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ASSESSMENT OF THE COMPARATIVE ADVANTAGE
IN POLISH FOREIGN TRADE IN FOOD AND NON-FOOD PRODUCTS
ON THE WORLD AND EUROPEAN UNION MARKET

Key words: comparative advantages, foreign trade, food, Poland, European Union

ABSTRACT. The progressive processes of globalisation, integration and liberalisation of economies are the reason for which the competitiveness of economic entities is increasingly analysed in the context of their links with the international market. One of the ways to assess competitiveness is to analyse the comparative (relative) advantage in trade in products of a given economic sector. The objective of the article is to assess the comparative advantage in Polish foreign trade in food and non-food products, both in total Polish trade and with European Union Member States. The studies used the RTA relative trade advantage index. The data source was the WITS-Comtrade commercial database. The studies show that, in the years 2004-2017, there was a rapid development of Polish foreign trade in food products, in particular with the EU, resulting in a high trade surplus. Trade in non-food products grew more slowly, and the trade balance was negative. It is shown that Poland had a comparative advantage and was competitive on the world market (also on the EU market) in trade in these products, but did not have such an advantage in total trade in non-food products. The results obtained indicate international competitiveness of the Polish food sector and its large importance for national trade and payment balance.

INTRODUCTION

The development of processes of globalisation, integration and liberalisation of economies resulting in the popularisation of the paradigm of open economic development and internationalisation of economic activity caused a change in the nature and increased the intensity and range of competition on an international scale. This international scope concerned, on the one hand, competition on international markets and, on the other hand, – a need to face competitive pressure of foreign entities present on regional and domestic markets. This international dimension of competition makes entities operating on the market and competing for benefits of international trade face new challenges, under which the conditions activities are being undertaken are becoming more and more difficult. This applies to both food producers and other economic entities in Poland.

The evolution of the comparative (relative) advantage in international trade was dealt with by classical authors in economics (inter alia, Ricardo, Torrens, Mill, Marshall), but empirical studies on this issue did not start before the 60s of the previous century. This

was when Béla Balassa suggested a way of assessing comparative advantage in export [Balassa 1965]. The Balassa-type comparative advantage results from the application of the export volume criterion in relation to areas and, at the same time, foreign countries [Guzek 2004]. What is comparative in this aspect are not the costs or benefits but the advantage of the given country over foreign countries (or of foreign countries over the country) [Guzek 2004]. According to B. Balassa, a high advantage can be revealed not only with high profitability of production and export of a given product group of an analysed country, but also with low profitability (or lack thereof). An analysis of comparative advantage according to B. Balassa can be treated as an approximation of a given country's ability to compete in international trade and, at the same time, a basis for assessing the current competitive position of this country and its changes in the past. For this reason, the comparative advantage in this approach is rather a competitive advantage [Misala 2011]. The constantly developed theory by B. Balassa and methods of studying comparative advantage he suggested are used even today in studies of international competitiveness in the field of foreign trade and widely understood international trade. For many reasons, this fact is not surprising at all. Most important, however, is the fact that the always specified system of cost and price comparative advantage of a given country over foreign countries or a lack of such an advantage highly determines the development of foreign trade of each country, and thus, the development of international trade in general [Misala 2010].

An analysis of comparative advantage in foreign trade in products of a given economic sector is one of the ways of assessing the competitiveness of economic entities. The purpose of the studies, the results of which have been presented in this article, is to assess the comparative advantage in Polish foreign trade in food and non-food products, both in total Polish trade and with European Union Member States.

MATERIAL AND METHODS OF STUDIES

For the purposes of studying comparative advantage, B. Balassa suggested the revealed comparative advantage index (RCA), which has been defined by the following formula:

$$RCA_{ik} = \frac{X_{ik}}{\sum_{i=1}^N X_{ik}} : \frac{X_{iw}}{\sum_{i=1}^N X_{iw}}$$

where: RCA_{ik} – revealed comparative advantage index in the export of a product group i by country k to a specific market, X_{ik} – export of a product group i by country k to a specific market, X_{iw} – export of a product group i by a group of countries w to a specific market, N – number of product groups.

When this index takes values greater than 1, the analysed country has attained a comparative advantage in export to a specific market. When the index takes values lower than 1, the analysed country does not have a comparative advantage in export to a specific market. On the basis of this index, it is determined whether the share of a given product in export of an analysed country is higher (lower) than the share of this product in global export to

a specific market [Balassa 1965]. The formula of the index proposed by B. Balassa was modified many times in subsequent years (inter alia, Thomas L. Vollrath [1991], Keld Laursen [1998], Laure Latruffe [2010], Jo H.M. Wijnands and David Verhoog [2016]).

The achievements of subsequent researchers resulted in the fact that the relative trade advantage index was selected (RTA) in logarithmic form to assess the comparative advantage in Polish foreign trade. RTA is the difference between the revealed export advantage index (RXA) and revealed import advantage index (RMA). The calculations were based on the following formulas [Szczepaniak 2017]:

$$RTA_{iPL} = \ln RXA_{iPL} - \ln RMA_{iPL}$$

$$RXA_{iPL} = \frac{\frac{X_{iPL}}{X_{iw}}}{\frac{X_{PL}}{X_w}} \quad RMA_{iPL} = \frac{\frac{M_{iPL}}{M_{iw}}}{\frac{M_{PL}}{M_w}}$$

where: RTA_{iPL} – relative trade advantage index in Polish trade in a product group i on a given market, RXA_{iPL} – relative export advantage index of Polish export of a product group i to a given market, RMA_{iPL} – relative import advantage index of Polish import of a product group i from a given market, X_{iPL} – Polish export of a product group i to a given market, X_{iw} – global export of a product group i to a given market, X_{PL} – Polish export of all product groups to a given market, X_w – global export of all product groups to a given market, M_{iPL} – Polish import of a product group i from a given market, M_{iw} – global import of a product group i from a given market, M_{PL} – Polish import of all product groups from a given market, M_w – global import of all product groups from a given market.

The positive value of the RTA index (greater than 0) signifies the presence of revealed comparative advantage in Polish trade in a given product group on a given market and indicates the intensity of this advantage, while its negative value (lower than 0) indicates that this advantage does not occur and, therefore, an unfavorable competitive situation is taking place. This index enables a more objective analysis compared to the RCA revealed comparative advantage index as it not only encompasses the export situation but also the import situation of a given country.

An assessment of comparative advantage in Polish foreign trade in food and non-food products, on the EU market and world market, carried out on the basis of the RTA index, was preceded by a short overview of results of Polish foreign trade in similar aspects. The study covered the years 2004-2017.

The data source was the WITS-Comtrade commercial database, in which trade flows are expressed in USD. The basis for identifying food products was a division according to the HS classification (Harmonized Commodity Description and Coding System). The term "food products" is understood as products belonging to the following HS sections:

- I – livestock and products of animal origin,
- II – vegetable products,

III – fats and oils,

IV – food preserves¹.

The remaining HS sections include non-food products.

RESULTS OF THE STUDIES

During the period of Polish membership in the European Union, dynamic growth of foreign trade in food products has been observed. In 2017, the total value of Polish trade in food products amounted to nearly USD 49.6 billion, in which export reached USD 29.6 billion, and import USD 20.0 billion. When compared to 2004, this constitutes a four-fold increase of trade, whereby export increased 4.5 times and import – more than 3.5 times. What is more, since Poland's accession to the EU, the positive balance of trade in food products typically increased. In 2017, its value exceeded USD 9.6 billion – more than nine times higher than in the year of accession (table 1).

Table 1. Results of Polish foreign trade in food and non-food products on the world and EU market in 2004-2017, mln USD

| Specification | Export | | | Import | | | Balance | |
|--------------------------------------|--------------------|-----------|-----------------------|----------|-----------|-----------------------|-----------|----------|
| | 2004 | 2017 | 2017 2004 = 100 | 2004 | 2017 | 2017 2004 = 100 | 2004 | 2017 |
| | Total Polish trade | | | | | | | |
| Food products | 6,483.6 | 29,583.1 | 456.3 | 5,453.1 | 19,965.8 | 366.1 | 1,030.5 | 9,617.3 |
| Non-food products | 67,295.3 | 191,724.5 | 284.9 | 82,701.3 | 198,012.8 | 239.4 | -15,406.0 | -6,288.3 |
| Total | 73,778.9 | 221,307.6 | 300.0 | 88,154.4 | 217,978.6 | 247.3 | -14,375.5 | 3,329.0 |
| Polish trade with the European Union | | | | | | | | |
| Food products | 4,829.5 | 23,916.9 | 495.2 | 3,493.3 | 13,796.0 | 394.9 | 1,336.2 | 10,120.9 |
| Non-food products | 54,673.3 | 151,023.9 | 276.2 | 57,213.9 | 114,525.5 | 200.2 | -2,540.6 | 36,498.4 |
| Total | 59,502.8 | 174,940.8 | 294.0 | 60,707.2 | 128,321.5 | 211.4 | -1,204.4 | 46,619.3 |

Source: own calculations based on the WITS-Comtrade data

¹ Section I includes the following product departments: 01. Live animals, 02. Meat and edible meat offal, 03. Fish and seafood, 04. Dairy products and eggs, 05. Other products of animal origin. Section II includes the following product departments: 06. Live plants and cut flowers, 07. Vegetables, 08. Fruit and nuts, 09. Coffee, tea, spices, 10. Cereals, 11. Milling products, malt, starches, 12. Oilseeds and oleaginous fruit, 13. Plant extracts, 14. Other vegetable products. Section III includes the following product department 15. Animal or vegetable fats and oils. Section IV includes the following product departments: 16. Meat and fish products, 17. Sugars and confectionery, 18. Cocoa and cocoa products, 19. Cereal products and pastry, 20. Fruit and vegetable products, 21. Miscellaneous food products, 22. Alcoholic and non-alcoholic beverages, 23. Waste and animal feed, 24. Tobacco and tobacco products.

Table 2. Relative trade advantage indices RTA in Polish foreign trade in food and non-food products on the world and EU market in 2004-2017

| Specific- cation | Total Polish trade | | | | | | | | | | | | | |
|--------------------------------------|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
| Polish trade with the European Union | | | | | | | | | | | | | | |
| Food products | 0.36 | 0.39 | 0.42 | 0.40 | 0.34 | 0.31 | 0.32 | 0.30 | 0.32 | 0.35 | 0.37 | 0.37 | 0.30 | 0.32 |
| Non-food products | -0.03 | -0.04 | -0.04 | -0.04 | -0.03 | -0.03 | -0.03 | -0.03 | -0.04 | -0.04 | -0.05 | -0.05 | -0.04 | -0.04 |

Source: own calculations based on the WITS-Comtrade data

Food trade plays an important role in total Polish foreign trade. The export share of these products in total Polish export, in the years 2004-2017, increased from about 9 to 13%. The import share of food products in total Polish import was lower but, in the analysed period, it increased from about 6 to 10%. The food sector is also one of few branches of national economy which achieves a positive balance in trade. The surplus in food trade has a positive effect on the total balance of Polish foreign trade (negative by 2014), but its relatively low level, when compared to the deficit of trade in other products, was the reason why, for the majority of the analysed period, it had no decisive influence on the direction of change in this balance. Only in the years 2015-2017, did the surplus in trade in food products cover the deficit in trade in other products (table 1).

Polish trade in both food and non-food products has been asymmetric for years, which means that export and import are dominated by European Union Member States. In the geographical structure of Polish food export, the EU share constitutes ~80% (in 2017 it amounted to 80.8% and was higher by 6.3% when compared to 2004), and of import ~70% (in 2017, it was 69.1%, i.e. was higher by 5% than in 2004). In the analysed period, there was regular improvement in the balance of trade in food products with EU countries, reaching a level of up to more than USD 10 billion, in 2017 (tab. 1). The positive balance of foreign trade with EU countries covers the deficit in trade with non-EU countries and results in the fact that the Polish food industry manages to constantly strike a positive trade balance. In trade, in food products on the EU market, Poland also achieves a surplus (since 2005).

Trade in food products is, therefore, an important part of Polish foreign trade. The export share of food in total export is higher than that of import of food in total import and the average annual growth rate of Polish food export is clearly higher than that of the entire Polish export to the world market. The food sector, being the economy branch that generates a high positive balance in trade, is of great importance for national trade and payment balance.

In 2017, the RTA index in total Polish trade in food products amounted to 0.32, which means that Poland generally had a relative comparative advantage in trade in these products and, therefore, was competitive on this market. The level of this advantage, in the years 2004-2017, ranged from 0.30 to 0.40, always remaining relatively high. Poland was generally not competitive in trade in non-food products, as evidenced by RTA indices which were negative throughout the analysed period (table 2). However, other studies indicate a diversified situation in this regard when it comes to individual groups of non-food products [Szczepaniak 2018]. In the analysed period, the part of total trade in food per food products in trade, in which Poland has a comparative advantage, was significantly higher than in the case of trade in non-food products (in 2014, it was: 97 and 38% respectively, and in 2017 – 78 and 54% respectively) (figure 1).

Admittedly, the RTA index in trade in food products between Poland and EU countries in 2017 was lower than in total trade and amounted to 0.24, but Poland had a relative comparative advantage in trade in those products and was competitive on the EU market constantly. The level of this advantage in the analysed period was, however, highly variable (within 0.17-0.45). It was at its lowest during and immediately after the global financial crisis. In this period, the food industry only slowed its development, but trade results

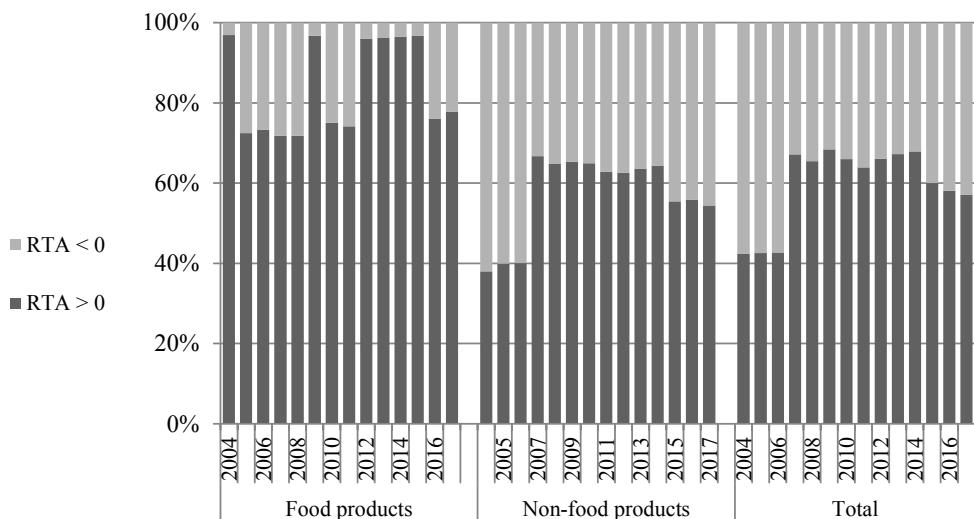


Figure 1. The structure of total Polish trade according to the RTA index*

* analysis by HS sections

Source: own calculations based on the WITS-Comtrade data

deteriorated significantly. Even in this period, however, Polish food producers remained competitive on the market. With regard to total trade in non-food products, Poland failed to have a competitive advantage (negative RTA indices) (table 2), while a diverse situation was maintained when it comes to individual sections of these products. As in the case of total Polish trade, the part of total trade in food with the EU per food products in trade, in which Poland has a comparative advantage on the EU market, was significantly higher than in the case of trade in non-food products (in 2014, it was: 69 and 46%, and in 2017 – 80 and 52% respectively) (figure 2).

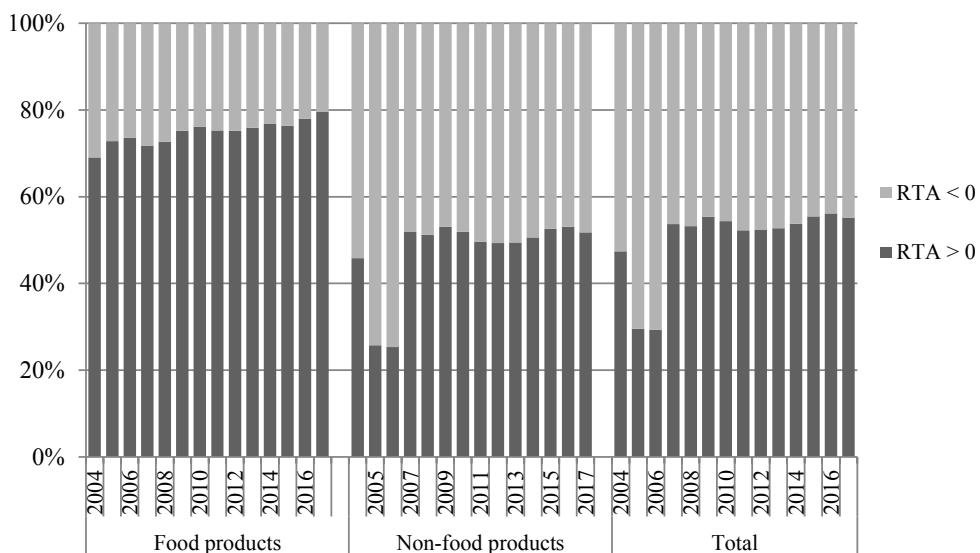


Figure 2. The structure of Polish trade with the EU according to the RTA index*

* analysis by HS sections

Source: own calculations based on the WITS-Comtrade data

CONCLUSIONS

An analysis of comparative advantage according to B. Balassa (rather competitive advantage), often made based on the RCA revealed comparative advantage index, was carried out in this study based on its modified formula, i.e. RTA relative trade advantage index. This index is more universal, as it takes into account both the export and import situation of a given country. The results of this account can be treated as an approximate assessment of the given sector's ability to compete in international trade and, at the same time, as it is an export competitiveness index, can be used to refer to past measurements – as a basis for assessing the international competitive position of this sector.

The analysis showed that, during the period of European Union membership, Poland had a relative comparative advantage in trade in food products on the world market, and

did not have such an advantage in total trade in non-food products. In food trade with the European Union itself, Poland also had a comparative advantage, but the level of RTA indices was, in this case, a bit lower. Per products with a comparative advantage in 2017, 78 and 54% constituted the value of total Polish trade in food and non-food products and 80 and 52% of trade in these products with the EU, respectively. The dynamic development of trade in food products after Poland's accession to the EU, as well as the significant comparative advantage in trade in these products – when compared to trade in other products – attest to the competitiveness and high importance of the Polish food sector to the national economy.

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OCENA PRZEWAG KOMPARATYWNYCH W HANDLU ZAGRANICZNYM
POLSKIMI PRODUKTAMI ŻYWNOŚCIOWYMI I NIEŻYWNOŚCIOWYMI
NA RYNKU UNIJNYM I ŚWIATOWYM

Słowa kluczowe: przewagi komparatywne, handel zagraniczny, żywność, Polska, Unia Europejska

ABSTRAKT

Postępujące procesy globalizacji, integracji i liberalizacji gospodarek sprawiają, że konkurencyjność podmiotów gospodarczych coraz częściej analizowana jest w kontekście ich powiązań z rynkiem międzynarodowym. Jednym ze sposobów oceny konkurencyjności podmiotów jest analiza przewag komparatywnych (względnych) w handlu produktami danego sektora gospodarki. Celem artykułu jest ocena przewag komparatywnych w polskim handlu zagranicznym produktami żywnościowymi i nieżywnościowymi, zarówno w wymianie handlowej Polski ogółem, jak i z samymi państwami członkowskimi Unii Europejskiej. W badaniach wykorzystano wskaźnik relatywnej przewagi handlowej RTA. Źródłem danych była baza danych handlowych WITS-Comtrade. Z badań wynika, że w latach 2004-2017 nastąpił dynamiczny rozwój polskiego handlu zagranicznego produktami żywnościowymi, w tym zwłaszcza wymiany z UE, skutkujący wysoką nadwyżką handlową. Wymiana handlowa produktami nieżywnościowymi rozwijała się wolniej, a saldo obrotów było ujemne. Jak wykazano, Polska posiadała przewagi komparatywne i była konkurencyjna na rynku międzynarodowym (również na rynku UE) w handlu tymi produktami, ale nie miała takich przewag w łącznym handlu produktami nieżywnościowymi. Otrzymane wyniki wskazują na międzynarodową konkurencyjność polskiego sektora żywnościowego i duże jego znaczenie dla krajowego bilansu handlowego i płatniczego.

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