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PAYMENTS FOR PUBLIC GOODS UNDER THE COMMON AGRICULTURAL POLICY *VERSUS* MARKET FAILURES

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In the reality of the marketplace, a situation often arises where an economic surplus (rent) achieved by agricultural producers is partly taken over by related non-agricultural sectors. In this sense the category of economic rent embraces market failures related to such factors as price flexibility, and thus represents an effect of the misallocation of resources in the agricultural sector. The question therefore arises of whether there exists a developmental model of agriculture in which such market failures would be reduced. Apparently the only coherent response to this need is action taken under the paradigm of sustainable agriculture. This type of model for the sector's functioning is supported by the objectives of the European Union's Common Agricultural Policy (CAP), including through support for the supply of public goods in rural areas. This article addresses the question of whether CAP payments for public goods are a desirable systemic solution serving to reduce market failures. It is hypothesised that the financing of activity relating to the supply of public goods lessens the negative impact of the "market treadmill", since it reduces the unexpected outflows of economic surplus away from farms, caused by agricultural prices. To verify the hypothesis, a panel regression analysis was performed on three sets: the EU-15 countries, the EU-12 countries, and – within Poland – subsectors of farms from six standard output classes. The analysis covered the years 2004–2012. The results of the computations provided confirmation of the hypothesis. It may be stated that an increase in the level of payments for public goods, as a percentage of total subsidies to agriculture, leads on average to a reduction in the drainage of economic rents through prices. It was also found that the financing of public goods under the CAP is more effective in reducing market failures in the EU-15 countries than in the EU-12.

Keywords: Common Agricultural Policy, influence, market failures, panel regression, public goods.

INTRODUCTION

One of the key issues in agribusiness is the ability of farms to accumulate and carry out extended production, that is, to produce food while at the same time achieving a level of income that enables the regeneration of the fixed assets employed, and also ensures fair remuneration for the farmer's labour. In practice a situation often arises where an economic surplus (rent) achieved by agricultural producers fails to fulfil the criterion of optimum allocation, in Pareto's sense, in flows between sectors.[1] In the supply chain it is partially taken over by purchasers, processors and sellers, and finally by consumers themselves. In this sense the category of economic rent embraces market failures related to such factors as the flexibility of prices. It therefore constitutes an effect of misallocation in a broad sense.

Attempts are made to reduce the misallocation of resources in the agricultural sector through support mechanisms. Nonetheless, the fallibility of national redistribution policy in this area is a well-known fact (cf. e.g. Czyżewski A. 2007; Zegar 2012). In the subject literature the term "leakage" is used with regard to state aid. It is estimated that only 20% of the total amount of support to agriculture in the OECD countries creates a net surplus; the remainder flows out to other branches of the economy (OECD 2000). The question therefore arises whether there exists a developmental model for agriculture in which such market failures and failures of redistribution policy would be reduced. Apparently the only coherent response to the problem of the incompatibility of environmental, social and economic goals is action taken under the paradigm of sustainable agriculture. This includes such desirable practices as sustainable intensification and precision agriculture, which in certain aspects fall under such a developmental paradigm. We will not consider the sustainable agriculture paradigm in detail, since this is a topic well covered by the literature (e.g. Woś, Zegar 2002; Zegar 2012). It should be recalled, however, that one of its chief principles is that agriculture and rural areas should supply public goods

[1] In Pareto's sense, an economic rent is a surplus payment to a production factor above that which would persuade it to provide services in a given use (Brooke 2010; Pareto 1896). A more precise version of this definition states that an economic rent is the surplus of income above the alternative payment to a factor which it might receive in a different use.

(such as natural amenities, landscape, rural culture, biodiversity, traditional foodstuffs and food security in a broad sense) in conditions of sustainable food production.

The European Union's Common Agricultural Policy (CAP) promotes sustainable agriculture through support for the supply of public goods in rural areas. This article serves as a contribution to the discussion in a wider community context (the operation of the so-called European model of agriculture[2]), and addresses the question of whether CAP payments for public goods are a desirable systemic solution serving to reduce the effects of market failures expressed in the flexibility of agricultural prices. We put forward the hypothesis that the financing of activities related to the supply of public goods lessens the negative effects of the "market treadmill", since it reduces the unexpected outflows of economic surplus away from farms through agricultural prices.

Public goods in the cap

The concept of public goods is something of a generalisation. In economic theory, four types of goods may be distinguished: private, common, club and public. The criteria of classification are the features of rivalrous *vs.* non-rivalrous and excludable *vs.* non-excludable (Klimowicz, Bokajało 2012, p. 98). In a narrow sense, "pure" public goods are those that are both non-rivalrous and non-excludable (Ulbrich 2003, p. 67). In practice, however, few such goods exist (examples might be nationwide service institutions, national defence, law and order and security). The definition is thus frequently extended to include common goods (those which are rivalrous but non-excludable) and what are called *merit goods*, which might physically be private goods, but due to social doctrine and government social policy are delivered to citizens even when they do not accept that fact. These include most of the goods financed by the public sector, particularly in the fields of education and healthcare, but also – according to the latest concepts – in agriculture.

Public goods are not subject to market valuation in a strict sense, but they may be considered to be subject to institutional valuation (the institution in our case being the CAP), which results in the subsidisation of particular management methods. Such a model of value is not without its defects, but it gains public acceptance more easily than does the subsidisation of market goods. There are reasons to believe that the financing of public goods under the CAP lessens the effects of market failures in the agricultural sector, because:

1) a higher level of payments for public goods, as a percentage of total subsidies, can be expected to favour the sustainable development of farms, since it stimulates their multifunctional development and diversification of income sources; there is thus less pressure to increase productivity in the classical sense, since family farms may maintain a rate of increase in income by means of activity other than agriculture (although related to agriculture);
2) a higher level of payments for public goods favours activity associated with lower flexibility of product prices, such as organic food production and agritourism;
3) to a greater or lesser extent, the supply of public goods releases farms from the market treadmill, since it reduces their dependence on agricultural price fluctuations;
4) subsidies for the supply of public goods are less susceptible to "leakage", since they are capitalised in land rental prices to a lesser degree in view of the absence (or very limited extent) of market valuation of public goods (Czyżewski B., Matuszczak 2016).

The identification of the subsidies that serve to finance public goods is open to discussion (see eg. Brelik, Grzelak 2016). For example, do the direct payments made under the first pillar of the CAP lead to the creation of such goods? A certain step in this direction is the cross-compliance principle,[3] although it may be said that this serves more to maintain the usefulness of land and other assets to produce safe food in the long term. The receipt of area payments, however, is little dependent on reductions in the use of environmentally harmful chemicals or over-intense agricultural production. Moreover, although direct payments were intended to improve the economic situation of professionally active farmers, they are largely transferred, through increased rental prices, to landowners who are not professionally active in agriculture but merely lease their land (Góral, Kulawik 2015). On the other hand, programmes under the second pillar of the CAP are oriented towards not only the development of agriculture, but also that of rural areas in a wider sense, and in the authors' view these make a greater contribution to the creation or conservation of public goods (or more precisely, common goods; cf. Czyżewski B., Matuszczak 2016a; Czyżewski A., Stępień 2016). One may refer to certain public amenities that are generated by particular programmes of the second pillar. It is believed that agri-environmental payments encourage action to protect biodiversity in rural areas, to protect the natural environment and landscape, to promote organic agriculture, and to protect genetic resources in agriculture (Topor D. 2017; Rachisan R. et al. 2015). These goals are achieved, for example, through actions leading to improvement in the structure of landscapes lacking environmental amenities (ponds, woods, hedgerows), preservation of the cultural values of rural areas (the traditional structure of farmland), renaturalisation of transformed cultivated meadows, protection of water and soil, creation of open areas and buffer zones, and preservation of traditional orchards. Subsidies to less favoured areas are intended primarily to preserve the vitality of rural areas, maintain landscape amenities, promote environmentally friendly agriculture, and prevent depopulation. Other subsidies for rural area development serve to support tree-planting or maintenance of the ecological balance of forest environments, for example, which undoubtedly increases public amenity (Zegar 2012).

[2] The European model reflects the dual function of agriculture – as well as food production, it also serves the broadly defined development of rural areas and supply of public goods, and its fundamental basis is family farms (cf. Fischler 1999).

[3] Cross-compliance principles require farmers to act to ensure animal welfare and protect the environment in such matters as the use of animal wastes and fertilisation. These actions are a necessary condition for the receipt of direct payments.

RESEARCH METHODS

It is assumed in this study that the features of public goods (or more precisely, common goods) are associated with the following: agri-environmental payments, less favoured area payments, set-aside payments, and subsidies for rural area development (according to the typology of the EU's FADN[4]). Consequently, vectors of these variables were used in the analysis. This was carried out using data concerning the aforementioned programmes and concerning the products and inputs of FADN representative farms, as compiled by the Institute of Agricultural Economy and Food Management, and data from the EAA Eurostat database in relation to agricultural price indices and inflation.[5] On the basis of these, input-output matrices were produced at the level of representative farms in the SO system,[6] and calculations were made of the outflows of economic rents through prices (ΔA) and the vector of payments for public goods. The results were aggregated at sector level by multiplying them by the number of farms represented in each SO class in the country in question.

Market failure was defined in terms of price flexibility. The flexibility of agricultural prices is defined as (ΔP/P):(ΔQ/Q), where P denotes prices and Q denotes production (Tomek, Robinson 2001). Unexpected changes in prices thus lead to outflows (drainage) or inflows of economic surplus. The surplus drainage or inflow through price changes is expressed mathematically as follows:

$$\Delta A = \left[\sum_{i=1}^{n}\left(\frac{Q_{it}\cdot P_{it}}{HICP} - Q_{it}\cdot P_{it-1}\right)\right] - \left[\sum_{j=1}^{m}\left(\frac{F_{jt}\cdot R_{jt}}{HICP} - F_{jt}\cdot R_{jt-1}\right)\right] \qquad (1)$$

where:

HICP is the rate of inflation;

ΔA is the change in the economic surplus of a sector or farm in period *t* relative to *t–1* (called the drainage or inflow of economic surplus through prices);

Q_i is the quantity of output *i* in successive years (*t–1, t*) in an *n*-element output matrix;

F_j is the quantity of external input *j* in successive years (*t–1, t*) in an *m*-element input matrix;

P_i is the price of output *i* in year *t–1*;

R_j is the price of external input *j* in successive years (*t–1, t*).

It should be noted that the above equation defines changes in the surplus resulting exclusively from changes in the prices of sold products and purchased means of production. It is based on the assumption that price expectations are adaptive,[7] and consequently the volumes of production and of means of production are determined based on prices from the preceding period. Most agricultural economists accept this assumption. Hence a farm realises an unexpected economic surplus (rent) with respect to the previous year if the revenue in real prices ($\frac{Q_{it}\cdot P_{it}}{HICP}$) exceeds the revenue in fixed prices from the preceding year ($Q_{it}\cdot P_{it-1}$). Similarly, a farm obtains an unexpected revenue (rent) if its inputs in year *t* in real prices ($\frac{F_{jt}\cdot R_{jt}}{HICP}$) are lower than the same volume of inputs in fixed prices from the preceding year ($F_{jt}\cdot R_{jt-1}$). Of course, this approach is subject to certain limitations. The behaviour of farmers under this model is somewhat naive, since they consider price changes for the same volumes of products or means of production in successive periods. If it were to be assumed that the market operates in conditions of stationary (but not static) equilibrium,[8] then both volume and prices would be subject to change. It is thus implicitly assumed that, in view of the adaptive expectations existing in agriculture, stationary equilibrium does not occur.

The next step was the calculation of panel regression models, in which the flows of economic surplus through agricultural prices are presented as a function of the level of payments for public goods as a percentage of the total pool of CAP subsidies. This was done for three sets: the EU-15 countries, the EU-12 countries, and – within Poland – subsectors of farms from six standard output (SO) classes. Data referred to the years 2004–2012. The following functions were computed:

$$\frac{ABS\ \Delta A_{C,T}}{S_{C,T}} = \alpha_0 + \alpha_1 PG_{C,T} + \beta' DU + u \qquad 2)$$

$$\frac{ABS\ \Delta A_{SO,T}}{S_{SO,T}} = \alpha_0 + \alpha_1 PG_{SO,T} + \beta' DU + u \qquad 3)$$

[4] FADN (Farm Accountancy Data Network) is an agricultural accounting system for farms in the EU.

[5] The input-output matrices are based wholly on the FADN database, but price indices, including inflation, are based on Eurostat (EAA) data, since these are not included in the FADN figures.

[6] The economic size of a farm is expressed in units of standard output (SO), namely the five-year average of the value of annual production from a given type of crop or animal farming obtained from one hectare or from one animal, in average conditions for the region in question.

[7] Economists distinguish two basic types of price expectations: adaptive and rational. In the first case, expectations are formulated based on historical data (*ex post*) and then adjusted in subsequent periods by the error of expectation, namely the difference between the expected and the actual price. Rational expectations, on the other hand, are formulated *ex ante* on the basis of forecasts.

[8] Static equilibrium denotes a point of equilibrium between demand and supply at a given moment (in a given period). Stationary equilibrium is of a dynamic nature, and is a set of equilibrium points of demand and supply in successive periods. The equilibrium path is formed by way of continuous and immediate adaptation (shifting) of the demand and supply curves in response to changing market conditions.

where:

C, T, SO denote respectively the country, the year, and the SO class of farm according to FADN;

$\frac{\mathrm{ABS}\,\Delta A}{S}$ is the absolute value of the drainage or inflow of economic surplus through prices as a percentage of total subsidies, with ΔA calculated by equation 1). The absolute value of ΔA is taken because it is assumed that both unexpected drainage and inflow of surplus through prices reflect market failures (resulting from flexible prices). In conditions of static equilibrium the changes in income ought to correspond exactly to the changes in real total productivity (TFP). The value of ΔA for a given country or SO class was divided by the total amount of subsidies in order to take account of differences in the sizes of the economies being compared (in particular, of the agricultural sector);

PG is the level of payments for public goods (the four classes of subsidies listed above) as a percentage of total subsidies;

β is a vector of dummy variables (zero–one) for the effects of individual countries, DU, in the case of the fixed effects model; for the random effects model $\beta' U$ is part of the random component, and in case of panel estimation by the ordinary least squares (OLS) method is equal to 0;

u is a random component.

It should be noted that in the case of these models we are dealing with whole populations rather than samples. The sets in individual countries cover the same part of the agricultural sector as is represented by the FADN results. In each case the set is responsible for 90% of agricultural output in the country in question.[9] The issue of statistical significance is therefore debatable (should attention be paid to it at all?) both in space and in time. Each of the studied cross-sections constitutes a closed population (EU-15, EU-12, Polish farms by SO class), and the time series begins at the date of the accession of the EU-10 countries to the Community. Hence, there is no "sample" involved.[10] On the other hand it might be concluded that the data for all objects in the population do nonetheless constitute a sample, but a "sample from the repeatability of the phenomenon". The explained flows of rents through prices are an effect both of main causes and of subsidiary (random) causes, which give the model a stochastic character. The values and signs of the regression coefficients reflect the situation in the studied populations of countries in the years 2004–2012. The *p*-value represents the probability that the relations described occurred only in a given place and time and are not universal in nature. In this case, however, the evidence is strong – that is, the probability that the described relationships are "accidental" is low. It should not be expected, however, that the value of the coefficient of determination R^2 will be high, since the regression analysis includes only two variables: the absolute value of the surplus drainage/inflow through prices as a percentage of total subsidies[11] (the dependent variable, %) and the level of payments for the aforementioned public goods as a percentage of total subsidies (the independent variable, %).

RESULTS

For the panel consisting of the EU-15 countries (cf. Table 1) the appropriate model was found to be the random effects model (based on the Breusch–Pagan and Hausman tests). The effect of the level of payments for public goods as a percentage of total subsidies is statistically significant ($p < 0.001$) and is inversely proportional to the scale of market failures (measured in terms of the value of drainage/inflow of surplus through unexpected price changes), which is in accordance with expectation. An increase in the level of payments for public goods by 1% causes a fall in the absolute value of the drainage/inflow by 0.92% (measured as a percentage of total CAP subsidies).

In the random effects model it is assumed that there are individual effects that are constant in time but unobservable at the level of objects (countries in this case), to which are assigned specific amounts of variance of the dependent variable, called the *between variance*. This concerns factors specific to particular countries, such as climate, agrarian structures and economic policy. The between variance is compared with the *within variance*, which reflects purely random variation. In the case under analysis the rho index[12] takes the value 0.063, which means that the individual country effects are responsible in total for only around 6% of the residual variation. At the same time, the coefficient of determination reflecting individual effects is approximately 15%. It can therefore be concluded that the effect of the only variable – the amount spent on public goods – is extremely large, considering that the scale of drainage of rents through prices is potentially dependent on a number of other factors (global prices, the development of the local market, the cyclicity of agricultural production, integration processes in agribusiness).

[9] The FADN field of observation consists of commercial farms. The minimum economic size for inclusion of a farm in the field of observation has been determined since the 2010 accounting year on the basis of analysis of sums of Standard Output (SO) values for individual SO classes (according to data from the Polish Central Statistical Office). In practice the cumulative sum of SO values from the various classes is calculated, beginning with the largest, until a level of approximately 90% of the value for the total population is reached. The lower boundary of the interval in which this occurs is the minimum economic size threshold (Standard Results 2013).

[10] The statistical significance is the probability that the observed relations within a sample occurred purely by chance, and thus do not hold in the entire population from which the sample was taken.

[11] The value of surplus drainage/inflow is divided by the total value of subsidies so as to compensate for differences in the absolute size of the agricultural sector in particular countries.

[12] Rho = square of between variance/(sum of squares of within and between variance)

Table 1. Effect of payments for public goods on market failures (measured as the absolute value of drainage /inflow of economic surplus through changes in agricultural prices) in the EU-15 countries in 2004–2012.

Linear model, random effects (GLS); 120 observations, 15 units of cross-sectional data, time series length 8. Dependent variable (ABS ΔA): *absolute value of surplus drainage/inflow* (as % of subsidies). Robust HAC standard errors.

Variables	Coefficient	Standard error	t*	p-value
constant	43.3077	6.43618	6.7288	<0.0001
Payments for public goods, VPG (as % of subsidies)	–0.922416	0.199626	–4.6207	<0.0001
Descriptive statistics and tests				
Coefficient of determination LSDV R^2 = 0.135				
Arithmetic mean of dependent variable	26.77338	Standard deviation of dependent variable		27.60776
Log-likelihood	–557.0161	Akaike information criterion		1118.032
Between variance	135.863	Within variance		522.973
Breusch–Pagan test: Null hypothesis: Variance of error in a unit = 0. Asymptotic test statistic: chi-square(1) = 12.6936, with p-value = 0.000366917				
Hausman test: Null hypothesis: The GLS estimator is consistent. Asymptotic test statistic: chi-square(1) = 0.745391, with p-value = 0.38794				

*relation of regression coefficient to standard error.
Source: based on data from Eurostat (EAA) and FADN (EU).

Table 2. Effect of payments for public goods on market failures (measured as the absolute value of drainage /inflow of economic surplus through changes in agricultural prices) in the EU-12 countries in 2004–2012.

Estimation: panel OLS, linear model; 90 observations, 12 units of cross-sectional data; time series length: minimum 5, maximum 8. Dependent variable (ABS ΔA): *absolute value of surplus drainage/inflow* (as % of subsidies). Robust HAC standard errors.

Variables	Coefficient	Standard error	t*	p-value
constant	43.5181	7.7461	5.6181	0.0002
Payments for public goods, VPG (as % of subsidies)	−0.651741	0.325177	−2.0043	0.0703
Descriptive statistics and tests				
Coeff. of determ. R-square	0.086674	Adjusted R-square		0.076295
Arithmetic mean of dependent variable	31.98444	Standard deviation of dependent variable		22.10390
Log-likelihood	−401.7398	Akaike inform. criterion		807.4795
Breusch–Pagan test: Null hypothesis: Variance of error in a unit = 0 Asymptotic test statistic: chi-square(1) = 3.48049, with p-value = 0.0620962				
Test for normality of distribution: Doornik–Hansen (1994) Null hypothesis: the empirical distribution is normal. Chi-square(2) = 4.388, with p-value = 0.11146				

*relation of regression coefficient to standard error.
Source: based on data from Eurostat (EAA) and FADN (EU).

In the EU-12 countries (Table 2) the marginal effect of the amount spent on public goods is much weaker (with a regression coefficient of – 0.65), although it is still statistically significant. This variable explains slightly under 9 % of the variation in rent drainage through prices, which is about one-third less than in the previous case. In this case the statistical tests (Breusch–Pagan) showed that the individual effects of countries are not significant, and that it is appropriate to use classical OLS estimation. This meant that it was necessary to verify, among others, the assumption of normality of the residual distribution – as Table 2 shows, this condition was found to be satisfied (using the Doornik–Hansen test). The effect on the results from any deviations from other assumptions is limited by robust standard errors. The results also show that the relative scale of market failures (the mean of the dependent variable) is greater among the EU-12 countries than among the EU-15.

In Poland, however, the situation is closer to that found in the EU-15 (see Table 3). The regression coefficient is –0.87; this means that a 1 % increase in the relative level of payments for public goods reduced the surplus drainage/inflow by 0.87 % (of the pool of subsidies). The coefficient of determination is relatively high, at 19%, and so the financing of public goods explains to a relatively high degree the variation in surplus drainage/inflow through agricultural prices. It is also notable that the scale of market failures in Poland was found to be high compared with the previous models (the surplus drainage/inflow amounted on average to as much as 44% of the value of subsidies), although it fell significantly from year to year (by approximately 3.25 % of the value of subsidies), as is indicated by the statistical significance of the time factor. As regards the assumptions, OLS estimation was again found to be appropriate. This means that the economic size of farms is not a factor that significantly determines the studied relationship between payments for public goods and market failures. The empirical distribution was confirmed to be normal.

Table 3. Effect of payments for public goods on market failures (measured as the absolute value of drainage/inflow of economic surplus through changes in agricultural prices) in Poland in 2004–2012.

Estimation: panel OLS, linear model; 48 observations, 6 units of cross-sectional data (SO classes), time series length 8. Dependent variable (ABS ΔA): *absolute value of surplus drainage/inflow* (as % of subsidies). Robust HAC standard errors.

Variables	Coefficient	Standard error	t*	p-value
constant	74.9591	11.9119	6.2928	0.0015
Payments for public goods, VPG (as % of subsidies)	−0.875973	0.325835	−2.6884	0.0434
time (linear trend)	−3.25066	1.10677	−2.9371	0.0324
Descriptive statistics and tests				
Coeff. of determ. R-square	0.230029	Adjusted R-square	0.195808	
Arithmetic mean of dependent variable	43.97947	Standard deviation of dependent variable	22.35300	
Log-likelihood	−210.4642	Akaike inform. criterion	426.9284	
Breusch–Pagan test: Asymptotic test statistic: chi-square(1) = 1.23273, with p-value = 0.266876				
Test for normality of distribution: Doornik–Hansen (1994). Null hypothesis: the empirical distribution is normal. Chi-square(2) = 0.920, with p-value = 0.63139				

*relation of regression coefficient to standard error.
Source: based on data from Eurostat (EAA) and FADN (EU).

Generally speaking it lacks in the literature studies of the effects of publics goods payments on market failures as in the approach proposed by the authors. However many authors considered the impact of public goods schemes on some positive externalities of the market mechanism. One may assume that such effects may be also perceived as a reduction of market imperfections. Pawłowska-Tyszko (2014) claims that environmental payments bring positive effects in the social dimension, because as a basis of remuneration for green services, they play also a profit-making role, which is of particular importance in small, extensive holdings being main beneficiaries of these programmes. However, S. Chabe-Ferret and J. Subervie (2012) noted that "as a result of support for agri-environmental activities, two effects emerged: *additional* – value added generated by the implementation of an obligation and *windfall* - extraordinary, unexpected income. Therfore, farmers should actually receive remuneration from the budget for achieving the *additional* effect only. Meanwhile, after receiving the subsidy, the producer's marginal private costs decrease and its benefits increase. Thus, subsidies are cost-ineffective and hence producers do not incur full social costs of their activities". Other authors studied the effects of separate CAP schemes which has been above included to the proxy of public goods. For example Zawalińska (et al, 2013) and Gorton (et al. 2009) suggested that the LFA scheme appears more effective in reducing land abandonment or in promoting continued land use in intermediate rural and predominantly agricultural regions (where the share of population living in rural areas is between 15-50% and more than 50% of the rural population works in agriculture) which is to some extent in line with the findings that the public goods payments reduce market failures. There are also evidences that stringent environmental policies can stimulate innovations that may over-compensate for the costs of complying with these policies including market distortions (Porter and Van der Linde 1995). This confirms analysis of De Santis and Lasinio (2015) which says that the gradual strategic reorientation of environmental policies in the EU in favor of economic incentives has been more effective in stimulating productivity and innovation than in setting explicit directives about pollution control levels.

CONCLUSIONS AND DISCUSSION

The calculations appear to confirm the hypothesis put forward at the outset, that payments for public goods reduce the negative effects of the market treadmill, and more precisely the market failures that are its cause. It has been found that an increase in the level of payments for public goods, expressed as a percentage of total subsidies to agriculture, by 1% leads on average to a fall in the drainage of economic rent caused by prices by between 0.6% and 0.9% of the value of the pool of subsidies; that is, in case of an increase in real productivity, this is more or less the growth in income that can be expected. The level of significance of the knowledge obtained here may be debated. On the one hand, the results are credible, the models satisfy the necessary assumptions, and the number of observations is relatively large. On the other hand, the interpretation of the results and the search for explanations "why" consist largely of speculation. Nonetheless, we certainly know more about how the financing of the supply of public goods influences the market failures associated with the flexibility of agricultural prices, King's effect and the market treadmill.

It is interesting to consider why the financing of the analysed categories of public goods under the Common Agricultural Policy is more effective in reducing market failures in the EU-15 countries than in the EU-12. It may be assumed that in the new member countries these payments modify the structure of agricultural production to a lesser degree and are less likely to lead to the creation of added value (through changes in that production structure), or that they less effectively stimulate the multifunctional development of the agricultural sector, which can make farms independent of the global market (and the flexibility of agricultural prices). In other words, these payments represent not so much an alternative direction for the functioning of agriculture in the new EU countries, as a supplement which may take the form of social assistance. Therefore, an effective route to increased income in the EU-12 countries is still provided by support oriented towards increasing productivity (such as production subsidies and investment support), in view of the relatively

high marginal increments. On the other hand, the negative external effects of the market mechanism (including the drainage of economic surplus) in the case of the EU-15 countries can be reduced by means of support for public goods, broadly defined. Such payments make the actual changes in income closer to those resulting from changes in real productivity, and thus reduce errors in price expectations. They should also create conditions for public goods to be capitalised indirectly by the market in the form of various services and products offered to residents of both rural and urban areas. A certain dualism in the system of support is thus postulated, differing somewhat between the two analysed groups of countries – the EU-15 and the EU-12. Poland, although it belongs to the second of these groups, combines elements of both pro-efficiency support, in view of the still relatively low productivity of labour and capital, and support for public goods, as the analysis has shown.

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