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FARM INVESTMENT IN POLAND UNDER CONDITIONS OF ECONOMIC CHANGES IN SELECTED AGRICULTURAL MARKETS

Elżbieta Jadwiga Szymańska[1] ✉, Mariusz Dziwulski

[1] Warsaw University of Life Sciences – SGGW, Poland

ABSTRACT

The aim of the research was to determine changes in the level of investments in fixed assets on Polish farms with different types of production in the context of changes in the economic situation on selected agricultural markets in Poland. The research used studies of the literature on the subject and the mass statistics data of Poland's Central Statistical Office. A detailed analysis covered 878 farms which in 2005–2013 kept continuous accounting under the FADN system and did not change the direction of production. They were grouped into three categories depending on their specialization: cereal, dairy and pig. The study formulated a research hypothesis that production profitability affects farm investments. The research used a comparative analysis of changes in economic results on farms in 2005–2013 and the Pearson's linear correlation method. Results show that the scale and nature of investments in farms with different production directions were diversified and changed in the following years. To a large extent, changes in investments depended on changes in the profitability of production in single agricultural markets, which confirms the formulated hypothesis. Pig farms were characterized by the greatest sensitivity of changes in investments to changes in the price situation in agricultural markets. The possibilities of co-financing investments and their long-term nature mitigated the impact of shock changes on the investment dynamics.

Key words: farms, specialization, investments, economic changes, profitability of production, agricultural markets

JEL codes: E32, O12, Q11

INTRODUCTION

The condition and possibilities of agricultural development are shaped by many factors of a natural, economic and political nature, which may facilitate or hinder making certain decisions [Wilkin 2009]. Therefore, efficient management of an agricultural holding requires the manager to have a thorough and comprehensive understanding of the situation in which a given entity is located.

Agriculture as a sector of the economy is subject to economic fluctuations. They result from both general economic conditions and peculiarities related to the macroeconomics of the land factor [Czyżewski 2007], including mainly the dependence of economic effects on weather conditions and low flexibility of agricultural production. The last of these factors leads to greater volatility of prices than production. As a consequence, the sector's adaptive responses to changes

Elżbieta Szymańska https://orcid.org/0000-0001-7686-124; Mariusz Dziwulski https://orcid.org/0000-0002-6442-4676
✉elzbieta_szymanska@sggw.edu.pl

in the economic situation take place mainly through the price relations of products sold to those purchased by farmers.

Economic impulses from the economy affect the development processes of agriculture mainly by shaping the conditions of profitability of agricultural production, expressed in the relation of prices of products sold to prices of means of production purchased by farmers (price scissors index), as well as the amount of budget support for agriculture [Grzelak 2015]. As a rule, the opening of the scissors of prices (deterioration of price relations) takes place in the conditions of a downturn, while the closing in the period of good economic conditions.

Of great importance in shaping the economic situation in agriculture is the level of interest rates, determining the conditions of access to loans and the situation on the labor market, which determines the outflow of labor resources from agriculture. The impulses of the global economic situation are transferred to farms through foreign trade and the related level of exchange rates, as well as the so-called exogenous shocks. Although the situation in foreign trade in food products directly affects the processing sphere, agriculture also experiences changes in the global economic situation through inter-sectoral connections. On the other hand, exogenous shocks, which consist of the occurrence of sudden events in the global food economy, e.g., the occurrence of an epidemic in livestock, crops or disturbances in agrometeorological conditions, result in significant changes in the production volume and abruptly change the economic conditions of the functioning of certain types of production farms [Grzelak 2013b].

Research on the problem of economic changes in agriculture covers three areas. The first concerns the determination and characteristics of periods of better and worse economic conditions in the entire agricultural sector [Seremak-Bulge 2016, Walczyk and Szajner 2016]. The second takes into account the relationships between agricultural prosperity and changes in the entire economy [Grzelak 2013c, Maśniak 2015]. In the third, cyclical analyses are carried out on specific agricultural markets, e.g. in the pork market [Hamulczuk 2006, Stępień 2015].

The effects of changes in the economic situation on agricultural markets may have a significant impact on the strategic decisions of farms in the field of specialization, but also on the amount of investment outlays. The issue of investments in agriculture in the context of cyclical changes is therefore important due to the diverse nature of market adjustments of farms and the resulting implications for agricultural policy and the prospects for the development of agriculture and rural areas.

THEORETICAL BACKGROUND

Investment processes largely shape the economic situation of agriculture. Their scope and nature determine the directions of development of this sector. The integration of the Polish economy with the EU countries and the inclusion of the CAP instruments in agriculture gave a significant impulse to the growth processes of farms and rural areas, due to the increase in financial support and improvement of the economic situation [Grzelak 2013a].

In the pre-accession period, Polish farmers received financial support from the SAPARD Programme for adjustment investments on their farms. After Polish accession to the EU, there were funds available for financing investment projects from the following programs: Sectoral Operation Programme for Restructuring and Modernization of the Food Sector and Rural Development, Rural Development Plan 2004–2006 and Rural Development Programme 2007–2013. The direct aim of these measures was improving the competitiveness of farms and also, their modernization and development. Another important priority was the adjustment of agricultural production to the EU requirements and standards [Grzelak and Kiełbasa 2014].

The literature review shows that farmers' investment decisions are influenced by investment prices (lower prices encourage investment), as well as output prices (higher prices encourage investment to produce more). In research relating to investments, Woś [2000] pointed to the role of the agricultural boom, macroeconomic conditions and the necessity to introduce instruments of income policy that would enable the creation of conditions for generating a positive accumulation rate for a wider group of farms.

Nowadays, there exist public policies directly targeting investment or tax policies linked to investment, allowing a reduction of taxes on farm revenue when investing. Those policies basically aim at decreasing investment costs. Other policies may influence farmers' investment decisions indirectly, through their impacts on market prices. However, in most developed countries and in particular, the EU, direct intervention on output market prices has been progressively replaced by payments decoupled from production and prices [Femenia et al. 2017].

It is a fact that, favorable conditions in the environment of farms largely contribute to farmers taking up investment activity [Zając 2012], while in the case of an unfavorable situation on the agricultural product markets, the willingness to invest in agricultural activity is reduced [Musiał 2009]. In his literature review on the modelling of firms' investment decisions, Chirinko [1993] concluded that firms' investment is more responsive to output quantities than to capital prices. In turn, the research carried out by Wigier [2009] showed that the impact of investment support instruments on agricultural income was relatively weaker than price relations and direct payments. Serra et al. [2009], using data for Kansas farms from 1997 and 2001, compared the sensitivity of investment to output price to its sensitivity to public payments, and found investment to be more sensitive to output price in periods of a favorable economic situation (i.e. increase in capital stocks) and more sensitive to government support in the case of a difficult economic situation. On the other hand, Sadowski and Giżycka [2012] showed that the choice of the direction and scope of investments among farms benefiting from investment support under the CAP was determined primarily by such criteria as production potential, relations between production factors and the production directions implemented and their effectiveness.

In theory, the situation of price volatility (uncertainty) combined with investment irreversibility should make agents invest less and delay investment decisions [Dixit and Pindyck 1994, Sckokai and Moro 2009]. However, research in the French cultivation sector suggests that during periods of stable output prices, there was a relatively stable level of investments. On the other hand, a period of higher but more volatile prices was characterized by larger investments of more volatile value [Femenia et al. 2017]. This may be explained by the fact that in such context agents may continue to invest but do so in more malleable technologies, that is to say, technologies that are more easily reversed [Cavallo et al. 2013]. Another explanation is that uncertainty increases the expected return of the investment project, and hence the threshold price that would trigger investment [Dong et al. 2016]. Finally, high investments in the presence of price volatility may be explained by farmers changing their output mix in order to produce crops that are less risky [Sckokai and Moro 2009].

AIM AND METHODOLOGY OF RESEARCH

The aim of the research was to determine changes in the level of investments in fixed assets on farms in Poland with different production directions in the context of changes in the economic situation on selected agricultural markets. The study formulated a research hypothesis according to which the profitability of production affects investments in farms.

The research used studies of the literature on the subject and the mass statistics data of the Central Statistical Office in Poland, including the purchase prices of agricultural products[1]. A detailed analysis covered 878 farms that met two criteria:

- kept on an ongoing basis accounting under the FADN system in 2005–2013,
- in the analyzed period they did not change the direction of specialization.

The selection of the research sample carried out in this way made it possible to analyze the production and economic results on farms in relation to the implemented investments and changes in the economic situation on selected agricultural markets.

[1] Purchase prices – calculated by the Central Statistical Office as the average annual prices paid for agricultural products by purchasing units for agricultural producers.

The selection of such a time range resulted from three premises:

1. in the analyzed period, the most dynamic changes in the level of investments in the Polish agricultural sector took place, which allows for a reliable assessment of changes in the property of farms after Poland's accession to the EU,
2. the adopted scope covers the implementation of two support programs important for co-financing investments in agriculture, such as the Sectoral Operational Program 2004–2006 and RDP 2007–2013,
3. the condition of continuing accounting under the FADN system significantly reduces the size of the surveyed sample. To optimize the correctness of inference, it was limited to the 9-year research period.

The analyzed farms were divided into three groups:

1. specializing in the cultivation of cereals – 26 farms,
2. farms specializing in milk production – 743 farms,
3. specializing in pig farming – 109 farms.

The specialized dairy farms are defined as „dairy cows" according to the FADN typology [Floriańczyk et al. 2016]. The group of farms specialized in the cultivation of cereals and pigs was distinguished based on the share of the production value of cereals and livestock in the total production value of farms, which exceeded a level of 70%.

The research used a comparative analysis of changes in the economic results of farms in the years 2005–2013 and the Pearson linear correlation method between changes in farm income in the current and previous years as compared to changes in the amount of investment expenditure in 2005–2013. Pearson's linear correlation coefficient measures the strength of the relationship between feature Y and X. It is expressed by Formula 1:

$$r = \frac{\sum_{i=1}^{n}(x_i - \bar{x})\sum_{i=1}^{n}(y_i - \bar{y})}{S_X S_Y}, \qquad (1)$$

where:

S_X, S_Y – standard deviations,
x, y – averages.

The descriptive, tabular and graphic methods were used in the presentation of the research results.

CHANGES IN THE ECONOMIC SITUATION ON SELECTED AGRICULTURAL MARKETS

The period after Poland's accession to the EU was characterized by quite a strong increase in the prices of agricultural products. Apart from the inflationary effect of price changes, their level was largely influenced by supply and demand conditions in the domestic and global markets. According to FAO data, the world food price index in the years 2004–2007 calculated in real prices increased by 28%. The price boom translated into a fairly strong increase in farm income also in Poland. However, in the years 2005–2013 there were quite significant fluctuations in the economic situation. In 2009, as a result of a decline in the prices of agricultural products in the world (–15% y / y), the income of farms in Poland and other EU countries decreased significantly. This was largely due to the economic crisis, whose impact was wide-ranging, also affecting agricultural markets. A symptom of the recession in this sector was the decline in demand in agricultural markets, which was manifested in the reduction of purchase prices and exports of agri-food products. According to the Central Statistical Office (GUS) data in Poland, the price reductions in 2009 were mostly related to cereals and cow's milk. At the same time, an increase in the prices of live pigs was observed, which, with the decline in cereal prices, meant an increase in the profitability of pig rearing (Fig. 1).

Changes in the profitability of production determine the level of income that directly affects the amount of investment. They also indirectly determine the scale of external financing, including preferential loans. In 2009, when the crisis on agricultural markets was noted, the level of investments increased, which was a consequence of the amount of support for investments from external funds. However, changes in the income of specialized farms were diversified, therefore the scale of changes in the value of investments also differed. In 2011–2012, the profitability of production on basic agricultural markets improved. The prices of plant production, especial-

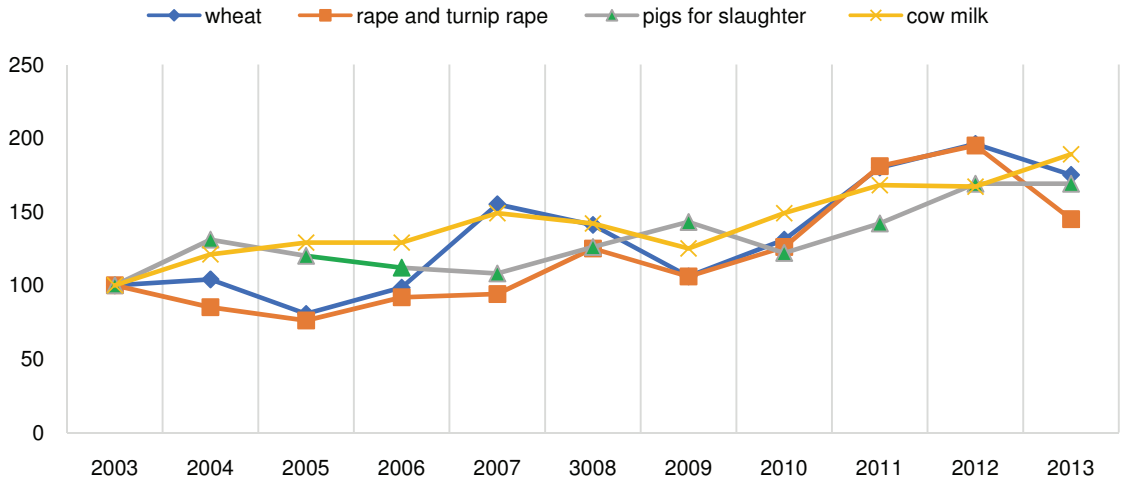

Fig. 1. Dynamics of changes in purchase prices of selected agricultural products in Poland in 2003–2017 (2003 = 100)
Source: Author's own study based on GUS data.

ly wheat and rape, rose in particular. In the cereal market, prices began to rise due to lower supply and weak upward trends in world prices. The dynamics of prices in the milk market also significantly accelerated. In the following year, the economic situation in agriculture was stable. It was also favored by good weather conditions.

The dynamics of changes in the prices of basic agricultural products confirms the cyclical nature of economic fluctuations in single agricultural markets. At the same time, the correlation was confirmed that the dynamics of price changes in the periods of better economic conditions was greater than in the periods of recession [Jędruchniewicz 2018].

FARMS SPECIALIZING IN THE PRODUCTION OF CEREALS

The dynamics of investment expenditures on farms specializing in the production of cereals clearly differed from the global trends. During the period of intense growth in investments in the entire agricultural sector in 2005–2008, their level was relatively stable on cereal farms (Table 1). Additionally, in 2012, when the level of agricultural investments in the agricultural sector in total was the highest, the value of investments in this group of farms was the lowest and amounted to PLN 62 thousand. In the following year, however, there was a clear increase in investment expenditures on farms specializing in the production of cereals, to the level of PLN 372 thousand.

Changes in the level of investment of cereal farms can be explained by changes in the economic situation, characteristic of this market. The recorded decline in investments in 2011–2012 may have been a consequence of very low grain prices in 2009–2010. The average price of wheat in these two years was PLN 53.5 / dt, i.e. less by 24% than in 2008, which contributed to a decline in producers' income.

On the other hand, the high level of investments in 2013 could have resulted from the good situation in the cereals market in 2011–2012. Cereal prices in this period, due to the global demand and supply conditions (low cereal stocks), reached a record level, taking into account the decade after Poland joined the EU. According to data from the Central Statistical Office of Poland, the average purchase price of wheat in Poland in 2011 was on average PLN 86 / dt and was 49% higher than in 2010. The producers were therefore able to react to the market situation with a delay, which seems natural in the case of seasonal production. As a result of the increase in prices, the total production value of farms in 2011 and 2012 increased by 48 and 18% annually, respectively.

Table 1. The level of investment and production and economic results of cereal farms in 2005–2013

Specification	UoM	Years								
		2005	2006	2007	2008	2009	2010	2011	2012	2013
Investment expenditures	thous. PLN	81	108	89	82	93	185	149	62	372
Gross investments	thous. PLN	73	97	86	78	86	179	131	56	369
Net investments	thous. PLN	45	67	51	37	42	133	77	-1	308
Investment subsidies	thous. PLN	0.2	2.7	2.6	6.4	6.8	9.6	14.8	17.2	15.0
Agricultural land area	ha	77	79	85	88	89	91	94	99	101
Cereal cultivation area	ha	71	72	77	80	80	77	82	88	85
Total production value	thous. PLN	135	164	275	214	185	265	388	440	343
In it: cereals	thous. PLN	122	152	258	190	167	233	344	406	290
Total costs	thous. PLN	140	148	178	208	211	219	265	319	357
Direct costs	thous. PLN	58	65	75	87	98	92	107	150	170
Subsidies to operating activities	thous. PLN	38	67	45	70	89	88	98	91	110
Income from the family farm	thous. PLN	27	80	135	74	61	137	231	223	99
Total assets	thous. PLN	591	696	821	860	875	977	1 268	1 253	1 402
In it: buildings	thous. PLN	126	122	118	137	143	180	194	182	229
land	thous. PLN	96	123	207	210	134	155	306	317	347
machines, devices and means of transport	thous. PLN	259	316	341	343	393	418	447	447	536
Total liabilities	thous. PLN	149	184	175	195	212	266	314	261	494
Long-term liabilities	thous. PLN	93	106	119	138	155	195	258	198	401

Source: Author's own study based on FADN data.

Income from a family farm in 2012 in the analyzed group of farms amounted to an average of PLN 223 thousand. It was 3% lower than in 2011, but it was 2.6 times higher than the average income in the researched farms in 2005–2010. An increase in production profitability was recorded despite a significant increase in the prices of mineral fertilizers in 2011–2012, which resulted in a significant increase in costs in the researched farms. Cereal farms invested mainly in the purchase of land, which was reflected in the enlargement of the UAA in the analyzed period. Its value in 2005–2013 increased 3.6 times, and that of machines and devices two times. Investments in this group of farms were largely implemented with the use of external capital, especially long-term liabilities. Their value in the analyzed period increased 4.3 times, reaching a level of PLN 494 thousand in the 2013 year. The high level of income in the preceding years had a positive effect on the creditworthiness of the surveyed units and increased the farmers' willingness to take risks.

FARMS SPECIALIZED IN MILK PRODUCTION

Changes in the level of investments on farms specialized in milk production were clearly similar to the trends observed in the entire FADN sample. On dairy farms, changes in the level of investment expenditures

were relatively low in the analyzed period. Much lower compared to farms specializing in cereal cultivation. In 2005–2013, the value of investment expenditures increased by 28% to PLN 54 thousand (Table 2). A characteristic feature of these farms was a permanent and relatively stable level of accumulation of fixed assets. In each of the analyzed years, dairy farms recorded a positive level of net investment. Capital expenditure in each year more than covered the costs of depreciation.

The crisis in the milk market in 2009 did not translate into a decrease in the value of investments in the researched farms. Low income in 2009 was offset by investments co-financed from external funds, as evidenced by the increase in subsidies to investments. However, the growth rate of investments in 2009–2010 in the analyzed group was lower than in the agricultural sector in general. The value of investment expenditures in this period increased by 5.6 and 6.0%, respectively, on an annual basis. On average, in the tested FADN sample, this increase amounted to 9.5 and 12%, respectively. A significant reduction in milk prices in 2009 led to a decrease in the basic herd of dairy cows in 2010 by 3.8%. In turn, in 2013 there was a large drop in investments (–18.5% y / y) with a simultaneous increase in the total agriculture sector. As a result of lower milk prices and an increase in production costs, the in-

Table 2. The level of investments and production and economic results of dairy farms in 2005–2013

Specification	UoM	Years								
		2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Investment expenditures	thous. PLN	42	51	50	44	46	49	52	67	54
Gross investments	thous. PLN	44	51	50	43	45	52	50	66	53
Net investments	thous. PLN	26	32	29	18	19	24	19	33	16
Investment subsidies	thous. PLN	0.0	0.3	2.4	2.9	3.0	4.5	5.0	5.4	6.6
Agricultural land area	ha	77	79	85	88	89	91	94	99	101
Cereal cultivation area	ha	71	72	77	80	80	77	82	88	85
Total production value	thous. PLN	144	155	188	183	165	203	256	262	281
In it: cereals	thous. PLN	105	111	130	132	122	148	177	188	213
Total costs	thous. PLN	92	100	115	134	138	142	168	189	203
Direct costs	thous. PLN	47	52	62	73	74	72	89	103	109
Subsidies to operating activities	thous. PLN	14	23	16	26	27	31	34	30	35
Income from the family farm	thous. PLN	63	73	88	75	54	95	123	106	118
Total assets	thous. PLN	518	568	635	668	673	706	820	863	898
In it: buildings	thous. PLN	190	200	210	219	218	219	221	220	223
land	thous. PLN	81	94	121	120	84	91	136	142	144
machines, devices and means of transport	thous. PLN	125	137	146	167	195	202	229	252	267
Total liabilities	thous. PLN	67	74	80	84	90	90	92	96	102
Long-term liabilities	thous. PLN	52	56	62	66	67	70	68	73	80

Source: Author's own study based on FADN data.

come of farms keeping dairy cows in 2012 decreased by 14% compared to the previous year. The decrease in profitability of dairy cows was also influenced by the high prices of cereals and an increase in fertilization costs.

Investment expenditures on dairy farms were multidirectional. The main investments were in machinery, equipment and means of transport. Their value in the analyzed period increased 2.1 times to the level of PLN 267 thousand per farm. In the following years, the share of foreign capital in financing agricultural investments on dairy farms decreased. It was probably related to the relatively higher profitability of milk production.

FARMS SPECIALIZING IN PIG REARING

In the group of farms specializing in pig breeding, the level of changes in investment expenditures varied in individual years. Their highest value per farm was recorded in 2006 at the level of PLN 98 thousand. However, this was not related to the situation in the pork market. According to the Central Statistical Office of Poland, the prices of live pigs decreased by 6.8% compared to 2005, while the income of the researched farms decreased by 5.4% per annum (Table 3). The increase in investments was not preceded by a good situation on the pork market in 2005. At that time, the prices of live pigs decreased by over 8% in relation to 2004.

Table 3. The level of investments and production and economic results of pig farms in 2005–2013

Specification	UoM	Years								
		2005	2006	2007	2008	2009	2010	2011	**2012**	**2013**
Investment expenditures	thous. PLN	67	98	54	50	89	80	56	86	84
Gross investments	thous. PLN	67	95	51	46	86	75	49	70	76
Net investments	thous. PLN	37	63	14	4	43	29	-2	19	18
Investment subsidies	thous. PLN	0.0	0.3	5.4	5.4	5.2	6.8	8.4	8.7	9.0
Agricultural land area	ha	77	79	85	88	89	91	94	99	101
Cereal cultivation area	ha	71	72	77	80	80	77	82	88	85
Total production value	thous. PLN	446	457	511	587	615	609	767	893	948
In it: cereals	thous. PLN	385	394	415	503	533	495	636	733	803
Total costs	thous. PLN	338	361	430	485	469	509	623	723	787
Direct costs	thous. PLN	245	267	335	381	348	381	481	574	622
Subsidies to operating activities	thous. PLN	25	36	20	33	35	40	47	35	46
Income from the family farm	thous. PLN	132	125	104	143	188	147	198	213	216
Total assets	thous. PLN	880	975	1 024	1 088	1 111	1 150	1 296	1 376	1 415
In it: buildings	thous. PLN	423	447	460	472	471	470	481	497	498
land	thous. PLN	59	73	113	111	74	83	151	153	155
machines, devices and means of transport	thous. PLN	176	211	208	225	281	297	310	323	347
Total liabilities	thous. PLN	67	95	51	46	86	75	49	70	76
Long-term liabilities	thous. PLN	203	219	210	212	209	207	196	207	191

Source: Author's own study based on FADN data.

The high level of investment expenditures in 2006 could, however, be associated with a higher amount of subsidies to operating activities, especially as part of the adaptation of farms to EU standards, which in FADN accounting are booked in the category of subsidies to operating activities. In the following years (2007–2008), the level of investment expenditures on farms specialized in pork production was relatively low, which could be related to their income situation. In 2007, the average income in the researched farms reached the lowest level in the analyzed period and amounted to PLN 104 thousand. This was due to a significant deterioration in the price situation on the pork market. The average price of live pigs amounted to PLN 3.46 / kg and was the lowest in the analyzed period. In 2008, despite an increase in prices on the pork market and an increase in the income of pig farms, the level of investment fell to PLN 50 thousand per farm. In the following year, the improvement of the situation on the pork market translated into a strong increase in investment expenditures to PLN 89 thousand.

In 2011, there was a decrease in the level of investment expenditures on farms keeping pigs to PLN 56 thousand (a decrease by 30% on an annual basis). The level of gross investment did not allow covering the costs of depreciation in the researched farms. The net investment value was negative (PLN –2 thousand). It was probably related to the deterioration of the situation on the pig market in 2010. According to the Central Statistical Office, the average price level of live pigs in 2010 was 15% lower than in the previous year and amounted to PLN 3.89 / kg, and agricultural income decreased by 22% to PLN 147 thousand in relation to 2009.

DEPENDENCIES BETWEEN INVESTMENT OUTLAY AND AGRICULTURAL INCOME

Agriculture is a capital-intensive industry [Barry and Ellinger 2012]. In agriculture, investments have always been predominantly financed by owner equity and credit was obtained by bank loans [Kay et al. 2012].

The basic source of financing investments in farms in Poland is agricultural income. They indirectly affect the level of external financing, largely determining creditworthiness. Economically larger farms, and thus achieving higher incomes, are more inclined to incur liabilities, and also to use budgetary funds supporting investments in the agricultural sector. It is forced by the construction of some measures from EU programs based on co-financing of investments by farmers and requiring farmers' own contribution for their implementation, which in consequence naturally prefers farms with higher income [Dziwulski and Szymańska, 2020].

In examined farms specializing in the production of cereals, a simple statistical analysis showed a stronger impact of liabilities on investments than changes in income. The correlation coefficient between changes in investment expenditures and family farm income from the previous year was 0.43, and for the current year's income, it was only 0.30 (Fig. 2). In turn, on dairy farms, the amount of investment expenditures

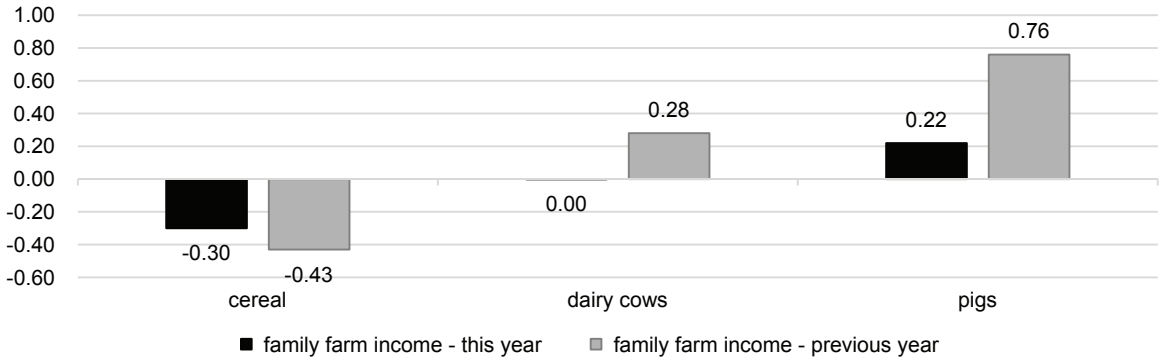

Fig. 2. Coefficients of correlation between changes in income and changes in the amount of investment expenditures in years 2005–2013

Source: Author's own study based on FADN data.

did not correlate with the level of agricultural income in the current year. It was also poorly correlated with agricultural income in the previous year (0.28).

The level of investment expenditures on pig farms depended largely on their income situation, taking into account the shift of one year. The correlation coefficient between changes in investment expenditures and family farm income from the previous year was 0.76. In relation to the current year's income, it was only 0.22. The increase in livestock prices and the related improvement in the profitability of production translated into an increase in funds allocated to investments in the following year. On the other hand, the downturn in the market resulted in a lower level of investment expenditures in the next year.

SUMMARY AND CONCLUSIONS

The conducted research shows that the scale and nature of investments in farms with different production directions were diversified and changed in subsequent years. To a large extent, changes in investments depended on changes in the economic situation on single agricultural markets. The accumulation of good times in the following years significantly increased the investment activity of farms. This is indicated, among others, by the rapid increase in investment in cereal farms in 2013 after two years of maintaining high grain prices. On the other hand, owners of pig farms generally reacted to economic fluctuations with a delay of one year. The research hypothesis formulated in the work, according to which the profitability of production influences investments in farms, has therefore been positively verified.

A common feature of investments in separate groups of farms was their increase in 2006 and 2009 and a decrease in 2008. In 2006, the increase in investment expenditures in each of the analyzed groups of farms took place due to the large scale of adjustment investments and funds available for this purpose. In 2009, despite the increase in investment expenditures in all types of agriculture, the disproportions in the level of changes were definitely greater. As a result of the crisis in the milk market, investment expenditures on dairy farms increased by 4.5% compared to the previous year. In turn, the good situation in the pig market contributed to an increase in investment in pig farms by 78% compared to 2008. Moreover, farms specializing in milk production were distinguished by the ability to permanently rebuild their assets, which is indicated by the positive level of net investment in each of the analyzed years.

The possibilities of co-financing investments and their long-term nature mitigated the impact of shock changes on the investment dynamics. The crisis in the milk market in 2009 did not cause a decrease in the investment activity of farmers but only slowed down the growth of investment outlays. Pig farms were characterized by the greatest sensitivity of changes in investments to changes in the price situation in agricultural markets. The share of foreign capital in the structure of financing investments in these entities depended on the level of profitability of production. Higher profitability resulted in an increase in the share of their own resources (income) in financing the purchased fixed assets.

Based on the research, it can be concluded that higher profitability of production contributes to an increase in agricultural income, and this in turn increases investment in farms. Due to the volatility of the economic situation on individual markets and the irreversibility of some investments, investment decisions made by farmers are difficult and require knowledge and experience. The farmer has to assess the profitability of production and investment costs in the current period and forecast changes in the following periods. The EU aid programs are an important source of financing investments in Polish farms. The level of support for farms from these programs should be related to the possibilities of farm development and their production direction.

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INWESTYCJE W GOSPODARSTWACH ROLNYCH W WARUNKACH ZMIAN KONIUNKTURY NA WYBRANYCH RYNKACH ROLNYCH W POLSCE

STRESZCZENIE

Celem badań było określenie zmian w poziomie inwestycji w środki trwałe w gospodarstwach rolnych w Polsce o różnych kierunkach produkcji w kontekście zmian koniunktury na wybranych rynkach rolnych. W badaniach wykorzystano studia literatury przedmiotu oraz dane statystki masowej Głównego Urzędu Statystycznego. Szczegółową analizą objęto 878 gospodarstw, które w latach 2005–2013 prowadziły w sposób ciągły rachunkowość w ramach systemu FADN i nie zmieniły kierunku produkcji. Pogrupowano je na trzy grupy w zależności od specjalizacji na: zbożowe, mleczne i trzodowe. W opracowaniu sformułowano hipotezę badawczą, według której opłacalność produkcji oddziałuje na inwestycje w gospodarstwach rolniczych. W badaniach wykorzystano analizę porównawczą zmian wyników ekonomicznych w gospodarstwach rolnych w latach 2005–2013 oraz metodę korelacji liniowej Pearsona. Z badań wynika, że skala i charakter inwestycji w gospodarstwach rolnych o różnych kierunkach produkcji były zróżnicowane i zmieniały się w kolejnych latach. W dużym stopniu zmiany w inwestycjach były zależne od zmian koniunktury na poszczególnych rynkach rolnych, co potwierdza sformułowaną hipotezę. Największą wrażliwością zmian inwestycji na zmiany sytuacji cenowej na rynkach rolnych charakteryzowały się gospodarstwa trzodowe. Możliwości współfinansowania inwestycji i ich długoterminowy charakter łagodziły wpływ szokowych zmian na dynamikę inwestycji.

Słowa kluczowe: gospodarstwa rolne, specjalizacja, inwestycje, zmiany koniunkturalne, opłacalność produkcji, rynki rolne