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Development of Intra-industry Trade as a Measure of Competitiveness of the Polish Food Sector

JEL classification: *F14, L66, Q17*

Key words: *foreign trade, intra-industry trade, food sector, agri-food products, competitiveness*

Abstract: *This article aims at analysing the significance of the intra-industry trade in the Polish foreign trade in agri-food products and assessment of the competitiveness of the Polish food sector on this basis. The analysis uses, first of all, the index introduced by Grubel and Lloyd (hereinafter referred to as GL index), which is a commonly used indicator of intra-industry trade intensity and one of the measures of international competitiveness. The analysis showed that in the period of Poland's membership in the European Union the foreign trade in agri-food products noted a significant boost and the competitive position of Polish food producers improved on the international scale. At the same time, the intensity level of intra-industry trade in these products increased considerably. In 2001-2011, the importance of intra-industry trade in the Polish agri-food trade increased by over 14 percentage points. Consequently, in 2011 almost 50% of the trade in agri-food products was intra-industry trade. A predominant part of this exchange was horizontal intra-industry trade, including trade in goods differentiated in respect to*

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a given industry that were relatively highly processed and showed a high level of substitutability between each other. The intra-industry trade in differentiated products of lower level of processing was less intensive. These products included agricultural raw materials and homogeneous products. Moreover, as regards the food sector a quite significant part was played by vertical intra-industry trade, including re-export, i.e. export of finished goods manufactured from raw materials imported from other climate zones. The growing intensity level of intra-industry trade in agri-food products is one of the markers of high competitiveness of the Polish food producers.

Introduction

Foreign trade is one of the most important factors shaping the international relations and determining economic development of countries. The value of global trade volumes increases much faster than the world Gross Domestic Product. Consequently, the share of foreign trade in the generation of the national income increases steadily. Economic history provides a number of examples of dynamic development of countries and economic sectors resulting from intensive foreign trade.

World trade development is a phenomenon closely linked to globalisation. It is a synonym and a driving force of globalisation (see: Kowalczyk 2009). The higher frequency of research on international competitiveness in recent years is also closely related to the integration and globalization processes worldwide. Since these processes occur with different force in many areas of social and economic life, they have a significant impact on the functioning and development perspectives of economies and entities functioning within their limits. Under such conditions, building, strengthening and keeping the international competitiveness is a special challenge, and foreign trade development becomes one of the most important manifestations of shaping the competitive position of these entities (see: Szczepaniak 2012).

Presently, the issues related to international competitiveness attract special interest for all the obvious reasons. International competitiveness of the national economy of a given country, or its individual sectors is divided between international ability to compete and international competitiveness *sensu stricto*, also referred to as competitive position. This is accompanied by development of research on the manifestations of the ability to compete and methods and manners of measuring the competitive position, since the results of such a measurement may provide valuable clues for projecting development and shaping relevant economic policy, including foreign and international ones.

Theoretical research on broadly understood international competitiveness of economies puts a lot of emphasis on the economic category defined as comparative (relative) advantage, which translates into presence (or absence) of such advantage in foreign trade of a given country or a group of countries. Of course, each of the countries has greater or lesser possibilities with regard to transforming the comparative advantages into competitive advantages or creation of new advantages of the type. Moreover, the comparative and competitive advantages in the foreign trade of a given country are shaped by several determinants, which may be classified according to many criteria (see: Misala 2012).

When pursuing the policy of transforming the current comparative advantages into competitive advantages one should assess the benefits following from the foreign trade development both in respect to inter-industry and intra-industry trade. But, according to Misala (2012), special preferences should be given to solutions conducive to consolidation of international division of labour of the intra-industry type (resulting in intra-industry trade stimulation), especially of horizontal nature. This is evidenced by the fact that the development of the intra-industry division of labour clearly stimulates creativity and innovativeness, enables to take advantage of broadly-conceived economies of scale in the field of production and sales, as well as facilitates problem-solving in the process of implementing the so-called adjustment processes.

At present, intra-industry trade is becoming increasingly important in the international foreign trade (it accounts for approximately a quarter of the world trade). This is linked to both the development of globalisation and international integration processes, as well as to technological progress and structural transformations in the area of production and consumption. Intra-industry specialisation is sometimes considered the most important form of economic and trade integration. The idea behind it is that a given country, simultaneously, exports and imports products from the same production industry (sector). In other words, it is a two-way trade of products manufactured in the same industry (see: Begg 2007). A feature differentiating it from other streams in the current trade is stability and lack of mechanisms leading to its exhaustion (see: Olczyk 2008). The following are considered the main reasons for intra-industry trade development: the continuing processes of final goods differentiation and diversification of demand, similar tastes of consumers, similar prices of production factors, lack of obstacles to international trade, geographical spreading of products and technological processes, significant size of the internal market (see: Misala, Pluciński 2000).

Intra-industry trade may be of horizontal or vertical nature. Horizontal intra-industry trade is predominated by the exchange of differentiated products of similar quality and showing a high level of substitutability between each other. It results from the willingness to satisfy the domestic and foreign demand for substitutes, as well as the desire to achieve economies of scale. Grubel and Lloyd (1975) differentiated three groups of such products: goods being substitutes in production (products similar in respect to production process and thus factor-intensity, but different from the perspective of consumption), goods being substitutes in consumption (products similar in respect to consumer destination, but different from the perspective of production technique, thereby also factor-intensity) and goods being substitutes both in production and consumption.

The horizontal intra-industry trade may also refer to homogeneous products, but to a considerably lesser extent. The most common forms of intra-industry trade in such products is border trade and cyclical trade. As regards trade in agri-food products, cyclical trade has relatively the greatest significance, since it results from e.g. variable weather conditions or the phenomenon of good or bad crops (e.g. import and export of defined species of cereals, oil crops, fruit, vegetable or potatoes in a given period). Border trade, which has local character and aims at minimisation of transport costs, is of smaller significance in terms of trade exchange (see: Ambroziak 2009).

Vertical intra-industry trade takes place within the limits of one industry and is taken up, primarily, in relation to the exchange of semi-finished goods and components of products between various enterprises from different countries, whereas the exchanged goods differ between each other in relation to quality and price level. A specific form of vertical intra-industry trade is re-export, which consists in import of defined goods and their subsequent export after performing certain operations of production and commercial nature (such as: processing, refinement, sorting and packing). This form of trade is very significant in the agri-food sector, since in this case re-export consists in export of finished goods manufactured from raw materials imported from other climate zones (especially in such sections of the sector as: fish, fruit and vegetable, oil, coffee and tea, tobacco).

Intra-industry trade plays a special role in the trade of industrial products between highly developed countries. This follows from the fact that over the years these countries became similar to each other in terms of production technology, capital availability and the availability of qualified workforce, as well as structure of demand. This substitutability of economies of trading partners on the supply side is measured by way of no technological gap, while on the demand side – lack of disproportions in the

level of income (GDP per capita). Complementarity of economies, on the other hand, causes self-restriction in the development of mutual trade, which, in turn, limits the benefits following from traditional international division of labour (see Ambroziak 2009).

According to Krugman and Obstfeld (2007), the development of intra-industry trade probably results to a greater extent from benefits from the scale of production, than from international specialisation following from clear comparative advantages. This is evidenced by Begg (2007), who indicates specialisation of individual countries as regards production and export of goods as regards which they have a comparative advantage, but at the same time he emphasizes that this principle fails to explain the entire intra-industry exchange. Hence the current industry manufactures a wide range of products, diverse in terms of quality and kind, which are highly substitutable and these are primarily the object of intra-industry trade. According to Begg (2007), there are three sources of intra-industry trade. The first, follows from the fact that consumers simply like to have a wide selection of different varieties and makes of products (differentiation of demand). The second is related to the fact that individual countries do not produce all varieties of a given good, but they tend to specialise in production of selected varieties, which they subsequently exchange between each other via international market (economies of scale). The third source of intra-industry trade concerns exchange between countries situated close to each other, and it follows simply from the needs to minimise transport costs.

In most general terms, intra-industry trade brings additional benefits from foreign trade above what may be obtained owing to comparative advantage, because it allows for achievement of benefits both on account of specialisation, as well as greater size of the market. Each of the countries participating in such exchange may reduce the quantity of produced goods, but produce them on a greater scale making better use of resources, keeping higher efficiency and lower unit costs. As a result, the prices of goods should drop on all markets and the volume of sales should increase. For the consumers, on the other hand, intra-industry trade implies higher number of varieties and variants of goods available on the domestic market that are offered by manufacturers from both their country and abroad. Wider selection of goods on the market causes better satisfaction of increasingly different needs of consumers (see: Ambroziak, Szczepaniak 2012).

The intra-industry trade intensity level testifying to its specialisation constitutes one of the measures of export competitiveness. And, although competitiveness and specialisation are two different notions, the literature

of the subject basically agrees that the measures of specialisation may be used in research on competitiveness. Information on what goods constitute the export specialisation of a given country and how intensive this specialisation is, make it possible to define the character of production specialisation and foreign trade, as well as changes occurring within this scope, and thereby they indirectly enable to assess the level of competitiveness of a given economy at the background of other countries (see: Zielińska-Głębocka 2003; Olczyk 2008).

Methodology

The analysis of the role of intra-industry exchange in the Polish foreign trade in agri-food products uses the index introduced by Grubel and Lloyd (1975), hereinafter referred to as GL index, which is a commonly used indicator of intra-industry trade intensity and one of the most popular measures of specialisation. From this perspective, this index also provides information on the level of competitiveness.

$$GL_i = \frac{\sum_{i=1}^n (X_i + M_i) - \sum_{i=1}^n |X_i - M_i|}{\sum_{i=1}^n (X_i + M_i)} \times 100$$

where:

GL_i – intra-industry trade index for i^{th} industry (in this case a group of products according to HS classification),

X_i – export of products of the i^{th} industry from a given country to another country (group of countries),

M_i – import of products of the i^{th} industry to a given country from another country (group of countries),

n – number of industries (here groups of agri-food products according to HS classification).

The value of this index expressed in percent implies approximately the share of intra-industry trade in total trade (total of intra-industry and inter-industry trade). This index may take on values within the range from 0 to 100. The higher the value of this index the greater part of trade between the partners may be explained by way of intra-industry trade development, the lower the value – the greater the significance of inter-industry trade.

The notion of industry (sector) is extremely important with regard to calculation and interpretation of the intra-industry trade indices. This may be determined based on demand or supply criteria. In terms of demand, the issue of separating the industry is predetermined by the production of goods being close substitutes to each other given the value in use of given products (e.g. dark chocolate and milk chocolate). In terms of supply, on the other hand, the industry is determined by products manufactured with the use of the same (or similar) number of similar production factors (e.g. spirits and denaturant). The proper definition of the industry is significant from the perspective of selection of statistical data of relevant level of data disaggregation (detail). The more detailed the data (lower level of aggregation) the more underestimated the indices of intra-industry trade. On the other hand, if data of higher aggregation level are applied to the calculations it is possible to overestimate the indices for the trade.

Special usefulness of intra-industry trade index in research on competitiveness is evidenced by the fact that the most competitive economies of the world are characterised by high level of this index, which in turn bears witness to high complementarity of export of these countries with supply import of their trading partners. In more general terms, it can be assumed that the higher the values of the intra-industry trade index the higher the level of international competitiveness *sensu stricto*, to put it differently the competitive position of a given economy or sector is higher.

The analysis of the importance of the intra-industry exchange in the Polish agri-food trade was conducted both for our agri-food trade in total, as well as in geographical terms, i.e. divided into trade with the “old” European Union countries (EU-15), new Member States (EU-12) and non-EU-27 countries (third countries).

The research covered agri-food products belonging to HS01-HS24 sections, according to the four-digit classification of the Harmonized System (HS). Selection of this aggregation level seemed an optimal solution from the perspective of data detail selection.

The analysis was based on trading data taken from the WITS database – World Integrated Trade Solution, expressed in USD. The conducted analysis covers, in general, the 2001-2011 period, i.e. both the period directly before the EU enlargement, as well as the first years of our membership in the EU.

Intra-industry Exchange in Agri-food Products – General Trends

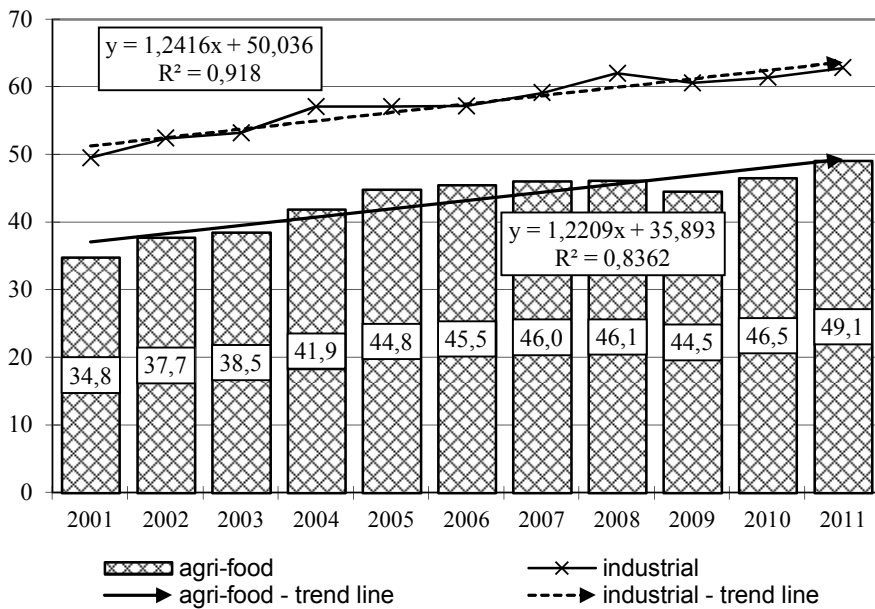
The aspect of structural transformations in the Polish foreign trade in agri-food products analysed in this study concerns the change in the character of Polish participation in this trade, and the actual development of intra-industry relations therein. The analysis of the value of the index of intra-industry trade in agri-food products in Poland performed for the 2001-2011 period showed its clearly upward trend. The marked trend line having the form of a linear function is characterised by a significant growth (at the pace of 3.5% per year) and high coefficient of determination R^2 (0.8362), which points also to a strong autocorrelation of expressions in time series. Throughout this period, the significance of intra-industry exchange in the Polish agri-food trade increased by as much as 14.3 percentage points (p.p.), despite its minor fluctuations in individual years. In the first period after the accession, the indices of intra-industry trade in agri-food products in Poland increased steadily – by 2005 they increased very fast, and as of 2006 rather slowly (up to 46.1% in 2008). In 2009, i.e. at the time of the global economic crisis, the share of intra-industry exchange in total agri-food trade in Poland decreased (by 1.6 p.p.) for a short period of time, which points to its high sensitivity to economic fluctuations¹, but already in the next year it returned to the level from the previous years. In 2011, the increase in the share of this trade was even more evident (by 2.6 p.p.), which caused that nearly a half (49.1%) of agri-food trade had intra-industry character (Figure 1). Thus after Poland's accession to the EU, the stream of Polish agri-food trade, to a much greater extent than before the accession, was composed of products from the same industry.

In the analysed period the intensity level of intra-industry exchange in agri-food products was, however, lower than in case of industrial products in total (excluding mineral products). Although the determined trend function of the index of intra-industry trade in industrial products was characterised by a course very similar to the trend function of intra-industry trade in agri-food products, the results of regression analysis were statistically more significant, which was confirmed by even higher value of the coefficient of determination R^2 (0.9180). This follows from the fact that in case of indus-

¹ Intra-industry trade is more sensitive to economic fluctuations than trade of inter-industry nature, because intra-industry trade deals, above all, with substitutes the demand for which is relatively flexible in terms of price. This means that an increase of price of one good causes greater demand for another good, which is a substitute of the first one. Thus even a slight increase in price of an imported good may cause increased demand for a substitute good produced in the country.

trial products, as compared to agri-food products, there are greater possibilities of differentiation of products within the framework of the same industry, and, consequently, there is a higher potential for growth of the two-way exchange. Moreover, it should be also noted that, at the times of the economic crisis (2009), there was a decrease in the intra-industry trade indices within the scope of both of the aforementioned groups of products, but the decrease was greater in the group of agri-food products. In 2010-2011, namely in the period of foreign trade revival, the intra-industry trade indices within the scope of the analysed groups of products rose once again, but this time it especially concerned agri-food products. This testifies to the thesis that the intra-industry trade is more sensitive to economic fluctuations than inter-industry trade.

Figure 1. Indices of intra-industry trade in Polish trade in agri-food products and industrial products in total (% , trend lines)



Source: Own calculations based on WITS-Comtrade database.

The increase in the inter-industry trade intensity after Poland's accession to the EU followed, above all, from the full liberalization of trade volumes in the Community. The degree of openness of the economy understood e.g. as the level of tariff barriers, is considered to be one of the more important factors determining the inter-industry trade development. Given the fact that the demand for differentiated goods – being the main object of two-way exchange – is relatively flexible in terms of price (they have many substitutes), the trade in such goods is subject to greater restrictions due to favouritism, than is the inter-industry trade. Moreover, goods exchanged under the intra-industry trade are often produced in the branches characteristic of high economies of scale, which favours price decreases after opening of the economy and winning new outlet markets (see: Ambroziak, Szczepaniak 2012).

The growth of intra-industry exchange intensity was also significantly influenced by the increasing level of income per capita. Along with the growth in the level of society's wealth, the tendency to differentiation among purchasers increases as well². After Poland's integration with the European Union the domestic offer of food products could be enriched to a greater extent with supplies from abroad. As a result, opening our market to the EU producers caused an increase in import. On the other hand, better access of Polish food producers to the Community market and the extension of the export offer of these products, along with a continually high demand among the EU recipients contributed to the dynamic growth of the Polish export (faster than import). The stream of Polish agri-food trade with other EU countries consisted to a significant extent in products from the same industry.

Intra-industry Exchange in Agri-food Products – in Geographical Terms and Divided into Types of Goods

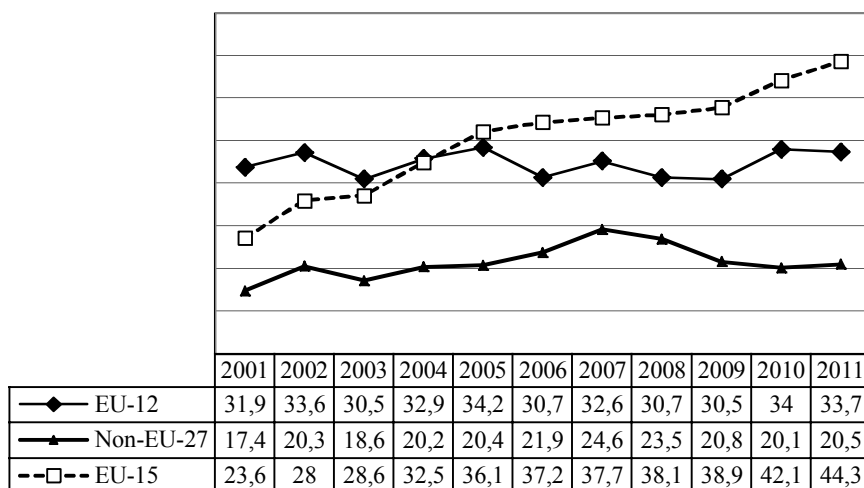
In Poland, the highest level of intra-industry trade intensity after the accession was characterised by trade with the “old” EU Member States (EU-15). At the same time, within the analysed period the importance of this form of trade increased quite considerably (up to 44.3% in 2011, i.e. 20.7 p.p. in 2001-2011). The intensity level of intra-industry exchange with the

² For purchasers, the criterion of differentiation between products may be such characteristics and functions as: (1) aesthetic qualities – shape, colour; (2) symbolic qualities – brand, country of origin; (3) physical and functional qualities – type and quality of the material, technical construction, (4) services auxiliary to sales – advisory, credit conditions, customer service, promotion (see: Ambroziak 2009).

EU-12 countries was also rather high, it has been on the increase until 2005, in the subsequent years it decreased to grow again in the last period – to as much as ca. 34% in 2010-2011. The lowest intensity of intra-industry trade was all the time typical of trade with non-EU countries and while in 2001-2007 its level grew by 7.2 p.p., it then dropped by ca. 4 p.p., i.e. to 20.5% in 2011 (Figure 2).

Contrary to the Polish agri-food trade with EU-12 and non-EU-27 countries, the intra-industry exchange with EU-15 countries proved resistant to the crisis phenomena. In 2009 the index of intra-industry trade increased, as compared to the previous year, by almost 1 p.p., while in other two cases it noted a decrease.

Figure 2. Indices of intra-industry exchange in Polish trade in agri-food products in geographical terms (%)



Source: Own calculations based on WITS-Comtrade database.

The intra-industry trade intensity in individual groups of agri-food products was highly differentiated in Poland (Table 1, Figure 3). In 2011, in the majority of groups of products (14 out of 24) over 50% of trade volumes were intra-industry in character. In particular it covered: coffee, tea and spices (09), cereals (10), sugars and sugar confectionery (17), miscellaneous edible preparations (21), products of animal origin, not elsewhere specified or included (05), beverages, spirits (22), as well as preparations of vegetables, fruit (20), preparations of cereals; pastrycooks' products (19),

products of the milling industry (11), residues and prepared animal fodder (23), edible vegetables (07), cocoa and cocoa preparations (18) and dairy produce (04).

During the Polish membership in the EU, the greatest increase was noted regarding the significance of intra-industry exchange of such groups of agri-food products as: cereals (by 55 p.p.) and products of primary processing of cereals (by 39%), coffee, tea and spices (by 38 p.p.), fats and oils (by 34 p.p.), dairy produce (by 26 p.p.), sugars and sugar confectionery as well as preparations of vegetables and fruit (in both groups by 23 p.p.), and residues and prepared animal fodder (by 21 p.p.). At the same time, this form of trade lost its significance in reference to the group of the so-called vegetable products not elsewhere specified or included (by 44%) and miscellaneous edible preparations (by 13 p.p.), fish and crustaceans, molluscs and other aquatic invertebrates (by 11 p.p.), vegetable saps and extracts (by 7 p.p.) and tobacco and manufactured tobacco substitutes (by 6 p.p.).

Table 1. Competitiveness indices for intra-industry trade in Polish foreign trade in agri-food products (according to the HS sections, %)

HS section number	HS section name	2003	2005	2007	2009	2011	Change in 2003-2011, percentage points
01	Live animals	21.8	37.0	38.6	43.9	34.7	+12.9
02	Meat and edible meat offal	31.7	48.5	41.7	26.8	36.6	+4.9
03	Fish and crustaceans, molluscs and other aquatic invertebrates	47.5	37.6	38.5	37.9	37.0	-10.5
04	Dairy produce	24.7	22.2	36.6	45.0	50.7	+26.0
05	Products of animal origin, not elsewhere specified or included	65.1	61.6	64.4	63.3	68.0	+2.9
06	Live plants; cut flowers	73.7	68.7	61.8	58.8	58.9	-14.8
07	Edible vegetables	45.7	46.1	47.0	47.6	52.7	+7.0
08	Edible fruit and nuts	15.4	32.1	31.4	26.3	35.5	+20.1
09	Coffee, tea and spices	40.0	49.3	60.2	73.6	78.3	+38.3
10	Cereals	21.5	56.6	48.0	37.5	76.4	+54.9
11	Products of the milling industry; malt; starches	16.3	35.4	32.5	42.0	55.5	+39.2
12	Oil seeds and oleaginous fruits	27.9	37.7	35.8	61.9	36.0	+8.1
13	Vegetable extracts	22.2	14.5	20.0	24.1	15.2	-7.0
14	Vegetable products not elsewhere specified	52.8	74.3	90.9	30.0	9.3	-43.5

Table 1 continued

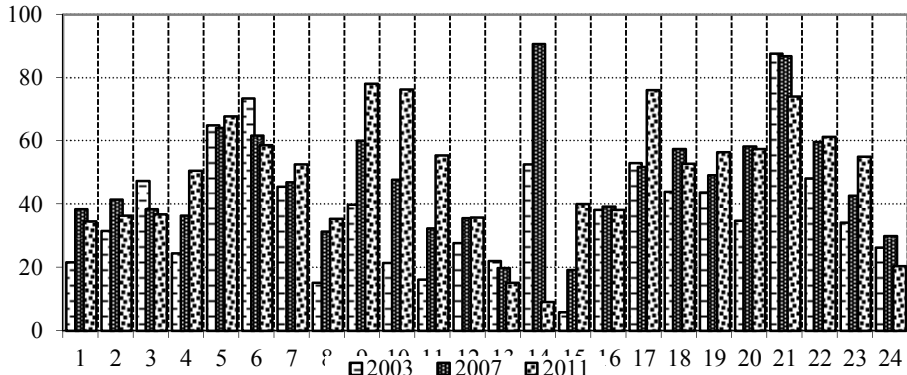
HS section number	HS section name	2003	2005	2007	2009	2011	Change in 2003-2011, percentage points
15	Animal or vegetable fats and oils	6.0	19.5	19.4	32.7	40.2	+34.2
16	Preparations of meat, of fish	38.4	40.0	39.3	40.6	38.4	0.0
17	Sugars and sugar confectionery	53.2	43.6	52.0	71.8	76.2	+23.0
18	Cocoa and cocoa preparations	44.0	55.4	57.7	55.1	53.0	+9.0
19	Preparations of cereals; pastrycooks' products	43.9	48.1	49.3	54.7	56.7	+12.8
20	Preparations of vegetables, fruit	34.9	50.7	58.4	53.1	57.6	+22.7
21	Miscellaneous edible preparations	87.7	82.9	87.0	80.5	74.3	-13.4
22	Beverages, spirits	48.3	53.2	59.8	54.1	61.5	+13.2
23	Residues and prepared animal fodder	34.3	43.3	42.8	42.3	55.2	+20.9
24	Tobacco and manufactured tobacco substitutes	26.5	35.9	30.0	17.1	20.6	-5.9
1-24	Total for agri-food products	38.5	44.8	46.0	44.5	49.1	+10.6

Source: Own calculations based on WITS-Comtrade database.

From the analysis of indices of intra-industry trade in agri-food products in individual groups of countries divided into types of goods (according to HS sections) it follows that in 2011 there were significant differences in the level of intensity of intra-industry trade in individual sections in geographical terms (Figure 4). The share of two-way exchange in the trade of many groups of goods was clearly higher in trade with the EU-15 countries (even as much as over two-fold) than with the EU-12 countries or non-EU-27 countries. This concerned e.g. dairy produce; coffee, tea and spices; sugars and sugar confectionery; miscellaneous edible preparations; cocoa and cocoa preparations; beverages, spirits; and products of the milling industry. Apart from the last group, the indices of intra-industry trade were shaped within the limits of 60-80%. On the other hand, the intensity of two-way exchange of such products as: vegetable saps and extracts, residues and prepared animal fodder, animal or vegetable fats and oils, and live ani-

imals were the highest in the relations of Poland with the EU-12 countries.

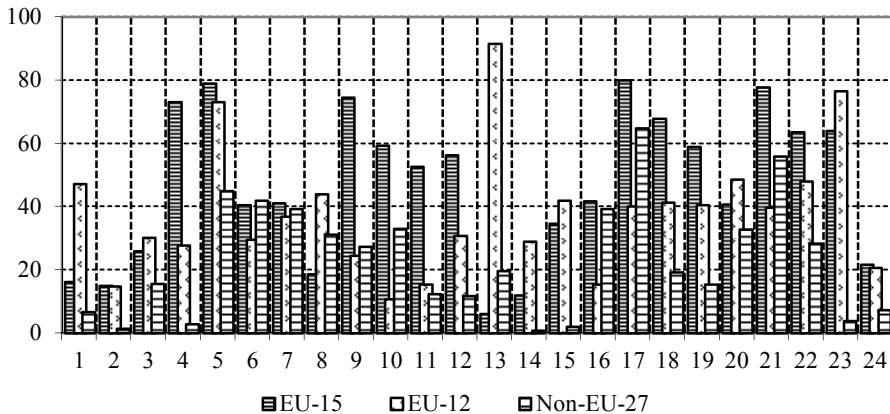
Figure 3. Indices of intra-industry exchange in Polish trade in agri-food products divided into types of goods (according to HS* sections, %)



* description of HS sections is included in Table 1

Source: Own calculations based on WITS-Comtrade database.

Figure 4. Indices of intra-industry exchange in Polish trade in agri-food products with individual groups of countries in geographical terms and divided into types of goods in 2011 (according to HS* sections, %)



* description of HS sections is included in Table 1

Source: Own calculations based on WITS-Comtrade database.

Conclusions

For a long period of time, the foreign trade in agri-food products worldwide covered two basic groups of goods, i.e. products of a given climate zone, which were exported to other zone and raw materials produced on a mass scale in specialised regions, mainly due to favourable natural conditions. This changed in the last few years, primarily, due to globalisation and economic integration. Gradual reduction of tariff and non-tariff barriers, and efforts to reduce the costs of food production by transnational food corporations, as well as purposeful reduction of transport costs became a strong incentive to develop world trade within the scope of food products (see: Kowalczyk 2009).

The period of Poland's membership in the European Union was marked by systematic increase in and improvement of results of trade in agri-food products. Positive changes were visible already in 2003, when Poland for the first time became a net exporter of agri-food products achieving a positive balance of trade volumes in the amount of EUR 454 million and registering a two-digit growth rate in export and import. In the year of the accession, the Polish foreign trade in agri-food products was almost by 30% higher than in 2003. Poland's trade volumes for agri-food products also increased in the next years, due to continuing increase in the value of both export and import. The only exception was the year 2009, when the trade volumes dropped by more than 5% as compared to the previous year. These changes followed from the economic slowdown caused by the global financial crisis. In 2011, the value of Poland's trade volumes for agri-food products amounted to almost EUR 28 billion, including export reaching the value of over EUR 15.2 billion and import – EUR 12.6 billion. Thus, despite the difficult economic situation worldwide the increase in trade in food continued. From the moment of Poland's accession to the EU the positive balance of trade in agri-food products systematically increased. The only exception was the year 2008, when the surplus was clearly lower. In 2011, the value of trade balance amounted to almost EUR 2.6 billion, which means that it was by over EUR 2.1 billion higher than in the pre-accession period. In the entire period of Poland's membership in the Community, the export of agri-food products grew by almost four times, import – by three times and a half, and foreign trade balance in these products almost six-times (see: Szczepaniak 2012).

After Poland's accession to the European Union the intra-industry trade in agri-food products noted a considerable increase. The full liberalisation of agri-food trade in the Community after 1 May 2004, the growing GDP

level per capita, and, consequently, the increase in the purchasing power of the population and their tendency to differentiate consumption, as well as the extension of the range of manufactured products due to implemented investments and introduced innovations as well as continuing high demand among the EU purchasers contributed to the development of the intensity of two-way exchange in agri-food trade.

As follows from literature of the subject, the most important reasons for intra-industry trade development are economies of scale resulting from specialisation of individual countries in production of selected varieties of goods (extension of production series translates into better use of resources and reduction of average costs) and definitely greater selection of products on the market, thereby the consumer demand for differentiated and diverse range of goods is better satisfied. Thus intra-industry exchange is beneficial for both producers and consumers. Under such circumstances, it is not surprising that the importance of intra-industry exchange in agri-food products in Poland increased significantly after our country accessed the European Union.

In 2011, almost 50% of exchange in agri-food products was intra-industry in character (by over 14 p.p. more than in 2001 and by almost 11 p.p. more than directly before the accession). A predominant part of this exchange was horizontal intra-industry trade, including trade in goods differentiated in respect to a given industry that were relatively highly processed and showed a high level of substitutability between each other. The intra-industry trade in differentiated products of lower level of processing was less intensive. These products included agricultural raw materials and homogeneous products. A quite significant part was played by vertical intra-industry trade, including mainly re-export, i.e. export of finished goods manufactured from raw materials imported from other climate zones.

In geographical terms, the highest share of intra-industry trade measured with GL index was typical to Poland's trade with the EU-15 countries, followed by new Member States (EU-12). Intra-industry trade with third countries was less intensive.

The intensity level of intra-industry exchange in agri-food products divided into types of goods was also very highly differentiated. It was the highest (GL>70%) regarding the trade in: coffee, tea and spices; cereals; sugars and sugar confectionery; and the so-called miscellaneous edible preparations; the lowest (GL<20%) – for trade in vegetable products not elsewhere specified or included; vegetable saps and extracts; and tobacco and manufactured tobacco substitutes. In the last years the majority of food

production sections noted a strengthening of the intra-industry trade intensity.

To sum up, the development of the Polish foreign trade in agri-food products, including gradually increasing role of intra-industry exchange, point to clear development of specialisation and the production profile adjustment to both the internal market, as well as changes in the demand structure of foreign partners. Eight years after the Poland's accession to the EU, the trade in agri-food products is almost to the same degree an intra-industry and inter-industry trade, which points to the fact that there is both competition in terms of quality and price in the sector, and there are no signs of clear prevalence of one of these forms of competition (contrary to what was noted in the previous years, when there was a clear prevalence of lower price competition). Thus, the phenomena give signs of improvement of the international competitive position of Polish food producers.

It should be also recognised that intra-industry specialisation is the easier way to enter the international division of labour, and it is the intra-industry development of the division of labour in the field of food production worldwide that is currently the main driving force of international food trade, especially trade between economically developed countries.

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