IDENTIFICATION OF THE AREA GROUPS OF AGRICULTURAL HOLDINGS BENEFITING FROM THE REDISTRIBUTIVE PAYMENT SCHEME – A POLISH CASE STUDY

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ABSTRACT

The aim of this paper was to answer the question of which area groups of Polish agricultural holdings had incurred loss on (and which had benefited from) applying the redistributive payment. Mathematical methods were applied. It was found that in the period between 2015 and 2019, holdings with a size of up to 6 ha and holdings with a size of over 55 ha incurred loss on the introduction of redistributive payment in its current form (some slight differences were identified as regards the threshold holding areas in individual years of the period in question). Thus, holdings with areas between 6 and 55 ha benefited from redistributive payment. The redistributive effects of the instrument are too weak in Poland to consider it a tool for accelerating positive structural transformations in agriculture.

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Introduction

According to Buckwell, Matthews, Baldock and Mathijs (2017), taking into consideration the assumed objectives, the main expenditures incurred under the European Union's Common Agricultural Policy, i.e. direct payments, are inefficient, ineffective and unfair, and therefore require further reforming. Exploiting the considerable potential of direct payments in the field of affecting the economic reality requires a proper design which would provide satisfactory effectiveness with acceptable costs and minimum side effects (Sadłowski, 2020).

According to Majewski and Malak-Rewliowska (2018) CAP instruments lead to an excessive concentration of subsidies in a relatively small group of large agricultural holdings. The authors classify the issue in the area of a negative impact of the Common Agricultural Policy on the allocation of funds, in addition to capturing the support addressed to farmers by producers of agricultural inputs and intermediaries in the food supply chain. Šlajs and Doucha (2014) point to the fact that in the Czech Republic the vast share of the support goes to a small group of large agricultural holdings which

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mostly operate extensively, have low employment levels and weak relationships with rural communities.

Redistributive payment, introduced in 2015, was meant to provide a fairer distribution of funds among farmers (Beluhova-Uzunova, Atanasov, Shishkova, 2019). In the view of Beluhova-Uzunova, Atanasov and Hrisov (2017) the instrument can help overcome structural imbalance by directing financial aid to sectors characterised by high added value. However, instruments which promote smaller holdings or decrease payments to large holdings may induce adaptive processes on farms, which consist in unproductive activities aimed at circumventing legal provisions (division of agricultural holdings), thus jeopardising the fulfilment of expected results (Forstner et al., 2018). According to Kulawik (2015) European Union Member States, while designing Common Agricultural Policy instruments at national levels, often place emphasis on redistributive objectives (sphere of equality) instead of effectiveness and environment-related objectives, as they treat the subsidies as a primary tool for solving income problems and issues related to internalising the external outcomes in agriculture.

Redistributive payment is a voluntary instrument for EU Member States. This means that a Member State decides whether to apply redistributive payment or not. The decision does not affect the amount of the so-called national ceiling, which is the total value of payment entitlements allocated to a given Member State to be used for the direct support scheme for farmers. Eight Member States, including Bulgaria, Croatia, France, Lithuania, Germany, Poland, Portugal and Romania, and two regions, Wales in the United Kingdom and Wallonia in Belgium, opted for the application of the redistributive payment scheme. As a result of a reform of the direct support scheme, redistributive payment is to become a mandatory instrument (whereas the equivalent of redistributive payment in the new scheme will be called “complementary redistributive income support for sustainability”). Moreover, Member States are going to receive greater power in the field of shaping the instrument at national level (Sadłowski, 2019).

Given the above, in the context of designing the instruments of the direct support scheme subject to the aforementioned reform, the experience of states where the instrument in question is being applied, as well as the economic studies in this field, are gaining an even greater significance. Poland’s experience might prove particularly valuable due to non-standard solutions applied in this area.

There are few research results on the redistributive payment in the relevant literature. This is especially because the experience related to using this instrument has been relatively scarce. In temporal terms, redistributive payments have been in use since 2015, and in spatial terms, they have been limited to eight EU Member States and two regions. As a result, source data that might be useful in studying this field represent short time series, and only refer to some EU Member States.

Based on an overview of studies into this area, the following groups can be identified:

- 1) *ex ante* simulations relying on hypothetical data, e.g. Matthews (2013), or real data, e.g. a variant analysis for Hungary by Potori, Kovács and Vásáry (2013), research concerning Bulgaria (Ivanov, Malamova, Sokolova, 2015);
- 2) impact assessments for the countries that have introduced redistributive payments;
 - variant analyses, e.g. for Germany by Hansen and Offermann (2016) or for France by Chatellier (2018),
 - measurement of actual impact, e.g. *ex post* assessment for Poland by Sadłowski (2018).

These studies differ in the research methods they use and their range. Redistribution impact has been usually measured by farm size or by region.

And so for example Hansen and Offermann (2016) stated that a full utilization of the scope for the redistributive payment in Germany could have slightly reduced income inequality, but, due to the limited correlation of land endowment and income level, would not constitute an efficient distributive policy instrument either. In turn, Sadłowski (2018), based on data for 2015 referring to Poland, stated that fundamentally the introduction of both redistributive payment and so-called voluntary coupled support (all forms of this support taken together) resulted in a decrease in the average aid per holding in the same group of provinces and at the same time an increase in this size in other provinces (compared to the situation in which the amounts for financing these instruments would be distributed under the single area payment).

Such publications in a vast part are a response to the call by Ciliberti and Frascarelli (2018) who assert that research in this area should in particular include quantitative and scenario analyses facilitating the measurement of the redistribution effect and the assessment of the impact of alternative solutions on support concentration levels, including cross-regional and cross-sectoral transfers.

EU legislation and solutions adopted in Poland

The individual Member States which have decided to apply redistributive payment are responsible for the financial matters and for the decisions on the form of the instrument, within the framework set out at EU level. A Member State can allocate a maximum of 30% of the national ceiling for financing the redistributive payment scheme. Under EU law, a principle was established under which the maximum permissible redistributive payment rate will not exceed 65% of the national average payment per hectare (calculated by dividing the 2019 national ceiling by the area covered by single area payment in 2015).²

2 Article 41(4) and Article 42(1) of the Regulation (EU) No. 1307/2013 of the European Parliament and of the Council.

In the period between 2015 and 2019, the redistributive payment financing level ranged from 8.30 to 8.64% of the national ceiling (the data on the financing level in absolute and relative terms are listed in columns “b” and “c” of Table 2, respectively). In Poland the national average payment per hectare amounts to EUR 244.05/ha, which means that the redistributive payment rate cannot exceed EUR 158.63/ha. Given the existing financing level, which does not exceed 9% of the national ceiling, and the existing conditions of eligibility for redistributive payment, there is no actual risk of any linear reduction of the redistributive payment rate in relation to the said restriction. The redistributive payment rate has not exceeded the amount of EUR 43 per hectare so far (Information about redistributive payment rates in individual years is provided in column “d” of Table 2), which means that it has been nearly four times lower than the permissible value.

Moreover, Member States decide on the form of redistributive payment, defining the hectare range on a holding to be covered by the payment. The said range must fall between 0 and 30 ha or the average size of an agricultural holding in a given country³ (the greater of these two values being the upper limit). At the same time, Member States have been given the possibility to graduate the payment rate progressively or degressively within the defined hectare sub-ranges.⁴

The hectare range of (3;30] has been covered by the redistributive payment scheme in Poland. According to the adopted assumptions, support as part of the redistributive payment scheme is to be addressed to medium-sized holdings characterized by some potential for development, despite the fact that they do not benefit from the scale of production as much as the largest holdings (Ministry of Agriculture and Rural Development, 2015). Poland is the only country where the lower limit was set at a value other than 0. It was treated as a special type of progressive rate graduation, with a 0 rate for the hectare range of (0;3] (European Commission, 2016). This means that this support is provided to the agricultural area on a holding to which a single area payment was granted, and which is a surplus of over 3 ha, but does not exceed 27 ha. Thus, the maximum annual amount of support provided to a single holding as part of redistributive payment in a given year is the product of 27 ha and the payment rate for that year (the relevant data is presented in column “e” of Table 2), and it is granted to all holdings where the agricultural area covered by single area payments is at least 30 ha.

Plans are being made for the next financial perspective to depart from the voluntary character of the redistributive payment scheme. This means that once the planned reform is implemented, the instrument is to be applied in all EU Member States. The scope of decision-making in relation to the financing level and the forms of redistributive

3 The average size of agricultural holdings in individual EU Member States is listed in Annex VIII to Regulation (EU) No. 1307/2013 of the European Parliament and of the Council. It is 6 ha in Poland.

4 Article 41(4) and (5) of Regulation (EU) No. 1307/2013 of the European Parliament and of the Council.

payment is to be extended. In the proposed EU regulations⁵ no limit has been established in relation to the level of financing redistributive payment (the current limit is set as 30% of the national ceiling), while the permissible share of the redistributive payment rate in the national average amount of payments was set at 100% (it is currently 65%). Furthermore, no upper limit has been established for the eligible hectare range.

The main objective of this paper is to provide an answer to the question which area groups of Polish agricultural holdings have benefited (and which have incurred loss) on the application of the redistributive payment.

Materials and methods

Mathematical methods were applied in the studies, the results of which have been demonstrated in this paper. The methods helped identify the area ranges of agricultural holdings benefiting from redistributive payments in their current form (as compared to the situation where redistributive payment would not be applied, and the funds allocated for financing the instrument would be distributed as part of single area payment). The data from the Ministry of Agriculture and Rural Development served as the source material.

Each beneficiary of redistributive payment is at the same time a beneficiary of single area payment. As the allocation of a specific amount for financing redistributive payments automatically entails a reduced level of financing of the single area payment (exactly by the same redistributive payment amount), the application of redistributive payment is advantageous to only some of the beneficiaries.

S_{JPO} – single area payment rate (EUR/ha),

S_{RED} – redistributive payment rate (EUR/ha),

F_{JPO} – level of financing single area payment (EUR),

F_{RED} – level of financing redistributive payment (EUR),

P_{JPO} – size of agricultural area covered by single area payment (ha),

$(a; b]$ – the hectare range on a holding to which redistributive payment is granted.

The single area payment rate (EUR/ha) which would be applicable if redistributive payment were not applied can be calculated using the following formula:

$$S'_{JPO} = \frac{F_{JPO} + F_{RED}}{P_{JPO}} \quad (1)$$

The method for calculating the total and unit support amount for holdings falling within a given area group in the applied variant and the alternative “zero” variant (without redistributive payment applied) was shown in Table 1.

⁵ Proposal for a Regulation of the European Parliament and of the Council (COM(2018) 392).

Table 1. The amount of support granted as part of the single area payment and redistributive payment schemes depending on the variant applied and the size of holdings

Area group of holdings	“Zero” variant		Applied variant	
	Total amount $K' = f(x)$	Average amount per hectare $\bar{S}' = f(x)$	Total amount $K = f(x)$	Average amount per hectare $\bar{S} = f(x)$
$x_1 \in (0; 3]$	$K'_1 = x_1 \times S'_{JPO}$	$\bar{S}' = S'_{JPO}$	$K_1 = x_1 \times S_{JPO}$	$\bar{S} = S_{JPO}$
$x_2 \in (3; 30]$	$K'_2 = x_2 \times S'_{JPO}$	$\bar{S}' = S'_{JPO}$	$K_2 = x_2 \times S_{JPO} + (x_2 - 3) \times S_{RED}$	$\bar{S} = \frac{x_2 \times S_{JPO} + (x_2 - 3) \times S_{RED}}{x_2}$
$x_3 \in (30; \infty)$	$K'_3 = x_3 \times S'_{JPO}$	$\bar{S}' = S'_{JPO}$	$K_3 = x_3 \times S_{JPO} + 27 \times S_{RED}$	$\bar{S} = \frac{x_3 \times S_{JPO} + 27 \times S_{RED}}{x_3}$
x – size of holding (ha), K' – the amount of support granted to a given holding (EUR) if the “zero” variant is applied K – the amount of support granted to a given holding (EUR) in the applied variant $\bar{S}'$ – average level of support per area unit on a given holding if the “zero” variant is applied, $\bar{S}$ – average level of support per area unit on a given holding in the applied variant, S'_{JPO} – single area payment rate (EUR/ha) which would be applicable if the “zero” variant were applied, S_{JPO} – single area payment rate (EUR/ha) in the applied variant, S_{RED} – redistributive payment rate (EUR/ha) in the applied variant.				

Source: Author’s elaboration

In order to answer the question of what size should a holding have to receive support in the same amount, notwithstanding the variant applied, the following equations should be solved:

$$K'_2 = K_2 \quad (2)$$

$$K'_3 = K_3 \quad (3)$$

Therefore:

$$x_2 \times S'_{JPO} = x_2 \times S_{JPO} + (x_2 - 3) \times S_{RED} \quad (4)$$

$$x_3 \times S'_{JPO} = x_3 \times S_{JPO} + 27 \times S_{RED} \quad (5)$$

At the same time, the solutions to the equations allowed to mark out the limits of area ranges of holdings benefiting from or incurring loss on the application of redistributive payment:

- 1) Holdings with an area of $x \in (x_2; x_3)$ benefit from applying redistributive payment.
- 2) Holdings with an area of $x \in (0; x_2)$ and $x \in (x_3; \infty)$ incur loss on applying redistributive payment.

- 3) Holdings with an area of $x = \{x_2; x_3\}$ in the alternative variant without redistributive payment would receive support in the same amount as in the applied variant (therefore, the application of redistributive payment is neutral in terms of the amount received by the holdings with border areas).

In the years to come, the ranges may slightly differ (even without changing the criteria for redistributive payment) due to the structural transformations in agriculture. In this context, it should be stressed that the authorities making decisions on the shape of agricultural policy tend to indicate the preferred area group of holdings, rather than the hectare range of holdings, which should be prioritized, by covering the said holdings by support in the form of redistributive payment. However, the indication of hectare range is required for the design of the instrument at national level. This is the reason for the significance of simulation research in this field, aimed at providing the answer to the question of what hectare range should be established for the preferred area group of holdings to become the beneficiaries of the solution. Such simulation research can be performed with the use of the methodology described above. In addition, the methodology can be used to determine whether and how manipulating the levels of financing redistributive payment, the hectare range limits, or range graduation affects the location and size of the area range of holdings benefiting from the application of redistributive payment, and the average unit level of support of holdings in individual area groups.

Results and Discussions

The results of calculations performed in line with the algorithm presented above are listed in columns “f” and “g” of Table 2. Moreover, column “h” presents information about the size of hectare ranges of holdings benefiting from the application of redistributive payments in individual years. According to the data provided, the holding-size limits for redistributive effect purposes are relatively stable, so the size of the area range of holdings benefiting from the application of redistributive payment is subject to only minor changes.

Table 2. Redistributive payment in Poland – level of financing, support amount and area group of holdings benefiting from the application of the instrument

Year	Level of financing		Support amount		The area range of holdings benefiting from the application of redistributive payment (ha)		
	million euros	% of the national ceiling	EUR/ha	EUR/holding	from	To	range covered
<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>G</i>	<i>h</i>
2015	280.42	8.30	40.07	to 1,081.89	5.9	54.5	48.6
2016	281.81	8.30	40.01	to 1,080.27	6.0	54.4	48.4
2017	289.80	8.49	41.13	to 1,110.51	5.9	54.5	48.6

Year	Level of financing		Support amount		The area range of holdings benefiting from the application of redistributive payment (ha)		
	million euros	% of the national ceiling	EUR/ha	EUR/holding	from	To	range covered
<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>G</i>	<i>h</i>
2018	293.93	8.57	41.62	to 1,123.74	5.9	54.6	48.7
2019	298.04	8.64	42.25	to 1,140.75	5.9	54.8	48.9

Source: Author's elaboration based on data from the Ministry of Agriculture and Rural Development (2019)

Generally speaking, in the period in question holdings with an area of up to 5.9-6.0 ha and holdings with an area of over 54.4-54.8 ha incurred loss on the introduction of redistributive payment in its current form, which means that they would have received greater support, if the payment had not been applied, and consequently the funds allocated for its financing would have been distributed as part of the single area payment scheme. In turn, holdings with an area of over 5.9-6.0 ha and under 54.4-54.8 ha benefited from the application of redistributive payment in its current form. As regards the holdings with threshold holding areas the application of this instrument would be neutral in terms of the amount of the support received. Therefore, the area range of holdings benefiting from the application of redistributive payment is broader than the hectare range of holdings eligible for redistributive payment, i.e. (3;30], and it is shifted to the right.

Holdings which benefit from the introduction of redistributive payments include those holdings where the total amount of support as part of single area payment and redistributive payment, divided by the agricultural land area on a given holding (i.e.) is higher than the single area payment rate, which would be applicable if redistributive payment were not applied (i.e. , which is always equal to for holdings belonging to any area group). Given this holding group, the graph of function is plotted above the graph of function . The graphic representation is shown in Figure 1 which refers to 2017 (the middle year of the period being the subject of the study). This was limited to one example only, because no significant differences in this respect were recorded between individual years of the period in question.

Figure 1. Average unit level of support as part of single area payment and redistributive payment depending on the variant applied and holding size (2017)

Source: Author's elaboration based on data from the Ministry of Agriculture and Rural Development (2019)

In the applied variant the average level of support per hectare of land is constant and equal to the single area payment rate for holdings with an area of up to 3 ha, which is demonstrated by the initial horizontal section of the solid line in Figure 1. As regards holdings exceeding the lower limit of the hectare range on a holding covered by redistributive payment, the average amount of support per hectare of land is higher and initially increases proportionally to the holding area, reaching its peak value for holdings with an area of 30 ha. As the holding size increases, the average amount of support decreases, and asymptotically approaches the horizontal line drawn at the level of the single area payment rate (i.e. EUR 107.23/ha). The graph of the function takes this shape for holdings with an area exceeding 30 ha and no higher than 1 398.9 ha. Holdings with an area over 1 398.9 ha are subject to the capping of payments⁶, which in Poland entails the principle of not granting single area payment in the amount exceeding EUR 150 000. Given the above, from the point of exceeding the threshold area, the graph of average amount of support per hectare of land asymptotically approaches the horizontal axis of the coordinate system.

As regards the variant without redistributive payment, the amount of financing single area payment would be increased by the amount which has been allocated for financing redistributive payment in the variant currently being applied. Taking into consideration

6 Given the fact that in Poland a reduction ratio of 100% is applied to the amount of single area payment exceeding EUR 150,000, the threshold holding size, the exceeding of which means that the said holding will be subject to the capping of payment, may be calculated by dividing EUR 150,000 by the single area payment rate (which amounted to EUR 107.23/ha for 2017).

holdings with an area of up to 1,175.5 ha⁷, the average amount of support per hectare of land (as part of single area payment and redistributive payment) would be equal to the single area payment rate of EUR 127.61/ha, due to the lack of redistributive payment (horizontal dashed line in Figure 1). Agricultural holdings exceeding the said area threshold would be covered by the capping of payments, which would result in the reduction of average amount of support per hectare of land as the holding area would increase (to the right of the area threshold, the graph of the function being analyzed asymptotically approaches the horizontal axis of the coordinate system).

The solid line (demonstrating the currently applied variant) runs over the dashed line (demonstrating the alternative variant) for holdings with an area of over 5.9 ha and under 54.5 ha. This is how a graphic representation of area groups benefiting from (incurring loss on) the application of redistributive payment was obtained.

Conclusions

Redistributive payment with a zero rate for the initial hectare range may potentially constitute an impulse for positive structural changes in agriculture, consisting in the growth of small agricultural holdings, and a weak impulse for “artificial divisions” of large holdings aimed at maximizing the amount of the received support. This results from the fact that the potential relative increase of the support granted to small holdings may be significant in relation to increasing the holding size. In contrast, as regards large holdings, and even more so large-area holdings, support in the form of redistributive payment is a small part of the total support amount and total income.

If redistributive payment actually played such a function, the flows of holdings from area groups which are not beneficiaries of redistributive payment to area groups receiving such support, assuming the stable conditions for eligibility for redistributive payment, and financing levels, would result in the reduction of redistributive payment rates, and consequently in the declining importance of this instrument as a stimulator of structural transformations. Given the above, to counteract the reduction of the redistributive payment effect it would be necessary to increase the financing level. In Poland, the redistributive effects of this instrument are too weak to perceive this instrument as a tool accelerating positive structural transformations in agriculture.

Conflict of interests

The author declares no conflict of interest.

7 The threshold holding size of 1,175.5 ha was calculated in the same way as in the previously discussed variant, by dividing PLN 150,000 by the single area payment rate. However, the single area payment rate is higher in the alternative variant (amounting to EUR 127.61/ha), hence the lower threshold holding size in the quotient.

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