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RESOURCE CONDITIONS AND SUBSIDIES FOR PUBLIC GOODS IN THE EU

Marta Guth[1], PhD; **Adam Majchrzak**[2], PhD and **Katarzyna Smedzik-Ambrozy**[3], PhD

[1,3] Poznan University of Economics and Business, Department of Macroeconomics and Agricultural Economics, [2] Poznan University of Economics and Business, Department of Economic and Local Government Policy

Abstract. The work constitutes an effort of assessing the impact of resource conditions of the EU agriculture on the share of subsidies for public goods in the total value of subsidies. Based on the conducted analysis, it was indicated that in 2007-2013, there were three clusters of regions in the EU, which significantly varied in terms of the agricultural resource conditions. It was also proven that the fact of belonging to these clusters determined the variety in terms of the amount of shares in agricultural and environmental subsidies as well as other subsidies for rural area development in the total value of subsidies in particular EU regions. In the case of subsidies for setting fields aside and subsidies for areas with non-beneficial conditions of use, the resource conditions did not determine their share in the total value of subsidies. The timeframe of the analysis covered a period in 2007-2013, the spatial scope covered particular EU regions while the subject scope covered representative farms in a given region.

Key words: resource conditions, public goods, EU regions, EU agricultural policy.

JEL code: E02, H23, Q18

Introduction

The European Union is characterised by large heterogeneity of agricultural resource conditions. They are reflected in differences between farms from particular EU regions in terms of availability of the factor of capital, land and labour (Matuszczak, 2013). Furthermore, the EU agricultural policy exhibits a change consisting in a transition from remunerating farmers for fulfilling production functions to remunerating them for supplying public goods. This has been specifically visible since the MacSharry reform from 1992. The next CAP reforms after that year are a continuation of changes initiated with the MacSharry reform due to which they underline the transition in the EU agricultural policy from remunerating farmers for supplying food goods to remunerating them for supplying public goods (Poczta, 2010; Czyzewski, Stepien, 2014; Fiedor, 2004; Smedzik-Ambroży, 2013; Brelik, Matuszczak, 2013), which constitute one of the categories of market failures. Public goods are the basic provisions commonly available that can be used by anyone. In literature, there is an opinion that they differ from private goods only in that the latter goods become property of people after they pay for them, while this rule does not apply to the former goods (Cooper, Hart, Baldock, 2009), which causes that receiving a payment for supplying such goods will be more difficult, which in turn implies absence of stimuli for their supply (Baldock, Hart, Scheele, 2014). You can state that public goods are goods that the society demands and which the market mechanism is unable to deliver to the society. It is assumed that some agricultural systems, often extensive livestock farm systems and mixed systems or systems of permanent cultivation with a high share of semi-wild plants and ecological systems as well as selected agricultural practices included in the concept of sustainable agriculture, contribute to generating a broader scope of public goods, as compared to industrial systems. In agriculture, public goods are produced on private land, despite the fact that soil is a national heritage. A part of the benefits resulting from farming is hence transferred onto third parties without any compensation provided to the farmer (Baum, Sleszynski, 2009). This means that without adequate incentives (social expenditures) public goods will not be produced in the optimum amount – an insufficiency may occur or even their total shortage in the case of a lack of intervention, which will result in ineffective allocation of the society's resources. In the subject's literature, compared with: Cameron and Englin, 1997; Breffle and Morey, 2000; Hanley, Kriström, Shogren, 2009; Carson and Louviere, 2011, Czajkowski, Hanley, La Riviere, 2014, a number of methods of

[2] Corresponding author. Tel.: +48618569578; fax: +48618569565. E-mail address: adam.majchrzak@ue.poznan.pl

remunerating farmers for providing public goods can be listed, including direct cost evaluation of the supplied goods and payment for them, payment for using ownership rights to the resources or production factors in the scope necessary to supply public goods, payment for lost income in the case of supplying public goods relating to the environment, or covering the transaction costs or other barriers in relocation of resources necessary to supply public goods (FAPA, 2009). Nevertheless, one should remember that creating a remuneration system for public goods generated in agriculture will result in additional costs, which can include incentives, costs of administration, advice, communication, implementation, monitoring and evaluation. The governments of various countries and interstate organisations offer a number of regulations for the supply of public goods, such as the system of subsidies, tax mechanisms and legal regulations (RISE 2009). In the case of the European Union, the European Agricultural Fund for Rural Development (EAFRD) is a support instrument with a significantly bigger potential of actively encouraging one to supply public goods by means of an intentional and focused approach. Nevertheless, the degree in which it is used for supplying public goods highly depends on the method in which the Member States develop their internal growth programmes for rural areas, e.g. activities that are given a priority, the applied qualification criteria, the methods in which means are developed and directed as well as the way of implementing particular systems (European Network or Rural Development, 2010).

Due to a large variety, it is questioned whether the agricultural resource conditions in particular EU regions constitute a determinant of the share of subsidies for public goods in the total amount of subsidies in the EU. It was decided to study this phenomenon through a paper with the following hypothesis: the resource conditions in the EU constitute a quality predictor for the share of subsidies for public goods in the total amount of subsidies from the common agricultural policy.

Research methodology

The authors of this paper made an effort of assessing the impact of resource conditions on the share of public subsidies in the total amount of subsidies (SE 605) taking into account the fact that the absolute amount of these subventions is limited. The resource conditions were determined on the basis of the availability of the land factor for representative farms in particular EU regions (the average size of farm in ha), labour (annual work unit1) and capital (fixed assets after eliminating the land value). Subsidies for public goods covered the following subsidies: for setting fields aside (SE 612), agricultural and environmental (SE 621), subsidies for areas with adverse use conditions (SE 622) and other subsidies for developing rural areas (SE 623), covering subsidies for adjusting farms to the EU standards, for agricultural advice services, subsidies for improving the quality of farm products, for training, foresting and retaining ecological balance of the forest environment (Florianczyk et al., 2014, p. 26; Czyzewski, Smedzik-Ambrozy, 2016). The average shares in these subsidies were applied in the total value of subsidies for particular years between 2007-2013, namely a period constituting the last financial perspective in the EU. Due to the lack of information in the EUFADN statistics concerning the value of subventions in farms of representative regions of France (Guadeloupe, Martinique and La Raunion), Hungary (Kozep-Magyarorszak, Kozep-Dunantul, Nyugat-Dunantul, Del-Dunantul, Eszak-Alfold, Del-Alfold, Entre Douro e Minho, Tras-os-Monte) and Portugal (Entre Douro e Minho/Beira litoral, Norte e Centro and Tras-os-Montes/Beira interior), they were excluded from the analyses. In order to separate the clusters of EU regions varying in

[1] One AWU is equal 2200 hours in 2007-2010 and 2 200 hours from 2011 year. This is equal to annual labour time of a person working full-time (Florianczyk et al., 2014).

[2] Corresponding author. Tel.: +48618569578; fax: +48618569565. E-mail address: adam.majchrzak@ue.poznan.pl

terms of resource conditions for agricultural production in 2007-2013, Ward's cluster analysis along with Euclidean distance was used. As a result of the analysis, three clusters of EU-28 regions were obtained varying in terms of the agricultural resource conditions (Table 1). The statistical significance of differences between region clusters in the scope of availability of production factors were assessed by means of a t test for independent samples (in relation to the groups) because the number of regions exceeded 50 (Stanisz, 2007). Then a one-way and single-factor analysis was conducted (ANOVA) where the quality predictor was constituted by a given region being a member of cluster A, B or C while the dependant variables were constituted by the average share of particular types of subsidies for public goods in the total value of subsidies for the period of 2007-2013[1] (Table 2). At this point it is worth mentioning that the differences between clusters are statistically important if the significance level is $p<0.05$. In consequence, the applied research methodology allowed determining whether the separated groups of regions significantly varied in terms of the share of subsidies for public goods in the total subsidy value. In the final stage, the differences in the shares were compared between clusters (Table 3). The timeframe of the analyses concerned the last financial perspectives of the EU (2007-2013), the spatial scope covered particular EU regions, while the subject scope covered representative farms for those regions.

Agricultural resource conditions in the EU

In 2007-2013, there were three clusters of regions in the EU, which varied in terms of the agricultural resource conditions. The cluster with the least number of regions (seven) of the EU was characterised with a significantly higher availability of production resources than regions from the remaining two clusters. This results from an analysis of average values for 2007-2013 (Table 1) and was confirmed by means of a t test, which proved that the differences between availability of soil resources, capital and labour between regions of cluster A and cluster B as well as regions of cluster A and cluster C were statistically significant.

Table 1

Average availability of production factors in the EU region clusters in 2007-2013

CLUSTER	Number of regions	Land availability [in ha]	Labour availability [in AWU]	Capital availability [in EUR]
A	7	420.72	7.49	639395.82
B	71	26.69	0.44	55786.63
C	50	87.86	0.48	215105.51
Total	128	72.14	0.84	149936.70

Source: authors' work based on the EUFADN data

In regions from cluster C, in 2007-2013 there was a higher availability of capital as compared to cluster B regions, which exhibited through a two-times higher value of fixed assets falling for one farm from regions being a part of cluster C as compared to farms from cluster B. Availability of land for farms from cluster C was also bigger (more than 3-times) as compared to cluster B. Farms from both these clusters did not vary in terms of the labour factor availability. Also the results of statistical significance of differences between availability of particular resources completed using the t test confirmed that there were significant statistical differences between regions from clusters B and C, in terms of the land factor and capital factors (p levels in both cases were below 0.05). In the case of availability of the labour factor, p amounted to 0.10, which proved that the variety in this scope between regions from cluster B and cluster C was statistically insignificant.

Subsidies for public goods in the EU region clusters varying in terms of the agricultural resource conditions

The results of assessing the statistical significance confirmed the impact of resource

[1] Leven's test confirmed that the assumption about homogeneity of the variance by all dependant variables was met.

[2] Corresponding author. Tel.: +48618569578; fax: +48618569565. E-mail address: adam.majchrzak@ue.poznan.pl

conditions on the share of agricultural and environmental subsidies as well as interest from other subsidies for developing rural areas in the total amount of subsidies for representative farms in particular regions in the EU in 2007-2013. In the remaining two cases of subsidies for public goods, their share in the total value of subsidies, between the region clusters, did not significantly vary. On this basis, one can state that the resource conditions do not impact the amount of shares in subsides for setting fields aside and for areas with non-beneficial conditions of use in the total amount of subsidies (Table 2).

Table 2

Result of the assessment of statistical significance of the differences in share of subsidies for public goods between particular EU region clusters (one-way tests of significance, parameterization with sigma-limits, decomposition of effective hypotheses – differences are significant: p<0.05)

	Variable	SS	MS	F	p
Resource conditions as the quality predictor	Share of subsidies for setting field aside (SE 612) in total value of subsidies	0.011255	0.005627	0.707961	0.494612
	Share of agricultural and environmental subsidies (SE 621) in total value of subsidies	260.060	130.030	3.62393	0.029518
	Share of subsidies for areas with non-beneficial conditions of use (SE 622) in total value of subsidies	87.281	43.641	0.73403	0.482027
	Share of other subsidies for rural area development (SE 623) in total value of subsidies	190.7365	95.36824	17.19774	0.000000

Source: authors' work based on the EUFADN data

Farms from clusters A and C were characterised with the largest average share of subsidies for agricultural and environmental subsidies, in the total amount of subsidies. In the cluster of farms with the biggest and significantly varying availability of the soil, work and capital factors (cluster A), the share of other subsidies for developing rural areas was clearly the lowest. The factors were also low for farms from regions in cluster C (Table 3). On this basis, one can state that the relatively high availability of production factors, particularly land and capital, characteristic for farms from clusters A and C is a premise for increasing the share of agricultural and environmental subsidies and relatively low share of other subsidies for development of rural areas in the total amount of subsidies.

Table 3

Shares of subsidies for public goods in clusters of EU-28 regions

Cluster	Share of subsidies for setting field aside (SE 612) in total value of subsidies	Share of agricultural and environmental subsidies (SE 621) in total value of subsidies	Share of subsidies for areas with non-beneficial conditions of use (SE 622) in total value of subsidies	Share of other subsidies for rural area development (SE 623) in total value of subsidies
A	0.00	8.22	6.72	0.11
B	0.03	5.74	5.96	2.97
C	0.04	8.65	7.68	0.58
Total	0.03	7.01	6.67	1.88

Source: authors' work based on the EUFADN data

When it comes to regions from cluster B, characterised with the lowest level of availability of land resource as compared to the other two clusters, the share in agricultural and environmental subsidies in the total amount of subsidies was the lowest. There was also the biggest share of other subsidies for developing rural areas in the total amount of subsidies (Table 3). When comparing the results of analysis of region clusters, varying in terms of agricultural resource conditions, it should be stated that the relatively low availability of land factor is a premise for low share of agricultural and environmental subsidies and high share of other subsidies for developing rural areas, in the total amount of subsidies. In the remaining two cases

[2] Corresponding author. Tel.: +48618569578; fax: +48618569565. E-mail address: adam.majchrzak@ue.poznan.pl

of subsidies for public goods (share of subsidies for setting fields aside and for areas with non-beneficial conditions of use in the total subsidy amount), the region clusters did not significantly vary (Table 2) Hence, the difference in the scope of resource conditions did not constitute a factor allowing to predict their size. Based on the above, the following hypothesis was only partially verified: the resource conditions in the EU constitute a quality predictor for the share of subsidies for public goods in the total amount of subsidies from the Common Agricultural Policy. This only related to the agricultural and environmental subsidies and other subsidies for rural area development.

Conclusions, proposals, recommendations

To sum up, it should be stated as follows:

- In the European Union, there is a visible transition from the support of agriculture, determined by the size of farm production to the support due to supplying public goods by that sector, e.g. natural environment protection or retention of biodiversity. This is visible specifically in the agricultural policy of the EU after 1992, where through McSharry reform, conditions were created so that profiTable support of agriculture is provided according to the principle that this sector is not only remunerated for the production function but mainly for supplying public goods, which the entire society can use.
- Particular EU regions are characterised by a high level of heterogeneity when it comes to resource conditions of agricultural production. In 2007-2013, three EU region clusters could be listed which varied in terms of these conditions. Specific importance in this scope was constituted by the variety in availability of the land and capital factors of representative farms in particular EU regions.
- Variety in the scope of agricultural resource conditions in particular EU regions significantly impacted supply of some public goods by farms. Their relatively high provision of availability in the land and capital factor contributed to increased share of agricultural and environmental subsidies in the total amount of subsidies. The opposite situation occurred in the case of the share of other subsidies for rural area development in the total value of subsidies. It was the lowest in farms in regions varying from the remaining ones with the relatively highest availability of the capital and land factors at farms. Resource conditions were a quality predictor for the share of those subsidies in the total value of subsidies. They did not constitute the predictor in relation to the share of subsidies for setting fields aside and for areas with non-beneficial conditions of use in total value of subsidies.

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[1] Corresponding author. Tel.: +48 83 344 99 00 ext. 264; fax: + 48 83 344 99 50. E-mail address: danuta_guzal-dec@wp.pl.