Subsidising sustainability by farming types in Poland in the years 2004-2015

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DOI: 10.14595/CP/01/019

Abstract: The common agricultural policy of the EU aims to stimulate the sustainable development of agriculture regardless of the types of agricultural production. The aim of the study was to determine whether there are significant differences between supporting farms of various production types in Poland with subsidies from the Common Agricultural Policy of the EU, stimulating sustainable development in 2004-2015. The research was based on FADN farm data. As a result, it was proved that subsidies from CAP contributed the most to increasing the sustainability in the environmental dimension of farms specialising in animal husbandry using grazing, and the smallest – of farms specialising in field crops and granivores. It has been proved that in agriculture in Poland there is a positive effect of single area payments for balancing agriculture in its economic dimension, regardless of the production types of farms existing in a given area. In addition, it can be concluded that subsidies from CAP in 2009-2015 stimulated the sustainability of agriculture in the economic order at the expense of its sustainability in the environmental order.

Keywords: Common Agricultural Policy, CAP, subsidies, sustainable development, FADN

JEL: E02, H23, Q12, Q18

Introduction

The influence of agricultural policy on the development of agriculture results from the concept of induced agricultural development formulated by Y. Hayami and V.W. Ruttan (1985). According to them, agriculture generates too weak internal forces to trigger the growth process and keep it in a state of dynamic equilibrium. Therefore, development requires impulses from outside, or else exogenous stimuli [Hayami, Ruttan 1985]. Agricultural policy plays the role of such a stimulator. It also results in the possibility of this policy to influence the type of progress made in agriculture. It can be extensive (based on increasing the involvement and durability of production factors) or intensive (increase the productivity of production endowments). In agriculture, intensification is associated with the industrial (conventional) model of agriculture, which operated from the end of World War II up to the first oil crisis [Zegar et. al. 2014, p. 198-199, 203]. The intensification of production in agriculture was

influenced by the instruments of the Common Agricultural Policy of the EU, which since the inception of the MacSharry reform was of a pro-supply nature, stimulating increases in agricultural productivity which resulted from the pursuit of ensuring EU food self sufficiency [Ruttan 2005, pp. 65-99]. In relation to this, it can be said that the instruments of this policy directed the development of European agriculture along the "paths" of production intensification [Judzińska, Łopaciuk, 2011, pp. 26-30, Brouwer, Lowe 2000]. This resulted in the overproduction of agriculture in the EU, at the expense of reducing the quality of its natural resources [Fiedor 2004]. This underlined the necessity of reforming the Common Agricultural Policy towards instruments supporting sustainable development [Czyżewski B., Matuszczak 2013, p. 229]. The basic claim of the concept of sustainable development is the conviction that it is necessary to maintain a balance (sustainability) in the three elements of the macrosystem, i.e. the economy, the environment and the social system [Harris, Goodwin 2001].

The concept of sustainable development is present in various strategic documents of international, national, regional and local scope [Borys 2011, p. 76]. Already in 1997, sustainable development became a basic challenge for the EU and was included in the Treaty of Amsterdam as the overarching objective of EU policy [European Commission 1997, pp. 7 and 24]. With regard to agriculture, the concept of sustainable development assumes simultaneously striving to improve the living conditions of the population and to conduct agricultural activity, while not harming the specific resources of villages, such as the natural environment, landscape and cultural heritage [Żmija 2014, pp. 150-151]. The beginning of the process of reforming the Common Agricultural Policy to stimulate sustainable development in agriculture dates back to 1992, when it became a policy for demand. All subsequent reforms and changes in CAP, introduced after 1992, were a continuation of the ideas included in the MacSharry reform [Poczta et. al. 2007, Poczta 2010, p. 39].

It can therefore be said that only subsidies from CAP whose value depends on the volume of production, i.e. the subsidies for crop or animal production, as well as subsidies to intermediate consumption and to the costs of external factors, stimulate increases in farm productivity. However, these are gradually being phased out [Marcinkowski, Narojczyk, Stępień 2011, p. 83], which means that EU agricultural policy is becoming a policy supporting sustainable development of agriculture. Subsidies from EU agricultural policy: to less-favoured areas (LFA), agri-environmental areas, set-aside and other subsidies for rural development increase the quality of the natural capital of rural areas because farmers receive them for carrying out specific practices for the natural environment. On the other hand, decoupled payments, i.e. single farm payments (EU-15 plus Malta and Slovenia) or single area payments

(EU-12 countries without Malta and Slovenia), due to the lack of dependence between their value and production volume, and their positive impact on the incomes of EU farmers stimulate an increase in the economic and social sustainability of European agriculture. To the best of our knowledge, however, there is no literature stating that the CAP aims to stimulate the sustainable development of agriculture, regardless of the types of production farms. Therefore, the study aims to investigate whether there are significant differences between supporting farms of different types in Poland, with subsidies from the Common Agricultural Policy, stimulating sustainable development in 2004-2015.

Methodology

The accounting data from FADN (Farm Accountancy Data Network) representative farms from Poland was used. FADN accounting is a farm accountancy data network that requires access to income data obtained from different types of farms and their production results. The obligation to create such a network has been imposed on every country in the European Union. It is used for the evaluation and programming of the Common Agricultural Policy. The data obtained form the basis for the Commission's reports on the situation in agriculture and on individual agricultural markets. Annual reports are submitted to the Council and the European Parliament and are analysed within the system, serving the annual determination of farm incomes operating within the EU, analysis of agricultural activity and the impact assessment of proposed changes concerning European Union agriculture [Gazda 2014]. The division of farms into production types according to this methodology was applied. In it, the following production types of farms were distinguished, specialising in: field crops, horticulture, other permanent crops, milk, other grazing livestock, granivorous animals and combinations of different types of plant and animal production (mixed). Then, using this division, the shares of subsidies supporting the tasks included in the concept of sustainable development in the total value of subsidies for particular types of farms were calculated. These payments were divided into two groups. The first of these included subsidies for the implementation of tasks favourably affecting the quality of the natural environment of rural areas, and thus positively affecting the environmental order. The following types of subsidies belonged to this group: to less-favoured areas (LFA), agri-environmental, set-aside and other subsidies for the development of rural areas. The second group was the values of single area payments. Decoupled payments in Poland, i.e. single area payments, have a positive impact on farm incomes, which stimulates both the economic and social order of agriculture. Then, in order to determine the statistical significance of differences in average values of these shares in the period 2004-2015 between the analysed types of farms and holdings of other production

types, t-test was applied, as it is a suitable tool to determine statistical differences between average values [Stanisz 2006]. The time range covered the years 2004-2015, the representative – FADN representative farms according to their production types and spatial dimension concerns Poland.

Results and discussion

The highest average share of subsidies for tasks favouring sustainability in the environmental order in the total value of subsidies obtained in the years 2004-2015 was found in farms specialising in animal husbandry using grazing (29.3%). Second place in this respect was occupied by farms specialising in permanent crops (23.6%). Table 1 shows that farms with these types of production find it easiest to meet the requirements of agro-environmental programmes, therefore the share of subsidies is the highest for tasks that positively affect the sustainable development of rural areas with a predominance of these production types. On the contrary, in farms specialising in the cultivation of granivorous animals and in field crops, the share of these subsidies in 2004-2015were the lowest. These were, respectively, in farms specialising in granivores – 16.5% and in farms specialising in field crops – 13.9%.

Table 1. Average values of share of subsidies (per cent)

Years	Field crops	Horticulture	Other permanent crops	Milk	Grazing livestock	Granivores	Mixed	Average
2004	0.9	1.5	0.7	2.4	4.3	1.5	1.7	1.7
2005	10.5	18.7	22.6	24.0	32.9	18.2	19.7	18.4
2006	16.8	29.6	28.3	42.3	55.4	33.1	33.5	32.0
2007	17.7	30.3	36.9	24.6	34.9	23.7	26.5	24.3
2008	18.7	25.6	37.9	24.8	38.3	22.3	26.7	24.6
2009	17.7	26.4	37.4	19.4	33.3	17.5	22.1	20.6
2010	17.1	24.9	31.4	18.9	34.0	17.6	21.2	19.9
2011	15.0	7.6	26.6	18.1	30.9	14.1	19.0	17.8
2012	15.1	9.3	21.1	15.8	28.9	13.6	16.2	16.2
2013	15.5	9.3	20.7	16.1	16.1	15.5	16.6	16.7
2014	15.0	12.6	12.4	15.0	30.5	12.2	16.3	15.9
2015	6.2	6.7	7.5	8.9	12.4	8.1	8.7	7.9
Average	**13.9**	**16.9**	**23.6**	**19.2**	**29.3**	**16.5**	**19.0**	**18.0**

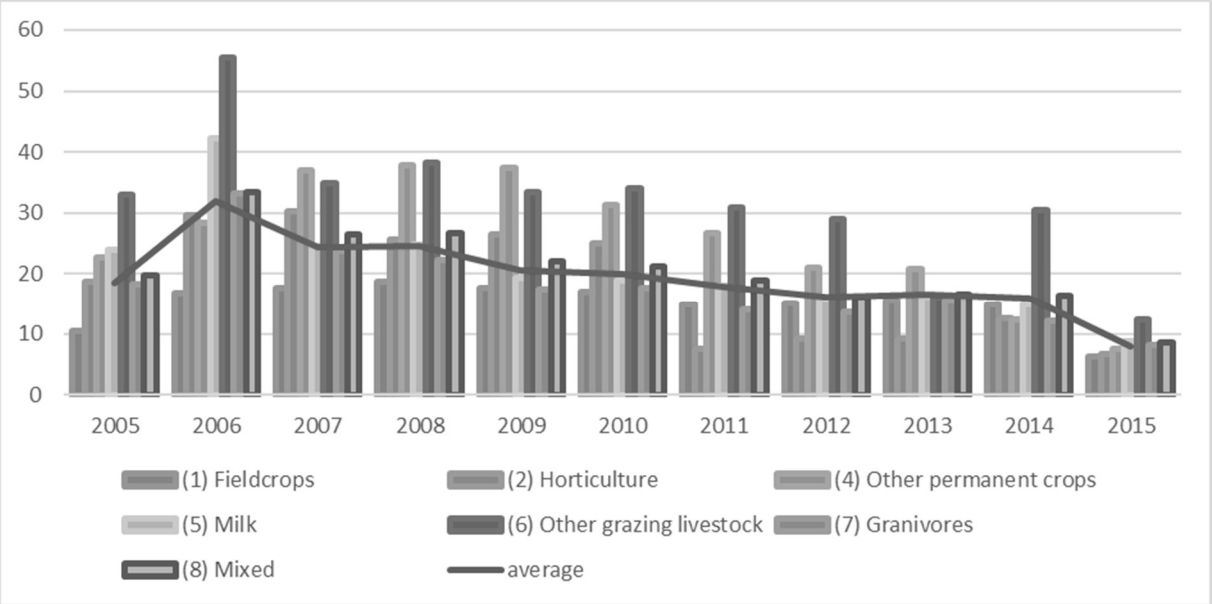
Source: own study based on FADN data.

The example of farms with granivorous animals is confirmed by T. Sobczyński's statement (2012, pp. 176-182) that the concentration of breeding of granivorous animals (pigs, poultry) creates significant environmental problems in the EU. Also J. Jankowiak, J. Bieńkowski, M. Holka (2010), in a study on farms from areas located in zones with the greatest sensitivity to nitrogen emissions to the environment, showed that the size of nitrogen surpluses in the surveyed farms depends mainly on the intensity of the organisation of agricultural production, especially including the intensity indicator of animal production organisation. By far the largest share of subsidies for tasks favourably affecting environmental sustainability in all farms in Poland occurred in 2006 (32%). Since 2008, it has been decreasing every year, on average in 2008-2015 by 2.6% annually.

The largest decrease in this share (by as much as 8%) occurred in 2015 compared to 2014 (Table 1). The annual values of share of subsidies for tasks favourably affecting environmental sustainability in the total subsidies of farms of various production types in Poland were characterised by high volatility in individual years 2004-2015. The largest spread in this area occurred in farms specialising in animal husbandry using grazing. It ranged from 4.3% in 2004 to 55.4% in 2006. The lowest differences between the value of shares and tasks favourably affecting environmental sustainability in total payments in the years 2004-2015 occurred in farms specialising in field crops (Table 1). The high volatility of the share of subsidies for tasks that favourably affect environmental sustainability in the total subsidies of farms of various production types in Poland is also confirmed in Figure 1.

By far the biggest changes in the value of share of subsidies for tasks favouring environmental sustainability in the total value of subsidies in 2005-2015 occurred in farms specialising in animal husbandry using grazing, farms specialising in permanent crops and in horticulture. In the latter type of production, the decline in the share of subsidies to tasks favourably affecting the environmental sustainability in the total amount of subsidies obtained was particularly visible in 2011 relative to 2010 (Figure 1). In addition, in Fig. 1. there is a visible decline in the share of contributions to the tasks favourably affecting environmental sustainability in total value of payments in 2005-2015 in all types of production farms. The only exception in this respect was 2006, in which the share in all types of farms increased in comparison to 2005, and 2014 in farms specialising in animal husbandry using grazing and in farms specialising in horticulture (Figure 1).

Fig. 1. The average values of share of subsidies in total of farms in percent)



Source: own study based on FADN data.

Next, the statistical significance of differences between the average value of share of subsidies for tasks favourably affecting environmental sustainability in the total amount of subsidies of farms of various production types in the years 2004-2015 was assessed Table 2).

Table 2. Statistical significance assessment of differences between average shares of subsidies for sustainability in the total value of subsidies in farms of different production types in Poland in 2004-2015

	Field crops	**Horticulture**	**Other permanent crops**	**Milk**	**Other grazing livestock**	**Granivores**	**Mixed**
Field Crops	-	0.3717	**0.0174**	0.1106	**0.0011**	0.3580	0.0851
Horticulture	0.3717	-	0.1515	0.5745	**0.0170**	0.9101	0.5784
Other permanent crops	**0.0174**	0.1515	-	0.3318	0.2817	0.0986	0.2871
Milk	0.1106	0.5745	0.3318	-	**0.0443**	0.4583	0.9628
Other grazing livestock	**0.0011**	**0.0170**	0.2817	**0.0443**	-	**0.0086**	**0.0327**
Granivores	0.3580	0.9102	0.0984	0.4582	**0.0086**	-	0.4488
Mixed	0.0851	0.5784	0.2871	0.9628	**0.03273**	0.4488	-

Source: own study based on FADN data.

Statistically significant differences between the average values of the share of subsidies for tasks favourably affecting environmental sustainability in the total values of payments

obtained in the years 2004-2015 occurred in farms specialising in animal husbandry using grazing against other production types of farms, except only for farms specialised in permanent crops. These differences were also significant in the case of farms specialising in field crops and in animal husbandry using grazing. On this basis, it should be stated that the highest average share of subsidies for tasks favourably affecting environmental sustainability in the total values of payments obtained in 2005-2015 in farms specialising in animal husbandry using grazing in relation to other production types of farms was statistically significant. Certainly, through subsidies from the CAP, the sustainable development of these farms was stimulated to the greatest extent. Going further, it can be assumed that rural areas dominated by this type of farm production will show the greatest environmental sustainability of agriculture, which should favourably affect the quality of natural resources of these resources.

Table 3 compares the average values of the share of single area payments in the total subsidies of farms with specific types of production in Poland in the years 2004-2015. Differences in this regard between farms of different types of production in particular years of the period 2004-2015 did not occur (see Table 3).

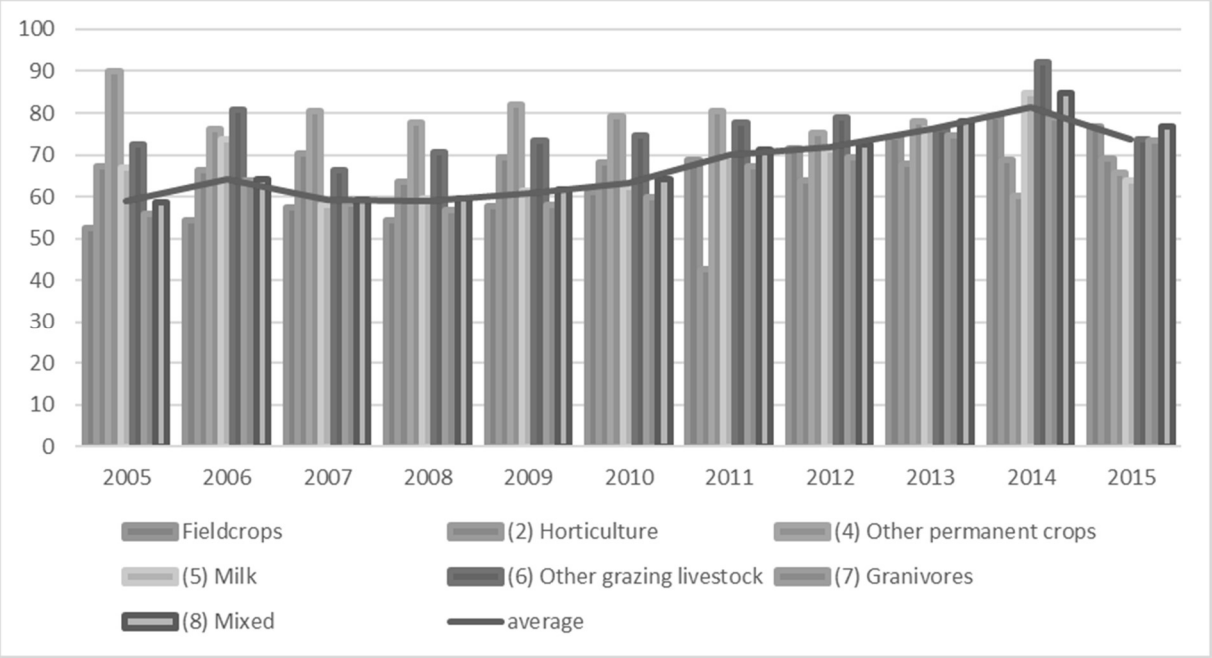
Table 3. Average values of shares of single area payments in the total value of subsidies obtained by farms of different production types in Poland in 2004-2015 (per cent)

Years	Field crops	Horticultre	Other permanent crops	Milk	Other grazing livestock	Granivores	Mixed	Average
2004	36.2	44.3	51.3	33.6	34.4	36.5	35.9	43.8
2005	41.9	48.3	67.5	43.0	39.7	37.7	39.1	48.5
2006	37.6	36.8	47.9	31.3	25.5	30.9	30.6	37.4
2007	39.7	40.0	43.4	33.4	31.5	34.5	32.8	38.9
2008	35.8	38.0	39.8	34.9	32.3	34.6	33.0	38.1
2009	40.1	43.1	44.4	42.1	40.1	40.4	39.6	41.9
2010	43.9	43.3	47.7	43.5	40.6	42.3	43.0	42.9
2011	53.9	35.0	54.0	51.5	46.8	53.1	52.3	46.9
2012	56.4	54.7	54.2	55.3	50.1	55.8	56.4	52.3
2013	59.0	58.6	57.4	60.2	53.6	59.2	61.5	55.4
2014	64.3	56.2	47.7	69.8	61.6	66.8	68.4	58.9
2015	70.3	62.3	58.2	55.0	61.4	65.2	68.1	58.1
Average	48.3	46.7	51.1	46.1	43.1	46.4	46.7	46.9

Source: own study based on FADN data.

Therefore, it should be stated that uniform area payments affect the economic balance of farms in Poland, regardless of their production type. It also shows the lack of statistically significant differences between the average values of the share of single area payments in the total value of subsidies in farms of different agricultural production types (see Table 4). In tab. 3, the systematic growth of the share of single area payments in the total value of subsidies obtained by farms of different agricultural production types is evident in 2006-2015. This increase was, on average, about 2.7% annually in these years. This is even more evident in Figure 2.

Fig. 2. The values of shares of single area payments in the total value of subsidies of farms of different production types in Poland in 2005-2015 (in percent)



Source: own study based on FADN data.

According to Figure 2, in the years 2006-2015, there was an increase in the value of shares of uniform area payments in the total subsidies of farms of all production types. A comparison of Figure 1 and Figure 2 shows that the share of subsidies for environmental sustainability in total subsidies is lower due to an increase in the share of single area payments in the total value of subsidies in Polish farms, regardless of their type of production. This allows us to state that the support of CAP for tasks that favourably affect the environmental sustainability of agriculture is being replaced by an increase in the share of single area payments in the total value of payments obtained. Therefore, the economic sustainability of agriculture in Poland should be expected to increase.

Table 4. Results of a statistical significance assessment of differences between shares of single area payments in total value of obtained subsidies for farms of different production types in Poland in 2004-2015

	Field crops	**Horticultre**	**Other permanent crops**	**Milk**	**Other grazing livestock**	**Granivores**	**Mixed**
Field crops	-	0.7264	0.4911	0.6711	0.3004	0.7195	0.7755
Horticulture	0.7264	-	0.2145	0.8961	0.4136	0.9481	0.9986
Other permanent crops	0.4911	0.2145	-	0.2435	0.0606	0.9481	0.3493
Milk	0.6711	0.8961	0.2435	-	0.5462	0.9564	0.9132
Other grazing livestock	0.3005	0.4136	0.0606	0.5462	-	0.5199	0.5026
Granivores	0.7195	0.9481	0.2869	0.9564	0.5199	-	0.9557
Mixed	0.7755	0.9986	0.3493	0.9132	0.5026	0.9557	-

Source: own study based on FADN data.

The lack of significant differences between the average values of shares of single area payments in the total value of subsidies obtained in the years 2004-2015 by farms of various production types in Poland allows us to state that CAP stimulates the sustainable development of agriculture in the economic order regardless of the type of production dominating in a given area.

Conclusions

Due to the subsidies from the EU's CAP in the years 2004-2015, the sustainable development of farms specialising in animal husbandry using grazing was stimulated the most. To the smallest extent, subsidies from CAP after Poland's accession to the EU stimulated the sustainable development of farms specialising in granivores and field crops. In particular, this concerned the environmental order of sustainable development. This was a disadvantageous phenomenon because, as shown by studies of various researchers, the concentration of rearing granivorous animals poses significant environmental problems. On this basis, it can also be concluded that rural areas with a predominance of farms specialising in animal husbandry using grazing will demonstrate the greatest environmental sustainability of agriculture. On the basis of the research conducted, it was also found that CAP stimulates the sustainable development of agriculture in the economic order regardless of the type of farms prevailing

in a given area. The study also showed a reduction in the share of subsidies for tasks that favourably affect environmental sustainability in the total value of subsidies obtained across all production types of farms. Within this survey, it should be noted that this was accompanied by an increase in the share of single area payments in the total value of obtained subsidies irrespective of the type of production of the farm. Therefore, it should be concluded that in Poland, through the impact of CAP, the economic sustainability of agriculture is gaining in importance at the expense of environmental goals.

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