

## REGIONAL INVESTMENT DIFFERENTIATION IN POLISH PIG FARMS

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### ***Szymańska E. Regional investment differentiation in polish pig farms***

*The core of the research study were farms specialized in the production of pigs for slaughter which from 2005 to 2010 were maintaining accounting books within the framework of the Polish FADN. These farms classified on four groups according to localization. A considerable regional differentiation is specific of Polish agriculture, also of the production of pigs for slaughter. Especially considerable disparities are visible between the north-western and the south-eastern parts of Poland. The Polish accession to the EU has influenced the augmentation of investment activity of pig farms. Due to the regional disparities in raising pigs in Poland, dissimilarities in the level of investments occurred. Disproportions between the individual regions of the country concerned particularly the value of investment per one farm, unit of area, or a person employed in the agriculture. The consequence of these differentiations is the effect of polarisation of Polish farms.*

***Key words:*** pigs farms, investments, regional differentiation, financial support.

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**Introduction.** Economic situation of the agriculture depends to a large extent on investment processes. Their scope and characteristics determine the trends of sector development. Integrating Polish economy with the EU member states and extending mechanisms of the common agricultural policy over Polish agriculture have given a crucial impulse to development processes of farms and rural areas due to the increase of financial support and improvement of the economic conditions [1].

Providing farms with fixed assets for production affects their economic situation considerably, and the structure of productive assets determines their production capacity. Having modern machines and technical equipment enables usage of new technologies, which contributes to the growth of labour productivity, scale of production and its quality [2]. Investment enterprises aim mainly at substituting human labour with capital, and that results from changes in prices of production factors with labour costs being the most dynamic ones [3, p. 81]. It causes certain consequences for economy and organization of farms, based on the preference of labour-saving techniques and technologies, which, at the same time, are capital-intensive [4].

Undertaking investment actions is an evidence for market activities, upgrading a farm and enlarging the scale of production. The period of farms' increased activity was the time fol-

lowing the accession of Poland to the European Union. According to GUS data (Polish Central Statistical Office), the value of funds intended for investment in the sector of agriculture and hunting in 2010 was PLN 3,7 billion and it was similar to the amount of 2009, but higher by 55% when compared to 2005. Altogether, from 2005 to 2010, it was over PLN 20 billion spent on investments in the sector [5].

Investments are an indispensable element of pig farms functioning. Without them it is not possible to increase the scale of production, improve the quality, profitability, and competitiveness in the national and international pigmeat markets. In 2012 there were about 397,7 thousand farms in the country that raised pigs. Over 48,7% of them raised only few head of the species. On the other hand, the share of farms raising 100 pigs and more was only 6,4% [6]. Moreover, the farms with a small scale of breeding, up to 10 head, raised 3,7% of the pig population, and the large ones, raising up to 200 head, constituted 52% of the pig population. Over 47,0% of the pig population was located in four voivodships: Wielkopolskie, Kujawsko-Pomorskie, Mazowieckie and Łódzkie. The smallest percentage of pigs was recorded in Lubuskie and Podkarpackie Voivodships.

The amount of investment in farms, including those where pigs are raised, depends on the level of agricultural development of a particular

region. Further investments increase existing disproportions in the field of technological progress and providing farms with fixed assets. The goal of the research study was the assessment of differentiation of investment value in pig farms.

**Material and methods.** The analyses used GUS data and studies of the reference books. The core of the research study were farms specialized in the production of pigs for slaughter; namely, those which share of pigs in commercial production was 60% and more, and from 2005 to 2010 were maintaining accounting books within the framework of the Polish FADN. During the analysed period, there were 951 such farms and their distribution in the individual regions differed, which was related to specialization of certain regions in raising pigs (fig. 1). Location in the four selected Polish regions became a criterion for grouping the

farms, they were: Pomorze and Mazury, Wielkopolska and Śląsk, Mazowsze and Podlasie, as well as, Małopolska and Pogórze.

To consider changes in the field of investments, two years were subjected to thorough analysis: 2005 and 2010. Their selection was a result of different economic conditions. In 2005 the economic situation was in favour of the pigs for slaughter producers. The population of pigs increased to 18,1 million head of livestock. Furthermore, there was a positive balance of pigmeat external trade which reached 46,0 thousand tones. A different situation was noticed in 2010. At the time, the population of pigs decreased to 14,9 thousand head of livestock. That was the consequence of lower prices of the pig livestock that reduced profitability of production. Concurrently, the negative balance of pigmeat external trade increased to 183,5 thousand tones.



Fig 1. Division of Poland on regions according to FADN Source [7].

Due to the source of data, the research study used the categories accepted by FADN, with the basis of analysis being gross and net investments. Gross investments, according to the existing methodology, mean the value of purchased and produced fixed assets reduced by the value of sold or transferred free of charge fixed assets in a fiscal year considering the difference in the value of foundation stock [7]. On the other hand, the value of net investment

means gross investments reduced by the value of amortization calculated for a fiscal year.

Description of the farms was made in the research study according to the scale of pigs for slaughter production, as well as, possession of basic production factors: land, labour and capital. Moreover, the levels of gross and net investments were measured. In order to present the differentiation of investment operation (activity) intensity in certain groups of farms,

the relation of the gross investment level to UAA and the number of full-time paid employees was calculated. A higher value of these ratings indicates a more capital-intensive character of production. Descriptive and tabular methods were used to present the results.

**Results and discussion.** The analysed farms were specialised in the pigs for slaughter production. The biggest farms were located in north-western Poland and the smallest ones in the south-east. In 2005, in Pomorze and Mazury region, the average herd was made of over 92 livestock units (LU) and production of pork reached almost 245 tons a year. In Małopolska and Pogórze region, the number of pig herds and the pigmeat production connected to it was half the size of the previous region. Similar numbers were also in Mazowsze and Podlasie region. In farms of Wielkopolska and Śląsk region the average herd counted 60,5 LU and pork production was 153,7 tons. In the following years the process of concentration of the pigs for slaughter production took place in all of the mentioned regions. The largest growth of herd numbers was noticed in Mazowsze and Podlasie, as well as, in Małopolska and Pogórze. The scale of pigs for slaughter production also increased. Its most significant growth in 2005-2010 took place in farms of Mazowsze and Podlasie and it was the growth by 49,7 tons. In that way the scale of the entities' production got closer to that of Wielkopolska and Śląsk farms.

Differentiation of the scale of production in the analysed farms was conditioned by the production factors. According to the size of UAA, the biggest farms were in Pomorze and Mazury, and the smallest ones in Małopolska and in Pogórze. The average UAA in pig farms in north-western Poland was 52,42 ha and in the following five years it increased only to 53,84 ha. The area of pig farms in south-eastern

Poland was about 23 ha of UAA. Little bigger entities were also found in the Mazowsze and Podlasie region, where the UAA from 2005 to 2010 increased from 24,30 ha to 26,49 ha of UAA. Further, in Wielkopolska and Śląsk region, the average UAA in 2010 was 32,65 ha.

The size of farms was also determined by a number of people employed. In Pomorze and Mazowsze there were 2 full-time paid employees on average. In other regions there were over 1,8 full-time paid workers and that was a more or less constant number for the next 5 years. Only in the farms of Małopolska and Pogórze region the employment rate increased in 2005-2010 from 1,86 to 1,9 full-time paid employees.

When fixed assets are taken into account, also the biggest farms of Pomorze and Mazury were dominant. The second position was occupied by entities from the Wielkopolska and Śląsk region. A smaller value of fixed assets was typical for pig farms of Mazowsze and Podlasie, and the smallest for those of Małopolska and Pogórze.

In relation to the scale of production, the highest level of agricultural income was reached by farms from north-western Poland. In 2006 that was PLN 111,4 thousand and five years later PLN 123,0 thousand (table 1). In the other regions agricultural income was lower. In 2005 it was about PLN 62,6 thousand in Wielkopolska and Śląsk, as well as, Małopolska and Pogórze regions. The lowest agricultural income was typical for Mazowsze and Podlasie region – PLN 57,7 thousand. In 2010 the growth of agricultural income was recorded in all the regions. In farms of Wielkopolska and Śląsk it was PLN 88,4 thousand on average, and in Małopolska and Pogórze that was by over PLN 11 thousand lower.

Tables 1

Characteristics of the surveyed farms groups

Specification	Pomorze and Mazury		Wielkopolska and Śląsk		Mazowsze and Podlasie		Małopolska and Pogórze	
	2006	2010	2006	2010	2006	2010	2006	2010
Pigs (LU)	92,68	98,12	60,54	67,95	46,95	60,15	43,98	55,49
Pork (tonnes)	245,9	283,4	153,7	188,7	129,7	179,4	117,1	126,6
Utilised Agriculture Area (UAA)	51,42	53,84	29,65	32,65	24,30	26,49	23,17	22,43
Number of full-time employee	2,23	2,13	1,83	1,84	1,83	1,80	1,86	1,93

The value of fixed assets (thousand PLN)	536,3	1362,5	430,8	1169,8	371,9	794,2	349,9	699,2
Farm income (thousand PLN)	111,4	123,0	62,7	88,4	57,5	82,0	62,6	77,0

Source: own study based on FADN data.

After the Polish accession to the EU, the Polish producers of pigs for slaughter were obliged to abide by legal regulations valid in the European Union that concerned production hygiene, environmental protection, animal welfare and food safety. An important issue became growth of international competitiveness. Due to that the majority of farms undertook investment operations.

In 2005 the biggest investments in terms of their value were carried out in farms of north-western Poland (PLN 39,9 thousand). Ma-

zowsze and Podlasie had a similar number (PLN 38,7 thousand). The value of investments carried out in pig farms in other regions was approximately PLN 28 thousand (fig. 2). Subsequently, in 2010 the value of investments in most regions recorded an increase, especially in farms of Wielkopolska and Śląsk (PLN 49,5 thousand). Only the farms of Mazowsze and Podlasie experienced a different situation. The average gross value of investments in farms of the region was the lowest and it was PLN 32,7 thousand.

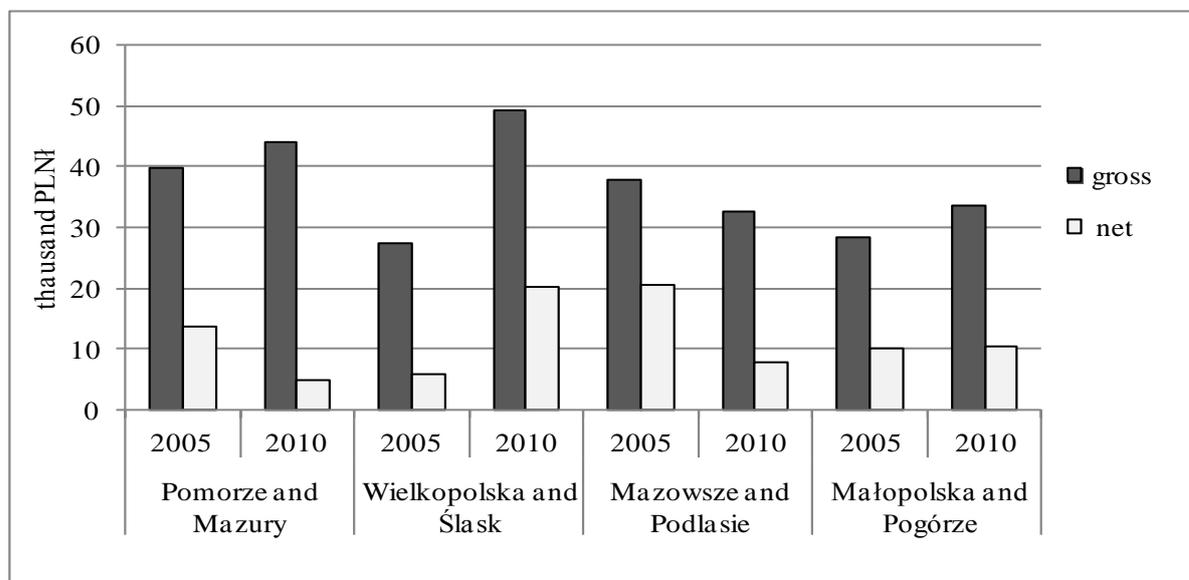


Figure 2. The value of the gross and net investment in the surveyed farms

Source: own study based on FADN data.

The value of net investment was significantly affected by amount of amortization expense. In the analysed period, its highest level was recorded in farms of Pomorze and Mazury, and its lowest level in the south-east. According to this, in 2005 the highest value of net investment was recorded in farms of Mazowsze and Podlasie region (PLN 20,4 thousand) and the lowest value in Wielkopolska and Śląsk region (PLN 5,9 thousand). On the other hand, in 2010 the highest value of net investment was recorded in Wielkopolska and Śląsk (PLN 20,2 thousand), and the lowest in Pomorze and Mazury region

(PLN 4,9 thousand). The most steady level of net investment was specific of farms of Małopolska and Pogórze (PLN 10,2 thousand).

One of the elements determining the amount of investment in relation to the basic production factors are their total assets value, which is the relation of the value of fixed assets (without the land value) to the number of full-time paid employees (AWU) in a farm – total assets value in relation to work or for 1 ha of UAA – total assets value in relation to land [8]. In the analysed sample, the lowest level of total assets value in relation to land was typical for farms of Pomo-

rze and Mazury (table 2). That was the consequence of large UAA of the entities. On the other hand, the highest rate of total assets value in relation to land in 2005 was recorded in farms of Mazowsze and Podlasie – PLN 1,56 thousand/ha, but it decreased by PLN 0,32 thousand/ha in 2010. A different situation took place in farms of Wielkopolska and Śląsk. Due to investments carried out, the rate of total assets value in relation to land increased from PLN 0,92 thousand to PLN 1,51 thousand. Further, in Małopolska and Pogórze the rate was rather steady and was PLN 1,27 thousand/ha.

In relation to the manpower of the analysed farms, the lowest rate of total assets value was

recorded in 2005 in the Wielkopolska and Śląsk region and that was PLN 14,9 thousand/full-time paid person. Little higher rate was specific of farms of Małopolska and Pogórze. At the same time the highest indicator of total assets value was recorded in Mazowsze and Podlasie (PLN 20,7 thousand/AWU). On account of investments carried out, the highest growth of the rate was recorded in the Wielkopolska and Śląsk region, by PLN 12,0 thousand/AWU. Definitely lower growth was recorded in north-western and south-eastern Poland. Only the Mazowsze and Podlasie region experienced the total assets value lowered to PLN 18,2 thousand per a full-time paid person.

*Table 2*

**The level of investment in the surveyed farms**

Specification	Pomorze and Mazury		Wielkopolska and Śląsk		Mazowsze and Podlasie		Małopolska and Pogórze	
	2005	2010	2005	2010	2005	2010	2005	2010
Technical equipment of agriculture utilized area (thousand PLN/ha)	0,78	0,82	0,92	1,51	1,56	1,24	1,26	1,28
Technical equipment of work (thousand PLN/ha)	17,9	20,7	14,9	26,9	20,7	18,2	15,2	17,3
The share of subsidies for investments in the amount of gross investment (%)	0,0	8,91	0,0	7,23	0,0	14,29	0,15	9,51
Ratio the value of gross investment to farm income (%)	0,36	0,36	0,43	0,56	0,66	0,40	0,45	0,43

*Source: own study based on FADN data.*

In the period, reimbursement of part of the investment expenses could be obtained from the EU funds. In 2002-2006 an important source of funding investment activities in pig farms was SAPARD (Special Accession Programme for Agriculture and Rural Development). It was the basic means of investment support for Polish agriculture and rural development adapting to the challenges of integration. Within the framework of the program, activities were implemented that aimed at improving the competitiveness of Polish agriculture and agro-food processing, adjustment of the agro-food sector to the requirements of the Single Market and support of the multifunctional development of rural areas. One of the activities within SAPARD was “Investments in farms”, which concerned, i. a. “Modernisation of pigs and poultry production”. In the years following the Polish integration with the European Union such

investments were subsidized within the framework of the Rural Development Plan for 2004-2006 on account of the “Alignment of Polish farms with the EU standards”. Moreover, in 2004-2006 the Sectoral Operational Programme “Restructuring and modernisation of the food sector and rural development 2004-2006” was implemented. One of its crucial actions was the “Investment in farms”. Within the framework of that action, aid was granted to, i. a. environmental protection investments, improvement of animal welfare and hygiene standards of agricultural production in farms. In the next financial perspective, farmers could apply for reimbursement of part of the investments expenses within the framework of the “Modernisation of farms” included in the Rural Development Plan for 2007-2013.

In the analysed group of farms, only the pigs for slaughter producers from Małopolska and

Podgórze received investment subsidies in 2005. The rate of the share of subsidies in the value of gross investment was 0,15% there. The situation definitely changed in 2010. At the time investment subsidies were received by all farms of the analysed regions. Their share in the value of investment was from 7,23% in the Wielkopolska and Śląsk region to 14,29% in the Mazowsze and Podlasie region.

The indicator allowing for the assessment of investment ability, and consequently the real investment effort reflected in future-oriented decisions, is the rate of investment understood as the share of investment in the income of a farm. To some extent, it is an expression of expectations for the economic condition [1]. According to the data, in 2005 the lowest indicator of the relation of investment value to agricultural income was in farms of north-western Poland – 36,0%, the level existing to 2010. On the other hand, the highest value of this indicator was in 2005 in pig farms of Mazowsze and Podlasie. The gross investment share in agricultural income was 66% at the time. Five years later the value of this indicator dropped to 40%. A different situation took place in farms of Wielkopolska and Śląsk where it increased from 43% to 56%. Further, in Małopolska and Pogórze the share of gross investment in the value of agricultural income remained on a similar level in the years analysed and was approximately 44%.

**Summary and conclusions.** The conducted research study has not exhausted the issue of investment differentiation in pig farms. However, it may constitute the basis for formulating a few conclusions.

1. A considerable regional differentiation is specific of Polish agriculture, also of the production of pigs for slaughter. Individual

regions differ in the size of farms, their equipment, concentration and scale of production. Observed spatial dissimilarities affects the production potential, effectiveness and possibilities of income generation of farms.

2. Especially considerable disparities are visible between the north-western and the south-eastern parts of Poland. In Pomorze and Mazury region there are farms with large UAA that dominate, they have a high rate of employment and significant value of fixed assets. High-level concentration of pig herds and a huge scale of production of pigs for slaughter are their characteristic features allowing for having high agricultural incomes. Definitely different structure of farms is found in Małopolska and Pogórze region.

3. The Polish accession to the EU has influenced the augmentation of investment activity of pig farms. That was mainly the result of necessity to adjust the farms to the EU requirements in the fields of hygiene of production, environmental protection, animals welfare and food safety. The producers of pigs for slaughter received financial support from various Union resources within the frameworks of many programmes in order to implement investments in the aforementioned areas.

Due to the regional disparities in raising pigs in Poland, dissimilarities in the level of investments occurred. Disproportions between the individual regions of the country concerned particularly the value of investment per one farm, unit of area, or a person employed in the agriculture. The consequence of these differentiations is the effect of polarisation of Polish farms, which may become more evident with next investments in the fields of technological advancement and providing farms with fixed assets.

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