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## Article

# Selected effects of financing agriculture from a regional perspective

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## SELECTED EFFECTS OF FINANCING AGRICULTURE FROM A REGIONAL PERSPECTIVE

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### Abstract

This paper contains an assessment of changes in the financial and property situation of agricultural holdings in different regions of Poland. In the years 2006-2013, growth of the level of income from a family-owned farm was registered in all regions, but capabilities of reproducing fixed assets and development capabilities varied.

Favourable changes in the availability of fixed assets in farms were observed. Regional differences became apparent in the efficiency with which these assets were used. The greatest growth of the value of fixed assets per 1 ha of farmland was registered in the Pomorze and Mazury region. Farms in the Małopolska and Pogórze region were in the most difficult situation, characterized by a permanent inability to reproduce fixed assets and develop.

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## INTRODUCTION

A farm, similarly to any entity in the market economy, must be active and capable of building competitive potential. Long-term development-related activities require modernization. Penetration into farms of innovation, in a broad sense, which contributes to increasing the level of modernity of production facilities and improves the quality of produced goods, is a factor inducing modernization of agriculture. Introducing innovation requires knowledge, qualifications and the skills to manage a farm.

Modernization processes require large financial outlays. The involvement of own equity to perform these processes may pose a challenge even to economically strong farms. This is why credit remains a significant foreign source of financing for development of farms, even though it is unavailable to many farms due to their low credit rating. Intensification of farmers' investment activity has been observed since Poland's entry into EU structures. Investment outlays in Polish agriculture increased from PLN 2398M in 2005 to PLN 4897M in 2014 (Rocznik..., 2014).

Agricultural holdings and rural areas as a whole, must have the resources for modernization and development. The primary source of financing for development are farmers' incomes, and their level determines farmers' inclination to invest. The share of own equity in financing the value of property determines the risk of activity borne by a farm and expresses the degree of a given entity's self-financing. However, aid from the state is necessary to initiate the process of development, since agriculture generates internal forces that are too weak to induce a growth process and maintain it in a state of dynamic equilibrium (Woś, 2004). The instruments of agricultural policy play such a role. The stream of funds from these instruments that can be applied to agricultural holdings is very broad, and utilization of these funds mainly depends on the activity of the farmers themselves in acquiring and making use of these funds. Studies show that there is regional variation in the use of subsidies intended for activity supporting modernization of farms and that this is a permanent phenomenon (Pietrzykowski & Wicki, 2011). Most studies are focused on assessing farmers' activity in obtaining funds for modernization. It seems that such assessment should be expanded by analysis of the changes that have take place in farms over time, which

would provide at least a partial answer to the question of whether subsidies contributed to the improvement of the financial and property situation and increased development capabilities of these entities. To fill in this gap, the goal of this study was to assess organizational and economic changes in agricultural holdings in individual regions during the period of financing from the EU budget. This gives a full picture of the modernization changes in agricultural holdings and explains regional variation in this regard.

## MATERIAL AND METHODOLOGY

The research was undertaken based on data from the FADN system (Wyniki..., 2007; 2014). The scope of analysis covers two time periods: the years 2005 and 2013. This approach made it possible to assess organizational changes and the effect of these changes on the property and financial situation of farms.

Income from a family-owned farm was accepted to be the basic measure for assessment of achieved effects. The higher the level of this income, the more inclined farmers are to develop farms by investing in fixed assets. Income from a farm is used to assess financing of agricultural production factors, including labour efficiency on a farm, in the context of both expanded reproduction capability, and thus development capability, and the capability of supporting a farming family (Zegar, 2008).

Selected methods of financial analysis were also applied (Gabrusewicz, 2002). Farms' capabilities of settling current liabilities were assessed on the basis of the current liquidity ratio, according to the formula: *current assets/current liabilities*, which takes on the following form in calculations where FADN data is applied: SE465/ SE495.

To determine the outlook of farms' operation, the rate of fixed asset production was calculated. This is one of the methods of assessing reproduction of fixed assets and development of farms. This index was calculated according to the formula: *(net investments/fixed assets) x 100%*, which, according to FADN, takes on the form: (SE521/SE441) x 100%. This index indicates the type of reproduction occurring on the farm (simple, expanded, narrowed). The dependence between the net value of investment and debt level were investigated using a coefficient of determination. The level of foreign capital was characterized by the debt ratio (DR=SE485x 100%/ SE436).

Analyses were conducted in division into regions according to the division used in the FADN system. So far, the problem of the regional differentiation has been analyzed according to the administrative division of the country (Binderman, 2012; Poczta & Bartkowiak, 2012; Głębocki, 2014).

## RESULTS

The availability of production factors in agricultural holdings in individual regions indicates that changes in the availability of these factors took place in the years 2006-2013 (Table 1). Data on land resources confirms the occurrence of land concentration processes, which improve the agrarian structure. The increase in land resources mainly pertained to Wielkopolska and Śląsk as well as Mazowsze and Podlasie, while the average area of farmland in an agricultural holding decreased by 08-1.8% in the remaining two regions. This is probably more the result of methods used to select farms for studies rather than actual changes in this scope.

Growth of capital saturation of land can also be observed, as shown by the growth of the value of total assets and fixed assets per 1 ha of farmland. The largest growth of the value of assets was registered in farms in Pomorze and Mazury (136 and 163%), and the lowest in the Małopolska and Pogórze region (81 and 92%). However, from an absolute perspective, the greatest changes took place in farms in the Mazowsze and Podlasie region. Growth of the value of fixed assets per 1 ha of farmland amounted to nearly PLN 19,397, with average growth in the amount of PLN 16,804. This indicates increased availability of technical production factors in agricultural holdings. Growth of land saturation with own

equity took place in all regions.

The tendency of declining employment in agriculture is widespread and concerns all new EU member states (Kołoszko-Chomentowska, 2014). In Poland, these changes are taking place similarly, with the exception of Wielkopolska and Śląsk. Farms are mainly based on family labour resources, and hired labour is only a small supplement.

Growth of production intensity is observed in all holdings (Table 2), which results from changes in the organization of production. Growth of indirect consumption values ranged from 32% in the Pomorze and Mazury region to over 70% in the Wielkopolska and Śląsk region. Greater consumption of means of production, particularly mineral fertilizers, also occurred. These changes are partially due to the rising costs of means of production. Studies show that direct subsidies have high significance to financing of current costs in the activity of agricultural holdings (Czubak & Jędrzejak, 2011). Changes in the intensity of production over time indicate that a growing burden caused by production factors is being placed on the environment.

The structure of production indicates changes in the organization of agricultural holdings with the exception of the Małopolska and Pogórze region. The share of plant production in the total value of production increased in the Pomorze and Mazury region in 2013, which is linked to the presence of large-area farms in this region, mainly specializing in plant production. In the Wielkopolska and Śląsk as well as the Mazowsze and Podlasie regions, however, growth of livestock production was observed. These are regions where specialization in animal production was determined by their natural conditions and agricultural traditions.

**Table 1: Production potential of farms according to regions**

Specification	Pomorze and Mazury (785)		Wielkopolska and Śląsk (790)		Mazowsze and Podlasie (795)		Małopolska and Pogórze (800)	
	2006	2013	2006	2013	2006	2013	2006	2013
Utilised agricultural area (ha)	38,4	38,1	22	29,5	13,7	15,4	10,8	10,6
Total labour input (AWU <sup>1</sup> )	2	1,88	1,75	1,95	1,71	1,67	1,68	1,64
Unpaid labour input (FWU <sup>2</sup> )	1,36	1,52	1,48	1,46	1,56	1,51	1,53	1,48
Total assets (EUR·ha <sup>-1</sup> )	11051	26130	15358	34894	18751	39790	22144	40188
Fixed assets (EUR·ha <sup>-1</sup> )	8555	22551	12336	29022	15844	35241	18656	35796
Equity(EUR·ha <sup>-1</sup> )	9266	23603	13533	32488	17238	38195	20932	38769

1 - Annual Work Unit, 2 - Family Work Unit

Source: Own calculations



**Table 2: Intensity of production**

Specification	Pomorze and Mazury (785)		Wielkopolska and Śląsk (790)		Mazowsze and Podlasie (795)		Małopolska and Pogórze (800)	
	2006	2013	2006	2013	2006	2013	2006	2013
<b>Total intermediate consumption (PLN•ha<sup>-1</sup>)</b>	2685	3556	32832	5633	2686	4314	3438	4594
<b>Mineral fertilizers (PLN•ha<sup>-1</sup>)</b>	383	631	435	819	416	540	318	514
<b>Crop protection (PLN•ha<sup>-1</sup>)</b>	203	268	223	348	215	195	170	216
<b>Energy (PLN•ha<sup>-1</sup>)</b>	402	532	472	809	397	606	606	767
<b>Plant production (%)</b>	42.2	58.4	51.7	49.5	51.3	46.3	54.6	54.6
<b>Animal production (%)</b>	57.8	41.6	48.3	50.5	48.7	53.7	45.4	45.4

Source: Own calculations

Growth of labour productivity, measured by the value of production per fully-employed person, was registered in all regions, and the largest growth took place in farms in Wielkopolska and Śląsk, amounting to 83.7% (Table 3). Farms in Mazowsze and Podlasie were also characterized by high (nearly 70%) labour productivity. Despite lower land and labour resources, but thanks to the relatively favourable relations between capital resources and other production factors, labour productivity is not much less than in regions with greater availability of these factors (Wielkopolska and Śląsk).

The highest growth of value added, by 63.3% and 52.6%, respectively, was also registered in these regions (Wielkopolska and Śląsk as well as Mazowsze and Podlasie). The value added per working person on the farm is a measure of labour efficiency in agriculture. Similarly, high growth was registered with respect to income from a family-owned farm per working person. These two regions are distinguished by achievements in agricultural production. Production and financial results were much higher in these regions, although these

results were more favourable than in 2006 in all regions. However, it should be noted that achievement of such results was only possible thanks to public funds. In 2013, the share of subsidies in income from a family-owned farm ranged from 52.3% in the Mazowsze and Podlasie region to 72.3% in the Wielkopolska and Śląsk region. Thus, one may pose the hypothesis that profitability of labour is not always linked to improvement in the use of production factors, but it is often the result of effective absorption of subsidies. The data shows that labour profitability was shaped under the strong influence of budget transfers in farms in all regions.

The data presented in Table 4 indicate a very diverse status of property and capabilities of its reproduction. The net value of investment (corrected by the value of depreciation) provides information about property reproduction processes. It is difficult to unambiguously assess the development capabilities of farms in individual regions because they are highly variable and various factors play a role in investment activity. Investments serve, above all, as a substitute of labour input that is

**Table 3: Production and economic indicators according to region**

Specification	Pomorze and Mazury (785)		Wielkopolska and Śląsk (790)		Mazowsze and Podlasie (795)		Małopolska and Pogórze (800)	
	2006	2013	2006	2013	2006	2013	2006	2013
<b>Total output (PLN•AWU<sup>-1</sup>)</b>	2685	3556	32832	5633	2686	4314	3438	4594
<b>Family farm income (PLN•farm<sup>-1</sup>)</b>	83098	108268	65237	119862	38178	64217	39307	48152
<b>Farm net value added (PLN•AWU<sup>-1</sup>)</b>	54670	68563	32076	47675	24213	37110	22688	24692
<b>Family farm income (PLN•FWU<sup>-1</sup>)</b>	34817	45842	23298	38047	16558	25260	15440	17735
<b>Family farm income (PLN•FWU<sup>-1</sup>)</b>	34862	36095	21667	33313	15518	24386	14858	17178

Source: Own calculations

**Table 4: Characteristics of the property status and financial situation of farms**

Specification	Pomorze and Mazury (785)		Wielkopolska and Śląsk (790)		Mazowsze and Podlasie (795)		Małopolska and Pogórze (800)	
	2006	2013	2006	2013	2006	2013	2006	2013
Gross investment (PLN•farm <sup>-1</sup> )	19 292	29 009	16 859	26 885	13 628	13 942	9 223	11 446
Net investment (PLN•farm <sup>-1</sup> )	-770	1 357	2 138	-851	2 388	-4 127	-2 634	-3 478
Current ratio	3.35	6.15	5.07	7.55	6.85	11.45	9.55	9.45
Liabilities ratio (%)	16.01	9.67	11.87	6.89	8.07	4.01	5.47	3.53
Share of equity in total assets (%)	83.8	90.3	88.1	93.1	91.9	96.0	94.5	96.5
Rate of fixed assets reproduction (%)	-0.23	0.16	0.78	-0.10	1.10	-0.76	-1.31	-0.92

Source: Own calculations

effected by capital. Techniques and technologies reducing the demand for labour, but also requiring large capital expenditures, are the consequence of this process. In this situation, holdings are not interested in using capital-consuming technologies.

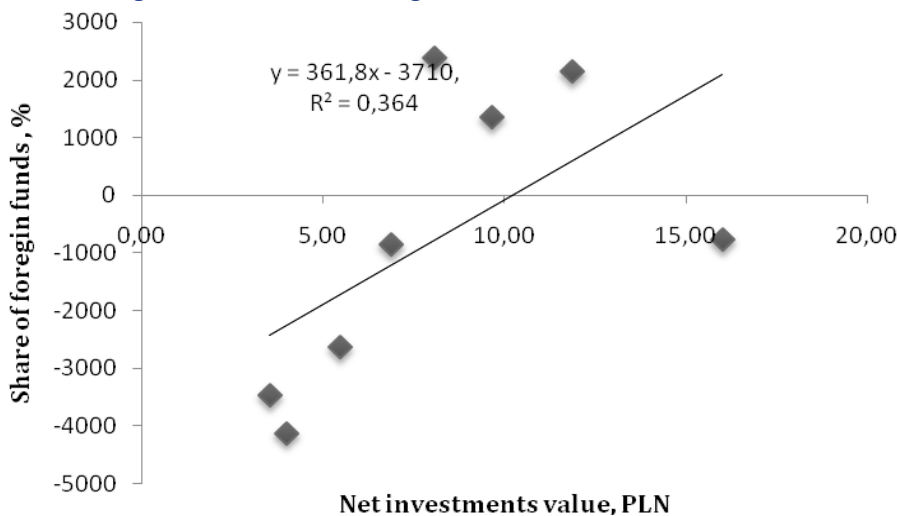
Farms in the Małopolska and Pogórze region were in the most difficult situation. The net value of investment and fixed asset reinvestment rate were negative in both periods of study, which indicates systematic decapitalization of fixed assets.

The financial liquidity ratio, providing information on farms’ capabilities of functioning on the market, deviated from optimal values, which should range from 1.5-2.0, in all cases (Gabrusewicz, 2002). There are many reasons for this state of affairs, and unambiguous interpretation is difficult. From an accounting perspective, one may presume that owners did not invest much in

the development of their farms. On the other hand, reproduction capabilities mainly depend on the level of income, which ultimately decides the capabilities of paying liabilities arising from credit taken for investment purposes. Thus, this is a very personal decision. In general, “over-liquidity” is present in the majority of agricultural holdings, arising from a cautious approach to investment and use of external sources of financing (Hertz, 2009). This may be a slow turnover of capital in agriculture. Money invested in current assets is returned only after the end of the production cycle, which is long. Thus there is not the possibility of early disposal of the portion of the assets, even if the economic calculations are positive.

This also correlates with the very high share of own equity in the value of assets, which may reach above 90% in some cases. This indicates that a farm has strong financial foundations and is exposed to less risk from

**Figure 1: The share of foreign funds and net investment value**



Source: Own calculations

activity, but on the other hand, it also limits development capabilities of these entities. Farms using foreign funds are more open to new initiatives. The correlation between the level of debt and net value of investment is relatively high  $r = 0.603$  (Figure 1), but this correlation is far from obvious. It may occur that the net investment value is negative while the level of debt is high, which results from low profitability of assets, among other things. This was the situation in the Pomorze and Mazury region in 2006. In other regions the net investment value was negative even at a low level of debt (see Małopolska and Pogórze). This reflects the low profitability of assets in agriculture.

## CONCLUSION

Stimulation of the modernization of agricultural holdings is one of the directions of support for Polish agriculture intended to improve its competitiveness. Funds from the budget that have been directed to agriculture have thus far improved the income situation, above all. It is thanks to subsidies that the level of income per person from a family-owned farm increased. This was achieved largely thanks to subsidies from the budget. Therefore, there is a low dependence between the income of a farm

and labour efficiency. This applies to all regions.

Favourable changes in the availability of fixed assets in farms were observed compared to the initial year of study, and this manifests as growth of the share of own equity in total assets. Regional differences became apparent in the efficiency with which these assets were used. The greatest growth of the value of fixed assets per 1 ha of farmland was registered in the Pomorze and Mazury region. In 2013, farms in this region were also characterized by the capability of reproducing fixed assets, despite not exhibiting such capability in 2006. Farms in the Małopolska and Pogórze region are in the most difficult situation. Public funds increased profitability of labour, however there is still a lack of fixed asset reproduction capabilities. This is a region with fragmented agriculture; income from agricultural activity is the lowest in the country, and residents' activity is oriented towards non-agricultural activity to a great extent. Capabilities of property reinvestment are very limited in such a situation, and in many cases, farmers are also not interested in investing in their farms' development.

The variable net value of investment and fixed asset reproduction index indicates the vulnerability of farms in all regions to changes in the economic climate.

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