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ECONOMIC INTEGRATION IMPACT ON THE EU TRADE STRUCTURE *

The objective of this paper is to find out whether economic integration led to trade specialisation or trade concentration and whether the EU foreign trade has more of intra-industry or inter-industry character. The analysis covers the period of 2004–2013 and was carried out in two parts of the total EU trade, i.e. intra-EU trade and extra-EU trade by using statistical indices. The analysis results confirm high dependence of the EU member states on intra-EU trade. Sectorial structure of intra-EU export is more diversified than extra-EU export, although in both cases EU foreign trade is more concentrated rather than diversified. Economic integration has also contributed to intra-industry trade growth among EU member states. On the whole, deeper integration has positive influence on trade growth.

Keywords: *economic integration; intra-industry trade; import; export.*
JEL classification: C19; F14; F15; F40.

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ВПЛИВ ЕКОНОМІЧНОЇ ІНТЕГРАЦІЇ НА СТРУКТУРУ ТОРГІВЛІ В КРАЇНАХ ЄС

У статті зроблено спробу визначити, чи призводить економічна інтеграція до торговельної спеціалізації або торговельної концентрації в країнах ЄС, а також чи має зовнішня торгівля ЄС переважно внутрішньогалузевий або міжгалузевий характер. Аналіз охоплює період 2004–2013 рр., його було проведено з використанням статистичних показників двох частин загального обсягу торгівлі ЄС, тобто внутрішньої та зовнішньої торгівлі ЄС. Результати аналізу підтвердили високу залежність країн-членів ЄС від зовнішньої торгівлі поза ЄС. Галузева структура зовнішнього експорту з ЄС більш диверсифікована, ніж експорт всередині Євросоюзу, хоча в обох випадках зовнішня торгівля ЄС характеризується скоріше концентрацією, ніж диверсифікацією. Економічна інтеграція також сприяла підвищенню внутрішньогалузевої торгівлі між членами ЄС. Загалом, глибока інтеграція має позитивний вплив на ріст торгівлі.

Ключові слова: *економічна інтеграція; внутрішньогалузева торгівля; експорт; імпорт.*
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ВЛИЯНИЕ ЭКОНОМИЧЕСКОЙ ИНТЕГРАЦИИ НА СТРУКТУРУ ТОРГОВЛИ В СТРАНАХ ЕС

В статье сделана попытка определить, приводит ли экономическая интеграция к торговой специализации или торговой концентрации стран ЕС и имеет ли внешняя торговля ЕС в большей степени внутриотраслевой или межотраслевой характер. Анализ охватывает период 2004–2013 гг. и был проведен с использованием статистических показателей в двух частях общего объема торговли ЕС, т.е. внешней и внутренней торговли ЕС. Результаты анализа подтвердили высокую зависимость стран-членов ЕС от внешнесоюзной торговли. Отраслевая структура внешнесоюзного экспорта более диверсифицирована, чем внутрисоюзный экспорт, хотя в обоих случаях внешняя торговля ЕС характеризуется скорее концентрацией, чем диверсификацией. Экономическая интеграция

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также способствовала повышению внутриотраслевой торговли между членами ЕС. В целом, глубокая интеграция оказывает положительное влияние на рост торговли.
Ключевые слова: *экономическая интеграция; внутриотраслевая торговля; экспорт; импорт.*

Introduction. In practice, individual countries or groups of countries are to some extent integrated, i.e. their activities are carried out more intensively among themselves than with others. A substantial part of economic integration is trade integration. The EU was created from the customs union founded in 1968, through a common market to an economic and monetary union, although not all member states of the EU participate in it in the same way (Fojtikova et al., 2014). The growing level of economic integration in the EU enables its member states to get economies of scale effects and thus more benefits from their different economic structure. At the same time as the EU integration process took place, the EU (as one unit) cooperated with third countries, especially through the creation of free trade areas or customs unions.

The paper focuses on changes in the sectoral structure of foreign trade of the EU member states by dividing it into extra- and intra-EU trade in the period of 2004–2013. The main objectives of the paper are firstly to find out if economic integration of the EU has led to trade specialisation or trade diversification and secondly, whether the structure of the EU foreign trade shows more intra or inter-industry trade. The hypothesis is that economic integration of the EU contributed to the growth of intra-industry trade. The structure of this paper is as follows: Firstly, the introduction to the topic is carried out. Section 2 outlines the theoretical background behind the sectoral analysis of international trade. Section 3 contains the analysis methodology based on statistical indices, as well as datasets used in calculation of product diversification of the EU member states and the level of intra-industry trade. Section 4 presents the empirical results of this analysis in detail. Section 5 contains the main conclusions of the analysis.

Theoretical background. Theoretically, a country can practice autarky or be integrated by trade with other countries. However, every country has different premises for foreign trade. The rate of integration of individual nations into international trade is especially given by their source endowment, economic development and economic size. Depending on economic structure of individual countries, they have different needs to participate in international division of labour. For example, W.S. Woytinsky and E.S. Woytinsky (1955) found that openness is higher in smaller economies. This was also confirmed by L. Fojtikova (2011) who estimated the openness of economy in the countries of the Visegrad group. The rate of openness expresses the level of trade integration of a given country in international environment and, from the explicit point of view, the level of protectionism in international environment (Fojtikova, 2011). L. Lipkova et al. (2011) distinguishes two groups of countries highly dependent on international trade: on the one hand, these are poor developing economies with limited structure of domestic production and on the other, these are developed economies of small economic size that is especially given by the number of inhabitants.

The source endowment of a country also influences the structure of trade. The comparative advantage based on differences in factor endowments across nations was introduced by the neoclassical authors E.F. Heckscher and B.G. Ohlin. According to

the Hecker-Ohlin theorem, a nation will export the commodity intensively when its relatively abundant and cheap, and it will import the commodity intensively if, its relatively scarce and expensive (Krugman and Obstfeld, 1991). Each country gains its comparative advantage due to productivity and product endowment. However, the traditional theory of comparative advantage is not able to explain the functioning of intra-industry trade because of competition and other factors. The whole idea of intra-industry trade is based on Linderr's theory of overlapping demand which states that the more similar the demand structures of two countries are, the more intensive will be the trade between these two countries (Linder, 1961). While the Hecker-Ohlin theory explaines international trade with agricultural products and mineral resources, Linder's theory focuses on international trade in industrial products. According to S.B. Linder (1961), the more similarity has income per capita of the countries, the more active is the trade between them. It is because similar level of income leads to similar structure of demand, i.e. similar consumption. This phenomenon was confirmed by empirical studies. For example, J. Kovarova (2013) confirmed it in the case of bilateral trade between the USA and the EU. The robust bilateral trade between the EU and USA is also proved by statistical data (for example, Eurostat). However, the conclusions of Linderr's theory are opposite to the Hecker-Ohlin theorem that postulates that countries abundant with the factor "capital" have a relatively high GDP per capita and countries abundant with the factor "work" have relatively low GDP per capita. According to the Hecker-Ohlin theory, countries with a similar level of income per capita and similar factor endowment do not have motivation for bilateral trade.

Methodology for calculation. The paper uses trade data from the "Eurostat Database of International Trade" (ComExt) which contains detailed annual nominal exports of goods data for all EU member countries by commodity and partner country expressed in euros. The data were analyzed using the Standard International Trade Classification (SITC) revision 3 at the 3-digit level, which contains 279 product groups in the period of 2004–2013. All data were analyzed separately by external trade and internal trade flows. External trade (extra-EU trade) represents transactions with all countries outside of European Union, i.e. with non-EU countries, as it now consists of 28 member countries. Internal trade (intra-EU trade) represents all transactions within the European Union, i.e. among the EU members. The paper deals only with trade in goods. It is also very important to distinguish the number of members of the EU, as it is gradually increasing over the years. According to the Eurostat (2015a) methodology, the paper deals with all current EU members, i.e. EU-28.

To understand the results of this analysis, it is important to introduce individual indicators and the method for their calculation. The first factor of trade analysis in this paper is trade dependence (trade openness) which serves as an indicator of country's involvement in international trade and measures the importance of international trade in the economy overall. It is measured as the value of total trade (imports + exports) as a percentage of country's GDP, in the form of:

$$TD_{it} = \frac{\sum_j X_{ijt} + \sum_j M_{ijt}}{GDP_i}, \quad (1)$$

where TD_{it} is the size of trade dependence of the economy i in year t; X_{ijt}, M_{ijt} and GDP_{it} are the size of exports and imports to partner country j, and the domestic product of country i in the year t accordingly. The result can theoretically reach the value from 0 to ∞. Higher result indicates higher trade openness of economy. If this indicator ranges in the interval (0,100), we can say that it is a rather closed economy. It is because the size of trade between the economy and the world is less than the size of production in the country. If the value of the openness indicator is higher than 100, then the country is more open, because the value of its trade is higher than the output of the economy.

Sectoral analysis of foreign trade of the EU-28 countries is conducted on the basis of separation of external and internal trade. Several indicators were chosen to analyze the differences in the sectoral composition of intra-EU and extra-EU trade of the EU-28. All indicators are commonly used in empirical trade analysis and the methodology used in this paper is based on the approach of United Nations (ESCAP, 2010). The sectoral Hirschman index (HI) is used to analyse product concentration pattern of the EU-28 export. It measures the degree of dispersion of countryrs exports across different products. High concentration levels indicate excessive dependence of the economy on several types of exported products. The Hirschman index for product diversification can be defined as a square of the ratio of exported product group i and the total export. Then the ratio is summarised and extracted as shown in the formula:

$$HI_i = \sqrt{\sum_i \left(\frac{\sum_j x_{ijk}}{\sum_j X_{ij}} \right)^2}, \tag{2}$$

where x_{ijk} represents the exports of country i to destination j in product k; X_{ij} means the total export of country i to destination j. The Hirschman sectoral index ranges between 0 and 1. The higher is the value of the Hirschman index, the higher the concentration of export on a few commodities will be.

Intra-industry trade measures the degree of mutual trade of goods within the same sector. A country with high value of intra-industry trade can better use the benefits from scale economies. While international trade based on the comparative advantage expresses inter-industry trade, intra-industry specialisation of each country is the key presumption of intra-industry trade. H. Grubel and P. Lloyd (1975) provided the index to measure intra-industry trade. Their index exactly corresponds to Linderrs ideas when it measures the export and import of a country by groups of goods. The Grubel-Lloyd index (GLI) is one of the most often used method to determine the extent of intra-industry trade. It is calculated as follows:

$$IIT_i = 1 - \frac{\left| \sum_j x_{ijk} - \sum_j m_{ijk} \right|}{\sum_j x_{ijk} + \sum_j m_{ijk}} = \frac{\sum_j x_{ijk} + \sum_j m_{ijk} - \left| \sum_j x_{ijk} - \sum_j m_{ijk} \right|}{\sum_j x_{ijk} + \sum_j m_{ijk}}, \tag{3}$$

where IIT_i represents the final value of the intra-industry trade index for country i; x_{ijk} and m_{ijk} refer to exports and imports of commodity k of country i to destination j. The index takes values from 0 to 1, where the higher is the index, the higher is the value of

intra-industry trade. This means that index close to zero indicates inter-industry trade corresponding to the Hecksher-Ohlin theory of comparative advantages.

Empirical results. Firstly, the results of the analysis showed a different level of trade dependence of the EU countries (also called trade openness) in the way of intra-EU and extra-EU markets. In 2013, the highest ratio of foreign trade to the gross domestic product was achieved by Belgium, whose trade dependence reached 181.1%. It is followed by Slovakia (174.8%), Hungary (159.6%), the Netherlands (157.6%) and Czech Republic (154.4%). However, there are also countries in the EU which are open very little. They are usually big member states such as France, the United Kingdom, Italy or Spain. The reason is their large internal markets. However, there are some exceptions. For example Germany (72.7%) and Poland (79.7%) also have big internal markets but their openness is high. The reason is that there is very high demand in the world for goods from Germany, because it produces very high quality goods. Poland is still using its comparative advantages, mainly cheap labour. However, Greece (40.8%) and Cyprus (38%) have less trade dependence. However, it is necessary to say that these countries are mainly specialised in the export of services such as tourism or transport.

Most of the EU countries are more oriented on the common market as can be seen in Figure 1, that shows the percentage share of intra-EU and extra-EU trade openness in the overall trade openness. Most of the EU countries reached over 50% of intra-EU trade dependence in 2013. Countries such as Luxembourg, the Visegrad group or Baltic countries achieved the total trade openness over 70% with the predominant share of intra-EU trade. The only exception is the United Kingdom (UK) and Greece, which are more dependent on extra-EU trade. The main reason is their geographical position on the edges of the European Union. The direction of UK trade is more at the market of the United States and the countries of the Commonwealth rather than the EU. Greece trades mainly with the United States, Turkey and other countries around the Mediterranean region. It is also important to point out trade dependence development during the period of 2004–2013. Most of the EU countries increased their total trade dependence, thus the ration of trade with goods in their GDP. However Cyprus, Finland, Ireland, Luxembourg, Malta, Romania and Sweden decreased their trade dependence by 2013 in comparison with 2004. Luxembourg even reduced the value of the trade dependence index from 106% to 75%. There were also changes in intra-EU and extra-EU trade dependence. While 16 countries (Belgium, Bulgaria, Czech Republic, Estonia, Germany, Hungary, Italy, Latvia, Lithuania, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia and the United Kingdom) increased their intra-EU trade dependence in the considered period, 24 countries increased their extra-EU trade dependence at the same time (Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Malta, the Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden and the United Kingdom). The analysis also showed that trade dependence of all the EU countries was the lowest in 2009. It was caused by economic recession inside as well as outside the EU market, which caused the reduction of foreign trade.

Figure 2 shows the values of the Hirschman index of product concentration among the EU-28 countries for intra-EU and extra-EU trade in 2013. The analysis

show that extra-EU export is more concentrated than intra-EU one, which is more diversified. For example, the average value of extra-EU export HI was 0.236 in 2013, whereas the average value of intra-EU export HI was only 0.175 at the same time. The fact that most of the EU members achieved lower product concentration at the internal market is caused by several factors. First of all, for companies from the EU states it is much easier to sell products within the EU. The reason is the effect of the single market where united or very similar legislation, standards, regulations, and also language and geographical proximity simplifies trade among countries. Such a trade area creates higher competition among companies and causes higher specialisation of subjects at the internal market. As can be seen from Figures 3–4, there is higher intra-industry trade at the EU internal market.

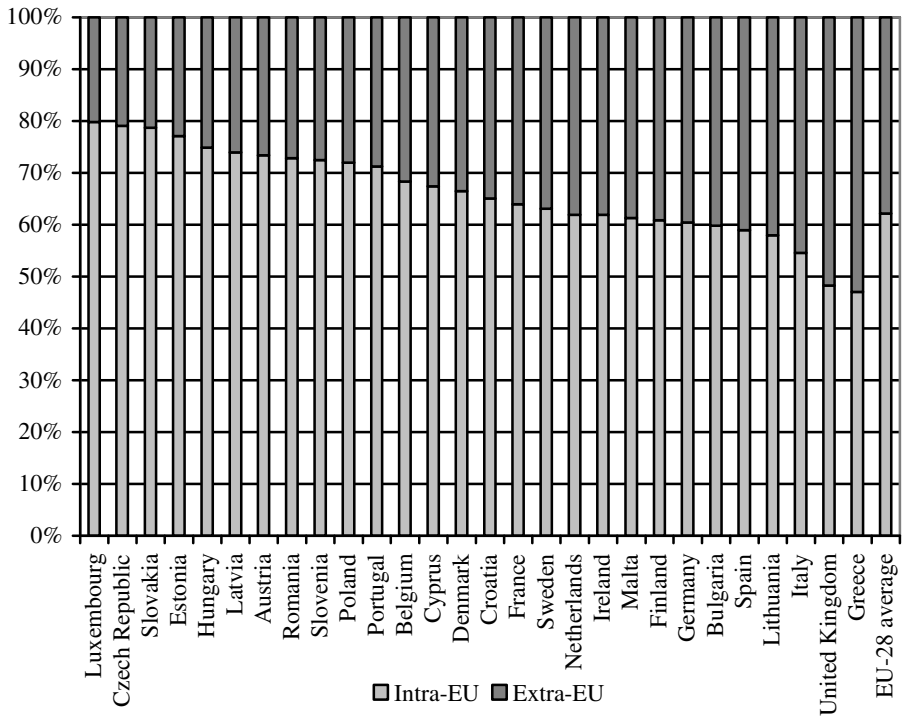

Figure 1. **The share of intra-EU and extra-EU trade openness in the total openness of the EU member countries in 2013,** *own calculations of the data* (EUROSTAT, 2015b)

Figure 2 also shows that the HI value is placed between 0.1 and 0.2 for most of the EU economies suggesting, in general, a relatively low export concentration. There are some countries in the EU that reached higher value of HI than 0.2. For example, Greece has the extreme value of HI in the case of extra-EU exports. It was caused by a very high share of petroleum products export outside the European Union which was almost 60% of its total extra-EU exports in 2013. Another high value of HI in the area of extra exports was reached by Bulgaria, Cyprus, Ireland, Luxembourg, Malta, Slovakia and the United Kingdom. High product concentration oriented at the EU common market comes from Cyprus, Ireland, Lithuania or Malta.

Conversely, countries such as Austria, France, Germany, Italy or Poland have highly diversified intra-EU exports. In the case of extra-EU export it is Austria, Italy, Poland and Sweden with the lowest value of the Herfindahl index. The development of export concentration of the EU countries showed interesting results. During the period 2004–2013, intra-EU export concentration decreased slightly from 0.188 to 0.175, while extra-EU export concentration increased from 0.222 to 0.236. The time development of the Hirschman index of the EU countries clearly shows that under higher competition there is a pressure for higher diversification of production; nevertheless, the EU countries are using their comparative advantages at world markets (Fojtikova and Vahalik, 2015).

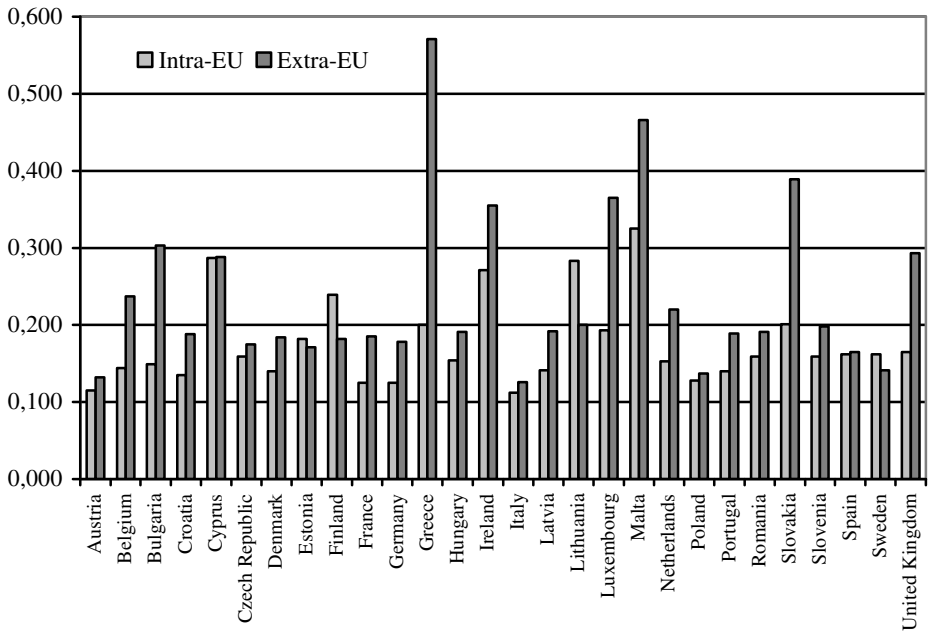

Figure 2. **The Hirschman index of product concentration in the framework of intra-EU and extra-EU export in 2013,** *own calculations of the data* (EUROSTAT, 2015b)

The analysis results of intra-industry trade (IIT) are shown in Figure 3 and 4. Figure 3 shows the values of the IIT of the EU countries at the common EU market in 2004 and 2013. Figure 4 shows the values of the IIT of the EU countries outside of the common EU market in 2004 and 2013. The IIT value is much higher within intra-EU trade. The averaged value reached in 2004 was more than 0.56 and by 2013 had increased to 0.60. It means that 60% of all goods traded at the EU common market is traded within the same product group. The rest of trade belongs to inter-industry trade.

When we take a look at intra-EU trade, there are significant differences among the EU states. On the one hand, there are countries such as Austria, Belgium, France or Germany, which reached a very high value of IIT, near 0.8 during the entire period. On the other hand, countries such as Cyprus, Greece, Ireland, Lithuania,

Luxembourg or Malta reached low values of IIT moving around 0.4. Most of other EU countries traded within intra-industry trade between 60% and 70% of their trade. Some EU countries increased their trade within the same industries between 2004 and 2013. For example, the IIT of Romania increased from 0.38 to 0.59 or in the case of Latvia the increase was from 0.36 to 0.58. It could be caused by their entrance into the EU internal market, as well as by partial change in the economic structure. However, there were also countries that decreased their trade within the same industry. For example, Malta recorded a drop of its IIT value from 0.46 to 0.35 and the value also decreased slightly in other 8 countries – Austria, Czech Republic, France, Luxembourg, the Netherlands etc. (Figure 3).

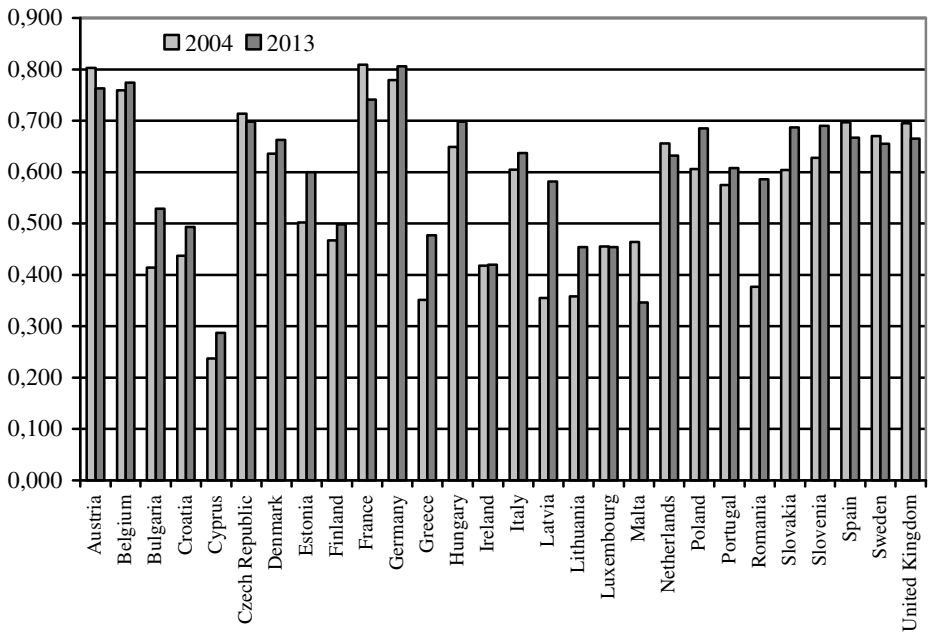

Figure 3. **The Intra-Industry Trade index of intra-EU trade in 2004 and 2013,** *own calculations of the data* (EUROSTAT, 2015b)

In comparison with intra-EU trade, the average value of the IIT index for extra-EU trade stands at much lower level that reached 0.42 in both selected years, thus only 42% of the total trade was exchanged within the same industry. The highest value of the IIT index within extra-EU trade was reached by Belgium, Germany, France and the United Kingdom during the entire period. It was due to their trade structure and historical ties with countries outside the EU. On the other hand, countries such as Cyprus, Greece, Lithuania or Slovakia achieved very low values of the IIT (under 0.3) in the both selected years. In the case of extra-EU trade, most of the EU countries recorded a decline in 2004–2013. As can be seen in Figure 4, the value of IIT of the countries such as Austria, France, Germany, Ireland, Latvia, Malta, Spain and the United Kingdom significantly decreased during the last 10 years. However, for example Croatia, Estonia, Romania and Slovakia considerably increased their intra-industry trade with countries outside the EU.

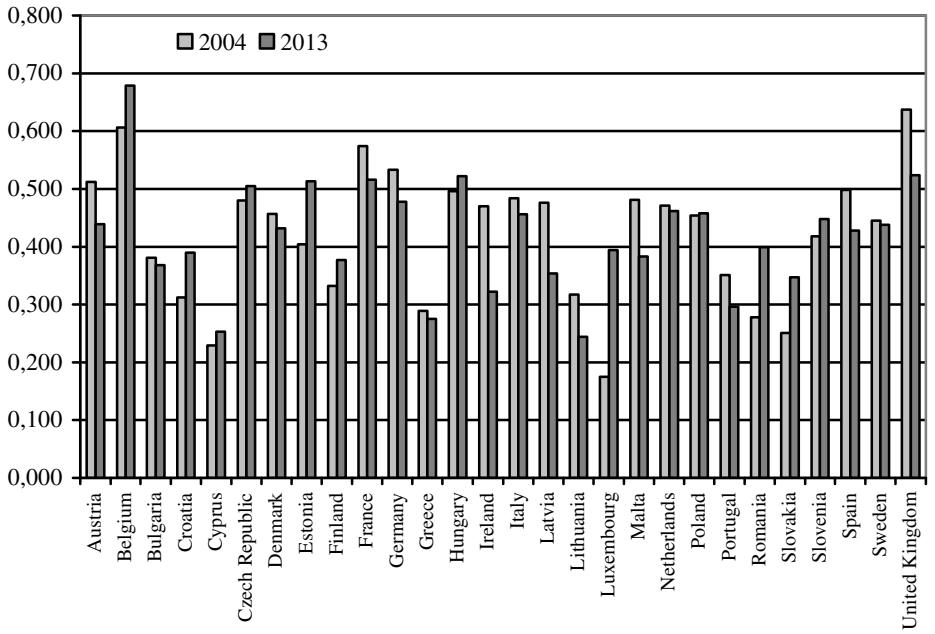

Figure 4. **The Intra-Industry Trade index of extra-EU trade in 2004 and 2013,** *own calculations of the data* (EUROSTAT, 2015b)

Conclusions. The results of this trade analysis that was carried out for the period 2004–2013 confirmed that economic integration and trade liberalisation contributed to trade growth between the countries. Deeper integration typical of the European Union contributed to the fact that intra-EU trade takes a dominant part in the total trade of almost all the member states of the EU, with the exception of UK and Greece that are more dependent on extra-EU trade. Although trade liberalisation among the EU and countries from Central and East Europe has gradually taken place since the 1990s, the membership of Slovakia, Hungary and Czech Republic in the EU made them the most trade integrated and open economies of the EU in 2013. In compliance with economic theory, indirect correlation between the size of the economy and the level of trade integration was confirmed, but some exceptions are obvious. Sectoral structure also plays an important role in this respect.

Comparing extra- and intra-EU trade, it was found that extra-EU export was more concentrated than intra-EU export which is more diversified, but in both cases the value of HHI responded more to trade concentration (close to 0.2) than to trade diversification. Development of this phenomenon in time showed that intra-EU export concentration decreased slightly, while extra-EU export concentration increased slightly. The results of trade analysis showed that 60% of intra-EU trade was carried out in the framework of the same product groups, while in the case of extra-EU trade, it was only 42%. In addition, while intra-industry trade in intra-EU trade increased from 56% to 60% during 2004–2013, intra-industry trade in extra-EU trade stayed on the same level. Based on this the hypothesis that economic integration of the EU contributed to the growth of intra-industry trade was confirmed,

although significant differences among the EU member states were discovered. However, it is important to keep in mind that the analysis was carried out only for the data on trade in goods and for some countries, such as Cyprus, Greece, Luxembourg and Malta, trade in commercial services plays a more important role than trade products sales.

Growing competition at the world market motivates EU members develop economic integration and cooperation also in other areas. However, many topics are very sensitive and delegating competencies from the national level to the EU institutions is very problematic. In addition, as mentioned above, the EU also deals with non-EU member states in economic and trade cooperation. This form of integration, in which the EU appears as one unit, is developed at a lower level than integration within the intra-EU market, but keeping the common rules through the Common Commercial Policy by individual members of the EU is also important. Analysing the trade policy of the EU and its role in increasing the EU competitiveness can be the subject for other estimation.

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