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# COMPETITIVENESS OF POLISH AND SLOVAK AGRI-FOOD PRODUCTS ON THE EUROPEAN MARKET

# Abstract

The aim of this paper was to define the Polish and Slovak competitiveness position of agricultural and food products on the European market, as well as for comparison purposes, on the markets of the third countries and to the other groups of products. However, the issue was show the changes of the competitiveness in this sector. The competitiveness performance in Polish and Slovak agrofood trade has been evaluated for the period of 1999-2012.

Trade theories indicate that countries specialize in the production of goods, trade in these goods and have better competitiveness position, if they have an absolute or comparative advantages in relationship to your partner (Ricardo 1957, Balassa 1965, Lall 2001, Guzek 2006).

In order to determine the competitive position, the comparative advantage and evaluation of agrofood trade were used. The analysis considers two indices: revealed comparative advantage (RCA) and net export index (NEI).

After joining the European Union, the importance of foreign agro-food trade in both of this countries has grew up in European market, but on the third countries market only Poland notified increases. The index of RCA in these countries is quite different. It is observed comparative advantage in Poland while in Slovakia there was not. Similar situation was in NEI index. A positive value of the net export index for agri-food products was found only in Poland.

**Keywords:** competitiveness, EU, foreign trade, comparative advantage **JEL**: *F14, F15,* F10, Q17

# Introduction

Trade has proven to be a powerful engine of economies, sectors, firms growth. But many countries cannot get market access, because they have smaller potential than others to compete on export market. Which countries are more competitive and which can get the market access, this is the first question that should be asked. Then to continue investigation, it should to look for the answer, why is this so? Frequent analysis of the agri-food trade in the countries of Central and Eastern Europe in the context of integration into the EU ( Bojnec and Ferto, 2012, Torok and Jambor 2102, Ubrežiová, Kapsdorferová, Sedliaková 2012, Kiss 2011, Nosecka, Pawlak, Poczta 2011, Rytko 2008, Horská, Ubrežiová 2007) indicate the process of the integration, free trade, shared history, geographical proximity and knowledge of the economy are urges of the development of trade between these countries. Trade which reflects the actual level of competitiveness. There have been a lot of changes since last fifteen years, which influenced on competitiveness of these countries. Although there is a lot of macroeconomic determinants of competitiveness, the end result of use available conditions is visible in the value, changes and structure of trade. Those analysis allows for the identification of comparative advantages in trade.

The economic literature relates to three different levels of competitiveness: individual company, individual sector and whole economy. To look into this levels it should use different methods especially when some authors indicate the dominant role of certain levels of competitiveness by reducing the importance of the other, or even recognize them for wrongful (Fagerberg 1988, Porter 1990, Krugman 1994). This levels are interlinked, but it should take into account the competitiveness of a whole economy cannot be connected to the rise or fall of a particular sector or a particular company. Following Lall and Albaladejo (2004), declining US competitiveness in textiles does not mean that the US economy is less competitive.

The competitiveness of the agro-food sector often sourced is to evaluate the ability of competitive or affiliated with the theory of strategic management concerning the effective use of resources (Mintzberg 2009), or the test is mainly in terms of cost-price point (Bojnec, Fereto, 2008). Competitiveness examinations in the sense of product competitiveness in foreign markets is showed the end result of having the right quantity and quality of factors of production as well as the effectiveness of their use in appropriate conditions shaped not only in the sector but also outside of them, in the area of national and international activities. As Klinger (2010) points out in the development of export very important is not only trade policy considerations such as tariffs, quotas, and exchange rates, but factors like gateway infrastructure, help on standards and certification, sector-level coordination in marketing and logistics, promotion abroad. All play a critical role in determining the competitiveness of individual exporting firms and in consequence in the given sector.

The purpose of this article is to explore ex post competitiveness and its changes in the agri-food sector in the two countries. Poland and Slovakia are neighbour countries with competitive economy and similar conditions of production. Both join the European Union in 2004, but only Slovakia is in the euro zone from 2009. To realize the objective, the following questions was arised:

- How to measure international competitiveness on the market?,
- Is Polish and Slovak trade of agro-food products competitive in the European market and in the other countries market?
- How Polish and Slovak competitive position changed in agro food trade during 1999-2012?

The answers for this questions and analysis of two indices (RCA, NEI) allow for a comparison of competitiveness of agro-food products over the 1999-2012 period.

The paper is structured as follows. First, methods and data used are given, followed by an analysis of agri-food trade, providing a background for analysis. The second part of the paper analyses competitiveness of agri-food trade with the EU27 and other countries. The last part is conclusions.

# Material and methods

### Methodological issues

In the literature circulated many comparative models. The most prevalent are based on modified Ricardo model or Balassa model. The first of these relates to determining the competitiveness on the basis of the profitability of exports, the second on the basis of the share of export individual goods in relation to the global exports' shares of these goods. It means that comparative advantage is the term used to describe the tendency for countries to export those commodities which are adept at producing and trading, vis-à-vis the rest of the world.

The analysis based on the Balassa index. In the literature numerous empirical studies have used the Balassa or modified Balassa index to identify a country's strong sectors (Wesley, Peterson, Valluru 2000, Amiti 1999, and Fertö, Hubbard 2003). The index is not satisfactory as a cardinal or ordinal measure but provides a useful tool in detecting comparative advantages of country in particular sectors.

This index corresponds with the Heckscher and Ohlin theory, and show competitive products on the foreign market, which gain the market thanks to the wealth necessary factors of production. According to Balassa comparative advantage would be revealed through an analysis of trade patterns that reflect both relative costs and differences in non price factors (Balassa 1965; Lee, 1995).

To judge the competitive performance of Poland and Slovak agro-food products in EU27 and third countries (extra EU27) market the article analysis refers to the approach of comparative advantage, evaluating such indices:

1. Modified revealed comparative advantage of Balassa (RCA),

2. Net export index (NEI).

In this paper it was decided to use to measure the competitiveness of the modified Balassa indicator showing existing comparative advantage of a specific product or sector on the given market. Balassa compares export shares of each product group to the world market in relation to the world's shares of this group, while the modified index applies to the export for a given market. Therefore, within the framework of the world market, extracted the individual markets, in order to take into account the geographical structure of the trade. It was decided also to compare the competitiveness of Polish and Slovak products from products originating only from the countries of the European Union due to the same conditions of access to individual markets. Markets are divided into two: the market of the European Union and third countries. The competitiveness of their exports in relation to the partners was examine of during the period from 1999 by 2012. Thanks to quite a large amount of years it can show changes in the competitiveness of the agri-food exports, and the analysis of the data of other product groups helped determine the situation and the importance of this sector in the national economies.

In order to calculate the indices mentioned above, we used the Eurostat trade database by the SITC system. Agri-food trade is defined as trade in food, drinks and tobacco (SITC 0\_1). Other product groups used for comparison is: SITC\_2\_4 - Raw materials, SITC\_3 - Mineral fuels, lubricants and related materials, SITC\_5 - Chemicals and related products, SITC\_6\_8 - Other manufactured foods, SITC\_7 - Machinery and transport equipment. Data were collected from 1999 to 2012. To the base of the comparisons was the same throughout the period the EU was treated as 27 countries.

#### **Revealed comparative advantage**

The index of revealed comparative advantage was first published by Balassa (1965) and was expressed as:

$$RCA = \frac{x_{ij}}{x_i} \div \frac{x_j}{x} \tag{1}$$

Where:

Xij - export value of the product group i and country j, Xj - the value of total exports of the country j, Xi - the value of world exports of the product group i,

X - is a global value of world exports

After conversion, this formula can be written as follows. It allows to extract a group of countries and to compare competing for a place on the market the products from a given country to products originating in another countries.

$$RCA = \frac{x_{ij} \sum_{i=1}^{m} x_{ij}}{\sum_{j=1}^{n} x_{ij} \sum_{i=1}^{m} \sum_{j=1}^{n} x_{ij}}$$
(2)

*Where:* x - means export to a given market, j - indicates a given country, i -denotes for a given product/group of products, m - stands for total number of products and n - is a number of countries.

By limited group of countries, and more specifically the target market (much smaller), it can compute the revealed comparative advantage or disadvantage index of exports to chosen market by comparing a focus country's export share from its total export in correlation with the reference countries' export share in their total export. If RCA>1, a focus country has a comparative advantage compared to reference countries on given market. In this case the country is specialised in exports for that group of products or given sector. Thus, that sector is competitive, compared to other countries'sector, and comparative advantage is revealed due to low relative costs and differences in non price factors. When RCA < 1 notes to a revealed comparative disadvantage.

To interpret the RCA index it should take into account that it is affected by the country's total exports that are connected to the country's economic dimension and its orientation to export. For this reason the same export market share for a sector leads to different RCA values. If the export market share for total trade is big then RCA present lower value. It indicates not only for the weakness of investigating products/sectors, but also that there are strong another sectors in national economies.

The Balassa-index is especially criticized because its asymmetric values of the index which reveals that it extends from one to infinity if a country enjoys comparative advantage from a product, but in case of comparative disadvantage, it varies between zero and one, which overestimates a sector's relative weight. However, the approach used in the work of the dichotomous and ordinal interpretation in order to indicate on the competitiveness of the agri-food sector and compare it with other countries' s sectors. It was not the aim to determine the size of the RCA and create a ranking of agri-food products. Of course, the greater the competitive advantage means the greater importance of this sector for the national economy, which does not always mean greater benefits from trade in terms of profitability. Very high indicators means high specialization, and often occur in countries with economic monoculture.

#### Net export index

NEI it's an indicator, that unlike RCA based only on exports, is also considering import a products or group of products. Import has also impact on the competitive position (Bojnec, Fereto, 2008). Two way trade often changes in short term the profitability of the production but in the long term the structure of the production, that particularly in the case of agriculture (livestock production) it's hard to play. This indicator corresponds with the theory of intra industry trade, where there is a phenomenon of overlap of the trade. This calculated index takes into account the exports of a country's product or sector minus the imports divided by exports plus imports. The index is formally expressed as:

$$NEI = \frac{X_{ij} - M_{ij}}{X_{ij} + M_{ij}}$$

Where: *Xij* denotes exports of sector *i* from country *j*, *Mij* denotes imports of sector *i* for country *j*.

The values range from -1 for imports only, to 1 for exports only; if the index is 0 (zero) the exports and imports have the same level. Thus, a negative value indicates that country has negative trade balance and imports are more important, while a positive value shows positive trade balance and the importance of exports.

Therefore, interpreting the basis of this indicator it can determine the trade balance and its importance in the foreign trade, as well as the volume of intra industry trade.

# **Results and discussion**

#### Polish and Slovakia trade flows of agro-food products

Polish and Slovakia trade flows were presented in the chart 1 and 2, the first concerns specific import and export on the market of the European Union (Intra EU27), and the second figure it is the trade flows with the rest of the countries not belonging to a group (extra EU27). In the case of the European market recorded an increase in the trade value of agricultural and food products during the considered period, both in Poland and Slovakia. Increase the value of export and import is particularly noticeable since 2004, so after the accession of the concerned countries to the EU. A similar situation took place in the markets of third countries, but only in the case of Polish. Slovak trade flows with Extra EU showed that export and import were nearly equal and there weren't significant changes from 1999 to 2012, it means stagnation.

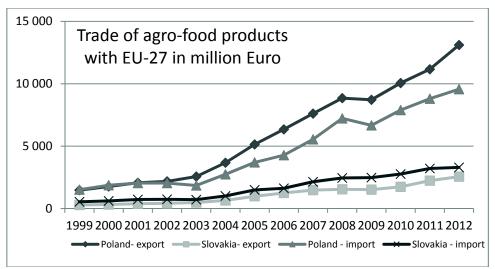


Figure 1. Trend of agro-food exports and imports to intra-EU in million Euro during 1999-2012 Source: own calculation based on data from Eurostat.

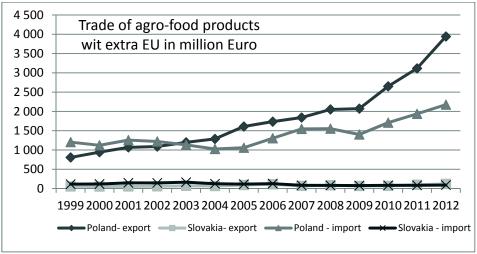


Figure 2. Trend of agro-food exports and imports to extra-EU in mil. Euro during 1999-2012 Source: own calculation based on data from Eurostat.

Polish balance of trade for agri-food products are constantly improved. A positive change from the negative trade balance to positive have been showed since 2001 in the trade with the countries of the EU and with third countries since 2003. It is worth to highlight the difference between exports and imports was significantly greater in the European market. A bit different the situation was in Slovakia, which with the EU has a negative trade balance and deteriorated after integration with the EU. A big decrease

have been since 2007, when Slovakia decided to join the eurozone and began to participate in the exchange rate mechanism ERM II, for two years before the introduction of the new money. The trade balance with third countries actually fluctuated within zero throughout the considered period, although slightly improved after 2003.

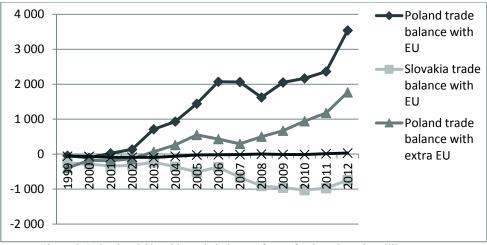


Figure 3. Poland and Slovakia trade balance of agro-food products in million euro Source: own calculation based on data from Eurostat.

The net export index was presented in table 1. The character at index indicates a positive or negative balance of trade, which was already being interpreted. However, there are important changes in the value of the index. In general, this indicator in Poland increased, which means reducing the shares of intra industry trade, in Slovakia this indicator grew, but in values less than unity which means improving the shares of intra industry trade.

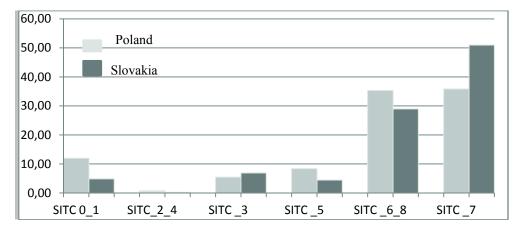
A positive value of the net export index (*NEI*) for agri-food products was found in Poland, where the *RCA* index has values greater than 0. The clear improvement in *NEI* was from 2003.

The *NEI* values increase also in Slovakia, but it was negative value in 1999 and was - 0,35 and changed to positive value in 2012 - 0,15.

Ekxport	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Poland -	-0,01	-0,03	0,01	0,03	0,16	0,15	0,16	0,19	0,16	0,10	0,13	0,12	0,12	0,16
UE27														
Poland -	-0,20	-0,09	-0,08	-0,06	0,03	0,11	0,21	0,14	0,09	0,14	0,19	0,22	0,23	0,29
Extra UE27														
Slovakia -	-0,31	-0,31	-0,30	-0,28	-0,19	-0,22	-0,21	-0,13	-0,18	-0,23	-0,24	-0,23	-0,18	-0,13
UE27														
Slovakia -	-0,35	-0,38	-0,45	-0,42	-0,40	-0,31	-0,11	-0,07	-0,08	-0,02	-0,07	-0,08	0,08	0,15
extra UE27														

Table1. Net export index for agri-food trade Turing 1999-2012

Source: own calculations based on EUROSTAT data base.



Product structure in Poland and Slovakia foreign trade and competitive position

Figure 4. Share of commodity groups in the Polish and Slovak export to the countries of the European Union in 2012 (in %) Source: own calculations based on EUROSTAT data base.

In the structure of export goods both in Poland and Slovakia to dominate other manufactured goods, and Machinery and transport equipment. The other groups of products account for about 20% of the exports from Slovakia and 30% of Polish exports. From among those less significant groups in Poland, stands out for its export of agrifood products, which accounted for in 2012 12% of total exports to the EU. Shares of agrifood exports from Slovakia in 2012 amounted to less than 5%. It is worth noting that half of Slovak exports were machinery and means of transport.

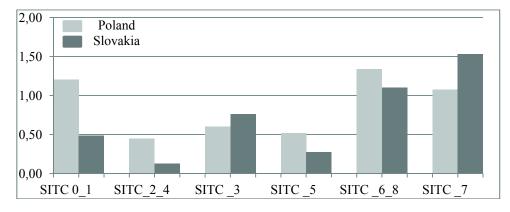


Figure5. The value of RCA for Polish and Slovak Republic in 2012 on the European market Source: own calculations based on EUROSTAT data base.

A level of *RCA* for agri-food products above 1 was found in three groups of products in Poland and two of them in Slovakia (figure 5). In Poland they were agro-

food products (1,20 in 2012), other manufactured goods (1,34) and Machinery and transport equipment (1,08). In Slovakia it was the same groups of product witout agrofood products. Accordingly RCA index amounted to 1,10 and 1,53. The high *RCA* values other manufactured goods, and Machinery and transport equipment can be explained by the big export market share for group trade. A *RCA* level below 1 is observed in the other three and four groups. For Poland they were: SITC\_2\_4 - Raw materials, SITC\_3 - Mineral fuels, lubricants and related materials, SITC\_5 - Chemicals and related products, for Slovak Republic they were: SITC 0\_1 - food, drinks and tobacco, SITC\_2\_4 - Raw materials, SITC\_5 - Chemicals and related products.

During the 1999-2012 period in the context of agro-food sector competitiveness growth of the *RCA* value is observed only in Poland, but only on the European market where *RCA* shifts from 0,78 to 1,20. The RCA index on the third countries market was fell down from 2,70 to 1,93, but it changed trends in 2008. In

Slovakia the trend of *RCA* showed a very small increasing for European market and a drop-off for extra EU market from 0,89 to 0,20 (figure 6). Indices were found to be stable for product groups with comparative disadvantage, but product groups with strong comparative advantage showed significant variation. Fertő (2008) reached similar conclusions, for instance, analysed agro-food trade in the Central European countries using the Balassa index. His results suggest a big changes in groups with comparative advantage as was in Poland on third countries market. Torok, Jambor, Hubbard (2012) found that almost all New Members States experienced a decrease in their comparative advantage after accession and convergence of revealed comparative advantage pattern. The changes of revealed comparative advantages should be observed with attention, especially if it was a decreases. It means that revealed comparative advantage was not persistent. New Member Countries by reducing the competitiveness of the agro-food products gave back market to other partners, which improve their competitive position and increasing their comparative advantage in this sector.

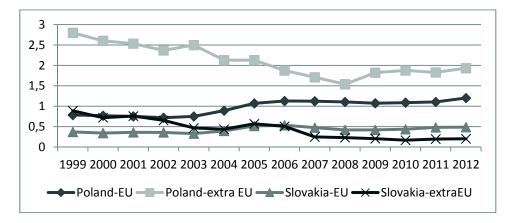


Figure 6. Values of the RCA for the agro-food trade of Poland and Slovakia from 1999 to 2012 on the EU market and Extra Eu27 Source: own calculations based on EUROSTAT data base.

# Conclusion

The results of the analisis of pattern of trade and two indices, used to assess competitive performance in Poland and Slovak for the agri-food trade in the EU and extra EU market during the last fourteen years. It can be combined to give warning for governments. They should take the activities to change the structure of sector and condition of production, because decreasing comparative advantage reduce the role of sectors in the national economy. It means that in Poland this sector play important role, while in Slovakia not so big.

The value of trade in these countries is increasing, while in Poland is growing in both export and import on both markets, but in Slovakia, the growing trend is observed for import and export on the EU market. Trade with third countries is characterized by stagnation since 1999.

Poland has a competitive advantage in the export to the EU and to the third countries of agri-food articles, but in Slovakia, there is no such advantage.

Increasing competitive position on the market of the European Union in both countries concerned, what is a very positive aspect and decrease was observed on the market in the third countries.

The positive balance of foreign trade of agro-food products, rice participation of agro-food products in total exports and improve the competitiveness indicators to confirm positive structural changes, which have made in Polish agriculture and the food industry. Poland compared with other countries of Visegrad is best in the analysis of competitiveness in foreign trade. Trends in Slovakia is similar as in Poland. A slight positive improvement of the RCA ratio was observed on the EU market, although this indicator is still at a low level, which indicates the comparative disadvantages.

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# Streszczenie

Celem niniejszej pracy było określenie pozycji konkurencyjnej Polski i Słowacji w wymianie handlowej produktów rolniczych i spożywczych na europejskim rynku, jak również dla celów porównawczych, na rynkach państw trzecich oraz w stosunku do innych grup towarowych.

Teorie handlowe wskazują, że kraje specjalizują się w produkcji towarów, a następnie w handlu tymi towarami, gdy posiadają przewagę absolutną lub komparatywną w relacji do swojego partnera (Smith 1954, Ricardo 1957, Balassa 1965, Haberler 1956, Guzek 2006).

W literaturze zatem rozpowszechniło się wiele modeli przewag komparatywnych. Te najbardziej rozpowszechnione oparte są na rozbudowanym modelu typu ricardiańskiego lub modelu Balassy. Pierwszy z nich dotyczy określenia konkurencyjności na podstawie opłacalności eksportu, drugi na podstawie stopnia zaawansowania eksportu poszczególnych towarów w relacji do ogólnoświatowego eksportu tych towarów.

W pracy posłużono się zmodyfikowanym modelem typu Balassy, celem określenia konkurencyjności towarów rolno-spożywczych pochodzących z Polski i Słowacji na rynku Unii

Europejskiej i na rynku krajów trzecich. W badaniach wykorzystano dane statystyczne Eurostatu. Rynki podzielono na dwa: rynek Unii Europejskiej i krajów trzecich. Konkurencyjność w eksporcie przedstawiano w relacji do partnerów z ugrupowania w okresie od 1999r. do 2012 roku. Dzięki dość dużej ilości lat można było pokazać zmiany w konkurencyjności eksportu rolnospożywczego, zaś analiza danych innych grup towarowych pozwoliła określić sytuację i znaczenie tego sektora w poszczególnych gospodarkach.

Polska cechuje się dużą konkurencyjnością towarów rolno-spożywczych zarówno na rynku Unii Europejskiej jak i rynku krajów trzecich. Słowackie artykuły rolno-spożywcze nie posiadają przewagi komparatywnej na żadnym z omawianych rynków, co zostało także potwierdzone przez ujemny bilans handlowy tymi towarami. W przypadku pozostałych grup towarowych oba kraje Grupy Wyszehradzkiej są relatywnie homogeniczne. Podobieństwo w wyposażeniu w czynniki produkcji jak i nowe technologie daje podstawy do wnioskowania, iż przewagi te mogą kształtować się na podobnym poziomie. Oba kraje posiadają przewagę konkurencyjną na rynku Unii Europejskiej w relacji do pozostałych partnerów z tego ugrupowania w przypadku maszyn i urządzeń, artykułów przemysłowych i paliw mineralnych. Brak przewagi widoczny jest dla surowców i chemii.

Zmiany w handlu nie ograniczyły się tylko do wzrostu wartości i wolumenu towarów, ale przede wszystkim do zmian strukturalnych w poszczególnych sektorach gospodarki narodowej, co przełożyło się na zmiany przewag konkurencyjnych. W przypadku towarów rolnospożywczych widoczny jest wzrost konkurencyjności w obu omawianych krajach. Reasumując można stwierdzić:

- Wartość obrotów handlowych w omawianych krajach wzrasta, przy czym w Polsce rośnie zarówno eksport jak i import na obu rynkach, na Słowacji tendencja wzrostowa obserwowana jest dl eksportu i importu na rynku UE. Handel z krajami trzecimi charakteryzuje się stagnacją od 1999 roku,
- Polska posiada przewagę konkurencyjną w eksporcie do UE oraz krajów trzecich artykułów rolno-spożywczych, na Słowacji brak jest takiej przewagi,
- Pozycja konkurencyjna maleje na rynku Unii Europejskiej w obu omawianych krajach, wzrasta natomiast na rynku krajów trzecich- poprawa widoczna jest od 2004 roku.

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