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Towards measuring political rents in agriculture: case studies of different agrarian structures in the EU

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Abstract: It is generally believed that the subsidisation of agriculture serves as a payment of political rents to farmers. Here, we attempt to show that characterisation of the entire amount of subsidies as "political rent" is unjustified in the light of the definition of political rent as formulated in the rent-seeking theory. Political rents in agriculture diverge from the definition, since the resources devoted to rent-seeking partly serve to produce public goods – that part cannot be regarded as wastage. Furthermore, if market imperfections cause rents to be captured by other entities (the treadmill theory), then it is even more true that these benefits are not exclusive. However, it is hard to find any attempts to measure the value of political rents. Thus, a novel methodology is proposed for valuing these items, with the aim of calculating the "pure political rent", based on an input-output (I-O) Leontief approach adopting matrices for "representative farms" according to EUFADN typology and on a decomposition of the Hicks-Moorsteen TFP index for the period 2007–2012 for four countries: Slovakia, France, Austria and Poland.

Keywords: agriculture, CAP, input-output analysis, rent-seeking

It is generally believed that the subsidisation of agriculture under the European Union's Common Agricultural Policy (CAP) is embodied by the payment of political rents to farmers as a result of rent-seeking. Careful analysis of the theory of rent-seeking, and Cochran's treadmill theorem (Levins and Cochrane 1996; Sumner 2014), would nonetheless appear to contradict that view. Rent-seeking is inextricably linked firstly to wastage of resources and loss of overall well-being (Olson 1965), and secondly to exclusive benefits obtained by selected social groups at the expense of others (Deininger and Binswanger 1995; Furtan et al. 2008; Georgiev 2010; Schmitz 2010). Political rents in agriculture diverge from this definition since the resources devoted to rent-seeking partly serve to produce public goods, and that part cannot be regarded as wastage. If the payment of political rents to agriculture results in the delivery of any public goods, then these benefits are also not exclusive. Furthermore, if market imperfections in sectors related to agriculture cause rents and economic surplus to be captured by other entities (the treadmill theory), then it is even more the case that these benefits are not exclusive.

In the case of provision of public goods by farmers, the evolution of the CAP shows that there is increasingly strong social acceptance for regarding certain types of subsidies for agriculture as payments for the supply of public goods produced in rural areas. There is insufficient evidence either for or against the existence of a "market treadmill" in contemporary European agriculture. Some fifty years ago, Cochrane (1958) introduced the notion that farmers are on a treadmill which in spite of their constant efforts to improve factor productivity (TFP), e.g., by adoption of new technologies, wears away any profits that

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might result. The effects also manifest in the opposite direction: if farmers decrease productivity, sell assets or if they are reluctant to adopt new technologies, they become "the laggards" and are lost in the price squeeze. In effect, their incomes drop more than proportionally to the fall in productivity. In fact, the treadmill is caused by market imperfections resulting from flexible agricultural prices[1] in response to productivity growth. The market treadmill in agriculture is referred to in the Polish literature as "the drainage of economic surplus" (Czyżewski and Brelik 2014).

In the authors' view, one can measure this drainage phenomenon. If it is possible to calculate what part of the economic rent flows out of agriculture as a result of market imperfections, then it becomes clear that the re-transfer of that amount does not meet the criteria of the definition of "political rent" (defined as resulting from an action aimed at achieving benefits unjustified by any productive activity). Similarly, political rent does not include funds paid out under rural development programmes if these represent remuneration for specific public goods supplied by farmers. It is therefore necessary to deduct, from the overall level of subsidies paid to agriculture, the value of the aforementioned surplus drainage (the treadmill effect), and the amount representing payment for public goods. If something remains, then it is undoubtedly a "pure political rent".

The objective of the present work is to verify the above concept of measurement of political rent, which is new in the literature, in relation to agricultural holdings that are representative for various agrarian structures in the EU. In order to achieve this goal, we had to identify clusters of such structures based on the use of land, and then determine the amount of surplus drainage, the value of public goods and the value of the pure political rent in the case study for each cluster. The question arises of whether the CAP compensates for the treadmill effects (if they occur) and to what extend agricultural subsidies are unjustified neither by market imperfections, nor by payments for public goods. We propose two research hypotheses:

(1) The level of subsidies is a function not only of political lobbying, but also (if not primarily) of market imperfections and public goods provided by farmers;
(2) Even though agricultural prices are shaped globally, their influence on rent flows in agribusiness varies depending on the agrarian structure. As a result, the same price conditions may in one country lead to the manifestation of Cochran's treadmill, and in another country to the opposite – an unexpected inflow of rents.

ASSUMPTIONS OF I-O APPROACH FOR MEASURING POLITICAL RENTS

Institutional valuation of public goods

Agriculture, since it supplies public goods (and hence has lower net consumption of them), pays a lower net amount of taxes (Starrett 1988). With this in mind, not all of the subsidy can be considered to represent political rent, particularly not that part which is paid on the condition of providing public utilities. The authors adopt the assumption that payments for public goods include set-aside and agri-environment payments, support for less-favoured areas and subsidies under rural development programmes. Of course, such an assumption is disputable because it may be questioned whether the valuation of public goods by the CAP institutions is correct and rational. Nevertheless, at this moment there is no alternative solution besides a social agreement on what payments for public goods are supposed to be.

Adaptive price expectations in agriculture

By way of an example, let us refer to the data in Table 4, relating to Poland. As has already been stated, price expectations in agriculture are of an adaptive nature. This means that in the period 2007–2012, a farm adjusts its price expectations every year on the basis of historical sale prices and the prices of production factors, according to the equation:

$$p_t^e = p_{t-1}^e + \lambda(p_{t-1} - p_{t-1}^e), \text{ where } \lambda \in (0,1) \qquad (1)$$

where:
p_t^e denotes expected prices in the period t
p_{t-1}^e denotes expected prices in the period $t-1$
p_{t-1} denotes prices in the period $t-1$
λ is a parameter.

Taking into consideration this system of prices, the farm concludes that it is possible to optimise the structure of production and to increase efficiency. For example, a "very small" Polish farm (cluster II –

[1]Tomek and Robinson (1981) define the price flexibility coefficient as $(\Delta P/P):(\Delta Q/Q)$, where P denotes prices and Q output.

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Table 4, column I) decreased its technological productivity by EUR 814 (the sum of year to year changes in the period 2008–2012). In conditions of adaptive expectation adjustments, the farm might expect its total agricultural income to decrease by a similar amount. Production decisions were made every year in conditions of uncertainty as to the following year's prices, and the effects of production became apparent in the following season, when the farmer could no longer influence the current supply. Unfortunately, out of the expected EUR 814, an additional sum of EUR 145 flowed out to other sectors of agribusiness, due to unfavourable price changes which could not have been foreseen at the time when the structure of production was being planned. Hence, it can be estimated that the surplus drainage through prices (effect of the market treadmill) in the case of "small" farms amounted to approx. 1% of total incomes from 2008–2012, and increased by 17% the expected drop in income. This is not a big "expectation error", but if there are groups of farms which are continuously suffering from the market drainage and others gaining from it, then agricultural policymakers should take this into account.

Theoretically the size of the error in a farm's price expectations should be correlated with the economic size of a farm, because stronger farms are less affected by information asymmetry and have more bargaining power in food-chains. Accordingly, they can receive lower political rents than smaller farms which also need compensation for market imperfections. The question is whether subsidies distort price expectations? If that is indeed true, subsidising small farms as a counteraction against market failure would result in a "vicious circle". There is no consensus among researchers concerning the positive and negative market effects of decoupling reforms. Kazukauskas carried out a study in the EU15 countries, showing that the probability of a farm disinvesting decreased due to the policy change for most farms (Kazukauskas et al. 2013). In turn, Yanwen shows that there exists a negative relationship between the subsidy and TFP change, if subsidies are associated with the acreage in countries with low per capita income (Yanwen et al. 2013).

Market imperfections are frequently observed in small-sized farms. For example, much attention is drawn to the inverse farm size-productivity relationship in low-income countries. Barrett proves that farmers in low-income countries cannot hedge uncertain crop prices through futures or insurance contracts nor by forward sales, and, for that reason, are more vulnerable to the diminishing returns when the harvest increases (Barrett 1993). However, other researchers failed to confirm the inverse farm size-productivity relationship arguing that it disappears after considering that semi-subsistence farms satisfy their own nutritional needs (Chen et al. 2011).

Kautsky was convinced of the superiority of large farms and saw no justification for agricultural policies designed to support small farmers (Kautsky 1899), but the experiences of the EU15 tell a different story. Its policies to support the economic development of small farmers have proven to be a particularly successful strategy to reduce rural poverty and ensure food security in Europe since the 1960s. Many economists have expounded this point of view with regard to other regions of the world: (Mellor 1976; Lipton 2005; Birner and Resnick 2010).

Measuring I-O-based TFP change and expected income

Generally speaking, the proposed method of computing TFP change is based on indicators of total factor productivity of the Hicks-Moorsteen (HM TFP) index, which have been decomposed in the input-output matrices for the representative farms. The method was developed by Lecomte and Louis (1974) and also adopted by Gburczyk (1990) as the *global productivity surplus accounts*. It is a different approach to changes in TFP than that generally found in the literature. Changes in TFP are calculated in real terms (after elimination of the effects of prices, subsidies and other payments from the CAP) not on the basis of the Malmquist Productivity Index, but using input-output matrices (60 input-output variables * 4-6 SO classes * 6 years). The Malmquist index has become popular for international comparisons of agricultural productivity since it does not require prices for its estimation, which are normally not available. In this case, we had available a complete matrix of price indices for 60 input-output variables, prepared with the use of Eurostat data. The I-O approach to measure TFP changes has one substantial advantage: it allows estimation of the absolute (monetary) value of the productivity change. Then, one can assess the treadmill effect and distinguish the part of the economic surplus flowing out of farms as the result of flexible prices. The question is whether agricultural policy manages to correct these market imperfections?

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The HM TFP Index in its original form is as follows (Coelli et al. 2005):

$$\text{HM TFP Index} = \frac{\sum_{i=1}^{n} P_{i0} \times Q_{i1}}{\sum_{i=1}^{m} P_{i0} \times Q_{i0}} \div \frac{\sum_{i=1}^{m} R_{i0} \times F_{i1}}{\sum_{i=1}^{m} R_{i0} \times F_{i0}} \quad (2)$$

It was transformed into a form where:

$$\Delta TFP = \left(\sum_{i=1}^{n} Q_{it} \times P_{it-1} - \sum_{i=1}^{n} Q_{it-1} \times P_{it-1} \right) - \left(\sum_{i=1}^{n} F_{jt} \times R_{jt-1} - \sum_{i=1}^{n} F_{jt-1} \times R_{jt-1} \right) \quad (3)$$

where:
Q_i = the quantity of product i in successive years (t – 1, t)
F_j = the quantity of external input j in successive years (t – 1, t)
P_i = the price of product i in successive years (t – 1, t)
R_j = the price of external input j in successive years (t – 1, t)
ΔTFP = the change in productivity in monetary units resulting from the change in real values of outputs and inputs (*excluding subsidies and other payments from the CAP*).

The input-output matrix contained the following variables according to the EUFADN classification (Official Journal of the European Union, L 335 p. 3, 13.12.2008):

Variable type	FADN codes of variables
Outputs	SE140, SE146, SE145, SE150, SE155, SE160, SE165, SE170, SE175, SE180, SE185, SE190, SE195, SE200, SE216, SE220, SE225, SE230, SE235, SE240, SE245, SE251, SE256, SE 395
Inputs	SE285, SE295, SE300, SE305, SE310, SE320, SE330, SE331, SE340, SE345, SE350, SE356, SE360, SE370, SE375, SE380, SE390, SE408
Subsidies	SE611, SE612, SE613, SE616, SE617, SE618, SE619, SE621, SE622, SE623, SE625, SE626, SE631, SE632, SE640, SE650, SE699, SE406, SE407

We next computed the change in the value of the representative farm's surplus resulting exclusively from the change in prices of products sold and of supplied factors, using the equation:

$$\Delta A_{Ft} = \left[\sum_{i=1}^{n} \left(\frac{Q_{it} \times P_{it}}{HICP} - Q_{it} \times P_{it-1} \right) \right] - \left(\sum_{i=1}^{n} F_{jt} \times R_{jt-1} - \sum_{i=1}^{n} F_{jt-1} \times R_{jt-1} \right) \quad (4)$$

where:
$Q_{it} \times P_{it-1}$ = calculated using the vector of output deflators
$F_{jt} \times R_{jt-1}$ = calculated using the vector of input deflators
$HICP$ = the inflation rate used to transform values from current prices into real prices in order to reflect changes in the purchasing power of farmers' revenues,
ΔA_{Ft} = the change in the farms' rents in period t relative to t – 1 (the drainage or inflow of economic surplus through prices that reflect the market treadmill effect)
other symbols denote the same variables as in equation (3).

For example, a farm has additional surplus (rent) compared to a previous period t – 1when the actual revenues in real prices $\left(\frac{Q_{it} \times P_{it}}{HICP}\right)$ exceed the revenues in constant prices ($Q_{it} \times P_{it-1}$) deflated with producer price indices for specific outputs. Similarly, it also has an unexpected surplus if the actual outlays in real prices $\left(\frac{F_{jt} \times R_{jt}}{HICP}\right)$ are lower than the outlays in constant prices ($F_{jt} \times R_{jt-1}$) deflated with producer price indices for specific inputs.

There are some limitations to this approach. The behaviour of farmers in our model is quite naive since they consider a change of prices for the same amount of product (Q_{it}) two consecutive periods. If the stationary equilibrium was reached, both the production amount and prices would change. However, in this case the equilibrium is not stationary but static. We argue that it can be an effect of adaptive expectations.

We assume, in accordance with the above reasoning, that:

ΔTFP = *expected changes of income*
$\Delta TFP + \Delta A_F$ = *actual change of farm income* (*in real prices*)

Summing up, calculations of pure political rent can be reduced to two questions: what part of the economic surplus from agriculture was drained from farms of different economic sizes (SO classes) as a result of the market treadmill, and what was the value of the public goods supplied by these farms? Having determined these two quantities, we will then deduct them from the total subsidies paid to a representative farm of each SO class in a given period.

MATERIALS AND METHODS

Cluster analysis

To achieve the objective of the study, we performed in the first stage a cluster analysis of 27 EU coun-

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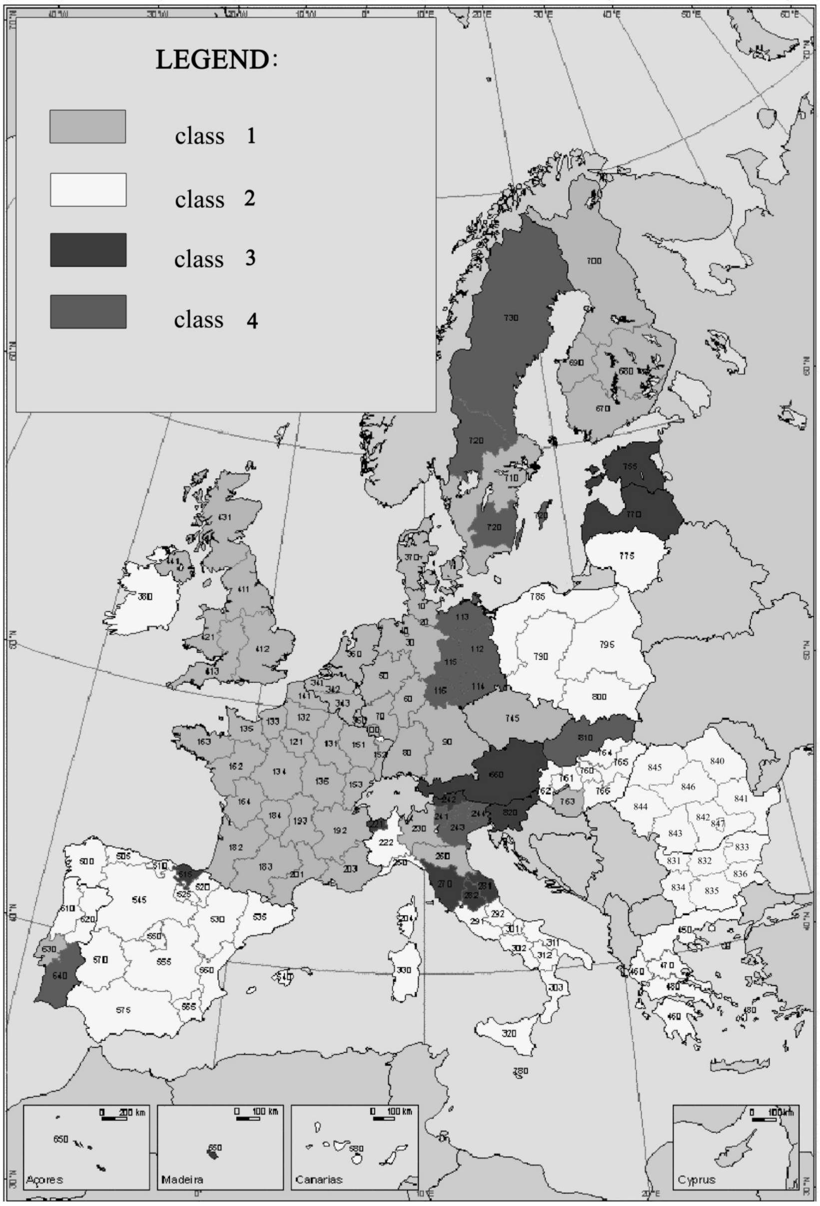

Figure 1. Clusters of EU-27 regions based on land use factors on farms in 2012 (Ward method, 136 regions)

Source: own analysis based on data from FADN

tries, based on a representative sample of farms selected from the EU Farm Accountancy Data Network (EUFADN). After elimination of collinearity[2], the following independent variables remained in the analysis: the economic size in SO[3]; the utilised agricultural area (UAA) in ha; set-aside land area in ha; fallow land area in ha; area of forests in ha; net added value (NAV) per SO.

On this basis, 136 average farms from a representative sampling of various regions of the EU27 (representing together 4 919 580 agricultural holdings in 2012) were divided into classes according to a cluster analysis[4]. Ward's tree clustering method was applied. Cluster analysis is a multivariate statistical technique that entails the division of a large group of observations into smaller and more homogeneous

[2]Variables characterised by very high or almost complete correlation were removed.

[3]The economic size criterion of Standard Output (SO) is the average monetary value of the agricultural output of an agricultural product (crop or livestock) over the reference period of 5 years, per 1 ha or 1 head of livestock per year, in average production conditions in particular geographical units (regions).

[4]Sampling was performed by EUFADN National Liaison Agencies, according to the classification rules defined and formally established by the Commission Regulation (EC) No. 1242/2008 of 8 December 2008 (Official Journal of the European Union, L 335 p. 3, 13. 12. 2008).

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groups. Ward's method, an agglomerative hierarchical clustering procedure, is based on least-squares criteria and minimises the within-cluster sum of squares, thus maximising the within-cluster homogeneity (Everitt et al. 2011). In general, this method is regarded as very efficient.

The farms' structures were hierarchically arranged and divided into four groups (Figure 1). The disjointness of the clusters was verified using the Silhouette index *S(i)* recommended by Gatnar and Walesiak (2004).

Methodology for computing political rents

The value of political rents for a representative farm over a long period lasting for *n* years is computed as (5 and 6):

If $\Delta A_{Ft1} + \Delta A_{Ft2} + \dots + \Delta A_{Ftn} < 0$

$$\begin{bmatrix} PR_1 \\ PR_2 \\ \vdots \\ PR_t \end{bmatrix} = \begin{bmatrix} \sum_{i=1}^{n} S_{1i} \\ \sum_{i=1}^{n} S_{2i} \\ \vdots \\ \sum_{i=1}^{n} S_{ti} \end{bmatrix} - \begin{bmatrix} \sum_{j=1}^{m} VPG_{1j} \\ \sum_{j=1}^{m} VPG_{2j} \\ \vdots \\ \sum_{j=1}^{m} VPG_{tj} \end{bmatrix} + \begin{bmatrix} \Delta A_{S_1} \\ \Delta A_{S_2} \\ \vdots \\ \Delta A_{S_t} \end{bmatrix} \quad (5)$$

If $\Delta A_{Ft1} + \Delta A_{Ft2} + \dots + \Delta A_{Ftn} \geq 0$

$$\begin{bmatrix} PR_1 \\ PR_2 \\ \vdots \\ PR_t \end{bmatrix} = \begin{bmatrix} \sum_{i=1}^{n} S_{1i} \\ \sum_{i=1}^{n} S_{2i} \\ \vdots \\ \sum_{i=1}^{n} S_{ti} \end{bmatrix} - \begin{bmatrix} \sum_{j=1}^{m} VPG_{1j} \\ \sum_{j=1}^{m} VPG_{2j} \\ \vdots \\ \sum_{j=1}^{m} VPG_{tj} \end{bmatrix} \quad (6)$$

where:

$PR_{1\dots t}$ = the political rent in period $t_{1\dots t}$

t = the number of periods

n = the number of subsidies

m = the number of payments for public goods

S_i = the subsidy paid to agriculture under the CAP

VPG_j = the payment for the public goods supplied by a representative farm according to the CAP institutional valuation

other symbols denote the same variables as in equation (4).

In accordance with the above methodology, calculations of PR_t were made for average agricultural holdings (regardless of legal form) of the representative sample in various economic size classes[5] (SO) in France (approx. 300 000 farms represented by the EUFADN sample[6]), Poland (approx. 730 000 farms represented), Austria (approx. 93 000 farms represented) and Slovakia (approx. 4300 farms represented), for each year relative to the previous year[7]. Thus, the results cover the period 2008–2012, but year 2007 has also been disaggregated to compute the changes of the variables in 2008 relative to 2007. Next, the results were added up for the period 2008–2012 which reflects the downturn (2007–2009) as well as recovery phases (2010–2012) of the business cycle in European agriculture[8]. The chosen countries include cases of the four different groups of agrarian structures identified in the cluster analysis.

RESULTS

Cluster analysis

Land as a production factor is of much greater importance in agriculture than in other sectors. It performs the function of both determining the location of the farm and the means of production (Poczta and Mrówczyńska 2002: 126). Compared with other

[5]According to the EUFADN, farms with an SO value in the range EUR 2000–8000 are "very small" farms, those between EUR 8000 and EUR 25 000 are "small", those between EUR 25 000 and EUR 50 000 are "average small", those between EUR 50 000 and EUR 100 000 are "average large", those between EUR 100 000 and EUR 500 000 are "large" and those above EUR 500 000 are "very large".

[6]The Farm Accountancy Data Network (FADN) is an instrument for evaluating the income of agricultural holdings and the impacts of the CAP. Holdings are selected to take part in the survey on the basis of sampling plans established at the level of each region in the Union. They represent a population of about 5 000 000 farms in the EU, which covers approximately 90% of the total utilised agricultural area (UAA) and account for about 90% of the total agricultural production (for more detail see EUFADN http://ec.europa.eu /agriculture/rica/concept_en.cfm#lacd, accessed June 14, 2016).

[7]Official Journal of the European Union, L 335 p. 3, (accessed Dec13, 2008).

[8]Collegium of Economic Analysis, Warsaw School of Economics 2015. Available at http://kolegia.sgh.waw.pl/pl/KAE/struktura/IRG/koniunktura/ Strony/rolnictwo.aspx) (accessed 14 May 2015).

[9]In these countries, agriculture still makes a relatively high contribution to the GDP and there is still a high level of employment in agriculture.

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continents, Europe has a relatively high proportion of agricultural land (over 50% of the total land area). The quality of soil varies significantly, from quite fertile brown soil in the west to weak podzolic soil in the central part, and to very fertile chernozem soil in eastern areas.

The above conditions, as well as other factors (mainly historical), result in great differences in the role of the land factor in production processes. We analysed the features connected with the land factor in individual EU regions and assessed the profitability of the resources, i.e., the net added value (NAV) per 1 ha of UAA, the NAV per 1 SO, the income of a family farm per 1 ha of UAA and the income of a family farm per 1 SO (Table 1).

According to the land factor features, the first two groups clearly predominate in European regions:

The first group includes primarily farms from the French, German, Danish, British and Finnish regions. Based on the values of the descriptive statistics, the farms in this group can be described as average farms within the EU. That is, they are the most similar to the averages obtained for the entire analysed population.

In the second group, the dominant farms are those from regions in countries that joined the EU relatively late (Poland, Lithuania, Hungary, Ireland, Bulgaria and Romania) and where, as such, agriculture is still an important sector of the national economy[9], as well as regions in the south of Europe (Italy, Greece and Spain). Relative to the total population of farms analysed, the agrarian structure here is fragmented – both the average economic size and the area of utilised agricultural land are three times smaller than the average for farms in the first group. The area of leased agricultural land is relatively small, and the level of afforestation is the lowest in Europe. In spite of the low values characterising land resources in this group, the profitability indices per SO and per ha UAA are above the average values. In fact, on average, they are twice as high as the average throughout the EU regions.

The third group consists of regions in Latvia, Estonia, Austria and Slovenia, as well as a few Italian regions, where the area of agricultural land is nearly two times smaller and farm economic power three times smaller than the average. The farms in this group also have the highest afforestation index (six times higher than the average). These features, however, do not prevent the attainment of an income from a family farm that is at a level similar to the average in the EU, or an NAV that is twice as high as the average.

The fourth group includes farms from regions in eastern Germany and Sweden, and a few regions in northern Italy and Slovakia, for which the key measures related to the land factor (economic size, area of UAA and area of leased UAA) are over five times higher than for the average farm in the EU regions. Unfortunately, the efficiency ratios connected with the land factor on these farms are not consistent with the scale of land use. In fact, the values of these ratios are exceptionally unfavourable, especially in the case of farm income per ha UAA and per SO, which is nearly six times lower than the average.

Market treadmill vs political rents in clusters 1 and 4

Farms from Slovakia and France are considered together since they have one common point important for this analysis: the market treadmill effects do not occur in these agrarian structures when considering

Table 1. Grouping variables for Ward classes characterizing the use of the land factor on an average farm in the EU regions (2012)

Variable	Class 1	Class 2	Class 3	Class 4
Economic size in SO[1] (SE005)[2]	173.7	36.8	56	374.3
Area of used UAA[3] in ha (SE025)	80.54	25.39	43.79	358.92
Area of leased UAA in ha (SE030)	53.90	11.65	23.07	306.41
Set-aside land area in ha (SE072)	0.56	1.02	3.86	2.67
Fallow land area in ha (SE073)	2.61	0.67	0.35	13.06
Forests in ha (SE075)	1.19	0.60	11.28	2.38
NAV[4]/1 SO (SE415/SE005)	468.6	560.6	441.5	537
NAV/1ha UAA (se415/SE025)	703.2	885.9	577	470.1
Income from a family farm /1ha UAA (SE420/SE025)	397.6	721.4	454.8	57.9
Income from a family farm /1SO (SE420/SE005)	269	416.2	337.8	195.6

[1]SO – Standard output, [2]Code of variable in FADN, [3]UAA – utilised agricultural area, [4]NAV – net added value

Source: own research based on EUFADN data

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the period 2008–2012. As we can see in the 5th and 7th rows of Tables 2 and 3, there is an inflow of economic surplus through prices. Although TFP has decreased, the actual income drops less than proportionally or even rises over the same time. As a result, agricultural policy has no market imperfections for which to compensate and it pays unjustified and relatively high political rents to farmers (the penultimate rows in Tables 2 and 3). Therefore, its efficiency could be called into question. One can carefully conclude that marked treadmill occurrence is somehow correlated with the economic size of a farm, which would be in line with Cochrane's observations regarding so-called "early adopters" (Levins and Cochrane 1996).

Slovakia

The economic position of Slovakian farms is markedly different not only from those in Western European countries, but also from those in East-Central Europe. One can say it is very specific in the European context. In Slovakia, the average area and the economic power of farms are the highest in the EU (Table 1). The majority are not family farms, but larger companies more comparable to business enterprises. Since 2002, employment in the agricultural sector has declined by 50%, from 109 000 to 52 000, as a result of a significant reduction of agricultural production. In 1994, 10.2% of the entire workforce was employed in agriculture. Now, only 2.2% are employed in the sector. Agriculture's share of GDP is 3.6%, while it accounts for 6% of total exports and 7% of total imports. The area on which maize is grown represents 51% of the total amount of arable land, the rape-growing area represents 23%, potato 15%, potato-oat areas 4% and mountain landscapes represent 7% of the total area of arable land. Animal breeding is an important sector of the Slovak economy. Its share of gross agricultural production comes to more than 60%. Between 2002 and 2010, animal production dropped by 26%. The intensity of animal production in Slovakia compared to other EU member states is significantly lower. Summing up, since EU accession in 2004, Slovakia's agricultural production has steadily declined. Previously a net exporter of some commodities, e.g. pork, Slovakia has become a net importer.

It, nonetheless, turns out that under European conditions this agrarian structure is not entirely successful, generating the greatest losses in social well-being. It is concluded that only the existence of the CAP and its assistance mechanisms keep the agricultural sector afloat in this cluster of regions.

Table 2. Surplus drainage, CAP payments for public goods and political rent for a representative farm in Slovakia – a total of 2008–2012

SO class	III	IV	V	VI
Income from family farm (incl. subsidies) (€)	39 552	59 360	17 213	–842 770
Total subsidies (€)	113 571	26 9018	846 034	2 746 198
TFP[a] change . i.e. expected change in income (€)	–3 556.26	11 819.77	–4 906.1	–168 874
Drainage/inflow of economic surplus through prices (€)	2 484.67	4 751.85	17 849.25	69 113.70
Actual change in income[b]	–1 071.60	16 571.63	12 943.15	–99 760
Surplus drainage/inflow relative to income (%) (outflow "–". inflow "+")	6.28	8.01	103.70	–8.20
Subsidies[c] relative to income (incl. subsidies) (%)	287.14	453.20	4 915.09	–325.85
Revenue (€)	350 090	739 487	2 476 598	12 128 456
Subsidies relative to revenue (incl. subsidies) (%)	32.44	36.38	34.16	22.64
Payment for public goods (€)	38 492	104 604	324 560	784 929
Payment for public goods relative to total subsidies (%)	33.89	38.88	38.36	28.58
Payment for public goods relative to income (%)	97.32	176.22	1 885.55	–93.14
Pure political rent (€)	75 079	164 414	521 474	19 61 269
Pure political rent relative to income (%)	189.82	276.98	3 029.54	–232.72
Pure political rent relative to total subsidies (%)	66.11	61.12	61.64	71.42

[a]Total Factor Productivity; [b]The sum of the value of the TFP surplus and its drainage is equal to the actual growth/fall in a family farm's agricultural income summed for the period 2008–2012; [c] It is assumed that payments for public goods include set-aside and agri-environmental payments, support for less favoured areas, and other subsidies under rural development programmes.

Source: own analysis based on data from EUFADN

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The analysis showed that in Slovakia, on representative farms in the individual SO classes, the TFP change took varying values, being negative in classes III, V and VI, and positive in class IV (Table 2). This means that in all classes of farms, with the exception of those in the "average large" class, there was a fall in productivity. The income from a family farm increased in classes IV and V, showing a decrease in classes III and VI. Only the "average large" farm increased its productivity (by EUR 11 819.77), and would thus expect its income to change by the same amount. However, the market added somewhat more (EUR 4751), resulting in a total income rise of EUR 16 571.63. A similar situation can be observed in all classes. In the case of "large" farms (class V), in spite of a fall in productivity (by EUR 4906) there was an increase in income, since the improvement of the price gap led to an inflow of EUR 17 849.25, thus adding to its income (Table 2).

As was noted above, the role played by subsidies in Slovakian agricultural production is unquestionably significant. The ratio of subsidies to income in the case of "average small" farms (class III) stands at 287.14%, while in the case of the largest farms (VI) the subsidies received are 3.5 times greater than the negative income generated. In the case of "large" farms, the sum of incoming subsidies is five times higher than the generated income. At the same time, payments for the supply of public goods accounts on average for approximately 30% of total subsidies.

Analysing the ratio of the "pure political rent" to total income and to total subsidies, in all classes of farms the pure political rent amounts to a multiple of the income. It also accounts for on average 65% of total subsidies. This is the worst result out of all of the clusters in terms of losses in social well-being.

France

The analysis showed that in France, there was a decrease in total factor productivity (TFP) in all SO classes (Table 3) in 2008–2012. This means that productivity fell, chiefly due to decreasing volumes of production. We remind the reader that total productivity and rent flows were calculated without taking subsidies into account. The income from a family farm has also decreased in the majority of farms (compare the actual change in income as the sum of the TFP surplus and surplus drainage/inflow through prices in Table 2) but to the smaller extent than would result from a TFP drop. In other words, the fall in productivity was offset by the inflow of economic surplus through prices and was smaller by 67% than the TFP drop in III SO, and almost 80% less in VI SO. For example, an "average large" farm saw its productivity fall by EUR 3,402.6, and could thus expect a similar fall in its income. Nonetheless,

Table 3. Surplus drainage, CAP payments for public goods and political rent for a representative farm in France – a total of 2008–2012

SO class	III	IV	V	VI
Income from family farm (incl. subsidies) (€)	64 800	113 758	262 218	581 410
Total subsidies (€)	91 395	123 773	196 977	213 060
TFP[a] change . i.e. expected change in income (€)	–3 402.59	–2 692.74	–6 840.35	–34 958.56
Drainage/inflow of economic surplus through prices(€)	2 487.72	3 574.82	7 366.88	28 106.36
Actual change in income[b]	–914.86	882.07	526.53	–6 852.20
Surplus drainage/inflow relative to income (%) (outflow "–". inflow "+")	3.84	3.14	2.81	4.83
Subsidies[c] relative to income (incl. subsidies) (%)	141.04	108.80	75.12	36.65
Revenue (€)	348 065	601 005	1 407 139	3 823 642
Subsidies relative to revenue (incl. subsidies) (%)	26.26	20.59	14.00	5.57
Payment for public goods (€)	18 366	17 882	12 203	4 865
Payment for public goods relative to total subsidies (%)	20.10	14.45	6.20	2.28
Payment for public goods relative to income (%)	28.34	15.72	4.65	0.84
Pure political rent (€)	73 029	105 891	184 774	208 195
Pure political rent relative to income (%)	112.70	93.08	70.47	35.81
Pure political rent relative to total subsidies (%)	79.90	85.55	93.80	97.72

Explanation see Table 2

Source: own analysis based on data from EUFADN

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the favourable changes in prices resulted in an inflow of rents into that class of farms from other sectors of agribusiness of EUR 2487.72. Hence, it can be calculated that the surplus inflow through prices on those farms accounted for 3.84% of their total income for 2008–2012. This is a comfortable situation for agricultural producers, since in spite of the decrease in TFP, their incomes still increase. Is it the case, then, that French farms are formulating more rational expectations than was assumed above, and that the cobweb model is becoming a thing of the past? One reason for these observations may be a gradual departure from the high-capital intensification of production in favour of more extensive and sustainable methods. A second explanation is no doubt the high degree of contractual integration (vertical and horizontal), which stabilises prices, spreading the production risk and reducing information asymmetry. Although the agricultural prices changes are global, we will see later that farms in the other clusters did not take advantage of this to the same degree. France is the world's sixth largest agricultural producer and the EU's leading agricultural power, accounting for about one-third of all agricultural land within the EU. With a base price value of EUR 70.4 billion in 2012, French agricultural production is the leader in Europe. France is holding its place as the leading agricultural power: its share of EU agricultural production is 18.1%. France's production is ahead of Germany's (13.4%), Italy's (12.3%) and Spain's (10.6%). The French agricultural sector accounted for 5.6% of French jobs in 2012, with 1.42 million employees and other workers working in agriculture, fisheries and the agri-food industries. It is also interesting to observe the ratio of total subsidies to income, which becomes consistently smaller as the size of a farm increases – on a small farm the ratio exceeds 141%, while on the largest it is less than 37%. Nonetheless, the proportion of total subsidies accounted for by payments for public goods (set-aside and agri-environment payments, support for less favoured areas and other subsidies under rural support programmes) is greatest in the case of the smallest farms, at 20%, and smallest for "very large" farms, at 2.28%. The ratio of these payments to income follows a similar pattern, amounting to 28.34% in the case of "average small" farms and just 0.84% in the "very large" group (Table 3).

Moving on to the calculation of the "pure political rent" as a proportion of total income and total subsidies (Table 3), as much as 100% of the income of "average small" farms is accounted for by such rent, while for the largest group of farms it accounts for more than one-third of income; as a percentage of total subsidies, the pure rent ranges from 79% to close to 98%. This means that CAP assistance not only provides remuneration for the supply of public goods (a compensation for surplus drainage is not needed in this case), but also supports income in the form of a pure political rent – accounting for as much as 100% of the total in the case of the smallest farms. The question arises of whether and to what extent it is possible to justify this on social grounds? However, supporting family farms in France seems to be easier to justify on social grounds than maintaining unprofitable agricultural enterprises in Slovakia, which are mostly operating as legal entities.

Market treadmill vs political rents in clusters 2 and 3

Farms from Poland and Austria are taken as the cases for the clusters 2 and 3. They also have common characteristics: the economic sizes of the average farm are quite similar (Table 1) and the occurrence of the market treadmill effects. We can see in the 4th, 5th and 7th rows of Tables 4 and 5 that there is a drainage of economic surplus through prices. TFP has also decreased but there is a more than proportional drop in the actual income at the same time. This means that agricultural policy should compensate for this market imperfection and pay adequate subsidies to farmers. However, its efficiency is also open to debate since the pure political rents still exist (the penultimate rows in Tables 4 and 5).

Poland

Polish agriculture is characterised by large degree of fragmentation; however, the average area of arable land (UAA) per holding is gradually increasing, and in 2014 amounted to 10.3 ha (in 2011 9.1 ha and in 2002 5.8 ha). Despite an acceleration of the concentration process, a little over half of holdings in Poland (51%) use no more than 5 ha of UAA. On the other hand, more than 72 000 holdings (5.2%) occupy an area of more than 30 ha of UAA, amounting to little more than 6 million ha of UAA, i.e., 41.3% of agricultural lands. Currently, the global value of agricultural holding production in Poland (in current prices) places Polish agriculture in 7th place in the European Union behind France, Germany, Italy, Spain, Great Britain and the Netherlands. The greatest shares in the commodity structure of agricultural production in 2014

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were constituted by cow milk (18.6%), pork livestock (13.9%), poultry livestock (13.5%), cereals (13.3%), vegetables (9.1%), industrial plants (7.3%), beef and veal livestock (6.3%), chicken eggs (5.7%) and fruit (5.1%). Poland also has a significant share of production in the EU28. In 2014, it was the largest producer of apples (26.4% of the EU28 production), poultry meat (15.1%), carrots (16%), white cabbage (31.4%), triticale (39%), blackcurrants (75%) and champignons (27.6%), the second largest producer of rye, oats (18.6%) and strawberries (18.8%) and the third largest producer of cereals (9.3%), sugar beets (9%), rapeseed (12.8%), onions (10%) and potatoes (11.4%). An income analysis based on the economic accounts for agriculture (EAA) indicates that incomes in Polish agriculture increased by 95.2% in the period 2004–2011. In 2014, approximately 1.9 million workers were employed full-time in Polish agriculture, i.e., less than 13%.

In the second cluster, taking the example of Poland, the change of total factor productivity (TFP) was also negative in all SO classes (Table 4). This means that in all classes of farms the productivity decreased. In contrast to the French farms, the income from a family farm in Poland decreased more than it would from the TFP drop in all SO classes except the largest class SO VI (in SO I class the drop was enhanced by 17%, in SO II by 36%, in SO III by 46%, in SO IV by 32% and in SO VI there was a decrease by 76%). This is an interesting phenomenon, particularly in the case of "very large" farms, where productivity decreased, but where thanks to the surplus inflow through prices, the drop in income was mitigated – similarly as in the case of farms in France. It is calculated that surplus drainage through prices amounted to 1% of income on "very small" farms and 2.4% on "average large" farms (in SO VI the inflow amounted to 2.96% of income).

The patterns revealed by Table 3 are also interesting for two further reasons:

– The ratio of total subsidies to income consistently decreases as the size of the farm increases – for a "very

Table 4. Surplus drainage, CAP payments for public goods and political rent for a representative farm in Poland – a total of 2008–2012

SO class	I	II	III	IV	V	VI
Income from family farm (incl. subsidies) (€)	14 486	31 177	81 248	154 511	345 459	885 109
Total subsidies (€)	13 031	21 679	42 404	72 600	158 464	873 152
TFP[a] change . i.e. expected change in income (€)	–813.59	–1 585.48	–2 768.69	–3 707.34	–5 786.17	–34 481.62
Drainage/inflow of economic surplus through prices. (€)	–145.07	–576.91	–1 237.46	–1 198.68	–8 275.91	26 212.29
Actual change in income[b]	–958.66	–2 162.39	–4 006.15	–4 906.02	–14 062.08	–8 269.34
Surplus drainage/inflow relative to income (%) (outflow "–". inflow "+")	–1.00	–1.85	–1.52	–0.78	–2.40	2.96
Subsidies[c] relative to income (incl. subsidies) (%)	89.96	69.54	52.19	46.99	45.87	98.65
Revenue (€)	51 189	102 932	247 204	481 387	1 355 614	7 831 130
Subsidies relative to revenue (incl. subsidies) (%)	25.46	21.06	17.15	15.08	11.69	11.15
Payment for public goods (€)	3 977	5 102	7 184	10 971	20 552	54 611
Payment for public goods relative to total subsidies (%)	30.52	23.53	16.94	15.11	12.97	6.25
Payment for public goods relative to income (%)	27.45	16.36	8.84	7.10	5.95	6.17
Pure political rent (€)	8 909	16 000	33 983	60 430	129 636	818 541
Pure political rent relative to income (%)	61.50	51.32	41.83	39.11	37.53	92.48
Pure political rent relative to total subsidies (%)	68.37	73.80	80.14	83.24	81.81	93.75

Explanation see Table 2

Source: own analysis based on data from EUFADN

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small" individual holding it is 89.96%; it then falls to approximately 46% in the case of "large" farms, although for "very large" farms it again increases to close to 100%. Can it therefore be concluded that the largest farms behave differently, following the same path as large farms in the "old" EU member states? By reducing their productivity, they maintain an increasing income, primarily thanks to the inflow caused by the positive influence of prices and to the large pool of political rent;
– At the same time, the proportion of total subsidies accounted for by payments for public goods is highest in the case of the smallest farms.

Analysing the level of the pure political rent as a percentage of total income and of total subsidies, it is found that such rent accounts for as much as 92.48% of the income of "very large" farms and 61.5% of the income of "very small" farms. In the other economic size classes, the percentage is smaller. This means that support from the CAP more than compensates for the surplus drainage through the market (excluding class VI) and the supply of public goods. At the same time, the pure political rent accounts for between 93.75% and 68.37% of total subsidies. One can conclude that the CAP has not dealt with the treadmill effects in this agrarian structure and "the laggards" have been punished by the market but remunerated by the agricultural policy. From the point of view of social welfare, it is a more desirable solution that that of Slovakia where laggards have been rewarded both by the CAP and by the market.

Austria

We next analysed average representative farms in Austria. In the analysed size classes (II, III,) the total factor productivity surplus took negative values (Table 4) but in the IV and V classes values were positive. However, the income from a family farm decreased in all size classes to a higher degree than would have been expected based only on changes in productivity. The drainage of surplus touched all SO classes and surprisingly was the largest in those where the TFP was increased.

This means that the agrarian structures which reached the highest level of the sustainability in Europe are also those most affected by unfavourable changes of agricultural prices. One possible explanation is that many of the products of sustainable agriculture cannot be hedged against price volatility.

Almost 80% of Austria's total area is used for farming and forestry. Roughly half of that area is forest, and the remainder is arable land and pasture. Over half the farming enterprises are smaller than ten hectares; nearly 40% are smaller than five hectares. The value of agricultural and forestry output is heavily concentrated in field crops, meat and dairy products. Because large parts of Austria are mountainous,

Table 5. Surplus drainage, CAP payments for public goods from the CAP and political rent for a representative farm in Austria – a total of 2008–2012

SO class	II	III	IV	V
Income from family farm (incl. subsidies) (€)	57 830	115 293	185 986	296 620
Total subsidies (€)	74 763	105 453	141 335	176 862
TFP[1] change. i.e. expected change in income (€)	–3 679.35	–2 903.97	1 261.57	4 531.73
Drainage/inflow of economic surplus through prices. (€)	–1 889.57	–2 087.57	–5 051.99	–7 024.64
Actual change in income[2]	–5 568.92	–4 991.54	–3 790.42	–2 492.92
Surplus drainage/inflow relative to income (%) (outflow "–". inflow "+")	–3.27	–1.81	–2.72	–2.37
Subsidies[3] relative to income (incl. subsidies) (%)	129.28	91.47	75.99	59.63
Revenue (€)	224 152	362 511	568 576	10 28150
Subsidies relative to revenue (incl. subsidies) (%)	33.35	29.09	24.86	17.20
Payment for public goods (€)	35 244	47 911	55 731	56 563
Payment for public goods relative to total subsidies (%)	47.14	45.43	39.43	31.98
Payment for public goods relative to income (%)	60.94	41.56	29.97	19.07
Pure political rent (€)	37 629.43	55 454.43	80 552.01	113 274.356
Pure political rent relative to income (%)	65.07	48.10	43.31	38.19
Pure political rent relative to total subsidies (%)	50.33	52.59	56.99	64.05

Explanation see Table 2

Source: own analysis based on data from EUFADN

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only the lowland areas of eastern Austria and some smaller flat portions of western and northern Austria are suitable for crop production and more intensive forms of animal husbandry. The remainder of the land is used for forestry and less intensive animal husbandry, most of which takes advantage of mountain pasturage. Although small, the agricultural sector is highly diversified and efficient. Most production is oriented toward local consumption. Agriculture plays an important role for Austria's economy going far beyond the production of food. While the share of agricultural production is less than 1.5 % of the GDP, the Austrian farmers provide services that have a positive impact on other industries. From being a substantial contributor to renewable energy (over 30%) in Austria, to providing service to the environment, all the way to landscape management in the alpine regions, the Austria farmer is a role model for the multifunctional aspect of agriculture.

In the case of Austria, the proportion of subsidies accounted for by payments for public goods is among the highest in the EU, at around 50%, and it is not much lower than this even on the largest farms. It should also be noted that the highest ratio of subsidies to income is found on the smallest farms. In the case of the largest farms, subsidies account for close to 60% of income.

Regarding the ratio of the "pure political rent" to total income and to total subsidies, as much as 65.07% of the income of small farms is made up of such rent, and 38.19% in the case of the largest farms. The ratios of pure rent to total subsidies are 50.33% and 64.05%, respectively (Table 5). It should be noted that this ratio is a better result in terms of social well-being than in the case of the three preceding clusters. Losses of well-being are smaller, and the efficiency of allocation greater, when the value of the pure political rent is lower. This indicates a desirable direction of evolution for the European agricultural model, while at the same time pointing out its vulnerability to market fluctuations.

CONCLUSIONS

Here, we have attempted to show that terming the entirety of subsidies paid to agriculture in the EU as a "political rent" is unjustified in the light of the definition of political rent formulated in public choice theory. Political rent cannot be considered to include payments for the supply of public goods or transfers providing compensation for other market imperfections (such as price flexibility). A methodology has been proposed for assessing these values, for the purpose of calculating the "pure" political rent. The analysis shows that the contribution of the pure political rent to the income of farms depends on the type of agrarian structure. It has been established that the subsidies from the CAP not only reward the supply of public goods but primarily compensate for surplus drainage caused by a "failing market" which supports the first hypothesis formulated at the beginning. However, a substantial portion of subsidies remain unjustified and support income as a pure political rent, thus causing losses in well-being. Interestingly, however, Cochran's treadmill is still encountered in some agrarian structures in spite of the global nature of agricultural prices, which confirms the second hypothesis. The case of Slovakia is very special in this context. Low and still falling factor productivity in Slovak agricultural enterprises has been surprisingly rewarding not only in terms of the inflow of rents by agricultural prices, but also owing to CAP subsidies, which account for more than 100% of incomes. Why has this been happening? There is no technological treadmill in those agrarian structures and "the laggards" problem does not occur in the sense of Cochran's theorem. Thus, the classical King law still holds: lower production means higher revenues. Meanwhile, the decoupled CAP payments do not enhance farm competition in terms of technological change, especially in crop production (which dominates in Slovakia). This leads to the more general conclusion that decoupled payments eliminate treadmill effects for "the laggards" and allow them to exist. However, the CAP does not consider this fact and it allocates subsidies without any regard to the productivity changes. As a result, in the countries of cluster 4, where the systemic transformation has led to the creation of large agricultural enterprises, the pure political rent is a multiple of the income in all classes of farms. Hence, this agrarian structure exists only thanks to rent-seeking, and generates significant losses in well-being. It is the financing of this group of farms by the CAP in the long term which arouses the greatest controversy. On the opposite side are those countries with the highest level of sustainability in agriculture (cluster 3), and where the percentage of income accounted for by the pure political rent is 65% in the case of small farms and 38% in the case of the largest. The ratio of the pure rent to total subsidies lies between 50 and 64%. This

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is the best scenario in terms of social well-being and suggests a desirable direction of evolution for the European agricultural model, while also highlighting its vulnerability to market fluctuations.

REFERENCES

Barett C.B. (1993): On price risk and the inverse farm size-productivity relationship. University of Wisconsin-Madison, Department of Agricultural Economics Staff Paper, Series No. 369: 1–17.

Birner R., Resnick D. (2010): The political economy of policies for smallholder. Agriculture World Development, 38: 442–1452.

Chen Z., Huffman W.E., Rozelle S. (2011): Inverse relationship between productivity and farm size: The case of China. Contemporary Economic Policy, 29: 580–592.

Cochrane W.W. (1958): Farm Prices: Myth and Reality. University of Minnesota Press, St. Paul.

Coelli T.J., Prasada Rao D.S., Donnell Ch.J., Battese G.E. (2005): An Introduction to Efficiency and Productivity Analysis. Springer, Armidale.

Czyżewski B., Brelik A. (2014): Czy subsydia ze wspólnej polityki rolnej UE są rentą polityczną? Próba konceptualizacji. Journal of Agribusiness and Rural Development, 31: 13–20.

Deininger K., Binswanger H.P. (1995): Rent seeking and the development of large-scale agriculture in Kenya, South Africa, and Zimbabwe. Economic Development and Cultural Change, 43: 493–522.

Everitt B.S., Landau S., Leese M., Stahl D. (2011): Cluster Analysis. 5th Ed. WileySeries in Probability and Statistics, John Wiley and Sons Ltd., UK.

Furtan W.H., Jensen M.S., Sauer J. (2008): Rent seeking and the Common Agricultural Policy: Do member countries free ride on lobbying? In: 107th EAAE Seminar "Modeling of Agricultural and Rural Development Policies", Seville, Jan 29–Feb 1, 2008.

Gatnar E., Walesiak M. (2004): Metody statystycznej analizy wielowymiarowej w badaniach marketingowych. Wydawnictwo AE im. Oskara Langego, Wrocław.

Gburczyk S. (1990): Podział korzyści ze wzrostu efektywności produkcji. Zagadnienia ekonomiki rolnej, 4: 3–19.

Georgiev M. (2010): "Rent seeking" in agricultural contracts in the country. Trakia Journal of Sciences, 8: 230–233.

Kautsky K. (1899): Die Agrarfrage (The Agrarian Question). English translation (1988) by P. Burgess. Zwan. Winchester, Mass.

Kazukauskas A., Newman C., Clancy D., Sauer J. (2013): Disinvestment, farm size, and gradual farm exit: The Impact of subsidy decoupling in a European context. American Journal of Agricultural Economics, 95: 1068–1087.

Lecomte Y., Louis J. (1974): Méthode des comptes de surplus: essai d'application à la politique industrielle. Statistiques et études financières, 13: 3–19.

Levins R.A., Cochrane W.W. (1996): The treadmill revisited. Land Economics, 72: 550–553.

Lipton M. (2005): The family farm in a globalizing world. 2020 VisionDiscussion Papers 40. International Food Policy Research Institute, Washington, DC.

Mellor J. (1976): The New Economics of Growth. Cornell Press, Ithaca, NY.

Olson M. (1965): The Logic of Collective Action: Public Goods and the Theory of Groups. Yale University Press, New Haven.

Poczta W., Mrówczyńska A. (2002): Regionalne zróżnicowanie polskiego rolnictwa. In: Poczta W., Wysocki F. (eds.): Zróżnicowanie regionalne gospodarki żywnościowej w Polsce w procesie integracji z Unią Europejską. Wydawnictwo AR im. Augusta Cieszkowskiego, Poznań.

Schmitz A. (2010): Agricultural Policy, Agribusiness, and Rent-seeking Behavior. University of Toronto Press Incorporated, Toronto/Buffalo/London.

Starrett D. (1988). Foundations of Public Economics. Cambridge University Press, Cambridge: 42–44.

Sumner D.A. (2014): American farms keep growing: size, productivity, and policy. Journal of Economic Perspectives, 28: 147–148.

Tomek W.G., Robinson K.L. (1981): Agricultural Product Prices. Cornell University Press, Ithaca and London.

Yanwen T., Jianbo G., Karimi H.R. (2013): The impact of the subsidy policy on Total Factor Productivity: An empirical analysis of China's cotton production. Mathematical Problems in Engineering, 2013: 1–8.

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