total trade. In Bulgaria, despite the impressive growth, the index remained low. Very high dynamics of HIIT characterised also Poland, Lithuania and Romania (fourfold and threefold increases respectively). At the end of the period covered, the top EU-10 performer in terms of HIIT intensity was the Czech Republic (a 11% share in total trade), closely followed by Poland, with a share of 10%. The lowest ranking countries were Estonia (merely 3%), Bulgaria, Lithuania and Romania (4% each). In general, the shares of HIIT, higher at present than 20 years ago (with the exception of Estonia), remain modest.

Conclusions

The pattern of inter-industry trade based on comparative advantage is still dominating in the EU-10 countries, but its share has been decreasing.

At the same time, intra-industry trade has driven trade developments in the majority of the EU-10. Specifically, a shift towards VIIT of high quality products and of HIIT has been recorded. Both developments reflect positive changes in the economies of those countries.

The increasing share of VIIT in high quality products in total trade reveals a process of specialisation that bases more on quality characteristics

(human capital, economies of scale, etc.) rather than only on price competition. It results in more advantages than inter-industry specialisation mostly based on different traditional factor endowments.

In five CEECs, the share of products of better quality is still higher in exports to other EU-10 countries than to more demanding EU-15 markets. However, the gaps in indices have narrowed significantly (whereas their absolute levels have gone up) in comparison with the mid-1990s. It suggests that there has been a rise in exports of goods of better quality (reflected in higher prices) not only in trade with the EU-10, but also with the EU-15.

We have also identified the increasing role of intra-industry trade in horizontally differentiated products (with the exception of Estonia), usually typical in more developed countries and considered in theory to be an expression of income convergence. The majority of the EU-10 countries have managed to modify their production patterns from complementary to competitive and move towards products based on high quality, thereby accelerating convergence towards the EU-15. However, due to considerable differences noted at the beginning of economic transition, the level of that convergence still varies widely in the EU-10: in relation to the EU-15 it is the highest in the Czech Republic and in Poland, whereas it is the lowest in the Baltic States.

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Key words: Intra-industry Trade, Horizontal Intra-industry Trade, Vertical Intra-industry Trade, EU-10 Countries, Trade Specialisation, Central and Eastern European Countries

Abstract

In this paper we identify trade specialisation changes in the 10 Central and Eastern European countries which joined the European Union after 2004 (EU-10, without Croatia). We measure those changes using indices of the intra-industry trade (IIT), i.e. is of simultaneous exports and imports of products belonging to the same industry.

We conclude that the pattern of inter-industry trade based on comparative advantages is still dominating in the EU-10, but its role has been decreasing. At the same time, almost all the EU-10 countries recorded a significant rise in the proportion of high quality vertically differentiated products, thus showing the improved competitiveness of their exports. According to the theory, such type of specialisation is based on factors such as human capital and R&D. We also identified the increasing role of IIT in horizontally differentiated products trade (i.e. simultaneous exports and imports of products of similar quality and technology) in the EU-10, typical for more developed countries and reflecting income convergence.

This paper extends earlier studies by using more recent data and a long period for comparison of IIT developments (20 years) and by covering all 10 Central and Eastern European countries which joined the EU.