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Internationalization of agro-food trade in the Visegrad Group countries after their entering into the European Union

Abstract. The foreign trade performance in agro-food sector in the Central European Countries for the period of 2004-2007 has been evaluated. The main exports and imports measures, comparative advantages, specialization as well as market shares and competitiveness have been analyzed. After entering into the European Union by the Central European Countries, the importance of foreign trade in agro-food sector has increased, an intra-branch trade has been intensified and its structure has changed. The comparative position of these countries in the trade has been created by rising comparative advantages of some sections and lowering of the others. The foreign trade turnover has risen and the agro-food trade has been internationalized.

Keywords: internationalization, agro-food trade, competitiveness, comparative advantage, market share, trade specialization, trade concentration.

Introduction

The processes of trade liberalization and changes in the global trade policy principles have exerted an influence on the growth of economic cooperation in the world as well as on alteration of development conditions of commerce. For several years already, the Visegrad Group countries have participated in the free trade in the EU common market. The Czech Republic, Poland, the Slovak Republic and Hungary have been aiming at consolidating their hold on trade in different economic branches.

The main aims of the paper are a comparison of foreign trade position of agro-food sector in the new EU member states and an evaluation of the process of internationalization. The ex post evaluation of the international trade position of agro-food sector and the intensification of foreign trade in the branch have been provided.

The available OECD's branch and product item statistics have been analyzed. The annual data on the merchandise trade in the main agro-food products, i.e. cereals, live animals, meat and edible meat offal as well as products of mill industry in years 2004-2007 have been compiled.[2] The measures of volume and dynamics of trade revealing the comparative advantages, participation in foreign markets, and trade concentration have been compared. The foregoing research has attempted to examine the international position and competitiveness of the Central European Countries in the agro-food trade as well as the changes in their involvement in international agro-food markets after their entering into the EU.

Methodological remarks

Internationalization is commonly understood as a rise in importance of foreign trade in the economy as well as an involvement of enterprises in international markets. The main measures of the process of internationalization are foreign trade balance and turnover. The trade turnover specifies the volume of trade and enables to measure the input of foreign trade in economy. The trade balance is defined as a difference between exports and imports in a given time. It informs about trade balance deficit or surplus. The trade balance surplus which is an export surplus is called net export; the trade balance deficit which is an import surplus is identified as a net import. The values of the mentioned measures show the level of economic openness to the foreign trade and the international position of economy. The trade balance informs also about the intra-trade within a branch [Durand & Giorno 1987].

There are a few methods to assess a competitive position in the international markets. Several indicators have been specified in the OECD's statistics to measure a commercial activity of the economy. The revealed comparative advantage (RCA) identifies the intensity of trade specialization of a country within a region or the world. It is calculated as the ratio of the share of a given product in country's exports to another country or region to the share of this product in the world's total exports (equation 1). If the RCA takes a value less than 1 this implies that the country is not specialized in exporting the product. The share of that group within the total exports of goods of this country is less than the corresponding world share. Similarly if the index exceeds 1 this implies that the country is specialized in exporting this type of goods [Balassa 1965].

$$(1) \quad RCA_i = \frac{x_{ij}}{X_j} \div \frac{x_{iw}}{X_w},$$

where: x_{ij} – exports of commodity i of country j, X_j – total exports of country j, x_{iw} – world exports of commodity i, X_w – total world exports.

For the calculation of the export performance of merchandise trade, the growth rate of total exports of goods from a particular OECD country has been subtracted from the growth rate of imports (of this category of goods) in the rest of the world. If the exports growth rate of a single country is higher than the growth rate of imports in the rest of the world, then the export performance of this country for this type of goods is greater than 1.

The export market share by type of goods is calculated by dividing exports of respective type of goods from the country by world exports of this type of goods (expressed as a percentage in the database). The indicator measures the degree of importance of country's exports of a specific type of goods for the total world exports of this type of goods.

$$(2) \quad He = (\sum_{i=1}^{n} f_i^2) \times 100,$$

where: n – number of countries of destination; f – export share of i-th country.

The Herfindahl index of geographical concentration for a given country's exports is a sum of squared shares of each country of destination in the total exports of the country (equation 2). If each of the countries of destination received the same export value from the country of dispatch, the Herfindahl index would be equal to 1/n (times 100%), where n is the number of countries of destination. The nearer to 1 (times 100%) is the index, the more geographically concentrated is the trade of this country [OECD's… 2006].

The foreign trade balance in agriculture and food industry

The rate of trade growth changed in years 2004-2007, the balance and the turnover of agro-food trade developed in the Visegrad Group countries. There was only one totally net exporter of agricultural goods among the considered countries. Hungary had a balance surplus of 1708 million USD in 2007. Its export surplus was almost tripled in comparison with 2004. The remaining countries had trade balance deficits. Poland was the biggest net importer of agricultural goods with the adverse trade balance of -1524 million USD. The import surplus was over a hundred percent higher in comparison with 2004 (Table 1).

Table 1. The foreign trade balance in agriculture and food industry in the Visegrad Group countries in 2004-2007, million USD and %

Country	Year							
	2004		2005		2006		2007	
	million USD	%	million USD	%	million USD	%	million USD	%
Agriculture								
Hungary	618	100	610	99	794	128	1708	276
Poland	-755	100	-714	95	-952	126	-1524	202
The Czech Republic	-602	100	-434	72	-673	112	-465	77
The Slovak Republic	-105	100	29	128	-63	60	-202	192
Food industry								
Hungary	785	100	640	82	539	69	628	80
Poland	1482	100	2451	165	3110	210	3504	236
The Czech Republic	-676	100	-746	110	-943	139	-1189	176
The Slovak Republic	-340	100	-459	135	-522	154	-732	215

Notes: agricultural sector includes agriculture, hunting and forestry, food industry sector includes food processing and beverages, according to the International Standard Industrial Classification (ISIC).

Source: own compilations on the basis of OECD statistics [Micro… 2009].

There were two net exporters of foodstuffs in the Visegrad Group in the analyzed period. Poland, Poland the biggest exporter of food, had export surpluses of 3504 million USD in 2007 and the trade grew by 236% since 2004. The surpluses were nearly fivefold of those of Hungary (628 million USD), where the food trade declined by 20% in comparison with 2004. The remaining countries had food trade balance deficits, the Czech Republic of 1189 million USD.

All countries of the Visegrad Group were net exporters of live animals. During the analyzed time three of them: the Czech Republic, the Slovak Republic and Hungary expanded their export surpluses of live animals. Only Polish export surpluses of live animals decreased in the respective time. The same three countries had growing export surpluses in cereals. The highest rate of increase in export surpluses of cereals was recorded in the Czech Republic, but the highest trade surpluses in cereals were gained by Hungary. The trade balance with the world reached 1518.8 million USD and that with the EU 900.6

million USD in 2007. Poland was the only net importer of cereals, with increasing import surpluses which grew in 2007 by 227% in comparison with 2004 (Table 2).

Poland was among the Visegrad Group countries one of the main net exporters of meat and edible meat offal. The trade balance doubled in 2007 in comparison with 2004 and grew up to 1245.6 million USD in trade with the world and to 760.9 million USD in trade with the EU. Hungary, the next net exporter of meat and edible meat offal attained in 2007 almost twice lower export surplus than Poland. The remaining countries, the Czech Republic and the Slovak Republic, were net importers of meat and edible meat offal, with a growing excess on imports side. In comparison with the 2004 year's value of the trade balance deficit, the one in 2007 almost doubled.

Table 2. The foreign trade balance of agriculture and food industry in the Visegrad Group countries in 2004-2007 by the group of goods, million USD

Country	Year							
	2004		2005		2006		2007	
	World	EU-15	World	EU-15	World	EU-15	World	EU-15
Live animals								
Hungary	84.5	50.6	60.1	8.6	53.0	69.9	94.7	71.5
Poland	190.7	136.7	236.6	160.9	320.6	215.5	188.6	119.6
The Czech Republic	95.6	53.5	116.8	77.4	128.4	87.5	158.3	98.2
The Slovak Republic	25.8	35.2	39.8	33.4	59.0	43.8	84.0	58.0
Cereals								
Hungary	363.6	190.0	528.0	343.8	724.7	390.9	1 518.8	900.6
Poland	-178.5	-85.1	54.6	63.1	-47.8	-23.6	-378.0	-193.5
The Czech Republic	13.6	5.9	233.9	140.2	146.2	109.6	233.9	187.3
The Slovak Republic	18.2	9.4	63.8	29.9	151.1	59.6	100.0	58.1
Meat and edible meat offal								
Hungary	515.8	278.5	411.4	168.9	404.8	175.1	574.4	292.1
Poland	479.5	244.9	798.5	393.3	1106.6	644.5	1245.6	760.9
The Czech Republic	-181.0	-121.4	-301.7	-234.5	-362.1	-261.2	-443.5	-348.4
The Slovak Republic	-55.6	-45.5	-113.0	-47.2	-122.3	-44.9	-155.7	-59.1
Products of mill industry								
Hungary	35.8	-3.3	25.8	-1.8	-1.1	-6.8	52.8	-6.9
Poland	-42.3	-40.6	-53.3	-40.6	-74.3	-57.3	-113.2	-73.2
The Czech Republic	77.3	0.8	55.8	-3.0	62.9	1.5	64.8	-2.4
The Slovak Republic	61.4	4.4	75.9	9.0	74.4	7.8	110.5	6.9

Notes: classification by Harmonized System (HS)

Source: own compilations on the basis of OECD statistics [Micro… 2009].

In comparison with the above mentioned, the value of mill industry merchandise trade balance was the smallest one. The only net exporter of mill products, both to the EU and the world, was in 2007 the Slovak Republic, with a balance surplus of 6.9 million USD in trade with the EU and of 110.5 million USD in trade with the world. The Czech Republic

and Hungary gained export surpluses in trade with the world, on the contrary Poland was a net importer of mill products in trade with the world as well as with the EU.

To summarize, after entering the EU the foreign trade balance of agriculture and food industry in the Visegrad Group countries has definitely boosted. One can conclude from this fact that in relevant countries the merchandise trade became more internationally dependent. Hungary and Poland were the leaders in the opening out to the international merchandise trade with growing up export surpluses, in agriculture by increasing exports of cereals and in food industry by expanding meat exports. With respect to imports, the Czech Republic, the Slovak Republic and Poland were importers in agriculture as well as the Czech Republic, the Slovak Republic in food trade. The Czech Republic was the biggest net importer of meat and Poland of cereals.

The comparative advantages and export performance of agriculture and food industry

The average revealed comparative advantage of agriculture and food industry in the Visegrad Group took in 2004-2007 on a value of 0.7 and 0.9 which indicates a low intensity of trade specialization of the group within the OECD. Still, two out of four countries reached the index value exceeding one. They were Hungary with index for agriculture equal 1.1 and Poland for food industry equal 1.6. This implies that these countries were specialized in exporting this type of goods.

Table 3. The revealed comparative advantage and export performance of agriculture and food industry in the Visegrad countries in 2004-2007

Country	Year									
	2004		2005		2006		2007		Average	
	RCA	EP	RCA	EP	RCA	EP	RCA	EP	RCA	EP
Agriculture										
Hungary	1.1	1.0	1.0	1.0	1.0	1.0	1.2	1.4	1.1	1.1
Poland	0.8	1.3	0.8	1.2	0.7	1.0	0.7	1.1	0.8	1.2
The Czech Republic	0.4	1.0	0.6	1.6	0.5	0.9	0.5	1.2	0.5	1.2
The Slovak Republic	0.5	1.4	0.8	1.5	0.7	1.0	0.5	1.0	0.6	1.2
Average	0.7	1.2	0.8	1.3	0.7	1.0	0.7	1.2	0.7	1.2
Food industry										
Hungary	1.0	1.0	0.9	1.0	0.9	0.9	0.8	1.1	0.9	1.0
Poland	1.4	1.3	1.7	1.3	1.7	1.1	1.6	1.1	1.6	1.2
The Czech Republic	0.6	1.2	0.6	1.1	0.6	1.0	0.6	1.1	0.6	1.1
The Slovak Republic	0.6	1.3	0.7	1.3	0.7	1.0	0.6	1.1	0.7	1.2
Average	0.9	1.2	1.0	1.2	1.0	1.0	0.9	1.1	0.9	1.1

Notes: as in table 1.

Source: own compilations on the basis of OECD statistics [Micro… 2009].

The Czech Republic was the least specialized in trade in agricultural and food products, the average RCA was in 2004 and 2007 equal to 0.5 and 0.6 respectively. Although the average RCA of the Visegrad Group was mostly less than one, the export growth rate was higher than the growth rate of imports in the rest of the world, the average export performance of the group for agricultural goods was 1.2 and for food produce 1.1 (Table 3).

Table 4. The revealed comparative advantage and export performance of agriculture and food industry in the Visegrad countries in 2004-2007 by group of goods

Country	Year									
	2004		2005		2006		2007		Average	
	RCA	EP	RCA	EP	RCA	EP	RCA	EP	RCA	EP
Live animals										
Hungary	2.3	1.1	2.3	1.0	2.2	1.0	2.1	1.1	2.2	1.1
Poland	3.0	1.4	3.1	1.0	3.2	1.1	2.1	1.0	2.9	1.1
The Czech Republic	1.4	2.0	1.6	1.1	1.5	1.0	1.4	1.1	1.5	1.3
The Slovak Republic	1.7	1.8	2.1	1.2	1.8	1.0	1.5	1.0	1.8	1.3
Average	2.1	1.6	2.3	1.1	2.2	1.0	1.8	1.1	2.1	1.2
Cereals										
Hungary	1.6	1.0	2.2	1.3	2.5	1.2	3.1	1.5	2.4	1.3
Poland	0.1	0.5	0.5	4.3	0.4	1.0	0.3	0.8	0.3	1.7
The Czech Republic	0.2	0.4	0.8	5.0	0.6	0.8	0.5	1.1	0.5	1.8
The Slovak Republic	0.4	1.1	0.8	2.1	1.2	1.8	0.7	0.8	0.8	1.5
Average	0.6	0.8	1.1	3.2	1.2	1.2	1.2	1.1	1.0	1.5
Meat and edible meat offal										
Hungary	2.0	1.0	1.8	0.9	1.5	0.9	1.5	1.1	1.7	1.0
Poland	1.7	1.2	2.2	1.4	2.5	1.2	2.4	1.1	2.2	1.2
The Czech Republic	0.2	1.6	0.2	1.1	0.2	1.0	0.2	1.2	0.2	1.2
The Slovak Republic	0.3	3.0	0.5	1.7	0.4	0.8	0.3	1.0	0.4	1.6
Average	1.1	1.7	1.2	1.3	1.2	1.0	1.1	1.1	1.1	1.3
Products of mill industry										
Hungary	1.1	0.8	1.0	0.9	0.4	0.4	1.0	2.7	0.9	1.2
Poland	1.1	1.1	1.0	1.0	0.8	1.0	0.7	1.1	0.9	1.1
The Czech Republic	1.7	1.2	1.3	0.8	1.3	1.0	1.0	1.0	1.3	1.0
The Slovak Republic	2.8	0.9	3.2	1.2	2.8	1.0	2.5	1.1	2.8	1.1
Average	1.7	1.0	1.6	1.0	1.3	0.9	1.3	1.5	1.5	1.1

Notes: as in table 2.

Source: own compilations on the basis of OECD statistics [Micro… 2009].

Broadly speaking, the Visegrad countries specialization in food trade was stronger than in agricultural trade. Contrary to the whole branch statistics, the main products statistics showed the highest specialization in live animals exports. The highest advantage was gained for live animals. It reached 2.1, then for mill products 1.5, for meet 1.1 and for

cereals 1.0. The RCA above the group average was achieved for live animals in Polish trade (2.9) and in Hungarian (2.2); for mill products in Slovakian trade (2.8); for cereals in Hungarian trade (2.4) and for meat in Polish trade (2.2). The average RCA was for each analyzed category of goods equal or higher than one. The figures revealed that the group had an advantage in main agricultural and food industry commodities (Table 4).

To sum up, the Visegrad countries had in agricultural and food merchandise in 2004-2007 on the one hand a low export orientation, on the other hand there were potential capacities to expand the production and exports of agro-food products. Especially in years 2005 and 2006, the mentioned countries succeeded in export expansion in different categories of agricultural and food goods. In terms of agro-food merchandise trade the countries referred to had comparative advantage in particular products and a high excess of animal and mill product exports over imports. The average agro-food export performance of the group surpassed the world import performance. The figures indicate that there was an apparent increase in intra-branch cooperation between the Visegrad Group and the EU after the accession. There are grounds for supposing that the international position of the analyzed countries in the agro-food trade may possibly strengthen in the future as well.

The export concentration and market share of agriculture and food industry

Table 5. The share of agriculture and food industry foreign trade of the Visegrad Group countries in the OECD market in 2004-2007, %

Country	Year				2004=100	Average
	2004	2005	2006	2007		
Agriculture						
Hungary	0.7	0.6	0.6	0.9	129	0.7
Poland	0.6	0.7	0.7	0.8	133	0.7
The Czech Republic	0.3	0.5	0.4	0.5	167	0.4
The Slovak Republic	0.2	0.3	0.2	0.2	100	0.2
Average	0.5	0.5	0.5	0.6	120	0.5
Food industry						
Hungary	0.6	0.6	0.5	0.6	100	0.6
Poland	1.2	1.5	1.6	1.7	142	1.5
The Czech Republic	0.4	0.5	0.5	0.5	125	0.5
The Slovak Republic	0.2	0.2	0.2	0.3	150	0.2
Average	0.6	0.7	0.7	0.8	133	0.7

Source: own compilations on the basis of OECD statistics [Micro… 2009].

Generally speaking, the share of agro-food exports of the Visegrad countries in the OECD's markets was very small. The share in agricultural market in 2004-2007 was on the average 0.5%, in food market 0.7%. Two out of the analysed countries, namely Hungary and Poland, had the market share above the average, in the agricultural market 0.7% each and in the food market 0.6% and 1.5% respectively. On the other hand, the smallest share in the agro-food OECD market had the Slovak Republic (0.2%) (Table 5).

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The average growth of market share in food exports was in 2004-2007 higher than the one in agricultural exports. The indices reached respectively 133% and 120%. The highest growth was reached in that respect by the Slovak Republic (150%) and the Czech Republic (167%). The exports of Slovakian food rose rapidly, but the agricultural exports were stagnating. Poland was the only country out of the Visegrad Group whose market share was been growing at a pace above the average in both agricultural and food markets.

Table 6. The geographical concentration and share in the world market of agriculture and food industry in the Visegrad Group countries in 2004-2007 by group of goods, %

| Country | Year | | | | | | | Average | |
| | 2004 | | 2005 | | 2006 | | 2007 | | |
	MS	He	MS	He	MS	He	MS	MS	He
Live animals									
Hungary	1.5	0.2	1.4	0.2	1.4	0.1	1.5	1.5	0.2
Poland	2.5	0.3	2.8	0.2	3.0	0.2	2.2	2.6	0.2
The Czech Republic	1.1	0.1	1.2	0.1	1.2	0.1	1.3	1.2	0.1
The Slovak Republic	0.5	0.2	0.7	0.2	0.7	0.1	0.7	0.7	0.2
Average	1.4	0.2	1.5	0.2	1.6	0.1	1.4	1.5	0.2
Cereals									
Hungary	1.0	0.1	1.3	0.1	1.6	0.1	2.3	1.6	0.1
Poland	0.1	0.2	0.4	0.2	0.4	0.2	0.3	0.3	0.2
The Czech Republic	0.1	0.2	0.6	0.3	0.5	0.3	0.5	0.4	0.3
The Slovak Republic	0.1	0.2	0.2	0.1	0.4	0.2	0.3	0.3	0.2
Average	0.3	0.2	0.6	0.2	0.7	0.2	0.9	0.6	0.2
Meat and edible meat offal									
Hungary	1.3	0.2	1.1	0.1	1.0	0.1	1.1	1.1	0.1
Poland	1.4	0.1	2.0	0.1	2.3	0.1	2.5	2.1	0.1
The Czech Republic	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
The Slovak Republic	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.2
Average	0.8	0.2	0.9	0.2	0.9	0.2	1.0	0.9	0.2
Products of mill industry									
Hungary	0.7	0.2	0.6	0.1	0.3	0.2	0.7	0.6	0.2
Poland	0.9	0.1	0.8	0.1	0.8	0.1	0.8	0.8	0.1
The Czech Republic	1.2	0.2	1.0	0.2	1.0	0.2	1.0	1.1	0.2
The Slovak Republic	0.9	0.1	1.0	0.1	1.0	0.1	1.1	1.0	0.1
Average	0.9	0.2	0.9	0.1	0.8	0.2	0.9	0.9	0.2

Source: own compilations on the basis of OECD statistics [Micro… 2009].

With respect to the analyzed categories of goods, the highest average share of Visegrad countries in the world export market was reached in the live animals market (1.5). Poland participated in this market in 2.6%, in the meat market in 2.1%. Hungary reached high levels of participation in the live animals market (1.5%), the cereals market (1.6%) and the meat market (1.1%) (Table 6).

The Herfindahl index of geographical concentration for a given country's exports, with regard to analyzed categories of goods was very low, the average value was 0.2. The trade partners were scattered, the pattern of trade was dominated by many trade partners, which means that the analyzed countries were not dependant on one country market.

To reassume, both the market share as well as the market concentration of the agro-food exports were for the Visegrad Group in 2004-2007 very small. The countries were not specialized in agro-food exports, the world market shares were rarely over 2%. The merchants in these countries cooperated with many partners trading small amounts of analyzed categories of goods with each of the cooperators. In terms of foreign trade advantages, a diversification of foreign markets was very important for these countries. A high geographical concentration of exports could have given rise to some perturbations because of depending on the only one partner demand. On the other hand, a concentration of exports may have resulted in lower transactional and transportation costs.

Conclusions

On the basis of the above analysis, we may conclude that entering by the Visegrad Group countries into the EU gave a substantial impulse to the development of their foreign agro-food trade in the European and the world markets. The average value of trade balance in the group doubled in the analyzed years. Hungary was the leading exporter of the agricultural products and it was Poland for the food products. After the EU accession, the mentioned countries relevantly expanded their exports which tripled or doubled. One can consider that there are strong chances of further internationalization of agro-food trade and participation in the international specialization and division of labor. The Czech Republic and the Slovak Republic increased their net agro-food imports. Their international trade position was weaker in this respect and it was threatened in the future.

The contribution of the Visegrad countries to the foreign agro-food markets was gradually extended and averaged around 1% of the world market. The leading shares had the Hungarian and Polish exports. The analyzed countries reached the highest participation in the meat market. Animal and meat products were strategic groups in the analyzed agro-food exports. Anyway, most of the exports consisted of animal and cereal raw materials. The raw material content of agro-food exports weakened the trade position and lowered the profit margin.

To conclude, the analyzed countries boosted up their international positions by increasing exports and imports of agro-food products. The trade balance surpluses proved there was an increase in intra-trade and an ability of the branch to compete with foreign producers. It can be anticipated that the tendency of growing shares in foreign markets will be stable as a result of the increasing competitiveness of agro-food production. The main indication is the existence of revealed competitive advantages conditioned on introduction of an appropriate strategy of expansion by the agro-food sectors in the EU newcomers.

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