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INDUSTRY IN POLAND

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Abstract. The article presents the agri-food products trade balance and its impact on the situation of food industry in Poland. The authors used descriptive methods and the statistic analysis to check whether changes in the trade balance have an impact on development of food industry in Poland. The authors wanted to check if changes in the trade balance of agri-food products have an impact on development of food industry in Poland. Particular attention was paid to the number of food processing companies and the number of people employed. We found that the balance of agri-food products had a positive impact on number of enterprises. The authors found that Poland is self-sufficient in food and the agri-food balance has improved.

Key words: trade balance, food industry.
JEL code: Q11, Q14

Introduction

Globalisation is a growing tendency within the world economy. This process is one of the most important in building the current economy. International corporations, factories and global trade are good examples describing these processes (Marks-Bielska et al., 2015).

As Juchniewicz and Lukiewska (2011) point out "the food industry is the most important and developing sector of the EU. It constitutes 13 % of all production companies in the EU - 286,000 companies". The industrial production of this sector reached 1,048 billion EUR and is employing 4.2 million people, which was 15.5 % of the employees in the production sector (Data&Trends...2014).

The food industry is an important sector because it is responsible for 18 % of industrial production in Poland. Another factor describing the food sector is that Poland is 8th amongst food exporters in Europe and Polish trade is recognizable throughout the world (Sektor spozywczy w Polsce, 2013). The food sector includes diverse activity, including meat and milk processing, and processing of animal and plant products, which can be both low and highly processed.

The food industry not only involves agriculture, but also enterprises and other economic sectors taking part in the production and distribution of food. These branches deliver food industry production means, services, knowledge and information to food consumers (Urban 2012; Brelik, 2014). The agricultural and food industry are parts of the food sector.

The development of the food industry is closely linked with changes in agriculture. According to Czyzewski and Majchrzak (2016), agricultural income falls when agriculture production rises. This effect is described in the literature as King's Law and reflects the low price elasticity of demand for agricultural products. However, agriculture plays an important role in the EU economy, although its share in Gross Domestic Product (GDP) is decreasing (Nowak et al., 2015).

The food industry is an important sector of the national economy. Its development will be dependent on the inclination to introduce innovation, which depends on investment outlays. The analysis carried out by Grzybowska (2013) proved that the investment outlays are diversified regionally in Poland. The highest percentage in investment outlays in the years 2005-11 were in the following provinces: Mazowieckie (40,3 %), Wielkopolskie (9,5 %), Malopolskie (7,6 %), Slaskie (6,9 %), Kujawsko-pomorskie (6,0 %), Lubelskie (5,7 %), Podlskie (5,3 %), Lodzkie (3,3 %), Pomorskie (3,2 %), Opolskie (2,6 %), Zachodniopomorskie (2,3 %), Warminsko-mazurskie (2,0 %), Dolnoslaskie (1,9 %), Podkarpackie (1,7 %) and Swietokrzyskie (0,8 %). The results of the

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investment in the food industry were important because they enabled the increase in the number of enterprises taking part in agri-food product trade and further improved the technical and technological state of enterprises (Urban, 2009).

The food sector takes part in the world's Global Value Chain. The agri-food value chain includes a "wide variety of activities from input suppliers, such as seeds, machinery and chemicals, to farming, processing, distribution and other food related services (also financial inputs" (Giovanetti and Marvasi, 2016). The authors analysed food exporters in the global value chain in Italy. They found, for example, that "Italian food firms producing high—quality products are more likely to export and to more distant and richer destinations". The phenomenon has an impact on food quality and "reorganization in the production in the food sector has led to the emergence of public and private quality and safety standards within the value chain".

Many factors have an impact on agri-food trade. Generally, we can divide these factors into two groups: external factors (exogenous), mainly international policy and trade liberalization, and internal (endogenous), mainly linked with the efficiency usage of production factors (Marks-Bielska et al., 2015). One of the most important factors influencing the competitiveness of trade in Poland is the exchange rate. When the national currency is low exports are profitable. Other factors are the accession into the European Union, which helped get access to new markets, modernization of the agribusiness sector, and low production costs (Hamulczuk et al., 2014). The changes of the functioning economy and the agribusiness sector were caused mainly by Poland's adoption of European regulations, liberalization of trade, and the improved competitiveness of the Polish agricultural sector (Kacperska, 2014a).

The survey conducted by Firlej (2011) found that enterprises adopt the possibility to cooperate and compete with other developed countries. Among other factors influencing the development of competitiveness of the food industry sector are the environment, technical infrastructure, and characteristics linked to human capital.

The competitiveness of the Polish agri-food sectors was different after the accession to the EU. The biggest export orientation was in the following branches: fish production and processing, potato processing, drinks production, and the production of food for animals. The export orientation was the weakest in ice cream production, grain product processing, potato, and the wine and beer sectors (Kowalski, 2009).

Research results and discussion

The objective of the research was to recognize the impact of trade balance of agri-food products on the nutritious industry in Poland.

To develop the problem of nutritious industry development, the authors attempt to answer the following questions:

- What is the profitability of nutritious industry in Poland?
- What is the current liquidity of nutritious industry in Poland?
- Is the nutritious industry developing in Poland?

The authors used data after 2004 and integration to the EU. The authors used regression analysis to describe the impact of the agri-food balance on the development of the food industry.

In order to determine the impact of trade balance on the development of food industry, a multiple regression approach was used, which is described by the following formula (Sobczyk, 2005):

$$\gamma_i = \beta_o + \sum_{j=1}^{K} \beta_j X_{ij} + \varepsilon_i \quad (1)$$

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where:

γ_i is the observation on the dependent varioble (i=1,2....n)

χ_{ij} is the observation on dependent variable belonging to the set of explanatory variables. β_0, β_j are structural parameters of the regression equation.

The explanatory variable was: X_1 (trade balance of agri-food products). The authors put in the table the estimated values of the regression, standard errors, the t test to evaluate the regression equation and the level of significance (p=0,05 most important).

The authors used also descriptive, tabular and graphic methods to present the research results.

We used the method of stepwise regression. It is based on adding variables sequential to the model as they have the next most important impact on gross output. Variables were sequentially explained: Y_1 (number of enterprises of meat industry), Y_2 (employment in meat industry in 1000 people), Y_3 (number of dairy enterprises, Y_4 (employment in dairy industry), Y_5 (current liquidity of meat industry), Y_6 (current liquidity of fruit and vegetables industry).

The choice of variables was due to substantive logic and the accessibility of data.

A positive trade balance of agri-food products in Poland has been observed since 2003 and is still rising. The difference between exports and imports is increasing with a positive impact on trade balance.

Only in 2009, there was a decrease of exports as an effect of the financial crisis. It was due to efforts by countries to save money and reduce expenditures. Since 2010, the trade of agri-food products has increased (Kacperska, 2014b). Most of the exports of agri-food products are dedicated to other EU countries, Russian third countries, China, South America, Africa and Asia countries.

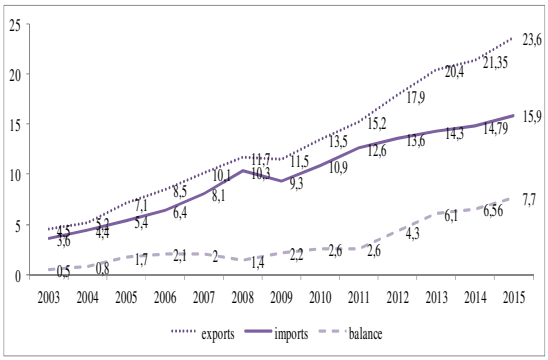
Russia was a very important trade partner. The value of exports to Russia in 2011 exceeded 1 mld USD and in 2013 increased by more than 30 % (Baltyk, 2014). However, the political crisis with Russia led to a decrease exports by Poland and other EU countries due to the imposed embargo. Another problem hurting exports was the instability in the Middle East and North Africa and these problems lead to lower prices, which hurt farmers (Borawski et al., 2016).

As a result of accession, Poland had to adopt EU regulations, but gained new markets. The accession led to elimination of tariffs, which created trade improvements. Polish agricultural products are rather cheaper than West European products and can be sold at lower prices. Poland as a country adjusted to the EU rules such as its trade policy that gave external benefits (Nacewska-Twardowska, 2014).

Germany was Poland's most important agri-food products' trade partner with 50 mln EUR in exports and 3.4 mld EUR in imports in 2014.

The second position in exports was Great Britain with 1.7 mld EUR, the third was France with 1.5 mld EUR, followed by the Czech Republic with 1.4 mld EUR.

Other export customers in 2014 were Denmark (699 mln EUR), Norway (698 mln EUR), and Italy (640 mln EUR) (Polish trade…,2015).



Source: author's calculations based on Ministry of Agriculture and Rural Development data

Fig. 1. **Export, import and trade balance of agri-food prooducts (mld EUR)**

More than 80 % of exports and imports of Polish agri-food products involve EU markets. That is why the EU markets are most important. However, Russia is an important partner, although this has changed because of the embargo. Russia is not self-sufficient in food

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production and imports accounted for 23 % of the total consumption in 2013 (Smutka, et al. 2016).The tendency highlights the consolidation of the nutritious industry and increasing scale efficiency. The employment in the milk industry decreased, which demonstrates the general replacement of labour by capital throughout the economy (Borawski, Dunn, 2014).

Table 1

Characteristics of nutritious industry in Poland

Years	Number of firms of meat industry	Employment in meat industry (in thou people)	Number of dairy enterprises
2010	697	79.8	205
2011	710	76.1	196
2012	717	79.9	195
2013	680	84.7	188
2014	693	87.0	181
2015	656	85.9	177

Source: author's calculations based on meat market in Poland and milk market in Poland

The agri-food industry is linked with agribusiness, which as a sector created demand for agricultural products, and has an impact on delivering enterprises, creates the investment in the processing industry and is responsible for trade balance. The enterprises of the rural market are engaged in production and processing, storage, and adding value to final products required by consumers (Firlej, 2010).

The nutritious industry is changing in Poland. The number of firms of the meat industry (-5.9) and the number of dairy enterprises (-13.7 %) decreased on one side, whereas the employment in the meat industry increased in the years 2010-2015 (7.6 %).

Profitability is the relationship between income and assets. As Niezgoda (2005) points out, the most important factors differentiating profitability of farms are the skills and competitiveness of the farmers. The decrease of profitability discourages farmers from making new investments and borrowing (Felczak, 2011). The percent profitability of net revenue (gross profit) is changing. Profitability as a % on net revenue increased only in 2010-2015 in the oil industry (118.3 %) and the fruit and vegetable industry (24.8 %), whereas the profitability in Poland in 2010-2015 decreased in the nutritious industry (-9.5 %), the meat industry (-9.6 %), the milk processing industry (-61.9 %).

Table 2

Profitability of nutritious industry in Poland

Years	Profitability in % of net revenue (gross profit)				
	Food industry	Oil industry	Meat industry	Milk processing industry	Fruit and vegetable industry
2010	5.57	1.09	3.76	2.68	4.24
2011	4.16	-0.23	2.29	2.18	3.05
2012	4.46	-0.23	2.45	1.68	4.72
2013	4.54	3.33	2.36	2.58	2.71
2014	4.56	5.66	3.35	1.33	5.89
2015	5.04	2.38	3.40	1.66	5.29

Source: author's calculations based on meat market in Poland and milk market in Poland

Liquidity is a crucial factor influencing the economic situation of enterprises. It is defined in different ways, including the ease of changing assets into money, the possibility to regulate the liabilities, and the positive state of financial resources (Wasilewski, Galecka 2010).

The relations between current and fixed assets are important. The equipment in fixed assets determines the need for current assets from one side and the intensive engagement of current assets can have a negative impact on efficiency and reduce the efficiency and financial competitiveness. The big equipment in fixed assets can reduce the investment (Golas et al., 2013).

Current liquidity is calculated as the ratio of current assets to short-term liabilities. It increased in 2010-2015 in the nutritious industry (5.3 %), oil industry (74.6 %), meat industry (9.2 %), and fruit and vegetable industry (22.5 %). It only decreased in the milk processing industry (-6.6 %). The decrease of liquidity and increase of debt is a factor pointing

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out the necessity to control the situation. The improvement of liquidity requires the control of losses on sales.

Table 3

Current liquidity of nutritious industry in Poland

Years	Current liquidity of				
	Food industry	Oil industry	Meat industry	Milk processing industry	Fruit and vegetable industry
2010	1.33	1.38	1.20	1.51	1.29
2011	1.37	1.07	1.24	1.48	1.44
2012	1.36	0.74	1.22	1.55	1.60
2013	1.25	0.95	1.30	1.57	1.49
2014	1.42	1.15	1.34	1.63	1.60
2015	1.40	2.41	1.31	1.41	1.58

Source: author's calculations based on meat market in Poland and milk market in Poland

Table 4

The results of regression

Specification	Coefficient	Std error	T-students	P value
Number of enterprises of meat industry	-8.57	3.92	-2.19	0.09
Employment in meat industry (in thou people)	2.57	0.29	8.82	0.00
Number of dairy enterprises	-5.29	0.46	-11.46	0.00
Employment in dairy enterprises	-0.59	0.13	-4.25	0.01
Current liquidity of meat industry	0.025	0.00	10.41	0.00
Current liquidity of fruit and vegetables industry	0.025	0.00	7.90	0.00

Source: author's calculations based on meat market in Poland and milk market in Poland

The trade balance of agri-food products had an impact on employment in the meat industry, the current liquidity of the meat industry and the current liquidity of the fruit and vegetable industry.

The trade balance had a negative impact on number of enterprises of the meat industry, the number of dairy enterprises and employment in dairy enterprises.

Conclusions, proposals, recommendations

International trade is an important factor creating opportunities not only in the nutritious industry, but also agriculture as a part of the national economy.

1) The current liquidity of the food industry is at a stable level, although its biggest changes have been observed in oil industry.
2) Since 2010 the profitability of the milk industry has decreased the most (-61,9 %) and the meat industry (-9,6 %). Profitability as a % on net revenue increased only in 2010-2015 in the oil industry (118.3 %) and the fruit and vegetable industry (24.8 %),
3) Statistical analysis showed essential negative relations. The trade balance of agri-food products is increasing and the number of food industry enterprises is decreasing, which indicates consolidation of this industry.
4) The food sector is an important part of the economy in Poland, which includes 286.000 enterprises, that account for 13 % of all production companies in the EU.

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