

CHANGES IN THE COMPETITIVE POSITION OF THE FOOD INDUSTRY IN THE EUROPEAN UNION MEMBER STATES

KATARZYNA ŁUKIEWSKA

ABSTRACT

Under the conditions of integration and liberalisation processes, as a result of the increasing intensity and scope of competition, competitiveness is becoming the basic condition for the functioning of enterprises and industries, as well as an important research area in economics. Most important is the ability to obtain sufficient and lasting competitive results, which translates to maintaining a competitive position over time. One of the most important economic and social sectors of the economy is the food industry. For this reason, the purpose of this elaboration was to evaluate the level and changes of the competitive position of the food industry within the EU countries in the period of 2005-2017. The following indicators were evaluated: share in exports, trade coverage rate and profitability and synthetical indicator of competitive position constructed on the basis of Hellwig's method. The research conducted shows that despite the general trend of the "new" countries of the EU improving their competitive position, the competitive leaders within the food industry were the "old" EU countries.

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Competitiveness, competitive position, food industry, EU.

KATARZYNA ŁUKIEWSKA

e-mail: katarzyna.lukiewska@uwm.edu.pl

University of Warmia

and Mazury in Olsztyn,

Poland

Introduction

The food industry is an important and dynamically evolving sector of the EU economy and every member country. It also participates in the fulfilment process of basic human needs and ensures food security (Gardijan and Lukač, 2018; Wilson, 2018). In 2017 it was composed of almost 264,000 enterprises in which there were approximately 4.3 million people employed, comprising approximately 14% of the total number of employees in industrial processing overall. The value of food

products was around 914 million euro, or 13.1% of the total industrial processing production output (Eurostat, 2018). However, economists highlight the tendency towards growth in food consumption. According to research conducted by Mikula (2017) during the first few years of the current century, global demand for food grew about 2% per year, and between 2000 and 2013 it increased 30.2% (from 3745 to 4877 million tons). In the context of the economic and social importance of the food industry, the

cyclic evaluation of the competitiveness of this branch on international markets has become very important.

The most significant factor is the ability to obtain good and lasting competitive results, which relate to holding a competitive position over time. Meanwhile, constant changes in the functioning of European and worldwide markets and society, combined with the processes of globalisation, economic integration, economic policy, economic crisis and dynamic advances in technology, are constantly influencing the competitive situation on the international market of various countries and industries, including the food sector. Turia et al. (2014) indicate that the challenges facing the food industry also include the very low growth of the population in the EU, a shift in consumer preferences towards more convenient and healthy food, innovativeness that stimulates product differentiation, and the responsiveness of the food chain which is important for stimulating this process. Due to these considerations, the purpose of this elaboration was to evaluate the level and changes of the competitive position of the food industry in EU countries in the period of 2005-2017. However, the contribution of the paper is two-fold. In addition to assessing the competitive position of the food industry, it also represents the development of a multidimensional framework for measuring competitive position, which could also be applied to other industries.

The article is organised as follows. The first section presents the theoretical background of interpreting competitiveness and the definition of competitive position adopted in the work. The second part outlines data collection and the research methodology. Partial indicators and a multidimensional analysis of competitive position have been proposed, referring to the adopted definition. The next two sections discuss statistical data and the research

results. Conclusions are presented in the last section of this article.

1. Literature review

International competitiveness is one of the most important research areas in economics. Despite the widespread use of this category by scientists, policymakers and business practitioners, the term of competitiveness is still ambiguously defined (Pascucci, 2018). There are many definitions of competitiveness in the literature on the subject, but none of them have yet become widely accepted. This is related to the complexity and multidimensionality of this category and to application at different levels of the economy. Competitiveness may be analysed in reference to the level of the national economy, the individual economic sector, or to individual enterprises (Matošková and Gálik, 2009; Harvey et al., 2017; Dresch et al., 2018). In addition, competitiveness is considered among at least three economic theories (theory of economic growth, international trade and microeconomics) and different levels of competitiveness (demand competitiveness and supply competitiveness) (Frohberg and Hartmann, 1997; Wziątek-Kubiak, 2003). For example, competitiveness can be understood as:

- "the ability of companies, industries, regions, nations or supranational regions to generate, while being and remaining exposed to international competition, relatively high factor income and factor employment levels on a sustainable basis" (Hatzichronoglou, 1996);
- "the sustained ability of a nation's industries or firms to compete with foreign counterparts in foreign markets as well as in domestic markets under conditions of free trade" (Kim and Marion, 1997);
- "the relative ability of a country's firms to produce and market products of

- standard or superior quality at lower prices" (Ezeala-Harrison, 1999);
- "the ability of an economy to provide its population with high and rising standards of living and a high level of employment for all those willing to work on a sustainable basis" (European Competitiveness... 2003);
 - "external or international competitiveness is the ability to exchange the goods and services that are abundant in the home country for the goods and services that are scarce in this country" (Altomonte et al., 2012),
 - "the ability to profitably gain and maintain market share in domestic and/or foreign markets" (Martin et al., 1991; Pitts and Lagnevik, 1997; Fisher and Schornberg, 2007).

Different definitions refer to the ability to achieve specific objectives of individual entities under the conditions of competition. The literature also highlights that competitiveness is a rather relative concept, evaluating and specifying a desired state (Pawlak, 2017).

The multidimensionality of this category means that various accents of competitiveness are highlighted in written definitions and research. In academic discourse, it is common to deconstruct competitiveness into other, less general, concepts. In the literature, most of the models used directly refer to factor and result competitiveness. Competitive factors are also referred to as a source of competitiveness, competitive potential or competitive capabilities. All these refer to the possibility of competing in the future. Result competitiveness, described as a competitive position, refers to the obtained and real competitiveness. Competitive potential, which refers to the resources used to generate (superior) performance, influences the competitive outcome (Buckley et al., 1992). According to Flejterski and Majchrzak (2018), competi-

tive position includes the state and change of share of each country in global turnover. Gnjidić (2018) states that a company's competitive position should indicate the industrial position the company has already taken in relation to its direct competitors in the industry. In this sense, the competitive position of the company is a comparative result of the shape (direction) and the intensity of the factors of industrial structure in the company. In this study, the competitive position at the industry level was understood as the ability to achieve profitable gain and market share in domestic and export markets in which the industry is active (Wijnands et al., 2007).

The lack of a clear definition of competitiveness causes certain difficulties in its measurement. So far, standard and universal methods of assessing competitiveness at different economic levels are not present in the literature. Measures used in the literature to assess the competitiveness of the industry refer to the competitive potential, including indicators of efficiency, productivity, innovation, labour costs (Putićová and Mezera, 2011; Volek and Novotna, 2016; Krieviņa et al., 2016; Carayannis and Grigoroudis, 2014), or competitive position, including indexes of trade balance, shares in the export market, indicators of revealed comparative advantage and intra-industry trade (Jambor et al., 2018; Bojnec and Fertó, 2017, Narayan and Bhattacharya, 2019; Smutka et al. 2018; Wardani et al., 2018). The choice of measures should be related to the adopted definition and the aspects of competitiveness emphasised (Olczyk, 2008).

According to research carried out by Wijnands and Verhoog (2016), the competitiveness of the food industry throughout the European Union is weak compared to third-party countries. Among individual members, countries such as Greece, Spain, Bulgaria, the Netherlands and others have

comparative advantage. This means that the share of the food industry in the total exports of these countries is greater than the average in all EU Member States. The opposite situation has occurred, among others, in Germany, the United Kingdom, Estonia, Portugal and Italy (Wijnands and Verhoog, 2016). The lack of comparative advantages of the food industry in these countries indicates the relatively limited significance of this industry in total domestic exports. Juchniewicz (2017) indicates that Germany, France, Italy, the United Kingdom, Spain and Poland are characterised by the highest production potential as measured by the number of enterprises and the number of employees. The highest levels of productivity in the food industry were seen in countries from the old EU, such as Ireland, Belgium, the Netherlands and Denmark (Juchniewicz, 2017) and the highest levels of innovation in Belgium, the Czech Republic, Germany, Greece and Spain (Łukiewska and Juchniewicz, 2017).

2. Research methodology

Taking into account the definition of competitive position adopted in the study, the following partial indicators were used to assess it: export market share (EMS), trade coverage index (TC) and profitability index (P).

Gaining shares in the international market is the basic premise of achieving a high level of competitiveness in terms of international industry (Zawiślińska, 2003), and the indicator of export share is treated in the literature as one of the basic measures of a competitive position (e.g. Banterle 2005; Wijnands and Verhoog, 2016). Export market share (EMS) was evaluated in line with the formula:

$$EMS_i = \frac{E_i}{\sum_{i=1}^n E_i}$$

where: E_i – the value of exports of the food industry of country i for the EU market.

Food industry enterprises compete with foreign rivals for consumer favour, not only on external markets but also on domestic markets with food importers. For this reason, it is also important to measure industry trade. In the article, the trade coverage index was used, measured by the following formula (Ambroziak, 2014; Firlej et al., 2017; Kowalska et al. 2017):

$$TC_i = \frac{E_i}{I_i}$$

where: I_i – value of the imports of food industry of country i and from the EU market.

The competitive position should be considered not only as the aspect of industry share in foreign and domestic markets but also in the context of the financial results achieved. In this paper, for the purpose of evaluating industry profitability, the indicator of the share of operating surplus in the value of turnover of industries (P) was used in line with the formula (among others: Fischer and Schornberg, 2006; Fischer and Schornberg, 2007; EU sectoral... 2005):

$$P_i = \frac{GOS_i}{TURN_i}$$

where: GOS_i – value of the gross operating surplus of the food industry of country i , and $TURN_i$ – value of turnover of the food industry of country i .

The usage of only the one-dimensional measures for the evaluation of the complex phenomenon of competitiveness is not sufficient. In the literature on the subject, there are no studies dealing with this issue as a whole, considering various aspects of competitiveness at the same time. For this reason, a synthetic measure of competitive position was developed in this article. This indicator enabled the replacement of the selected simple variables with one aggregate variable and the creation of a hierarchy of countries based on the competitive position of their food industry. Therefore,

this study employed the Hellwig (1968) method, which depends on the creation of a hypothetical country characterised by the greatest competitive position of the food industry, and then comparing every country with this model country:

$$z = (z_{01}, z_{02}, \dots, z_{0m})$$

where:

$$z_{0j} = \begin{cases} \max_i \{z_{ij}\}, & \text{where the variable } z_{ij} \text{ is stimulant} \\ \min_i \{z_{ij}\}, & \text{where the variable } z_{ij} \text{ is stimulant} \end{cases}$$

z_{ij} – standardised values of feature j in country i ,

The measurement of distance between each of the countries analysed and the standard was conducted using the Euclidean metrics based on the following formula (Suchecky and Lewandowska-Gwarda, 2010):

$$d_{i0} = \sqrt{\sum_{j=1}^m (z_{ij} - z_{0j})^2}$$

where: d_{i0} – Euclidean distance of country i from the reference object.

Based on the above formula, the synthetic measurement (CP) was calculated (Wysocki and Lira, 2003):

$$CP_i = 1 - \frac{d_{i0}}{d_0}$$

$$d_0 = \bar{d}_0 + 2S_{s0}$$

where: CP_i – synthetic indicator of the competitive position of the food industry in country i , d_0 – critical distance of a given unit from the model country, \bar{d}_0 – arithmetic average of taxonomic distances, S_{s0} – standard deviation of taxonomic distances.

The greater the size of the constructed synthetic measurement (CP), the smaller the distance from the model country, and the stronger the competitive position of the industry.

The subject of consideration in this article was the food industry located in various EU countries (except for Malta, due to the lack

of complete statistical data). Two statistical analyses were used in the research: NACE Rev. 2 (fr. *Nomenclature statistique des Activités économiques dans la Communauté Européenne*) – section C10 production of grocery articles, and SITC Rev. 3 (ang. *Standard International Trade Classification*) – aggregation of sections 01-09 and 4. The timeframe of the analysis was the period of 2005-2017 (and 2005-2016 in the case of profitability). The source of empirical data was the database of the Statistical Office of the European Union – EUROSTAT.

3. Research results

The share of the EU member countries in intra-union food exports during the years analysed was rather diverse (Table 1). The unquestionable leaders in the export of food products throughout the period in question were the Netherlands and Germany. The value of exports of food industry products from these countries in 2017 was 54.8 billion and 48.1 billion euro respectively, which altogether accounted for one-third of the entire intra-union exports of the food industry. Among other countries which were at the top of the list in terms of food exports, Spain noted significant increases, while France and Belgium experienced a decline. As a result of the almost doubled export value from Spain, this country increased its share in terms of the export indicator from 9.88% to 10.48% and advanced in the rankings from fifth to third. At the same time France and Belgium experienced relatively small growth in export value, and their share of intra-union exports reduced by 3.44% and 1.46% respectively. Italy held a stable sixth position during the period in question. In 2017, Poland was in seventh position, having overtaken Great Britain, Denmark, Ireland and Austria since 2005. During 2005-2017 Poland noted the highest growth of share in intra-union exports of food among all countries ana-

lysed (growth of 3.44% from the level of 2.90% to the level of 6.03%). According to Szczepaniak (2014), besides the full opening of markets and obtaining freedom of trade with the EU countries after Poland's accession to the European Union, the increase in foreign trade resulted from large investments in adaptation to EU standards, enterprises demonstrating a high level of understanding of the EU market and intense activity on it as well as an inflow of foreign direct investment, foreign strategic enterprise investments in Polish firms and utilising a substantial amount of union funds, both during the pre-accession period and after accession. Poczta and Pawlak (2011) also indicate cost and price advantages resulting from lower production costs, including wages and processing margins. As a result, Poland became the largest beneficiary of the shift in export destinations which took place after the enlargement of the EU in 2004.

Despite experiencing a decrease of the indicator by about 0.54% throughout the period analysed, Great Britain held eighth position. The reduction of Danish exports by 1.03% resulted in a fall in the rankings by two positions to ninth, and in Ireland a decrease of 0.49% resulted in a decline by one position to 10th). In Austria, despite

the small increase in market share (approximately 0.07%) that country fell one position to 11th. Among the countries of the "old" EU, unfavourable changes of position in the classification were also noted in Greece, Portugal, Finland and Luxembourg. The decrease of the share in exports in Greece by 0.17% resulted in this country slipping in the rankings from 12th to 15th. In the case of Portugal, despite the growth of the indicator from 0.79% to 1.13%, there was a decline from 15th to 16th. Finland and Luxembourg maintained a similar level of export shares, but this resulted in these countries falling six spots in the rankings.

A significant increase in exports, though not as high as that of Poland, was also noted in other countries of the "new" EU. In Hungary and the Czech Republic, the growth in market share was noted during 2005-2011; indeed, in the Czech Republic this continued during 2011-2017. As a result, these countries moved up in the rankings by one and two positions accordingly. The systematic growth in export market share meant that countries such as Lithuania, Bulgaria, Romania, Slovenia and Latvia rose in the rankings by three or four positions. The group of "new" EU countries with a low and decreasing share in exports included Slovakia, Croatia and Estonia.

Table 1. Level and changes of EMS indicator in the food industry of EU member countries 2005-2017

Specification	EMS in the years (%)			change in EMS in the years (%)			position in the years			change in position in the years		
	2005	2011	2017	2005-2011	2005-2017	2005-2017	2005	2011	2017	2005-2011	2005-2017	2005-2017
Netherlands	18.22	18.02	17.79	-0.20	-0.23	-0.43	1	1	1	-	-	-
Germany	15.47	15.97	15.63	0.50	-0.35	0.16	2	2	2	-	-	-
Spain	9.88	9.37	10.48	-0.51	1.11	0.60	5	4	3	+1	+1	+2
France	12.64	11.67	9.19	-0.96	-2.48	-3.44	3	3	4	-	-1	-1
Belgium	10.64	9.55	9.18	-1.09	-0.37	-1.46	4	5	5	-1	-	-1
Italy	7.06	6.73	6.89	-0.33	0.16	-0.17	6	6	6	-	-	-
Poland	2.90	4.09	6.03	1.19	1.94	3.13	11	9	7	+2	+2	+4
United Kingdom	4.41	4.06	3.87	-0.35	-0.19	-0.54	8	7	8	+1	-1	-

Denmark	4.93	3.90	3.27	-1.03	-0.63	-1.66	7	8	9	-1	-1	-2
Ireland	2.98	2.49	2.59	-0.49	0.10	-0.39	9	10	10	-1	-	-1
Austria	2.24	2.31	2.27	0.07	-0.05	0.02	10	11	11	-1	-	-1
Sweden	1.41	1.72	2.00	0.32	0.28	0.60	13	13	12	-	+1	+1
Hungary	1.21	2.04	1.94	0.83	-0.09	0.73	14	12	13	+2	-1	+1
Czech Republic	1.05	1.41	1.58	0.36	0.17	0.53	16	15	14	+1	+1	+2
Greece	1.41	1.24	1.24	-0.16	0.00	-0.17	12	14	15	-2	-1	-3
Portugal	0.79	0.97	1.13	0.17	0.17	0.34	15	16	16	-1	-	-1
Lithuania	0.44	0.62	0.82	0.18	0.20	0.37	20	18	17	+2	+1	+3
Bulgaria	0.24	0.67	0.74	0.43	0.08	0.51	21	19	18	+2	+1	+3
Romania	0.18	0.67	0.72	0.49	0.05	0.54	23	20	19	+3	+1	+4
Slovakia	0.55	0.88	0.70	0.33	-0.19	0.14	18	17	20	+1	-3	-2
Slovenia	0.19	0.31	0.38	0.12	0.07	0.19	25	21	21	+4	-	+4
Latvia	0.17	0.29	0.37	0.12	0.08	0.20	26	23	22	+3	+1	+4
Finland	0.29	0.28	0.30	0.00	0.02	0.01	17	24	23	-7	+1	-6
Croatia	0.19	0.16	0.28	-0.03	0.13	0.10	22	26	24	-4	+2	-2
Luxembourg	0.28	0.28	0.28	0.00	0.00	0.00	19	22	25	-3	-3	-6
Estonia	0.15	0.23	0.24	0.08	0.01	0.08	24	25	26	-1	-1	-2
Cyprus	0.06	0.06	0.07	0.00	0.01	0.01	27	27	27	-	-	-

Source: Own elaboration based on Eurostat.

In the intra-union trade of food during the period analysed, a positive trade balance in 2005 was noted in 10 member countries, which also registered a trade surplus in subsequent years (apart from France) (Table 2). At the same time, none of the countries which were net importers of food turned into net exporters in the period in question. As in the case of export share for the entire period analysed, the Netherlands was the leader in the rankings in this case. It was the only country in which the value of food exports was more than double that of imports. A systematic decrease of the relative surplus in trade in Denmark (the TC indicator decreased by 25.29%) with the simultaneous growth of it in Spain (the TC indicator grew by 21,20%), caused the change of position in the ranking of these two countries. Denmark lost

second place to Spain. The clear strengthening of the position as a net exporter of food was observed by Poland and Hungary. In Poland, during the first years after accession to the EU, a decrease in the TC indicator by 14.76% was noted due to the relatively faster growth of food imports compared to exports. During 2011-2017 there was a reversal of these relationships, as food export value increased faster than imports. The TC indicator increased by 25.72% and Poland moved up to fourth position in the rankings. In Hungary the increase in imports in relative terms to exports was noted in 2005-2011. The TC indicator increased from 1.14 to 1.46 and was at a similar level in subsequent years. Hungary advanced two positions in the ranking to fifth). Among other net exporters of food there were some unfavourable changes in

import-export relations. In Belgium, Ireland, Bulgaria and Latvia a decline in the relative surplus in food trade and competitive position in that range was noted.

Table 2. Level and changes of TC indicator in the food industry of EU member countries 2005-2017

Specifica- tion	TC			Change in TC in the years (%)			position in the years			change in position in the years		
	2005	2011	2017	2005- 2011	2011- 2017	2005- 2017	2005	2011	2017	2005- 2011	2005- 2017	2005- 2017
Netherlands	2.18	2.05	2.07	-5.86	1.18	-4.74	1	1	1	-	-	-
Spain	1.62	1.65	1.96	2.27	18.50	21.20	3	3	2	-	+1	+1
Denmark	1.98	1.66	1.48	-16.19	-10.87	-25.29	2	2	3	-	-1	-1
Poland	1.37	1.17	1.47	-14.76	25.72	7.17	6	7	4	-1	+3	+2
Hungary	1.14	1.46	1.45	27.51	-0.70	26.61	8	5	5	+3	-	+3
Belgium	1.46	1.35	1.31	-7.25	-3.26	-10.28	5	4	6	+1	-2	-1
Ireland	1.57	1.36	1.29	-13.42	-5.10	-17.84	4	6	7	-2	-1	-3
Bulgaria	1.26	1.08	1.17	-13.57	7.78	-6.84	7	8	8	-1	-	-1
Lithuania	1.09	0.80	1.04	-26.89	30.22	-4.80	9	11	9	-2	+2	-
Germany	0.85	0.92	0.84	7.68	-8.23	-1.18	11	10	10	+1	-	+1
Italy	0.71	0.74	0.84	4.17	13.70	18.44	14	13	11	+1	+2	+3
Greece	0.67	0.67	0.81	1.02	20.01	21.23	16	16	12	-	+4	+4
France	1.05	0.98	0.78	-6.79	-20.94	-26.31	10	9	13	+1	-4	-3
Sweden	0.57	0.67	0.77	16.62	14.45	33.46	17	14	14	+3	-	+3
Austria	0.78	0.78	0.77	0.38	-2.30	-1.94	12	12	15	-	-3	-3
Latvia	0.52	0.59	0.76	13.33	28.45	45.57	19	20	16	-1	+4	+3
Czech Republic	0.68	0.70	0.74	3.26	5.54	8.98	15	18	17	-3	+1	-2
Slovenia	0.42	0.62	0.69	46.52	12.61	65.00	22	15	18	+7	-3	+4
Estonia	0.53	0.66	0.66	23.04	0.35	23.47	18	19	19	-1	-	-1
Slovakia	0.73	0.71	0.64	-2.27	-9.87	-11.91	13	17	20	-4	-3	-7
Luxembourg	0.47	0.51	0.55	8.05	8.28	17.00	20	21	21	-1	-	-1
Portugal	0.33	0.40	0.49	22.21	21.21	48.12	25	25	22	-	+3	+3
Romania	0.35	0.58	0.43	67.96	-25.50	25.13	24	22	23	+2	-1	+1
Croatia	0.42	0.39	0.42	-7.92	7.62	-0.90	21	23	24	-2	-1	-3
United Kingdom	0.37	0.40	0.37	6.37	-6.66	-0.71	23	24	25	-1	-1	-2
Cyprus	0.27	0.24	0.32	-12.76	36.81	19.36	27	27	26	-	+1	+1
Finland	0.29	0.25	0.26	-13.97	2.42	-11.89	26	26	27	-	-1	-1

Source: Own elaboration based on Eurostat.

Among net importers, the major positive changes in export-import relations were observed in Slovenia, where the TC indica-

tor increased by 65.0% from 0.42 to 0.69. As a result of this improvement, Slovenia moved up in the rankings from 22nd to 18th

position. In Italy, Greece, Sweden, Latvia and Portugal the TC indicator increased by 18.44%-48.12%, resulting in a rise in the ranking by three or four places in all cases. In Romania and Cyprus, an increase in the relative surplus in the food trade brought about a rise in the rankings by a single place. In the Czech Republic, Estonia and Luxembourg, despite an increase of the TC indicator (by 8.98%-23.47%), these countries fell one or two places. The reverse was true in Germany: despite a small decrease in the relative trade surplus, a rise in the rankings by one position was noted.

There was a significant decline of competitiveness in the other member countries.

France was the only country which turned from a net exporter into a net importer of food. In 2005 that country's income from exports exceeded the value of imports by over 5%, while in 2017 it covered only 78% of the expenses for food imports. In Slovakia the faster growth of imports over exports brought about a decrease in the TC indicator from 0.73 to 0.64 and a downward shift in the ranking by seven positions (from 13th to 20th). In Austria, Croatia and Great Britain, the indicator of import-export coverage decreased by 0.71%-1.94% resulting in a slide in the rankings by two or three spots.

Table 3. Level and changes of P indicator in the food industry of EU member countries 2005-2017

Specification	P (%)			change in P in the years (%)			position in the years			change in position in the years		
	2005	2011	2016	2005-2011	2005-2016	2005-2016	2005	2011	2016	2005-2011	2005-2016	2005-2016
Ireland	16.94	19.29	24.29	2.35	5.00	7.35	1	1	1	-	-	-
United Kingdom	13.36	13.21	14.01	-0.15	0.80	0.65	2	2	2	-	-	-
Cyprus	9.12	6.53	9.30	-2.59	2.76	0.17	7	20	3	-13	+17	+4
Bulgaria	7.94	8.22	9.28	0.28	1.06	1.34	13	9	4	+4	+5	+9
Poland	9.66	9.15	8.99	-0.51	-0.16	-0.68	6	5	5	+1	-	+1
Latvia	11.15	6.91	8.67	-4.24	1.77	-2.48	4	17	6	-13	+11	-2
Austria	9.77	8.73	8.52	-1.04	-0.21	-1.25	5	6	7	-1	-1	-2
Czech Republic	6.27	7.05	8.51	0.78	1.46	2.24	23	14	8	+9	+6	+15
Slovenia	3.94	7.01	8.48	3.07	1.48	4.54	27	15	9	+12	+6	+18
Lithuania	7.90	7.46	8.40	-0.44	0.93	0.50	14	12	10	+2	+2	+4
Italy	9.04	7.59	8.31	-1.45	0.71	-0.74	8	11	11	-3	-	-3
Hungary	7.21	7.05	8.21	-0.16	1.15	0.99	19	13	12	+6	+1	+7
Croatia	8.61	8.29	8.05	-0.32	-0.24	-0.56	9	8	13	+1	-5	-4
Netherlands	7.52	6.68	7.25	-0.84	0.56	-0.27	17	18	14	-1	+4	+3
Estonia	5.05	6.17	7.17	1.11	1.00	2.11	26	21	15	+5	+6	+11
Luxembourg	8.37	6.98	7.08	-1.39	0.10	-1.29	12	16	16	-4	-	-4
Germany	6.64	5.58	7.05	-1.07	1.47	0.40	21	24	17	-3	+7	+4
Greece	12.81	12.58	6.83	-0.24	-5.75	-5.99	3	3	18	-	-15	-15
Belgium	7.47	5.48	6.83	-1.99	1.34	-0.65	18	25	19	-7	+6	-1
Spain	8.47	8.18	6.73	-0.29	-1.45	-1.73	11	10	20	+1	-1	-9

Portugal	8.57	5.99	6.69	-2.58	0.69	-1.88	10	22	21	-12	+1	-11
Finland	7.82	6.57	6.23	-1.25	-0.34	-1.60	16	19	22	-3	-3	-6
Sweden	6.45	5.43	5.76	-1.02	0.33	-0.68	22	27	23	-5	+4	-1
Denmark	6.74	5.83	5.71	-0.91	-0.12	-1.03	20	23	24	-3	-1	-4
France	5.40	5.44	5.60	0.05	0.15	0.20	25	26	25	-1	+1	-
Slovakia	5.90	9.51	4.82	3.61	-4.69	-1.08	24	4	26	2-	-22	-2
Romania	7.86	8.59	1.57	0.72	-7.01	-6.29	15	7	27	+8	-2-	-12

Source: Own elaboration based on Eurostat.

Another category describing the competitive position of the food industry was profitability (table 3). During the period analysed, there was an unfavourable tendency towards the deterioration of the profitability of the food industry in most countries (average range from 8.37% to 8.09%). In 2016, when compared to 2005, the profitability indicator decreased in 16 countries. It does not concern, however, the countries with the highest levels of profitability, namely Ireland, Great Britain, Cyprus and Bulgaria. Ireland and Great Britain occupied the highest positions in the profitability ranking for the entire period analysed. An increase in the operating surplus share on the market in Cyprus and Bulgaria caused these countries to rise in the classification by four and nine positions accordingly. A significant improvement in competitiveness was noted in the countries of the "new" EU such as the Czech Republic, Slovenia and Estonia. The profitability indicator in the Czech Republic increased from 6.27% to 8.51% (from 23rd to eighth place in the rankings), in Slovenia from 3.94% to 8.48% (from 27th to ninth), and in Estonia from 5.05% to 7.17% (from 26th to 15th).

An insignificant improvement in profitability was also noted in Lithuania, Hungary, Germany and France. The profitability indicator grew by between 0.20% and 0.99% in these countries. Other countries experienced a decrease of operational surplus share in the value of the turnover of the food industry. In spite of the Netherlands and Poland experiencing a decrease in terms of the profitability indicator (by 0.27% and 0.68% respectively), the improvement of their respective competitive positions in this range occurred (by three and one place in the rankings respectively). As previously mentioned, competitiveness is a relative category and requires comparison with other competitors. In Lithuania, Austria, Italy, Croatia, Luxembourg, Greece, Belgium, Spain, Portugal, Finland, Sweden, Denmark, Slovakia and Romania, there was a decrease in the operational surplus share in the value of food industry turnover, and an associated decline in the ranking. The most unfavourable changes concerned Romania (where the indicator decreased by 6.29%, meaning a fall by 12 positions).

Table 4. Level and changes of CP indicator in the food industry of EU member countries 2005-2017

Specification	CP in the years			change in CP in the years (%)			position in the years			change in position in the years		
	2005	2011	2017	2005-2011	2005-2017	2005-2017	2005	2011	2017	2005-2011	2005-2017	2005-2017
Ireland	0.54	0.53	0.53	-2.98	1.58	-1.47	1	1	1	-	-	-
Netherlands	0.50	0.42	0.42	-16.49	0.74	-18.86	2	3	2	-1	+1	-

Spain	0.47	0.42	0.37	-10.32	-12.32	-27.18	3	2	3	+1	-1	-
Poland	0.38	0.34	0.37	-10.82	7.80	-4.02	5	4	4	+1	-	+1
Belgium	0.42	0.29	0.33	-31.05	13.10	-28.23	4	7	5	-3	+2	-1
Germany	0.34	0.28	0.32	-17.47	13.88	-6.40	8	8	6	-	+2	+2
United Kingdom	0.35	0.32	0.30	-8.39	-4.48	-14.29	6	5	7	+1	-2	-1
Italy	0.34	0.27	0.29	-22.29	10.63	-16.33	7	9	8	-2	+1	-1
Hungary	0.24	0.26	0.28	8.03	7.97	14.26	16	11	9	+5	+2	+7
Bulgaria	0.26	0.24	0.27	-6.64	9.58	2.25	13	14	10	-1	+4	+3
Denmark	0.34	0.26	0.24	-24.50	-7.66	-43.43	9	12	11	-3	+1	-2
France	0.30	0.26	0.23	-10.73	-11.72	-26.89	12	10	12	+2	-2	-
Lithuania	0.25	0.18	0.23	-25.70	27.53	-5.55	15	17	13	-2	+4	+2
Austria	0.30	0.25	0.23	-17.39	-7.88	-31.41	11	13	14	-2	-1	-3
Czech Republic	0.15	0.17	0.21	12.09	26.14	29.28	21	18	15	+3	+3	+6
Latvia	0.26	0.13	0.20	-48.31	52.40	-26.96	14	21	16	-7	+5	-2
Slovenia	0.02	0.14	0.19	632.47	35.67	89.94	27	19	17	+8	+2	+10
Greece	0.34	0.31	0.18	-7.98	-42.92	-90.39	10	6	18	+4	-12	-8
Sweden	0.15	0.12	0.16	-21.46	33.66	4.74	22	24	19	-2	+5	+3
Estonia	0.07	0.12	0.15	57.52	29.19	50.86	26	23	20	+3	+3	+6
Cyprus	0.16	0.06	0.15	-62.30	142.49	-9.39	20	27	21	-7	+6	-1
Croatia	0.18	0.14	0.14	-21.15	1.18	-25.36	18	20	22	-2	-2	-4
Luxembourg	0.18	0.12	0.14	-31.20	11.83	-29.97	17	22	23	-5	-1	-6
Portugal	0.17	0.09	0.13	-49.66	53.79	-29.18	19	25	24	-6	+1	-5
Slovakia	0.14	0.23	0.10	72.94	-57.79	-37.01	24	15	25	9	-10	-1
Finland	0.13	0.07	0.08	-48.82	10.92	-76.14	25	26	26	-1	-	-1
Romania	0.14	0.19	-0.01	31.66	-104.76	1695.63	23	16	27	7	-11	-4

Source: Own elaboration based on Eurostat.

Next, the synthetic indicator of competitiveness was measured. This included the share in exports, the coverage of imports by exports and the profitability of the food industry at the same time (Table 4). The highest competitive position throughout the period in question was achieved by the food industry in Ireland, the Netherlands and Spain (Figure 1). Fourth place was occupied by Poland (rising from fifth), which surpassed Belgium in that range. Sixth place was occupied by Germany, which moved up two places in the ranking, mainly due to growth in profitability

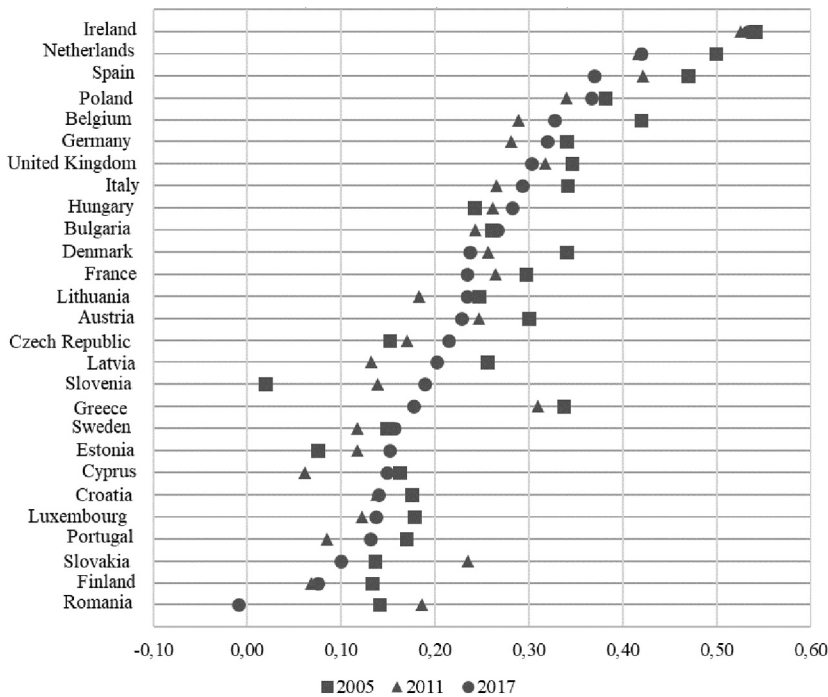
and the coverage of imports by exports. Improvement in the competitive position was also noted in other countries of the "new" EU besides Poland. During the period analysed, as the result of a systematic improvement of Hungary's competitive results, that nation occupied ninth position in 2017, which was seven positions better than in 2005. Slovenia moved up in the ranking by 10 positions (from 27th to 17th) and the Czech Republic and Estonia by six positions (from 21st to 15th and from 26th to 20th accordingly). Favourable changes were also noted in Bulgaria and Lithuania,

which advanced two to three positions in the classification. An improvement in the competitive position was also noted in Sweden which occupied 19th position (an improvement of three places).

Other member countries of the EU experienced a negative change to their competitive position (apart from France which held steady in 12th position). Here we refer mostly to the countries of the “old” EU. A particularly large drop in ranking came in the case of Greece which fell from 10th to 18th position due to the decrease of their

share in intra-union food exports and decreased profitability. Luxembourg and Portugal moved down six and five positions in the ranking of competitiveness of the food industry respectively. Unfavourable changes were also noted in Great Britain, Italy, Denmark, Austria, Finland and Cyprus which moved down in ranking by one to three positions. Among the countries of the “new” EU, a decrease in competitiveness was noted in Latvia, Croatia, Slovakia and Romania.

Figure 1. Level of CP indicator in the food industry of EU member countries in 2005, 2011, and 2017



Source: Own elaboration based on Eurostat.

4. Discussion

The interpretations of competitiveness often encompass the necessity of achieving relatively strong competitive results in comparison to competitors, which stand the test of time. In the period of 2005-2017 there was no change in the leadership po-

sitions in the rankings of the competitiveness of food industry on the intra-union market. In the period analysed, the highest competitive positions as measured by the synthetic index were occupied by the same countries, namely Ireland, the Neth-

erlands and Spain. These countries were also mentioned among the leaders in the competitiveness of the food industry in the EU in studies conducted by Wijnands et al. (2008). However, these studies cannot be directly compared because the authors used a different set of competitiveness indicators, namely growth of total value added in the industry, growth of value added reflecting industrial dynamism, growth of the Balassa index, growth of the share of exports, and growth of labour productivity.

The research also shows that the best results in terms of food exports were consistently achieved in the Netherlands and Germany. Spain was among the countries with the best results in foreign trade; the relatively fast growth of exports and consequently the advantage in food trade was noted. Similar conclusions were reported by Juchniewicz (2017). The best results in terms of the relative surplus of trade were achieved in the Netherlands, and in terms of the profitability of the food industry in Ireland and Great Britain.

During the period under consideration, the general trend of the improving competitive position was noted among many countries from the "new" EU. In the case of Poland, it was associated mainly with the doubling of the food export share; in Hungary and Estonia the growth of profitability; in Slovenia the growth of export share and trade surplus; and in the Czech Republic the improvement of profitability and share in exports. At the same time, there was a certain decrease of the competitive position of the food industry among countries in the "old" EU, especially Greece and Portugal. In these countries, it was mainly related to the reduction of the profitability of the food industry. In this period the process of gradual convergence of the "new" and "old" EU countries took place, in terms of competitive results achieved on the intra-union food market, yet the decisive leaders

in this range are still the countries of the "old" European Union. The results obtained in this regard are similar to the trend observed by Carraresi and Banterle (2015). The authors assessed the competitive results of the food industry 15 years after the expansion of the European Union. They noticed that the countries of Central and Eastern Europe, especially Poland, performed competitively after accession to the EU. However, the authors emphasise that they still play rather marginal roles in the EU as a whole.

Conclusions

Competitiveness under the conditions of intense competition among entities is an important research area in economics. Despite the popularity of this issue, no uniform definition and methodology for measuring the competitiveness of the industry has been created so far. The article presents the methodology for assessing competitive position according to the definition proposed by Wijnands et al. (2007). Creating a synthetic index enables the comprehensive assessment and ranking of selected countries. The methodology presented can be used to assess various industries and sectors. It can be used by individual enterprises and state authorities to build the competitiveness of the entire economy. The article filled the research gap in the field of creating a methodology for measuring the competitiveness of the industry and offers a comprehensive assessment of the competitive position of the food industry in the EU member states.

Nevertheless, it is desirable to point out research limitations and certain aspects of the problem which may be examined in further research. Firstly, the assessment of the competitiveness of the industry of individual countries may be different using different definitions and other indicators of assessment. Secondly, the research

focuses on the evaluation of competition results, without pointing out the sources of competitiveness. It may prove worthwhile to extend the study to include an analysis of competitiveness factors. Thirdly, the study is limited to the EU member states. Further research may include an analysis of the competitive position of member states of the European Union in comparison with third parties.

References

- Altomonte, C., Aquilante, T., Ottaviano, G.I.P. (2012), The triggers of competitiveness. The FIGE cross-country report, The Bruegel Blueprint Series, Brussels: Bruegel.
- Ambroziak, Ł. (2014), Ocena pozycji konkurencyjnej Polski w handlu zagranicznym produktami rolno-spożywczymi na podstawie wybranych wskaźników, in: I. Szczepaniak (Eds.) Monitoring i ocena konkurencyjności polskich producentów żywności (5) Synteza. Seria Monografie Programu Wieloletniego 2012-2014 (pp. 51-66), Warszawa: IERiGŻ-PIB.
- Banterle, A. (2005), Competitiveness and agri-food trade: An empirical analysis in the European Union, In 11th Congress of the EAAE 'The Future of Rural Europe in the Global Agri-Food System', 24-27 August 2005 (pp.1-13), Copenhagen.
- Bojnec, S., Fertő, I. (2017), The duration of global agri-food export competitiveness, *British Food Journal*, 119(6): 1378-1393. <https://doi.org/10.1108/BFJ-07-2016-0302>.
- Buckley, P.J., Pass, C.L., Prescott, K. (1988), Measures of international competitiveness: A critical survey, *Journal of Marketing Management*, 2: 175-200.
- Carraresi, L., Banterle A. (2015), Agri-food competitive performance in EU Countries: A fifteen-year retrospective, *International Food and Agribusiness Management Review*, 18 (2): 37-62.
- Carayannis, E., Grigoroudis E. (2014), Linking innovation, productivity, and competitiveness: Implications for policy and practice, *The Journal of Technology Transfer*, 39(2): 199-218. <https://doi.org/10.1007/s10961-012-9295-2>
- Dresch, A., Collatto D.C., Lacerda D.P. (2018), Theoretical understanding between competitiveness and productivity: Firm level, *Ingeniería y Competitividad*, 20(2): 69-86. <https://doi.org/10.25100/iyv.v20i2.5897>
- EU sectoral competitiveness indicators (2005), Enterprise and Industry Directorate-General Unit B2 Competitiveness and economic reforms, Office for Official Publications of the European Communities. European Commission.
- European competitiveness report (2003), Commission staff working document, SEC (2003) 1299 final, November 17, 2003.
- EUROSTAT. Annual detailed enterprise statistics – industry and construction, available at: <http://ec.europa.eu/eurostat/data/database> (accessed 20 February 2019).
- Ezeala-Harrison, F. (1999), Theory and policy of international competitiveness, Westport: Praeger Publishers.
- Figiel, Sz., Kufel, J. (2013), Macroeconomic performance and international competitiveness of the agro-food sectors in the EU Countries: Implications for the future CAP, *Procedia-Social and Behavioral Science*, 81: 405-410. <https://doi.org/10.1016/j.sbspro.2013.06.451>
- Firlej, K., Kowalska, A., Piwowar A. (2017), Competitiveness and innovation of the Polish food industry, *Agricultural Economics*, 63: 502-509. <https://doi.org/10.17221/111/2016-AGRICECON>
- Fischer, C., Schornberg S. (2007), Assessing the competitiveness situation of EU food and drink manufacturing industries: An index – based approach, *Agribusiness*, 23 (4): 473-495. DOI: 10.1002/agr.20139
- Fischer, C., Schornberg S. (2006), The competitiveness situation of the EU meat processing and beverage manufacturing sectors, *Acta Agriculturae Scandinavica Section C – Economy*, 4(3): 1-20. <https://doi.org/10.1080/16507540701597139>

- Flejterski, S., Majchrzak, M. (2018), Poland's long-term competitive position from the perspective of WEF global competitiveness reports, *Comparative Economic Research*, 21(2): 99-118. <https://doi.org/10.2478/cer-2018-0014>
- Frohberg, K., Hartmann M. (1997), Comparing measures of competitiveness, Discussion Paper No.2, Halle: Institute of Agricultural Development in Central and Eastern Europe.
- Gardijan, M., Lukač, Z. (2018), Measuring the relative efficiency of the food and drink industry in the chosen EU countries using the data envelopment analysis with missing data, *Central European Journal of Operations Research*, 26: 695-713. <https://doi.org/10.1007/s10100-018-0540-0>
- Gnjidić, V. (2018). Interdependence of company's industrial competitive position and its strategic orientation: A dynamic theoretical model, *Management: Journal of Contemporary Management*, 23(2):103-120. DOI: <https://doi.org/10.30924/mjcmi/2018.23.2.103>.
- Harvey, D., Hubbard, C., Gorton, M., Tocco, B. (2017), How competitive is the EU's agri-food sector? An introduction to a special feature on EU agri-food competitiveness, *Journal of Agricultural Economics*, 68(1): 199-205. DOI: 10.1111/1477-9552.12215.
- Hatzichronoglou T. (1996). Globalisation and competitiveness: Relevant Indicators, OECD Science, Technology and Industry Working Papers, 1996/05, OECD Publishing. <http://dx.doi.org/10.1787/885511061376>.
- Hellwig, Z. (1968), Zastosowanie metody taksonomicznej do typologicznego podziału krajów ze względu na poziom ich rozwoju oraz zasoby i strukturę wykwalifikowanych kadr, *Przegląd Statystyczny*, 4: 307-327.
- Jambor, A., Toth, A.T., Koroshegyi, D. (2018), Competitiveness in the trade of spices: A global evidence, Conference, July 28-August 2, 2018, Vancouver, British Columbia 277195, International Association of Agricultural Economists.
- Juchniewicz, M. (2017), Production resources and competitive position of food industry in EU Countries, RSEP International Conferences on Social Issues and Economic Studies, 7-10 November, 2017, Barcelona, Spain. DOI: 10.19275/RSEP-CONFERENCE108.
- Kim D., Marion B.W. (1995), Domestic market structure and performance in global markets: Theory and empirical evidence from U.S. food manufacturing industries, *Food System Organization, Performance and Public Policies*, Report WP109, University of Wisconsin-Madison.
- Kowalska, A., Tarnowska, A., Kovarnik, J. (2017), Polish-Czech trade in agri-food products before and after accession to the European Union, *Hradec Economic Days*, 7(1): 449-459.
- Krieviņa, A., Hâzners, J., Melece, L. (2016), Competitiveness of Latvian dairy sector: Productivity and export, *Research for Rural Development*, 2: 181-188.
- Łukiewska, K., Juchniewicz, M. (2017), Typology of innovativeness of food industry within EU countries in terms of globalization, 17th International Scientific Conference Globalization and its Socio-economic Consequences, Rajecké Teplice, 4-5 October 2017.
- Martin L., Westegren R., Duren V. E. (1991), Agribusiness competitiveness across national boundaries, *American Journal of Agricultural Economic*, 73(5): 1457-1464. <https://doi.org/10.2307/1242402>
- Matošková, D., Gálik, J. (2014), Selected aspects of the internal and external competitiveness of Slovak agricultural and food products, *Agricultural Economics*, 55(2): 84-93. DOI: 10.17221/579-AGRI-CECON
- Mikuła, A. (2017), Demograficzne uwarunkowania światowego i krajowego popytu na żywność w latach 2000-2015, in: K. Świetlik (Eds.), *Ewolucja światowego i krajowego popytu na żywność w kontekście zmian demograficznych i bezpieczeństwa żywnościowego seria Monografie Programu Wieloletniego 2015-2019* (pp. 17-49), 65, Warszawa: IERIGŻ-PIB.

- Narayan, S., Bhattacharya, P. (2019), Relative export competitiveness of agricultural commodities and its determinants: Some evidence from India, *World Development*, 117: 29-47. <https://doi.org/10.1016/j.worlddev.2018.12.013>
- Olczyk, M. (2008), *Konkurencyjność. Teoria i praktyka*, Warszawa: CeDeWu.
- Pascucci, F. (2018), The export competitiveness of Italian coffee roasting industry, *British Food Journal*, 120(7): 1529-1546. <https://doi.org/10.1108/BFJ-05-2017-0306>.
- Pawlak, K. (2017), Zdolność konkurencyjna przemysłu spożywczego krajów UE, USA i Kanady na rynku światowym, *Problemy Rolnictwa światowego*, 18 (XXXIII) (3): 248-261. <https://doi.org/10.22630/PRS.2018.18.3.83>.
- Pawlak, K., Kołodziejczak, M., Kołodziejczak, W. (2010), Konkurencyjność sektora rolno-spożywczego nowych krajów członkowskich UE w handlu wewnątrz-wspólnotowym, *Zagadnienia Ekonomiki Rolnej*, 1(322): 126-141.
- Pitts, E., Lagnevik, M. (1998), What determines food industry competitiveness? In: W.B. Traill and E. Pitts (Eds.), *Competitiveness in the food industry* (pp.1-34), Blackie Academic & Professional.
- Poczta, W., Pawlak, K. (2011), Potential competitiveness and competitive position of the Polish agri-foodsector on the single European market, *Berichte uber Landwirtschaft*, 89 (1): 134-169.
- Putićová, M., Mezera, J. (2011), Competitiveness of the Czech food industry, *Agricultural Economics*, 57(9): 413-421. DOI: 10.17221/89/2010-AGRICECON
- Smutka, L. Maitah, M., Svatos, M. (2018), Changes in the Czech agrarian foreign trade competitiveness – different groups of partners' specifics, *Agricultural Economics*, 64(9): 399-411. <https://doi.org/10.17221/399/2016-AGRICECON>.
- Suchecky, B., Lewandowska-Gwarda, K. (2010), Klasyfikacja, wizualizacja i grupowanie danych przestrzennych, in: B. Suchecky B. (Eds), *Ekonometria przestrzen- na. Metody i modele analizy danych przestrzennych*, Warszawa: C.H. Beck.
- Szczepaniak, I. (2014), Wyniki w handlu zagranicznym produktami rolno-spożywczymi, in: I. Szczepaniak (Ed.), *Monitoring i ocena konkurencyjności polskich producentów żywności (5) Synteza. Seria Monografie Programu Wieloletniego 2012-2014*, Warszawa: IERiGŻ-PIB.
- Turia, A., Goncalvesb, G., Mocana, M. (2014), Challenges and competitiveness indicators for the sustainable development of the supply chain in food industry, *Procedia - Social and Behavioral Sciences*, 124: 133-141. <https://doi.org/10.1016/j.sbspro.2014.02.469>
- Volek, T., Novotna, M. (2016), Labour productivity as a factor of sector competitiveness. The 10th International Days of Statistics and Economics, 8-10 September, 2016, Prague, Czech Republic.
- Wardani M.A., Mulatsih, S., Rindayati, W. (2018), Competitiveness and factors affecting Indonesian food industry's export to regional comprehensive economic partnership, *Etikonomi*, 17 (2): 185-198. DOI: 10.15408/etk.v17i2.7239
- Wijnands, J.H.M., Bremmers, H.J., Van Der Meulen, B.M.J., Poppe, K. J. (2008), An economic and legal assessment of the EU food industry's competitiveness, *Agribusiness*, 24(4): 417-439. <https://doi.org/10.1002/agr.20167>
- Wijnands, J.H.M., Meulen, B.M.J., Poppe K.J. (2007), *Competitiveness of the European food Industry. An economic and legal assessment*, Office for Official Publications of the European Communities.
- Wijnands, J.H.M., Verhoog, D. (2016), *Competitiveness of the EU food industry. Ex-post assessment of trade performance embedded in international economic theory*, LEI Wageningen UR.
- Wilson S. (2018), Assessing export competitiveness of food manufacturers in SIDS, *Competitiveness Review: An International Business Journal*, 28(4):408-432. <https://doi.org/10.1108/CR-07-2016-0038>.

- Wysocki, F., Lira, J. (2003), Statystyka opisowa, Poznań: Wydawnictwo Akademii Rolniczej im. Augusta Cieszkowskiego w Poznaniu.
- Wziątek-Kubiak, A. (2003), Konkurencyjność polskiego przemysłu, Warszawa: Wydawnictwo Bellona.
- Zawiślińska, I. (2003), Gospodarka Kanady przełomu wieków. Międzynarodowa pozycja konkurencyjna, Warszawa: Oficyna Wydawnicza SGH.

Katarzyna Łukiewska, PhD, is an assistant professor in the Department of Enterprise Economics at the Faculty of Economic Sciences of the University of Warmia and Mazury in Olsztyn. She holds a PhD in the measurement and assessment of the international competitiveness of the food industry. Her research interests include competitiveness, innovation, the productivity of sectors and using mathematical and statistical methods in the study of economic phenomena.