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Government expenditure and agriculture: changes in agri-orientation of the European Union countries

Abstract: The aim of the paper is to evaluate the fluctuations of central government expenditure on agriculture, the agriculture share of GDP and the level of national economies orientation on agriculture in the European Union (EU) countries, divided into the elder EU democracies and the post-communist EU member states. In the study, the agricultural orientation index for central government expenditure (AOI) was calculated. The data came from the Food and Agriculture Organization of the United Nations (FAO) and the World Bank. The analysis covered the period 2001–2016, due to the data availability. The results were presented mainly using Japanese candlestick charting. In most EU countries shrinking national expenditure on agriculture in relation to other spending categories were observed. That decrease was twice bigger in the elder EU democracies than in the post-communist countries although the first group of countries was spending on agriculture four times less. In almost all EU member states a reduction of more than 20% in the share of the agriculture in GDP creation was observed. The post-communist EU countries were more agri-oriented than the elder EU democracies. Taking into account the AOI levels, agriculture did not belong to top priority spending categories for EU national governments. The visible differences between the two country groups have roots in the postwar diverse economic development caused by political heritage. The performed research is comparative and should be treated as a contribution to future studies.

Key words: agriculture orientation index (AOI), central government expenditure on agriculture, agriculture share of GDP, European Union

JEL classification: H59, Q14, E62

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Introduction

Agriculture is particularly important for national economy [Tsakok and Gardner 2007]. Gollin et al. [2002] indicate that changes in agricultural sector affect macroeconomic activity. The fundamental rationale for public spending in and for the agriculture derives directly from the core reasoning underlying public-sector intervention in the economy [Mogues et al. 2012, Zawajska 2013]. The role of government in agriculture is present permanently in each step from the farm to the market [Dastagiri and Vajrala 2018]. Government expenditures on public goods, including rural public goods, are indispensable in agriculture. It is due to the fact that public financing of rural public goods, i.e.: education, health care, infrastructure, and social services, could generate important benefits for agriculture and boost its contribution to economic growth, poverty and hunger reduction, promoting sustainable development, and enhancing agricultural productivity [Syed and Miyazako 2013]. Thus, public expenditures allocated to agriculture are recognized as an important tool for promoting economic growth and alleviating poverty in rural areas [Akroyd and Smith 2007, Goyal and Nash 2016]. Many studies proved the link between government expenditure and agricultural growth or/and hunger and poverty reduction [Elias 1985, Diakosavvas 1990, Shetty 1990, Fan et al. 2000, Fan and Rao 2003, Fan and Zhang 2008, Fischer et al. 2009, Dastagiri 2010]. Nevertheless, increased value of public agricultural expenditure does not immediately contribute to kindle agriculture growth and poverty reduction [Goyal and Nash 2016] and cannot directly solve the basic problems of agricultural sector [Czyżewski and Matuszczak 2014]. The level and composition of public outlays is often determined by political economic concerns [World Bank 2011]. According to Birner and Resnick [2010], the political economic considerations influencing agricultural policy choices include interest group and collective actions, interaction of voters and interest group with politicians, social mobilization, the type of political regime, and ideas and ideology. However, despite increased attention and the need to improve budget processes, agricultural spending is often not a priority within central budgets [Akroyd and Smith 2007, Wielechowski 2019]. Budgetary trade-off between agricultural public expenditure and other spending categories is significant, especially in developing countries [Mogues 2012, Mogues et al. 2015]. As the economy is transformed, agriculture can still grow fast in absolute size [Mellor 2008], however, as Martin and Warr [1990] point out, along with economic development the agriculture share of GDP declines.

Research material and methods

The research is based on the time series analysis of the following indicators: the level of national economy agri-orientation by using the agriculture orientation index for central government expenditure (AOI), the agriculture share of central govern-

ment expenditure, the agriculture contribution to GDP. The AOI is developed by the Food and Agriculture Organization of the United Nations (FAO). The aim of the AOI is to assess whether public spending on agriculture reflects importance of this sector in the economy. The AOI is defined as the share of the agriculture in national (central) government expenditure divided by the agricultural share of total GDP [FAO 2012]. Agriculture refers to agricultural, forestry, fishing and hunting sector. The AOI is a currency-free measure. Central government expenditure are compiled according to the Government Finance Statistics (GFS) and the Classification of the Functions of Government (COFOG), and the agriculture share of GDP is compiled according to the System of National Accounts (SNA) [Mills et al. 2017]. The AOI greater than 1 refers higher prominence in government expenditure to agriculture than its contribution to the economy, as measured by GDP, while the AOI less than 1 reflects more prominence of non-agricultural sectors. The AOI equal to 1 shows neutrality in a government orientation to the agriculture [FAO 2018].

Twenty six EU member states, i.e. all, except Austria and Germany (due to the lack of data) were examined. The data came from the FAO and the World Bank. The analysis covered the period 2001–2016, due to the data availability. The research results were presented mainly using Japanese candlestick charting as well as tabular and selected statistical methods.

Japanese candlestick charting is the oldest known and established form of technical analysis on the stock market share prices [Marshall et al. 2006]. To construct Japanese candlestick chart, the knowledge about the opening, closing, highest and the lowest values of the described phenomenon in the analyzed time period is needed (Fig. 1). Each candle consists of the real body and two shadows. The real body is white, if the value in the closing period is greater than in the opening one. If the value in the closing period is below the value from the opening time, the real body is black. The range between the opening and closing value represents the real body of the

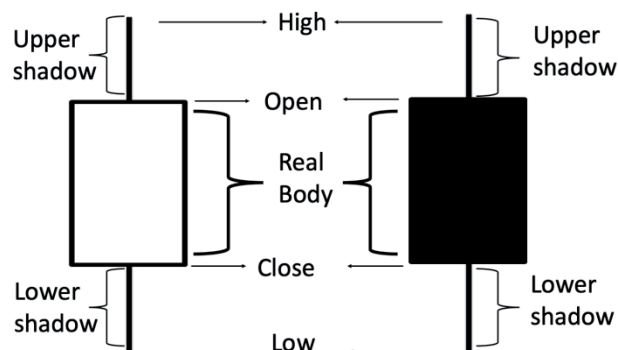


Figure 1

Japanese candlestick composition

Source: Own elaboration based on Nison [1994] and Gdakowicz [2014].

candle while the lower and upper shadows reflect the highs and lows of the described phenomenon in entire analyzed period [Nison 1994, Gdakowicz 2014].

The aim of the study was to evaluate the fluctuations of central government expenditure on agriculture, the agriculture share of GDP and the level of national economies orientation on agriculture in the European Union countries, divided into the elder EU democracies and the post-communist EU member states.

Results and discussion

Figure 2 shows that in the EU as a whole decreasing central government expenditure on agriculture were observed in the analyzed period. National governments spent on average 45% less on agriculture in relation to total expenditure in 2016 than in 2001.

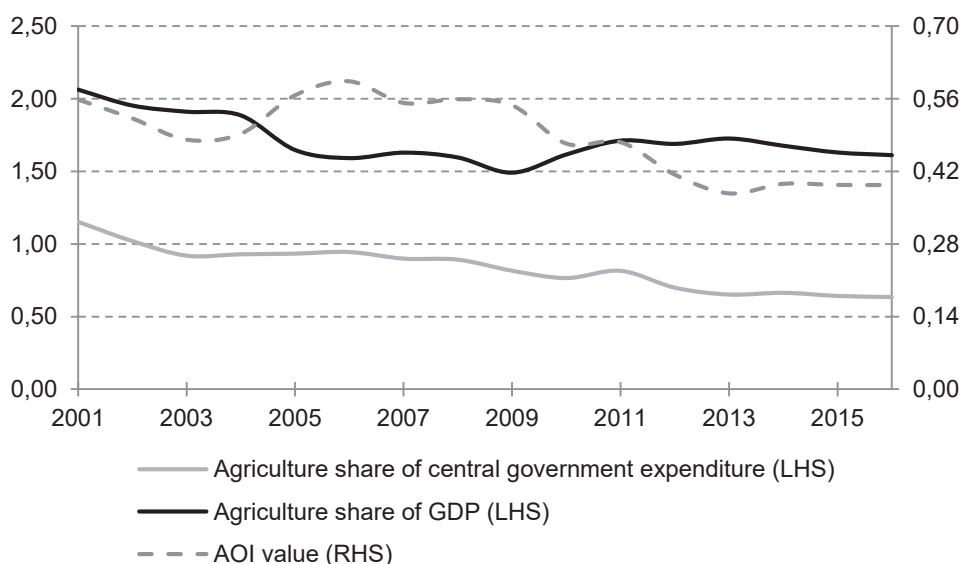


Figure 2

The agriculture share of central government expenditure, the agricultural share of GDP and the agricultural orientation index value in European Union countries in 2001–2016

Source: Own calculations and elaboration based on the FAO and the World Bank data.

Compared to average global or other world regions perspective, the EU government spending on agriculture is relatively low. The explanation for this situation could be that the EU provides an additional financial support (Common Agricultural Policy) and in consequence national governments can contribute less to the financing agriculture [Wielechowski 2019]. At the same time, the contribution of agricul-

ture to GDP of EU countries fluctuated and did not decrease significantly, i.e. the average decrease exceeded 20% (from 2.06% of GDP in 2001 to 1.61% of GDP in 2016). The agriculture share of GDP in the EU was smaller than 2%. Contrary to the situation in the EU, the world average share was a few times higher and constantly increasing (4% in 2003 and 6% in 2016). The AOI values presented on the right axis of Figure 2 indicate decreasing agri-orientation of the central governments but not in a whole 2001–2016 period. It is worth noting that on average, national governments of the EU member states were not agri-oriented regarding the AOI. The presented AOI values were against the United Nations Goal 2 of the 2030 Agenda for Sustainable Development [UN 2015], which is monitored by the AOI.

The table shows distinctions between the elder EU democracies and the post-communist EU member states on agriculture share of central government expenditure, agriculture input in GDP and economy agri-orientation based on the AOI. It

Table

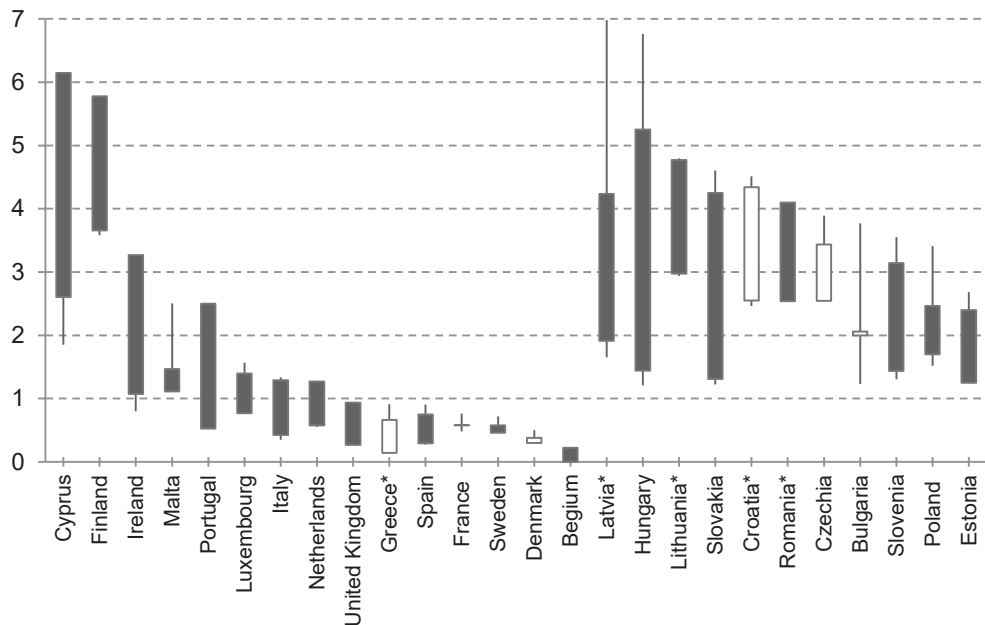
The agriculture share of central government expenditure, the agriculture share of GDP and the agriculture orientation index value based on the elder democracies and the post-communist countries of the EU in 2001–2016

Year	Agriculture share of government expenditure		Agriculture share of GDP		AOI value	
	elder democracies	post-communist countries	elder democracies	post-communist countries	elder democracies	post-communist countries
2001	1.03	3.05	1.96	3.75	0.53	0.81
2002	0.88	2.99	1.86	3.41	0.47	0.88
2003	0.77	3.10	1.83	3.18	0.42	0.98
2004	0.78	3.02	1.77	3.54	0.44	0.85
2005	0.74	3.39	1.53	3.17	0.48	1.07
2006	0.75	3.33	1.49	2.94	0.50	1.13
2007	0.69	3.26	1.51	3.00	0.46	1.09
2008	0.66	3.22	1.48	2.83	0.45	1.14
2009	0.60	3.19	1.39	2.57	0.43	1.24
2010	0.57	2.83	1.52	2.56	0.37	1.10
2011	0.58	2.90	1.52	3.41	0.38	0.85
2012	0.51	2.56	1.52	3.16	0.34	0.81
2013	0.48	2.25	1.54	3.38	0.31	0.67
2014	0.50	2.26	1.50	3.23	0.33	0.70
2015	0.47	2.25	1.49	2.89	0.32	0.78
2016	0.46	2.22	1.46	2.91	0.32	0.76

Source: Own calculations and elaboration based on the FAO and the World Bank data.

should be noticed that the differences were visible. Taking into account the changes in the agriculture share of total central government expenditure, both in the group of the elder EU democracies and post-communist EU member states, it was generally decreasing. However the drop was twice bigger in the first above mentioned country group although Eastern EU central governments on average were spending on agriculture relatively four times more (2.86 and 0.66% of total expenditure respectively). In the analyzed period, the reduction of the agriculture contribution to GDP (more than 20% on average) was observed regardless the country group. Nevertheless, the agricultural share in GDP in the post-communist EU member states was twice bigger than in the second group. Moreover, the former countries were much more agri-oriented (the average AOI level in 2001–2016 period equaled 0.93 and 0.41 respectively). The undisputed differences between Western and Eastern EU countries pictured in the table have roots in the post-war diverse economic and political evolution.

Figure 3 illustrates the share of agricultural spending in total central government expenditure in the EU member states in division on the elder democracies and the post-communist states. In case of 20 EU member states their central governments reduced relative spending on agriculture during entire research period, especially in Portugal, Hungary, the United Kingdom, Slovakia, Ireland, and Italy (more than



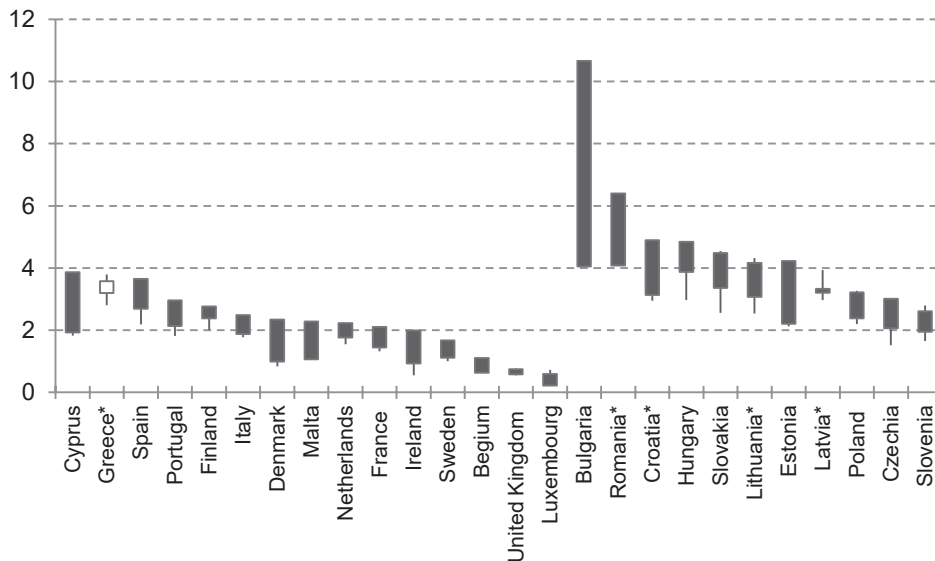
*Data on: Croatia for 2002–2016, Greece for 2006–2016, Latvia for 2007–2016, Lithuania for 2004–2016, Romania for 2011–2016.

Figure 3

The agriculture share of central government expenditure in the European Union countries in 2001–2016
Source: Own calculations and elaboration based on the FAO and the World Bank data.

65%). However, in Greece, Croatia and Czechia a substantial increase in relative agricultural expenditure was observed. In 2001–2016, the top states which spent the most on agriculture (in relative terms) were Finland, Lithuania, Latvia, Croatia and Cyprus (more than 3.3% of GDP), while Belgium, Denmark, Greece and the United Kingdom the least (less than 0.5% of GDP).

Figure 4 presents that among the EU countries a visible decrease in the agriculture share of GDP was observed in 2001–2016. In case of Luxembourg, Bulgaria, Denmark, Ireland, Malta and Cyprus the reduction was greater than 50%. Greece, which has experienced the effects of the global economic crisis the most, was the only EU member state where the agriculture contribution in GDP increased in analyzed period. The study indicates that the agriculture contributed much more to GDP creation in the post-communist countries, especially in Bulgaria and Romania, about 6% and 5% respectively. In case of Luxembourg, Great Britain, and Belgium the agriculture share of GDP was marginal, less than 1%. In general, the agriculture share of GDP in less developed EU countries was much greater than in the most developed ones. These results confirm Martin and Warr [1990] study. Moreover, high availability of arable land affects the high share of agriculture in GDP creation. High-income economies are focused more on service sector than on agriculture [Wielechowski 2019].



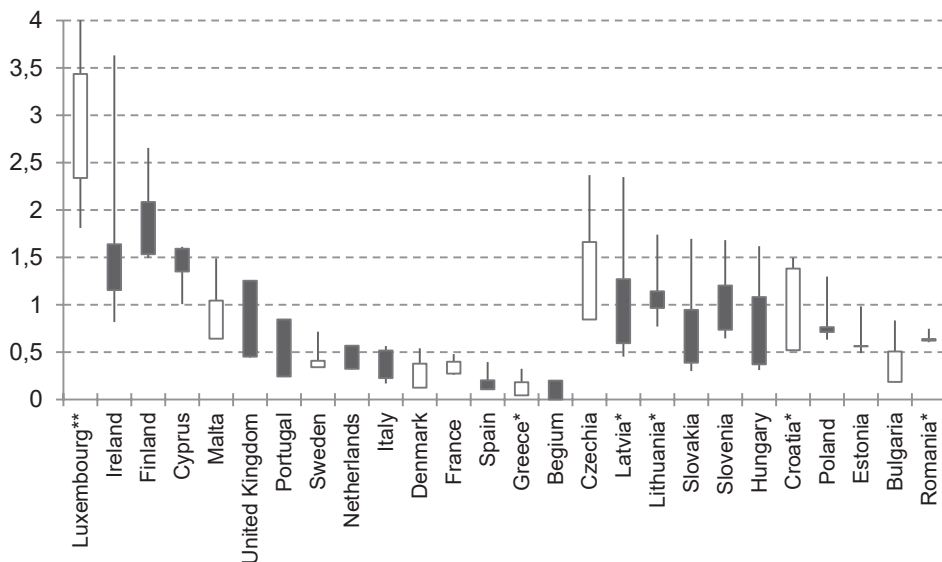
*Data on: Croatia for 2002–2016, Greece for 2006–2016, Latvia for 2007–2016, Lithuania for 2004–2016, Romania for 2011–2016.

Figure 4

The agriculture share of GDP in the European Union countries in 2001–2016

Source: Own calculations and elaboration based on the FAO and the World Bank data.

Figure 5 shows that, based on the AOI levels, the most agri-oriented countries in the EU were Luxembourg, Finland, Ireland and Czechia (AOI > 1.5). For Belgium, Greece, Spain, Denmark, Italy and France the AOI levels were smaller than 0.4 what indicates very little focus on agriculture in these economies. Decreasing AOI values over the analyzed period were observed in 17 EU member states, especially in Belgium, Portugal, Hungary, and the United Kingdom, whereas in Greece, Denmark, Bulgaria and Croatia an increase trend was observed. In general, as Figure 5 indicates, agriculture did not belong to the top priority list of spending categories for national governments of the EU member states.



*Data on: Croatia for 2002–2016, Greece for 2006–2016, Latvia for 2007–2016, Lithuania for 2004–2016, Romania for 2011–2016, **the maximum AOI level for Luxembourg was 6.22.

Figure 5

Agriculture orientation of the European Union countries in 2001–2016 based on agriculture orientation index values

Source: Own calculations and elaboration based on the FAO and the World Bank data.

Conclusions

The presented study, analyzing changes of central government expenditure on agriculture, the agriculture contribution to GDP, and the level of national economy orientation towards agriculture in the EU member states in 2001–2016 period, has led to the following conclusions.

1. The majority of central governments decided to reduce outlays on agriculture in relation to other spending categories. In the elder EU democracies, the relative

reduction was twice higher than in the post-communist countries. Eastern EU countries were spending four times more on average. Over the whole period considered, Finland, Lithuania and Latvia spent relatively most on agriculture, while Belgium and Denmark the least.

2. In almost all EU countries, a reduction of about 20% in the agriculture share of GDP took place regardless the country group. The top countries according to this ratio were Bulgaria, Romania and Croatia while Luxembourgian, British and Belgian the agriculture marginally contributed to national GDP.
3. Taking into account the AOI values, the post-communist EU countries, while compared with the elder EU democracies, were on average more agri-oriented. However, at individual country level, Luxembourg, Finland, Ireland and Czechia had the highest indexes.
4. One of the possible explanations for the obtained results can be the visible differences between Western and Eastern EU countries rooted in the post-war diverse in economic development caused by political evolution.
5. The performed research is comparative and should be treated as a contribution to future studies.

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Wydatki rządowe a rolnictwo – zmiany zorientowania na rolnictwo państw Unii Europejskiej

Abstrakt: Celem artykułu jest ocena wahań wydatków z krajowych budżetów centralnych na rolnictwo, udziału wartości dodanej rolnictwa w PKB oraz poziomu zorientowania gospodarerek narodowych na rolnictwo w krajach Unii Europejskiej w podziale na dojrzałe demokracje oraz postkomunistyczne państwa członkowskie UE. W badaniu został obliczony wskaźnik orientacji rolniczej (AOI). Wykorzystano dane pochodzące z Organizacji Narodów Zjednoczonych ds. Wyżywienia i Rolnictwa (FAO) oraz Banku Światowego. Badaniem został objęty okres 2001–2017 ze względu na dostępność danych. Wyniki zostały przedstawione głównie z wykorzystaniem metody świec japońskich. W większości krajów UE zaobserwowano zmniejszenie poziomu wydatków na rolnictwo w stosunku do innych kategorii krajowych wydatków publicznych. Spadek ten był dwukrotnie większy w dojrzałych demokracjach UE niż w krajach postkomunistycznych UE, chociaż pierwsza grupa krajów wydawała na rolnictwo cztery razy mniej. W prawie wszystkich państwach UE zaobserwowano zmniejszenie udziału rolnictwa w tworzeniu PKB, przeciętnie o ponad 20%. Postkomunistyczne kraje UE były bardziej zorientowane na rolnictwo niż dojrzałe demokracje UE. Biorąc pod uwagę poziomy AOI, rolnictwo nie należało do priorytetowej kategorii wydatków rządów krajowych UE. Widoczne różnice między dwiema analizowanymi grupami krajów mają swoje źródło w powojennym zróżnicowanym rozwoju gospodarczym będącym konsekwencją politycznej spuścizny. Przeprowadzone badanie ma charakter porównawczy i może stanowić przyczynek przyszłych badań.

Słowa kluczowe: wskaźnik zorientowania na rolnictwo (AOI), wydatki budżetu krajowego na rolnictwo, udział rolnictwa w PKB, Unia Europejska

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