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ECONOMIC PERFORMANCES OF AGRICULTURE OF CEFTA AND FORMER CEFTA COUNTRIES[1]

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Summary

All CEFTA countries had very similar stages of economic development after World War II. Many of them were centrally-planned socialist economies and the political changes that have occurred in these countries in the late 20th century caused changes in the whole economic system, as well as in the agricultural sector. Aim of this paper is to compare economic performances of agriculture of these countries with former CEFTA countries (Poland, Czech Republic, Slovakia, Hungary, Slovenia, Bulgaria, Romania and Croatia) which joined EU after 2004. The development performances of agriculture are considered according to the production and export performances of this economic sector, using a comparative approach. The results showed that there is a gap in development of agriculture between CEFTA countries and selected EU countries, so performances of agricultural sector are far from EU.

Key words: *Agriculture, Promethee method, Cluster analysis, EU, CEFTA.*

JEL: *Q17, Q18, F15*

Introduction

The economic performance of the agricultural sector is difficult to define precisely and comprehensively. Many authors have considered a variety of indicators to explain this term. Some studies use partial labour productivity, capital productivity and land productivity (Van

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Passel et al., 2007). In order to evaluate position of Slovakian agriculture in EU (European Union), Szabo and Grznar (2015) used the following indicators – agricultural production for the evaluation of effectiveness, intermediate consumption, fixed assets, labour force, levels of livestock, and supports/subsidies for the rendition of the level of inputs. In their study of the agriculture sector of the Western Balkans, Nikolic et al. (2017) used share of agriculture in total employment, net production index number, balance of agriculture product trade, agricultural gross value added as variables that describe importance of agricultural sector. Usually, unavailability of some data for all observed countries has influence on the selection of variables.

The Central European Free Trade Agreement (CEFTA) is a trade agreement between non-EU countries, members of which are now mostly located in Southeastern Europe. Founded in 1992 by Poland, Czechoslovakia and Hungary, CEFTA has been significantly transformed (Table 1). Its essential purpose, as contained in the founding Treaty signed in Cracow in December 1992 was to liberalize their mutual trade in a timescale which paralleled trade liberalization with the EU (Dangerfield, 2006). Today, members of CEFTA are Serbia, Bosnia and Herzegovina, Montenegro, Macedonia, Albania, Moldova and Kosovo (as UNMIK). Other countries have left CEFTA after their accession to EU.

Table 1. Members of CEFTA

Members of CEFTA	Joined	Former members of CEFTA	Joined	Left
FYR Macedonia	2006	Hungary	1992	2004
Serbia	2007	Czech Republic	1992	2004
B&H	2007	Slovakia	1992	2004
Albania	2007	Poland	1992	2004
Moldova	2007	Slovenia	1996	2004
Montenegro	2007	Romania	1997	2007
Kosovo (as UNMIK)	2007	Bulgaria	1999	2007
		Croatia	2003	2013

Source: CEFTA Portal, 2017

CEFTA is very important for Western Balkan countries. As Kikerova (2009) concluded, in only two years of implementation, the CEFTA agreement achieved noticeable positive effect in the form of significant growth of total trade in goods between these countries. On the other hand, CEFTA has played a modest, but useful role in the EU enlargement process, at no stage was there any serious intention (or possibility) that it would be anything other than an interim arrangement to serve a basic market integration function as a part of EU pre-accession (Dangerfield, 2006). Deeper integration within the CEFTA agreement, in preparation for entry into the EU, is crucial purpose of this agreement, because all countries belonging to CEFTA agreement are in different stages of the EU integration process, with the exception of Moldova (Table 2).

Table 2. CEFTA countries in process of EU integration

Country	Status	Year	Open negotiations
FYR Macedonia	Candidate country	2005	No
Montenegro	Candidate country	2010	Yes
Serbia	Candidate country	2012	Yes
Albania	Candidate country	2014	No
B&H	Potential candidate	-	No
Kosovo (as UNMIK)	Potential candidate	-	No
Moldova	-	-	-

Source: European Commission, 2017 (ec.europa.eu)

The aim of this paper is identification and comparison of the economic performances of agriculture in current and former CEFTA countries. First, the importance of agriculture in the overall economy will be determined in these countries by the following indicators: the share of agriculture in GDP, the share of agriculture in total employment and the share of agriculture in foreign trade. Then, this paper will provide an answer to the question of difference in economic performances of agriculture of CEFTA countries and former CEFTA countries that became members of EU. Economic performances are observed according to production performances and export performances. Also, the Netherlands, Germany and France are included in analysis as a benchmark due to their overall economic development.

Materials and methods

Analysis of agricultural performances of CEFTA and selected EU countries is divided in two stages. In the first stage, the goal was to group selected countries by importance of agriculture in their economy. In order to achieve this goal, cluster analysis was performed. Cluster analysis is the modern statistical method of partitioning an observed sample population into relatively homogeneous classes, to produce an operational classification (Stanojević et al., 2017). The objective is to sort observations into groups called clusters so that the degree of statistical association is high among members of the same group and low between members of different groups (Berlage and Terweduwe, 1988). The grouping in cluster analysis was based on the results (scores) calculated according to the characteristic values of all the variables, separately for each observed unit. K-means method was used in this study in order to divide countries in only two groups. The goal of the K-means method is to split the total number of observations into a prearranged number of k homogenous groups based on preferred characteristics (Lattin et al., 2003). The indicators of the agricultural importance in the economic development were used as variables are:

X1 - Share of agriculture in GDP (%);
X2 - Share of agriculture in total employment (%);
X3 - Share of agriculture in total export (%).

In the second stage, the goal was to rank selected countries by economic performances of their agriculture. In order to achieve this goal, the PROMETHEE method was used as

an adequate method for solving problems whose aim is multi-criteria ranking of final set of alternatives based on a number of criteria which need to be maximized or minimized (Nikolić et al., 2017). For each observed alternative it calculate its value expressed in level of preferences. Thereby, each alternative is evaluated based on the two preference flows. Positive preference flow φ + (P) indicate how much is given alternative better than the other (according to all criteria). Accordingly, the higher this preference flow is, the alternative is better. The negative flow of preference φ - (P) indicates how much a given alternative is worse than the rest, and therefore if this flow is lower, the alternative is better. After that, the PROMETHEE method accounts net preference flow φ (P) as the difference between these two flows (Brans, Mareschal, Vincke, 1984; Brans, Vincke, 1985). The multi-criteria analysis was conducted by using the Visual PROMETHEE software package in order to rank selected countries by their performances of agriculture. Economic performances of agriculture are described by variables given in Table 3. Variables Y1, Y2, Y3 and Y4 are indicators of production performances, while other variables are indicators of export performances.

Table 3. Indicators of economic performances of agriculture

Mark	Variable	Unit	Description
Y_1	Structure of resources in agriculture	ha/active farmer	Represented by the relationship land/labour. In the development of agriculture, land/labour ratio is the dominant factor for selection of production technology (chemical-biological and/or mechanical), i.e. it has a crucial influence on preferences towards labour-saving or land-saving technologies.
Y_2	Land productivity in agriculture	$/ha	The ratio of value of agricultural products to the area of agricultural land in use. It can be indicator of intensification of production.
Y_3	Labour productivity in agriculture	$/active farmer	The ratio of value of agricultural products to the number of active farmers. Higher values indicate more effective absorption of the labour factor in agricultural production, and consequently a higher residual income per unit of agricultural labour
Y_4	Share of livestock production in total agricultural production	%	The ratio of value of livestock production to total agricultural production. Lower level of this share indicate that agriculture is extensive i.e. the agricultural structure was dominated mainly by lower-value, plant-origin products, which were insufficiently used for conversion into livestock products with higher added values
Y_5	Export of agricultural products per hectare of agricultural land	$/ha	The ratio of export value of agricultural products to the area of agricultural land in use. This is indicator of export performances of agriculture.
Y_6	Export of agricultural products per active farmer	$/active farmer	The ratio of export value of agricultural products to import value. Higher values indicate better export performances of agriculture.

Mark	Variable	Unit	Description
Y_7	The export/import coverage of the agricultural products	%	The ratio of export value of agricultural products to the number of active farmers. Values above 100% indicate positive trade balance of agricultural products.

Source: Author

The empirical research was based on the data of the Food and Agriculture Organization (FAO), especially the data related to the resources, production and foreign trade of agricultural products in the period 2011-2013. The data of share of agriculture in gross domestic product (GDP) and GDP per capita were taken from World Bank database.

Results and discussion

Analysis of economic performances of agriculture in CEFTA and former CEFTA countries is divided in two sections. In first, economic relevance of agriculture is observed, while in second production and export performances are analyzed. Table 3 presents the economic relevance of agriculture in the CEFTA countries, as well as a synthetic indicator of socio-economic development – GDP per capita. According to Nowak and Kaminska (2016), Netherlands, Germany and France are three countries with the highest performances of agricultural sector in EU. Because of that, these countries are included in analysis as a benchmark of the level of agricultural development (Table 4). Beside these countries, the highest level of GDP per capita is recorded in Slovenia (20,729 euro), Czech Republic (17,557 euro), Slovakia (16,089 euro), Poland (12,559 euro) and Hungary (12,366 euro). All of these countries joined EU in 2004.

Table 4. Economic relevance of agriculture in the CEFTA countries (average for period 2011-2013)

Country	Share of agriculture in GDP (%)	Share of agriculture in total employment (%)	Share of agriculture in total export (%)	GDP per capita ($)
Netherlands	1.78	2.30	13.39	44,290
Germany	0.85	1.53	5.62	41,178
France	1.76	2.97	12.55	36,353
Slovenia	2.15	8.47	5.82	20,729
Czech Republic	2.56	3.03	4.62	17,557
Slovakia	3.63	3.20	5.15	16,089
Poland	3.16	12.50	11.44	12,559
Hungary	4.60	4.93	8.79	12,366
Croatia	4.51	12.53	11.34	11,593
Romania	6.26	29.43	9.23	8,981
Bulgaria	5.29	6.63	16.31	6,994
Montenegro	9.44	5.67	15.52	6,408

Country	Share of agriculture in GDP (%)	Share of agriculture in total employment (%)	Share of agriculture in total export (%)	GDP per capita ($)
Serbia	9.68	21.17	22.01	5,237
FYR Macedonia	10.97	18.23	14.98	4,853
B&H	8.01	21.42	8.37	4,249
Albania	21.71	45.80	4.60	3,945
Moldova	14.33	27.57	41.72	1,848

Source: The authors' calculations on the basis of World Bank and FAOstat. 2017

The least developed countries are current members of CEFTA and all of these countries are part of Western Balkan region, except Moldova. The transformation of the agricultural sector in these countries created a gap not only in agricultural development performances between the countries and the EU countries but also in export performances. Although agriculture's share in the economy has decreased since 2000, it is still relatively more important in the CEFTA than in the EU, both in terms of value added and employment. Rule that in the countries with a lower level of the socio-economic development, agriculture is more important for the economy is once more confirmed (Gajic et al., 2015).

Cluster analysis was performed in order to divide these countries in two groups. The analysis refers to the factors that determine the importance of agriculture in the overall economy - the share of agriculture in total employment, the creation of GDP and exports. Results are shown in Table 5. First cluster includes all countries that are members of EU, except Montenegro. In these countries, importance of agriculture in overall economy is at low level.

Table 5. Cluster analysis of agriculture in the CEFTA countries

Cluster 1		Cluster 2	
Country	**Distance**	**Country**	**Distance**
Netherlands	2.99	Romania	5.57
Germany	3.89	Serbia	4.79
France	2.43	FYR Macedonia	5.35
Slovenia	3.01	B&H	6.33
Czech Republic	3.57	Albania	14.03
Slovakia	3.20	Moldova	14.45
Poland	3.96		
Hungary	1.05		
Croatia	3.99		
Bulgaria	3.77		
Montenegro	4.62		

Source: The authors' calculations on the basis of World Bank and FAOstat, 2017

On the other hand, members of second cluster are Romania, Serbia, FYR Macedonia, Bosnia and Herzegovina, Albania and Moldova. Membership in the EU does not mean that it will necessarily get to the agricultural consolidation and the gradual disappearance of small farms. On the contrary, the number of farms with less than 2 hectares in Romania increased (Hubbard et al., 2014). Beside other factors, this probably slow downed the development of Romanian agriculture and placed it in second cluster.

The multi-criteria analysis was conducted by using the Visual PROMETHEE software package in order to rank selected countries by trade and production performances of agriculture. These performances were described by the variables presented in Table 3.

In terms of values of the analyzed variables, the individual countries are characterized by a high degree of differentiation. The variation ranges from about 33% to 275% (Table 6). The greatest diversity of the surveyed units is manifested in the case of variable Y5 – export of agricultural products per hectare of agricultural land ($/ha) and Y6 – export of agricultural products per active farmer ($/active farmer), both variables being indicators of export performances. This high level of variation could be expected if export performances of Netherlands (48,103 $/ha and 467,458 $/farmer) and Albania (80 $/ha and 145 $/farmer) are concerned. The smallest variation was seen in case of variable Y4 – share of livestock production in total agricultural production (%). Interestingly, in period 2004-2014, share of livestock production has declined in most of observed countries, especially CEFTA countries, while Netherlands and Germany still have high level of this share (above 64%). According to Miklos (2014) the decline of the animal sector has serious consequences for the whole sector in Hungary. Beside economic effects, as the total number of livestock units dropped to less than half of what it was in the mid-1980, the lack of enough natural manure makes it more and more difficult to improve the quality of the soils. According to this, it could be concluded that Hungarian livestock products have not be able to compete with same products from "old" EU countries.

Table 6. Characteristics of the variables describing the production and trade performances of the agricultural sector of the selected countries

	Y1	Y2	Y3	Y4	Y5	Y6	Y7
Minimum	1.8 *Albania*	421 *B&H*	1,857 Albania	21 *Macedonia*	80 *Albania*	145 *Albania*	11 *Albania*
Maximum	38.86 *Montenegro*	7,191 *Netherlands*	69,778 *Netherlands*	72 *Netherlands*	48,103 *Netherlands*	467,458 *Netherlands*	187 *Serbia*
Average	17.1	1,262	19,327	43.3	4,145	55,804	97.6
Standard Dev.	12.2	1,577	20,355	14.2	11,398	112,494	55.3

Source: The authors' calculations on the basis of World Bank and FAOstat, 2017

On the basis of The PROMETHEE method, the countries were ranked by development performances of their agricultural sector. Table 7 shows the results of the analysis. Net preference flow (φ) takes the values from -0.6607 to 0.8125. The best rated was the

Netherlands (the value of 0.8125), followed by Germany (0.6864) and France (0.6369). According to this ranking, agricultural sector of these countries is the most developed and therefore taking them as benchmark is justified. Next group are: Hungary, Czech Republic, Slovakia, Slovenia and Poland, the countries that joined EU in 2004. Their net preference flow φ is still above zero. Good performance of their agricultural sector is a result of joining the EU. According to Chrastinová and Burianová (2009) the results achieved by Slovak agriculture in 2004–2007 (i.e. after the integration into the EU) suggest that the income within the sector has improved also due to the inflow of the EU subsidies. In spite of good ranking of Czech Republic and Slovakia, they have one common problem connected with export performances. Czech agricultural production covers the domestic consumption by only 60% to 70% in the case of Slovakia, the situation is even worse, as the domestic production covers the local consumption by only a little more than 40% (Bielik et al., 2013).

Experience of other new EU member states from Central and Eastern Europe shows that price, production and trade can significantly change after accession, as well as during the pre-accession period. The extent of this adjustment occurring before or after accession depends on the pre-accession policy and market adjustments. Crucial tasks for these countries during the accession process are finding niche markets or being cost competitive (Mizik and Meyers, 2013).

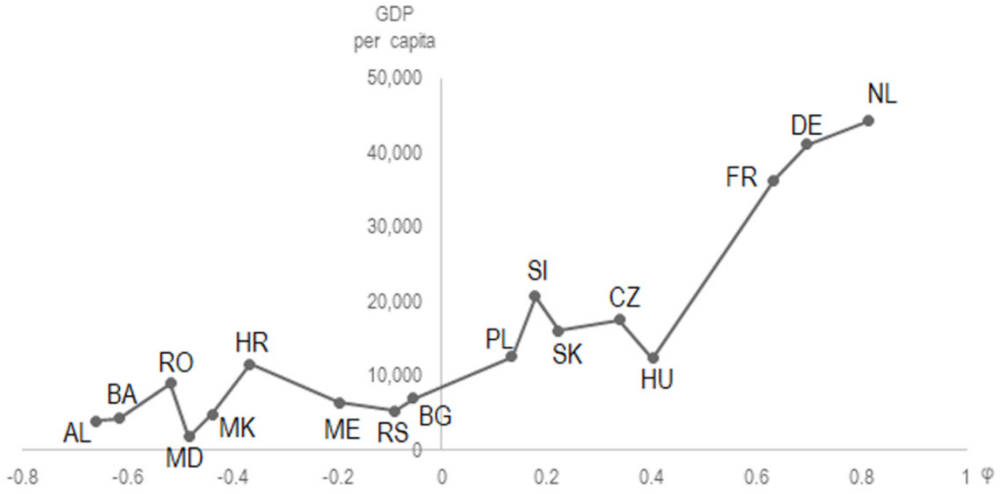
Table 7. The classification of the selected countries in terms of trade and production performances of agriculture

Rank	Country	φ	φ +	φ -
1	hh	0.8125	0.9018	0.0893
2	Germany	0.6964	0.8393	0.1429
3	France	0.6339	0.8125	0.1786
4	Hungary	0.4018	0.6964	0.2946
5	Czech Republic	0.3393	0.6696	0.3304
6	Slovakia	0.2232	0.6071	0.3839
7	Slovenia	0.1786	0.5804	0.4018
8	Poland	0.1339	0.5536	0.4196
9	Bulgaria	-0.0536	0.4643	0.5179
10	Serbia	-0.0893	0.4464	0.5357
11	Montenegro	-0.1964	0.4018	0.5982
12	Croatia	-0.3661	0.3036	0.6696
13	FYR Macedonia	-0.4375	0.2768	0.7143
14	Moldova	-0.4821	0.2500	0.7321
15	Romania	-0.5179	0.2411	0.7589
16	Bosnia and Herzegovina	-0.6161	0.1875	0.8036
17	Albania	-0.6607	0.1696	0.8304

Source: The authors' calculations on the basis of World Bank and FAOstat, 2017

All other countries had net preferences flow smaller than zero. Good ranking of Serbia can be explained by export performances of this country, especially positive export/import coverage that is consequences of trade agreements of Serbia with the EU, CEFTA countries and EFTA (Switzerland, Norway, Iceland and Liechtenstein) as well as with Russia, Belarus, Kazakhstan and Turkey. The dominant export market for agricultural products from Serbia is the EU market, where last year exported more than 50% of agricultural products. The second most important market of the region is the market of CEFTA agreement. This structure of exports indicates that the most important markets for Serbia are EU and CEFTA (Ristić and Obradović, 2015).

Figure 1. Correlation between GDP per capita and economic performances of agriculture



Source: The authors' calculations on the basis of World Bank and FAOstat, 2017

It is very important to notice that there is a strong positive correlation between the levels of development (observed as GDP per capita) of selected countries and the performances of the agricultural sector (Coefficient of correlation is 0.87). Therefore, it is possible to conclude that among other factors, the level of economic development has a significant impact on economic performance of agriculture (Figure 1).

Conclusion

The study assesses the economic performances of agriculture of current and former CEFTA. The Netherlands, Germany and France are included in analysis as a benchmark. Two clusters of selected countries were identified, differing significantly in terms of the importance of agriculture in their economy. Importance of agricultural sector is still high in Romania. Therefore, Romania is more similar to CEFTA than EU countries. On the other hand, Montenegro was placed among EU countries. In order to rank development performances of these countries, PROMETHEE method was used. Based on this analysis, countries can be roughly divided into three groups. First group consisted of

the most developed countries that were used as a benchmark. Members of the second group are former CEFTA countries that joined EU in 2004. All other countries are members of the third group. The study showed that there is a gap in development of agriculture between CEFTA countries and selected EU countries. Among EU countries, Bulgaria, Croatia and Romania have the least developed agricultural sector. It can be assumed that effects of EU accession have yet to become visible. On the other hand in CEFTA countries performances of agricultural sector are far from EU. Among these countries, the best ranking has Serbia, and agricultural sector in Albania is the least developed. With respect to all limitations of the study related to definition of economic performances of agriculture, conclusions can be summarized as follows:

- Empirical analyses of agriculture in the CEFTA and selected EU countries indicate a large differentiation between these countries. Among other factors, the level of economic development has a significant impact on economic performance of agriculture. So, economic development of agriculture is determined by the level of socio-economic development.

- Significant difference between production and export performances of agricultural sector of the EU and CEFTA countries indicate that there is a need for adequate instruments of agricultural policy that will improve agricultural sector in these countries before EU assessment. Agricultural policy of CEFTA countries must still be oriented on increasing of productivity of agricultural sector in order to reach out EU and to get chance to compete on EU market.

- In recent years, the EU has been faced with different economic, social and political problems. In addition to the global economic crisis and migrant crisis, the new serious problem is the decision of citizens of Great Britain to leave the EU. In these circumstances, it is unlikely that the further enlargement of the EU will be soon reached. Therefore, the position of the countries that aspiring to join the EU is not favourable. This political-economic trends are forcing these countries to find temporary alternative solutions for achieving higher economic growth. One of the possible solutions is deeper integration within the CEFTA agreement, in preparation for entry into the EU.

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EKONOMSKE PERFORMANSE POLJOPRIVREDE U CEFTA I BIVŠIM CEFTA ZEMLJAMA[6]

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Rezime

Sve zemlje CEFTE su se nakon II svetskog rata susrele sa veoma sličnim fazama ekonomskog razvoja. Većina ovih zemalja su bile centralno-planske socijalističke ekonomije, a političke promene sa kojim su se susrele krajem 20. veka, uticale su na promene u celokupnom ekonomskom sistemu, pa i u poljoprivrednom sektoru. Cilj ovog rada je komparativna analiza ekonomskih performansi poljoprivrede ovih zemalja i zemalja koje su ranije činile CEFTU (Poljska, Češka, Slovačka, Mađarska, Slovenija, Bugarska, Rumunija i Hrvatska), a koje su se pridružile Evropskoj uniji nakon 2014. godine. Razvojne performanse poljoprivrede su posmatrane sa stanovišta proizvodnih i izvoznih performansi ovog sektora ekonomije, koristeći komparativnu analizu. Rezultat su pokazali da postoji gep u razvoju poljoprivrede između CEFTA zemalja i selektovanih zemalja EU, a performanse poljoprivrednog sektora ovih zemalja su daleko od EU.

Ključne reči: *Poljoprivreda, Promethee metod, Klaster analiza, EU, CEFTA.*

JEL: *Q17, Q18, F15*

6 Rad predstavlja deo istraživanja na projektu: Održiva poljoprivreda i ruralni razvoj u funkciji ostvarivanja strateških ciljeva Republike Srbije u okviru Dunavskog regiona (III 46006), finansiran od strane Ministarstva prosvete, nauke i tehnološkog razvoja Republike Srbije.

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