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Competitiveness of Agriculture in New Member States of the European Union

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Abstract:

Purpose: *This paper aims to evaluate the competitiveness of agriculture in new member states of the European Union.*
Design/Methodology/Approach: *The competitiveness of agriculture was evaluated based on characteristics describing relations between production factors, their productivity, and the significance of agriculture in international trade. The survey was carried out for 2007 and 2017 using selected cluster analysis methods and principal component analysis (PCA).*
Findings: *In both analyzed years, two groups of countries having similar characteristics describing the competitiveness of agriculture were identified. A clear difference was observed between new and old EU member states in terms of the agricultural sector's competitiveness. The first group characterized by better values adopted for the analysis of variables in 2007 was countries of the so-called "old Union," consisting of 15 member states (excluding Portugal and Greece), and in 2017 this group did not include Austria. An additional value of the survey was that it identified the characteristics that had the largest share in explaining the variability of the analyzed phenomenon, creating grounds for formulating recommendations concerning measures in the European Union's agricultural policy.*
Practical Implications: *Considering the diagnosed factors that, to the largest extent, determined the classification of the countries to a specific group according to the level of agricultural competitiveness, it is possible to formulate recommendations regarding measures undertaken under CAP. They should be oriented at boosting the dynamics of structural changes in the agriculture of new member states.*
Originality/Value: *This paper focuses on a wide range of variables. Groups of countries most similar in terms of agricultural competitiveness were identified, and the characteristics of countries that had the largest influence on the above-mentioned classification were compared and defined.*

Keywords: *Competitiveness, agriculture, new member states, cluster analysis, PCA.*
JEL Codes: *O13, O47, Q12, C10.*
Paper Type: *Research Paper.*

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1. Introduction

Competitiveness is currently a key issue in the micro-, meso- and macroeconomic approach. Obtaining results better than those of competitive objects guarantees permanent development in the competitive market environment. Competitiveness is a complex issue (Giap *et al.*, 2017). This phenomenon's complexity is even deeper in the face of present-day challenges and the concept of sustainable development in agriculture. Many definitions of competitiveness and many surveys often adopt their own definition and choose a specific method of measurement (Siudek, Zawojska 2014; Sarker, 2014). According to one of the definitions, competitiveness is the ability to effectively compete with other entities to pursue analogous objectives (Latruffe 2010).

The Organisation for Economic Co-operation and Development (OECD) defines competitiveness as the "ability of companies, industries, regions, nations, and supranational regions to generate while being and remaining exposed to international competition, relatively high factor income, and factor employment levels on a sustainable basis" (Hatzichronologou, 1996). The European Commission uses the following definition: "a sustained rise in the standards of living of a nation or region and as low a level of involuntary unemployment as possible" (European Commission, 2009). Latruffe (2010) emphasizes that competitiveness is a relative measure. However, this is a broad concept, and a single agreed definition or method of its measurement does not exist.

Competitiveness was a term used concerning agriculture in scientific publications in the 1980s. Then, it mostly referred to the size of farms and benefits related to the scale of their operation. With time, agricultural competitiveness was associated with production systems, and in particular, with relationships between these systems and farm size, effectiveness, and productivity. The number of determinants of competitiveness in agriculture has been regularly increased; these include economic, organizational, psychological, and sociological factors (Schaper *et al.*, 2011). Also, agricultural competitiveness in the sector-based approach is defined, for instance, as continuing high profitability and ability to maintain a share in the domestic market and/or export markets (Ekman and Gullstrand, 2006). Furthermore, agricultural competitiveness in the spatial context is a bundle of unique abilities resulting from available resources and their mutual relations that are difficult for competitors to imitate and accomplish. Thus, competitiveness is a multivariate characteristic following the internal characteristics of agriculture of a specific country, connected with adapting to the changing environment.

To achieve a specific competitive position, understood as the result of competition, a sufficient competitive potential must be built (Jambor and Babu, 2016). Thus, evaluating the competitiveness of the agricultural sector, the production potential must be treated as a competitive advantage source. Adequate utilization of the agricultural

production potential in a specific country may result in production performance higher than in other countries and thus create a competitive advantage (Tłuczak, 2019). In respective countries, this potential is a derivative of the impacts of different groups of factors, including the size of production factors, their mutual relations, and method of use (Frohberg and Hartman, 1997). According to Latruffe (2010), competitiveness should be evaluated based on more than one element. Therefore, apart from evaluating the competitive potential, the competition results should also be considered in the survey.

Table 1. *Selected surveys concerning agricultural competitiveness in countries of the European Union*

Author and year of publication	Years covered by the survey	Scope of survey
Gopinath *et al.* (1997)	1974–1993	The surveys covered the competitiveness of agriculture in the USA and selected EU countries. Changes in total factor productivity (TFP) of agriculture were determined.
Gorton, Davidova, Ratinger (2000)	1994-1996	The surveys referred to agricultural competitiveness in Bulgaria and the Czech Republic compared to international markets and the EU.
Ball, Butault San Juan, Mora (2010)	1973–2002	The object of the survey was the international competitiveness of agriculture in the European Union and the United States. A gap was identified in the competitiveness and productivity of agriculture between the EU and the US.
Kravčáková Vozárová (2013)	2007-2012	The survey referred to agricultural competitiveness in countries of the European Union from the perspective of trade in agricultural products.
Carraresi, Banterle (2015)	1995-2011	The analysis covered the competitiveness of agriculture and agricultural and food industry in the EU, as well as the effect of the expansion of the EU and the economic downturn on the competitiveness of respective countries.
Nowak (2016)	2007-2014	The surveys were concerned with evaluating the competitiveness of agriculture in the countries of Central and Eastern Europe in relation to agriculture in the countries of the so-called old Union. Partial indicators of productivity of the production factors (land, labour, capital) were adopted as a measure of competitiveness.
Rzeszutko, Kita (2018)	2005-2013	Changes of competitiveness of Polish agriculture were investigated in comparison to other European countries with a similar production structure: Denmark, Germany, the Czech Republic, Slovakia, Hungary, Estonia, Latvia and Lithuania.

Source: *Own elaboration based on the review of literature.*

The European Commission (2008) emphasizes that productivity is the most reliable indicator of competitiveness in the long-term perspective. In such an aspect, surveys concerning the competitiveness of agriculture were carried out, among other researchers, by Gopinath *et al.* (1997) and Ball *et al.* (2010). In turn, many authors make use of trade-related measures of competitiveness (Pawlak, 2012, Matkovski *et al.*, 2019). An argument for evaluating competitiveness in this context is that

increasing the export volume of food and other agricultural products opens possibilities of developing the production to domestic producers (Xiao and Reed, 2007). However, in most of the available surveys, usually only one competitiveness evaluation aspect is considered. A review of selected analyses of the competitiveness of agriculture in EU countries points to various aspects of this phenomenon and, consequently, various measures adopted for analyses. At the same time, this is a confirmation of a wide scope of the term "competitiveness" and the fact that reference literature lacks a consensus regarding the scope of the definition and measurement methods.

The diversity of agriculture in the European Union countries and regions in terms of its structure, production, soil conditions, and climate allows certain specialization. The member states of the European Union also have different economic, social, cultural, and environmental conditions that influence the directions and possibilities of development of the agricultural sector (Cuerva 2011; Kijek *et al.*, 2019). This diversification became more intense after the subsequent stages of EU expansion. The admission of countries of Central and Eastern Europe to the Community in 2004, 2007, and 2013 increased the scale of agricultural production and the significance of agriculture in the EU, but on the other hand, gave rise to structural problems and the necessity to reduce the distance between agriculture in Eastern bloc countries and the so-called "old Union" countries. For this reason, as Martinho (2018) emphasizes, all surveys aiming to identify and describe agriculture and group the countries according to similar characteristics of agriculture are valuable. They help make strategic decisions concerning the agricultural sector, both at the regional, national, and supranational levels.

Thus, this is a significant prerequisite for investigating the diversification of the level of agricultural competitiveness of the European Union member states. Therefore, this paper aims to evaluate the competitiveness of agriculture in new member states of the European Union. The survey was carried out for EU member states in 2007 and 2017, using a chosen multivariate comparative analysis method and PCA.

2. Materials and Methods

Agricultural competitiveness was evaluated for 28 countries of the European Union, focusing on 13 new member states admitted to the EU in 2004, 2007, and 2013. The choice of years for analyses was determined by the availability of numerical data and the fact that in 2007 the EU expanded again after the accession of Bulgaria and Romania. This also made it possible to evaluate changes that took place over ten years in the competitiveness of new member states of the EU.

The competitiveness of agriculture was evaluated for 28 countries of the European Union, and the adopted survey period 2007-2017 made it possible to analyze the group of all the 13 new member states that joined the European Union in 2004 (Cyprus,

Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia), 2007 (Bulgaria, Romania) and 2013 (Croatia). The subjective scope and time range adopted for the survey made it possible to evaluate changes in the level of agricultural competitiveness of the countries of the European Union that took place over ten years, with a special emphasis on and an indication of the reasons for changes in the agriculture of new EU member states. The analysis was based on EUROSTAT data and data from the European Farm Accountancy Data Network (FADN). Table 2 presents the variables used in evaluating the competitiveness of agriculture in the member states of the EU.

Table 2. *Agricultural competitiveness evaluation indicators*

Symbol	Variable
X1	Average economic size of a farm (EUR)
X2	Average farm area (ha)
X3	Number of workers per 100 ha of agricultural land (AWU/100 ha)
X4	Total expenses per 1 ha of agricultural land (EUR/ha)
X5	Fixed assets per 1 FTE (EUR/AWU)
X6	Gross Investment per 1 ha (EUR/ha)
X7	Land productivity (production per 1 ha of agricultural land) (EUR/ha)
X8	Farm Net Value Added per 1 AWU (EUR/AWU)
X9	Current productivity of capital (production per 1 EUR of total expenses) (EUR)
X10	Potential productivity of capital (production per 1 EUR of fixed assets) (EUR)
X11	Workforce profitability (income per farm per 1 AWU) (EUR/AWU)
X12	Land profitability (income per farm per 1 ha of agricultural land) (EUR/AWU)
X13	Yield of wheat (dt/ha)
X14	Milk yield (kg/cow)
X15	Share of the country in the value of agricultural production of the EU (%)
X16	Share of the country in the EU export of products from group 0+1 according to SITC (%)

Source: *Own study.*

Before the multivariate analysis, the correlation of characteristics and indicators strongly correlated with other indicators were removed from the data set. The selected data were also standardized to avoid the impact of different units of parameters on Euclidean distance. The hierarchical analysis of clusters was applied to determine similarities between countries regarding agricultural competitiveness and group them into clusters according to the analyzed characteristics.

The results of analyses were presented in a graphic form as a dendrogram. The clustering algorithm was based on Euclidean distance and Ward's method. The dendrogram analysis in terms of differences in distance between subsequent nods made it possible to determine the number of clusters each year. The principal component analysis was used to present the EU countries on a two-dimensional scatter plot and identify the features characteristic of groups determined in the cluster analysis. The variables that turned out to be the most important for explaining the variability and competitiveness of agriculture were indicated. All calculations and graphs were made using the Statistica 13.1 package (StatSoft 2013).

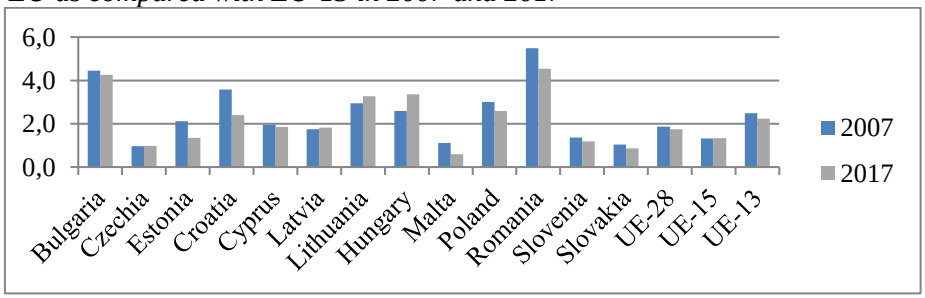
3. Results

Differences in the development level between developed and developing countries are mainly due to structural changes in the long-term process of their socio-economic development. The significance of the agricultural sector decreased for the sake of the industry and service sector. Nevertheless, due to agriculture's fundamental function, providing food security and functions related to protecting the natural environment or conservation of cultural values, it still plays an essential role in the economy. In the past, agriculture in developed countries underwent structural transformation much earlier (Gollin, Parente, and Rogerson, 2002), thanks to which they were able to improve the efficiency of management considerably.

The significance of agriculture in EU countries was analyzed in many scientific papers (van Arendonk, 2015, Špirková *et al.*, 2017, Bański, 2018), and such surveys are important because agriculture is an important sector of the economy for most of the new member states. Aligning agriculture with the Common Agricultural Policy requirements was a serious challenge for the EU and countries successively joining the Community (Kiss, 2011). It was accompanied by structural transformations in agriculture, including the impact of this sector on macroeconomic indicators. The relationship between agriculture and economy is expressed based on its share in creating Gross Value Added (Baer-Nawrocka, 2016).

As a rule, the higher the level of socio-economic development, the lower this share (Csaki and Jambor, 2009). Such a trend can also be observed in most new member states of the EU. These changes may be perceived as the right direction of transformations in these countries' economic structures (Baer-Nawrocka, 2016). Romania and Bulgaria are currently among the countries with the highest impact on creating Gross Value Added. The average share of agriculture in GVA in the group of new member states (EU-13) amounted to 2.2% and 2.5%, respectively, in 2017 and 2007. On the other hand, in the countries forming the "old Union" (EU-15), this percentage in analyzed years were, on average, 1.3% (Figure 1).

Figure 1. *Share of agriculture in Gross Value Added (GVA) in new member states of the EU as compared with EU-15 in 2007 and 2017*



Source: *Own elaborations based on data from Eurostat.*

Tables 3 and 4 present descriptive statistics of variables adopted to determine the competitiveness of agriculture in the European Union countries. They also indicate countries in which the specific variable assumed the minimum and the maximum value. In 2007 the average farm area was characterized by the largest variability, and in 2017 it was the number of workers per 100 ha of agricultural land. The least varied characteristics in both analyzed years were capital productivity and milk yield of cows.

Table 3. *Descriptive statistics of variables describing competitiveness of agriculture in the EU countries in 2007.*

Variable	Mean	Minimum	Maximum	Stand deviation	Variation
X1	97.2	7.1 Romania	312.6 Netherlands	94.1	97%
X2	74.8	3.1 Malta	584.0 Slovakia	113.2	151%
X3	8.1	1.4 UK	48.1 Malta	10.1	124%
X4	182.4	33.8 UK	1217.7 Malta	249.3	137%
X5	218734.2	9000.8 Bulgaria	984978.4 Denmark	255130.7	117%
X6	440.4	64.9 Spain	2194.2 Netherlands	477.8	108%
X7	2601.5	678.6 Latvia	13101.6 Malta	2860.4	110%
X8	21393.9	2223.8 Romania	60277.4 Denmark	15376.0	72%
X9	1.1	0.8 Finland	1.7 Spain	0.2	19%
X10	0.4	0.04 Ireland	0.9 Bulgaria	0.2	58%
X11	12561.0	430.4 Slovakia	30291.6 Luxembourg	8764.6	70%
X12	784.2	13.3 Slovakia	5523.1 Malta	1064.0	136%
X13	47.3	15.9 Portugal	82.9 Ireland	18.4	39%
X14	6227.2	3552.6 Romania	8584.1 Finland	1265.0	20%
X15	3.6	0.03 Malta	18.4 France	4.8	134%
X16	3.6	0.05 Malta	16.3 Netherlands	4.9	137%

Source: *Own study.*

Table 4. *Descriptive statistics of variables describing competitiveness of agriculture in the EU countries in 2017.*

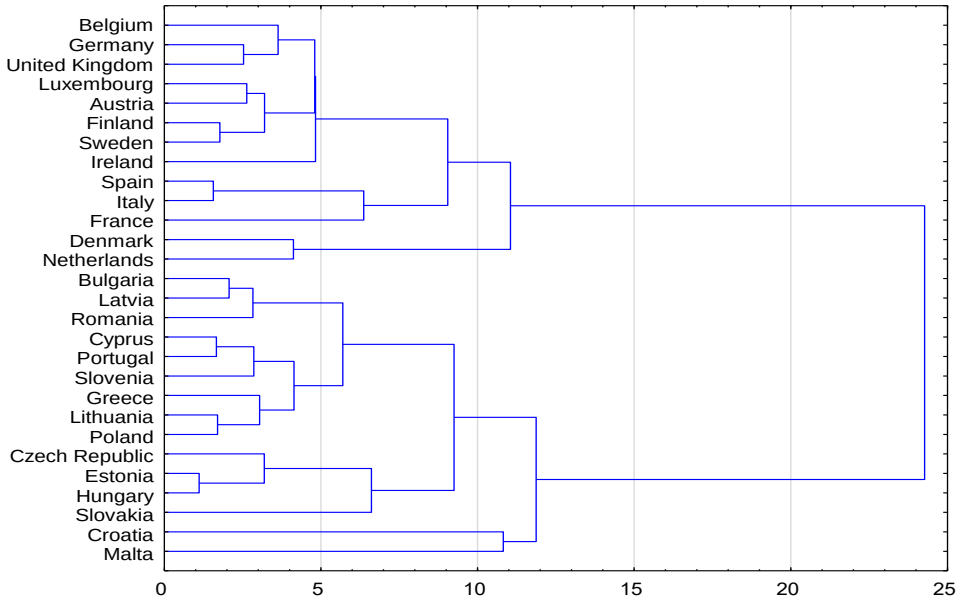
Variable	Mean	Minimum	Maximum	Stand Dev.	Coefficient of variation
X1	97.2	7.1 Romania	312.6 Netherlands	94.1	97%
X2	74.6	2.75 Malta	500.7 Slovakia	96.6	130%
X3	6.6	1.4 UK	48 Malta	8.9	135%
X4	2699.9	804.1 Lithuania	12531.3 Netherlands	2896.1	107%
X5	281000.3	28542.7 Romania	1209455.7 Denmark	302150.8	108%
X6	427.7	80.6 Spain	2106.2 Netherlands	416.9	97%

X7	3047.6	823.7 Lithuania	15434.2 Malta	3556.2	117%
X8	26107.6	5956.9 Slovenia	82666.7 Denmark	18274.8	70%
X9	1.1	0.8 Finland	1.6 Italy	0.2	17%
X10	0.4	0.09 Ireland	0.8 Slovakia	0.2	57%
X11	15168.0	592.8 Slovakia	32055.9 Luxembourg	9239.5	61%
X12	774.3	14.4 Slovakia	4120.4 Malta	833.2	108%
X13	59.2	16.3 Cyprus	100.9 Ireland	21.9	37%
X14	6858.0	2913.04 Bulgaria	9612.6 Denmark	1654.3	24%
X15	3.6	0.03 Malta	17.1 France	4.6	130%
X16	3.6	0.1 Malta	15.7 Netherlands	4.6	128%

Source: *Own study.*

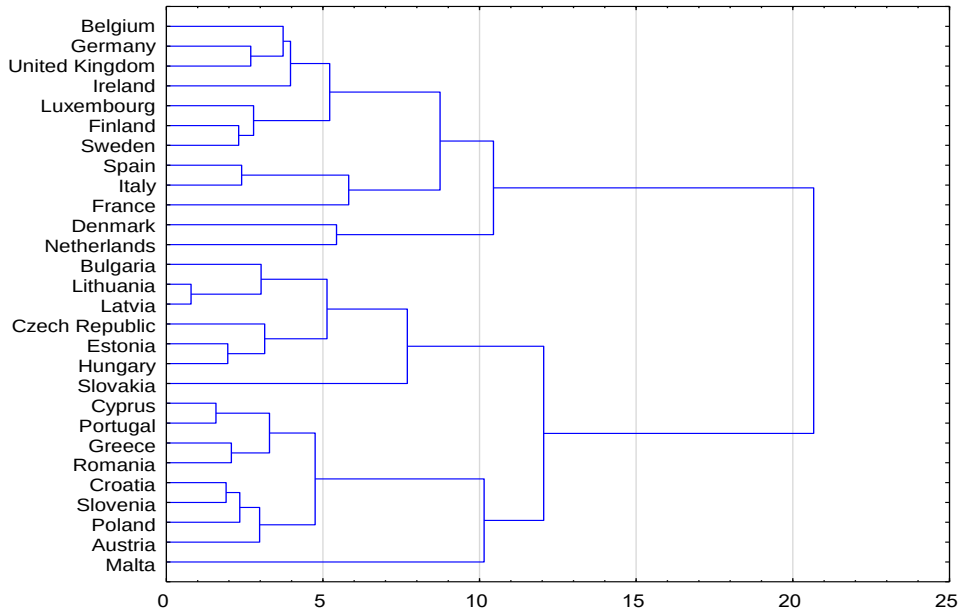
Before the hierarchical cluster analysis, the correlations between indicators describing agricultural competitiveness were investigated. Because total expenses (X4) and land productivity (X7) were strongly correlated with other variables (correlation coefficient exceeding 0.85), they were not included in the subsequent stages of analysis. Based on the other parameters, the analysis of clusters was carried out. The results were presented in a graphic form as dendrograms, separately for 2007 and 2017 (Figures 2 and 3).

Figure 2. *A dendrogram of the hierarchical cluster analysis based on the Euclidean measure and Ward's method for European Union countries in 2007*



Source: *Own study.*

Figure 3. *A dendrogram of the hierarchical cluster analysis based on the Euclidean measure and Ward's method for European Union countries in 2017*



Source: *Own study.*

Following the analysis of differences in distance between subsequent nodes on the dendrograms, for each analyzed year, two groups of countries with similar characteristics describing the competitiveness of agriculture were identified (Table 5). In 2007 the first group consisted of 13 countries, and 15 countries were classified as the second group. In turn, in 2017, due to a change in the evaluation of Austria's position, the first group was made up of 12 countries, and the second of 16. In both analyzed years, the group of countries with a high level of agricultural competitiveness consisted of countries making up the so-called "old Union," except Portugal and Greece, in 2007 and Austria in 2017.

There are clear differences between the two groups. Farms from less competitive countries were characterized by a twice smaller economic size and three times higher number of workers per 100 ha of agricultural land. The average workforce productivity expressed as net value added per 1 worker in 2007 was 34746.4 Euro in the 1st group of countries and 8995.1 Euro in the 2nd group. In 2017 the difference in the level of this indicator between the two groups of countries was three-fold. As suggested by the survey, in the EU market, agriculture plays a clearly smaller role in countries' 2nd group. The average share of these countries in EU production was 1.4% in both analyzed years, while in group 1, it was above 6%. Similar relationships can also be observed concerning the share in the export of agricultural and food products. Countries from group 1 prevail here. A clear difference can be observed between new and old EU member states regarding the agricultural sector's competitiveness. This

diversity was noted by many authors, e.g., Nowak *et al.* (2016), and Barath and Fertő (2017). Csaki and Jambor (2019) emphasize that transformation of the political system and accession to the European Union had a large influence on the present situation of agriculture in Central and Eastern Europe.

Table 5. *Division of EU countries according to agricultural competitiveness*

2007		**2017**	
Group 1	Group 2	Group 1	Group 2
Belgium, Germany, United Kingdom, Luxembourg, Austria, Finland, Sweden, Ireland, Spain, Italy, France, Denmark, Netherlands	Bulgaria, Latvia, Romania, Cyprus, Portugal, Slovenia, Greece, Lithuania, Poland, Czech Republic, Estonia, Hungary, Slovakia, Croatia, Malta	Belgium, Germany, United Kingdom, Ireland, Luxembourg, Finland, Sweden, Spain, Italy, France, Denmark, Netherlands	Bulgaria, Lithuania, Latvia, Czech Republic, Estonia, Hungary, Slovakia, Cyprus, Portugal, Greece, Romania, Croatia, Slovenia, Poland, Austria, Malta

Source: *Own study.*

The tree structures suggest that in 2007, from the point of view of the analyzed characteristics, countries that were most similar in the evaluation were: Estonia and Hungary; Spain and Italy; Lithuania and Poland; Cyprus and Portugal; Finland and Sweden (Figure 2). In 2017 the largest similarity was observed between Lithuania and Latvia; Cyprus and Portugal; Croatia and Slovenia; Greece and Romania; and Estonia and Hungary (Fig. 3). The lowest similarity in 2007 was recorded for Malta and Croatia (Figure 2). However, in 2017, Malta is distinct from Cyprus, Portugal, Greece, Romania, Croatia, Slovenia, Poland, and Austria (Figure 3).

The next step of the analysis was applying PCA to reduce the data space's size and present countries on a single scatter plot. The aim was to compare them and define those characteristics of the country that had the largest impact on the above groups' determination. As no significant difference was found between countries belonging to specific groups in 2007 and 2017 (Austria was the exception), further actions were taken only for 2017. The results of the analysis indicated that four eigenvalues exceeded 1. Thus, four new factors (PC1, PC2, PC3, PC4) were determined, which explained 80.3% of the whole system's variability. Factor loadings for 2017 were presented in Table 6.

Table 6. *Matrix of factor loadings calculated on the basis of agricultural competitiveness indicators ([a] strongly correlated factor loadings; [b] medium correlated factor loadings)*

2017	PC1	PC2	PC3	PC4
X1	-0.80[a]	0.23	-0.37	-0.22
X2	-0.25	0.72[b]	-0.39	-0.11
X3	0.44	-0.66[b]	-0.51	-0.08
X5	-0.84[a]	-0.22	0.10	0.37
X6	-0.51	-0.50	-0.52[b]	-0.01
X8	-0.95[a]	-0.12	0.05	0.00

X9	0.24	-0.66[b]	0.42	-0.36
X10	0.15	0.67[b]	-0.24	-0.56
X11	-0.79[a]	-0.38	0.28	0.03
X12	0.03	-0.85[a]	-0.43	-0.21
X13	-0.73[b]	0.15	0.37	0.07
X14	-0.67[b]	0.10	-0.33	0.05
X15	-0.29	-0.12	0.47	-0.70[b]
X16	-0.66[b]	-0.06	-0.09	-0.36
Eigenvalue	4,99	3,14	1,81	1,31
Variance %	35,61	22,44	12,94	9,35

Source: *Own study.*

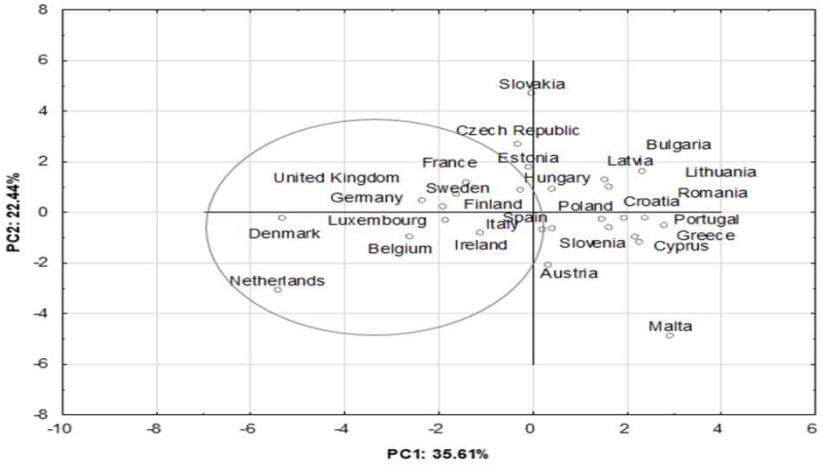
Taking into consideration the coefficients in table 6, the following conclusions can be formulated. The factor analysis reduced the set of 14 parameters initially used to describe the competitiveness of agriculture to four variation factors (VF) necessary for identifying the level of competitiveness of agriculture:

- resources and income (VF1)
- performance (VF2)
- gross Investment per 1 ha (VF3) and share in the agricultural production of the EU (VF4).

If the factor loadings between agricultural competitiveness parameters and VF coefficients are 0.75–1.00, the values are strongly correlated, while at 0.50–0.75, they are moderately correlated. The first two PCA axes accounted for 58% of the total variation in data (Fig 4, 5). The first factor (PC1) was strongly correlated with X1, X5, X8, X11, and moderately correlated with X13, X14, X16. The second factor (PC2) was strongly correlated with X12 and moderately correlated with X2, X3, X9, X10. The next two factors were, on average, correlated with X6 (PC3) and X15 (PC4). Strong positive correlations were observed between X2 and X10; between X3, X9, and X12 and between X1, X13, X14, X16, X8, and between X5, X11, X6. On this basis, four parameters, average economic size of the farm (X1), fixed assets per 1 FTE (X5), Farm Net Value Added per 1 AWU (X8), and land profitability (X12), were selected as the most important in explaining the variation in the data set (Figure 5).

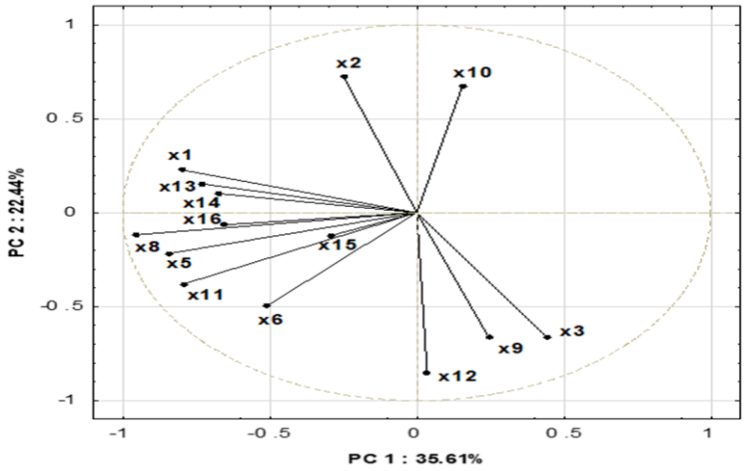
PCA made it possible to present EU countries on a two-dimensional scatter plot on the PC1-PC2 level. The ellipse marks countries from the first group (2017) clearly separated from other countries. Thus, it can be concluded that between the above-mentioned groups (group 1, group 2), there are evident differences in the values of parameters considered. Moreover, Figure 5 indicates that group 1 consists of countries characterized by much higher values of X1, X5, X8, X11, X13, X14, X16 characteristics than in the case of countries from group 2 (2017). These parameters also have the largest share (35.61%) in explaining the analyzed phenomenon's variability. Other factors account for, respectively: PC2 22.44%, PC3, that is, Gross Investment per 1 ha - 12.94%, PC4, that is, the share of agriculture in agricultural production of the EU - 9.35% of the variability in the competitiveness of agriculture.

Figure 4. *Scatter plot for EU countries in the system of coordinates PC1-PC2 (2017)*



Source: *Own study.*

Figure 5. *Principal component analysis (PCA) for agricultural competitiveness of indicators 2017*



Source: *Own study.*

4. Conclusions

The study evaluated the level of agricultural competitiveness in new member states of the European Union. The survey was carried out for 2007 and 2017 using selected cluster analysis methods and principal component analysis (PCA). Simultaneously, four principal factors identifying agricultural competitiveness were indicated: resources and income, performance, Gross Investment, and share of the country in the value of agricultural production of the EU. The most important parameters, best accounting for the variability of the analyzed dataset, were the average economic size

of a farm, technical resources (fixed assets per 1 FTE), workforce productivity (Farm Net Value Added per 1 AWU) land profitability.

In both analyzed years, two groups of countries having similar characteristics describing the competitiveness of agriculture were identified. Based on the analyses, a clear difference was observed between new and old EU member states regarding the agricultural sector's competitiveness. In both analyzed years, the group of countries with highly competitive agriculture consisted of countries making the so-called "old Union," except Portugal and Greece, in 2007 and except Austria in 2017. All new member states of the European Union were classified as countries with a low agricultural competitiveness level.

The classification of these countries to group 2 was largely determined by values such as economic size, technical resources, workforce productivity and profitability, wheat yield, milk yield of cows, and share in the EU export of agricultural and food products considerably lower than in group 1. Although most new member states have been members of the EU for more than ten years, none of them improved its competitiveness to an extent allowing reclassification to group 1 comprising countries with highly competitive agriculture. Considering the factors that, to the largest extent, determined the classification of countries to a specific group, the Common Agricultural Policy should be oriented at boosting the dynamics of structural changes in the agriculture of many new member states. To meet the competition requirements on the European single market, many member states must modernize their agricultural sector by improving the efficiency and economic force of farms through structural transformations. Reasons for taking up measures to accelerate structural transformations include, in the first place, improvement in the competitiveness of the sector and rational utilization of production factors. Defective agricultural structures often lead to applying wrong production technologies, and both areas imply low productivity of production factors.

The contribution of these authors to the investigation of agricultural competitiveness is twofold. Firstly, contrary to most of the previous surveys concerning agricultural competitiveness, they focus on a wide spectrum of variables, including relations between production factors, productivity, and the significance of agriculture for international trade. Secondly, the survey identified groups of countries most similar in terms of agricultural competitiveness, and the characteristics of the country that had the largest influence on the above-mentioned classification were compared and defined. According to the authors' knowledge, the presented surveys are new and contribute to the literature on agriculture's competitiveness.

The presented paper is subject to certain methodological limitations, which can set the directions for future surveys. The object of analysis is the agricultural sector in the respective EU countries. Considering the regional differentiation of agricultural production's natural and economic conditions, surveys concerning agricultural

competitiveness at the NUTS level would be of high cognitive value. Another interesting direction of study would be developing a synthetic measure based on a wide spectrum of variables that determine the competitive position of the agricultural sector and expand the surveys to cover the period before the accession of new member states to the EU.

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