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OUTLAYS ON INVESTMENTS IN FARMS SPECIALIZING IN MILK PRODUCTION, DEPENDING ON THE DEGREE OF PRODUCTION CONCENTRATION

Marcin Wysokiński, Mariusz Dziwulski, Sebastian Jarzębowski
Warsaw University of Life Sciences – SGGW

Abstract. The aim of this study was to determine the level of outlays on investments farms specializing in milk production depending on the scale of dairy cows breeding. The research involves agricultural holdings in Poland covered by FADN system in 2004–2009, in which the value of milk production in the total output was more than 60%. Studies have shown proportional relationship between the size of outlays on investments and the number of cows in the herd. In addition, the relationship was proved between an investment activity of farmers, depending on the situation of the milk market and dairy farm incomes. The article also examines the level of net investment in the studied groups of households per 1 ha of agricultural land, indicating a high diversity of farms in this regard.

Key words: investments, milk production, the scale of breeding, agriculture in Poland

INTRODUCTION

Accession to the European Union contributed to the strong development of Polish agriculture, including improving agricultural infrastructure, which is the result of increased investment activity of Polish farmers. According to the Central Statistical Office [Statistical Yearbook of Agriculture 2009] outlays on investments in agriculture in Poland increased from 2.2 billion PLN in 2004 to more than 3.9 billion PLN in 2009. There has been a marked improvement in the farm equipment in fixed assets, the farms have become more modern and competitive in relation to the western countries in the EU. It was also possible through the use of funds from the budget of the European Union or national, including the possibilities of using preferential loans. The beneficiaries of these measures were largely aimed on the milk production. According to data from FADN, in 2009, the average amount of surcharge in the type of agricultural dairy farm stood at 1,045.00 PLN per farm, to 677.00 PLN average sample of FADN. According to Bułkowska [2009]

Corresponding authors: Warsaw University of Life Sciences – SGGW, Department of Economics and Organization of Enterprises, Nowoursynowska 166, 02-787 Warsaw, Poland, e-mail: marcin_wysokinski@sggw.pl, mariusz_dziwulski@sggw.pl, sebastian_jarzebowski@sggw.pl

factor determining the investment activity of dairy farms in recent 10 years (2002–2012) have been preparing for accession and Polish accession to the EU, forcing many restructuring operations, such as to adjustment to production standards of the European Union. Was also observed strong level of concentration of production, resulting in an increase in the average dairy herd, increasing demand for agricultural land and farm equipment [Wąs et al. 2011].

Investments are necessary for the reproducing and development of the production capacity for improving the profitability and competitiveness of Polish agriculture [Mikołajczyk 2009]. According to Józwiak and Kagan [2008], the investment activities is an evidence to the commercial, farm modernization and expansion of production scale. Undertaken productive investments decide about development opportunities of farms. They show that a farmer increases assets or raise their quality, which contributes to increasing the farm capacity in the future. Improving technical work, as well as introduction of new machinery and equipment for agricultural production leads to increased productivity in both crop production and livestock. "On the other hand, lack of these actions may lead to processes that rely on reducing resource inputs, or reduce the number (or range) conducted activities [Kalinowski and Kiełbasa 2010; Mikolajczyk 2012].

RESEARCH AIM AND METHODOLOGY

This article attempts to assess the level of outlays on investments in dairy farms, depending on the scale of breeding cows. The research involves agricultural holdings in Poland covered by European FADN system in 2004–2009 (The Farm Accountancy Data Network). The research involves Mazovia and Podlasie region, including provinces Mazowieckie, Podlaskie, Lubelskie i Lodzkie, the area with the highest concentration of dairy cows in Poland. According to Central Statistical Office in 2010 the above regions generated over 54% of the total domestic production.

In the selection of objects for study, the purposeful method was used. For analytical purposes there were selected farms specialized in milk production. For this was used the FADN methodology based on classifying variable SO (standard production). As a criterion for determining the level of specialization of the surveyed households was used the value of milk production by specifying its share in the total output of the farm. For the study of this article were selected agricultural holings, that produce at least 60% of the final output of the farm.

In accordance with Manteuffel [1984], saying that the degree of specialization is determined mainly on the basis of the share in the structure of the final production (or goods) that branch or production activity, which is a definite dominance of one over the other. Industry specialization occurs when the activities in the production of one branch of the farm is large enough (eg 50, 60 or 75% of the final output of the farm).

In addition, it was assumed that the minimum size of the stock held by the surveyed units was 10 cows. In accordance with the principles of FADN groups have not less than 15 objects.

On the basis of own research, and literature [Juszczyk 2005][1] surveyed households were divided into 5 groups, considering the criterion for grouping the number of dairy cows on the farm with a similar size:
A – small farms (with 10 ÷ < 20 units),
B – average small (20 ÷ < 30 units),
C – medium-sized (30 ÷ < 40 units),
D – large (40 ÷ < 50 units),
E – a very large (50 or more units).

According to FADN methodology, gross investment = purchases – sales of fixed assets + breeding livestock change of valuation [Goraj 2010]. The presented results are the arithmetic means for selected groups of households. Chosen selection criterion of households makes they are not representative. However, they allow to observe the relation of dairy farms in the sector and to formulate valuable conclusions. For presentation of the results used tabulated statistics items, graphic and descriptive.

The number of farms that met the selection criteria was 874, 942, 959, 1032, 1056, 1145 accordingly in 2004–2009. Study sample systematically increased in each successive year. The largest group were the smallest farms (10 ÷ < 20 cows), accounting for over 50% of whole sample, the smallest group were formed farms with the largest herd of cows (over 50) – Table 1 presents number of households in each of the studied groups. The biggest changes were in the largest units – 40 ÷ < 50, and 50 or more cows. Their abundance in 2004–2009 increased by 3.2 and 3-fold, while the increase in the number of units in the group with the smallest scale was only 3%.

Table 1. Number of farms surveyed in selected groups in 2004–2009

Number of cows	2004	2005	2006	2007	2008	2009
A (≥ 10 < 20)	565	547	545	582	565	582
B (≥ 20 < 30)	206	272	278	290	293	314
C (≥ 30 < 40)	68	72	76	98	123	140
D (≥ 40 < 50)	20	35	40	31	46	64
E (≥ 50)	15	16	20	31	29	45

Source: Own calculations based on FADN data.

The share of the group with the smallest scale (A) showed a downward trend, decreasing by about 14 percentage points during the study period (from 64.6 in 2004 to 50.8% in 2009). Number of other groups characterized by the opposite tendency. The share of Group B and C increaded about 4 percentage points, respectively, from 23.6 to 27.4% and from 7.8 to 12.2%. The share of Group E, increased from 1.7 in 2004 to 3.9% in 2009. It is also a sign of increase in concentration of milk, that in some degree reflects the changes in the structure of dairy farmers in the region of Mazovia and Podlasie as well as Poland [Wysokiński 2011].

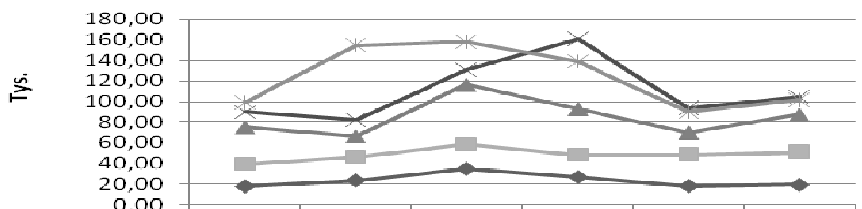
[1]"The number of dairy cows on the farm is well illustrated by the scale of production and other issues associated with it.".

DISCUSSION

Results of research proved diversity of gross investment between selected groups of farms the greater the scale of production including capital expenditures were higher (disturbance of this relationship was observed in 2007–2009, when the D objects on average invest higher amounts than E farms). This relationship is consistent with the thesis of J. Mikolajczyk [2009] that the level of investment expenditure depends on the amount of income generated by the farm.

By far the largest investment expenditures were incurred in the years 2006–2007, which could be related to the good economic situation in the market, as well as the launch of EU funds for the modernization of farms.

In 2009, intended funds for investments were higher than at the beginning of the analysed period (small differences from a few to several percentage points). Since 2007, farms with 40–50 cows invested more than individuals with larger scale of breeding. Probably the biggest farms stopped at a certain level of investment, reaching a satisfactory level of technology in the period 2005–2006. Figure 1 shows that the largest investment activity of E farms was attributed to the first years of research, in contrast to other farms – it can be associated with more efficient use of the Sectoral Operational Programme for the years 2004–2006 by E farms.

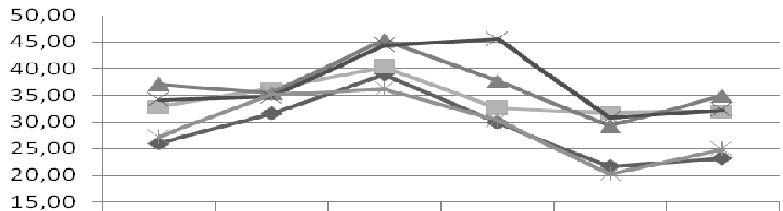


	2004	2005	2006	2007	2008	2009
A (≥10<20 cows)	18 017,0	23 811,2	35 003,9	26 985,3	18 382,8	19 359,6
B (≥20<30)	39 579,4	46 596,7	58 793,8	48 448,6	48 628,8	51 246,5
C (≥30<40)	74 694,8	66 075,1	116 333,	92 846,7	69 796,4	87 189,0
D (≥40<50)	90 212,0	82 461,8	131 082,	161 123,	94 217,4	104 867,
E (> 50)	99 278,0	155 220,	158 389,	139 147,	90 270,0	101 748,

Fig. 1. Gross investments in the surveyed dairy farms on average per farm in 2004–2009 (PLN)
Source: Own calculations based on FADN data.

Figure 2 shows that gross investment was a significant part of the total expences of households, about 20% of very large farms to almost 46% in the large farms. The lowest rate was recorded in the smallest farms (probably the economic size and generated incomes forced the consumer rather than investment approach). Dominated in this area large and medium-large objects. It shows their the most pro-development policy and willingness to invest, as well as existing needs of further modernization and concentration.

The highest share of gross investment in the total expenditure of households was stated in 2006–2007. It should be noted that the favorable conditions in the economy of the surveyed households (good economic situation, the availability of EU funds) sigificantly contributed to increase of investment activity during analised period.



	2004	2005	2006	2007	2008	2009
A (≥10<20 cows)	25,98	31,54	38,93	29,87	21,60	23,19
B (≥20<30)	32,82	36,29	40,29	32,56	31,67	32,02
C (≥30<40)	37,03	35,40	45,32	37,64	29,23	34,91
D (≥40<50)	34,16	34,69	44,37	45,49	30,82	32,29
E (> 50)	27,16	35,17	36,18	30,24	20,25	24,85

Fig. 2. The share of gross investment in the total expenditure of farms surveyed in 2004–2009 (%)
Source: Own calculations based on FADN data.

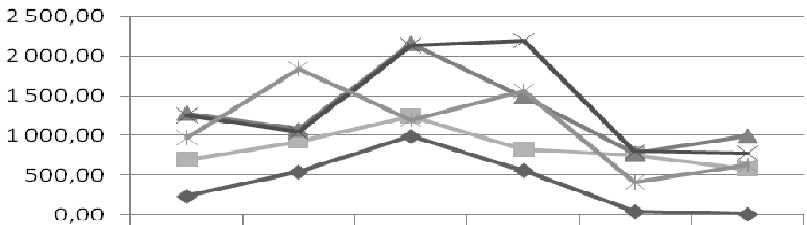
Changes in investment were accompanied by a strong increase in income of farmers maintaining dairy cows. According to the FADN data, the average income of a family farm of the type "dairy cows" increased by 72% to the level 34.6 thousand PLN in period 2004–2008.

Farmers could use the surplus for further investment in the farm. The action taken may have contributed to investment in longer or shorter period, to further increase the incomes and improve the economic situation. According to B. Gołębiewska [2010]: " Fixed equipment have a significant impact on their economic situation. Possession of modern machinery and technical equipment allows the use of new technologies, which contribute to the growth of labor productivity, improve quality and increase the scale of production: The level of farm income and gross investment are useful indicators to evaluate possibility of farms development. The investments made during the year can stimulate them for further action of investment in subsequent periods with the use of surplus funds earned. This action is rational. As noted by Ackoff [1973]: "Better rated are entities which are investing heavily in its future and pay for this by reduction in current profits, than those, which for increase in current profits sacrifice their future".

In 2009, the discussed index has returned to the level of the beginning of the study (2004), despite the fact that still functioned assistance programs for the modernization of agricultural holdings (RDP 2007–2013) – (decrease in income in the period 2008–2009 in dairy farms in Poland was on average 32%), which determined the decision about investment. According to a study by J. Mikołajczyk [2009] decrease in farm income allows for investments to a lesser extent.

To show a full picture of the investment activity of surveyed households, was calculated the level of net investment per 1 ha AL. Net investments in accordance with the FADN methodology is the value of gross investment less depreciation value in annual terms – Figure 3.

In each analyzed group, net investment had positive value. A positive value of this index shows assets reproducibility of the entities, although in varying degrees. Farms probably modernized machinery, exchanged worn out equipment or invested in buildings and structures.



	2004	2005	2006	2007	2008	2009
A (≥10<20 cows)	229,48	539,78	991,22	558,03	35,78	2,87
B (≥20<30)	699,18	927,38	1 238,21	822,36	760,90	573,80
C (≥30<40)	1 286,29	1 079,50	2 161,81	1 492,01	779,34	997,36
D (≥40<50)	1 255,20	1 043,36	2 134,88	2 198,73	800,51	779,73
E (> 50)	972,92	1 840,91	1 195,78	1 560,04	406,76	624,84

Fig. 3. Net investments per 1 ha agricultural land on average in the farm groups in 2004–2009 (PLN)
Source: Own calculations based on FADN data.

Taking into account the index, we can notice that its level in most of the analyzed years was growing to a certain point, after was decreasing. The highest level of investment per 1 ha of agricultural land, stand out farms of large and medium-large size, definitely the worst were shown in terms of the smallest objects, where in 2009, the index approached zero. During maintaining the downward trend may lead to a depreciation of productive assets and the long-term economic decline. On the other hand, the phenomenon of over-investment may characterize the largest-scale farms. Excessive equipment in large units with machines and devices can make significant costs depreciation, sometimes exceeding the level of resources intended for new investments.

The highest level of this indicator took place in 2006–2007. It is obvious that farmers used the favorable economic conditions during this period. After 2007, there was a definite decrease, which in units till 30 cows maintained until the end of the research. Ratio shows the relationship between the value of net investment per hectare of arable land and the size of the herd, which results from the analysis of the scatterplot (Figures 4 and 5) and correlation coefficients ($R_{2004} = 0.162$ and $p = 0.00$ $R_{2009} = 0.143$ and $p = 0.00$). Found a positive correlation between the value of investments and the size of the herd.

However, observing the data on the Figures 4 and 5, we can conclude that occurred quite large differences in terms of the size of the net investment index per 1 ha of agricultural land. Much of the investigated objects characterized by its negative value in both 2004 and 2009. Depreciation exceeded the level of investment spending. This means that the units have not been able reproduce its property, which is an unfavorable phenomenon in the long-term. Lack of explicit investment activities can lead to loss of competitiveness in some cases leading to bankruptcy. This in turn may lead to the further consolidation of dairy farms in the region of Mazovia and Podlasie in Poland as well.

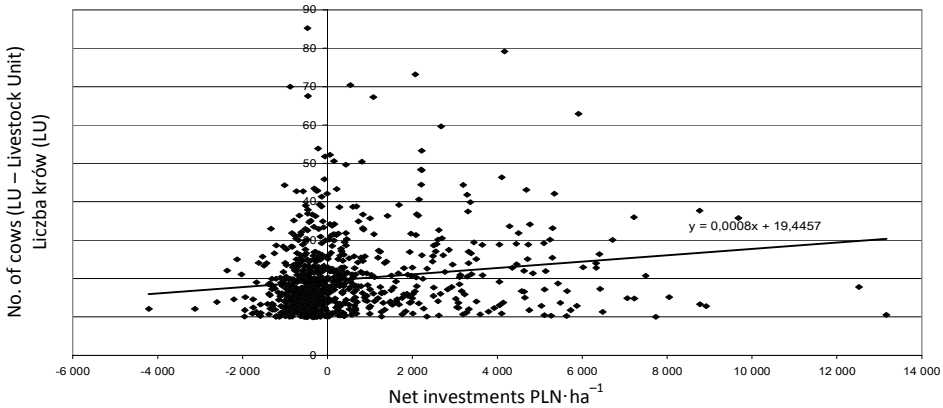


Fig. 4. The value of net investment per hectare of arable land and the number of dairy cows in 2004

Source: Own calculations based on FADN data.

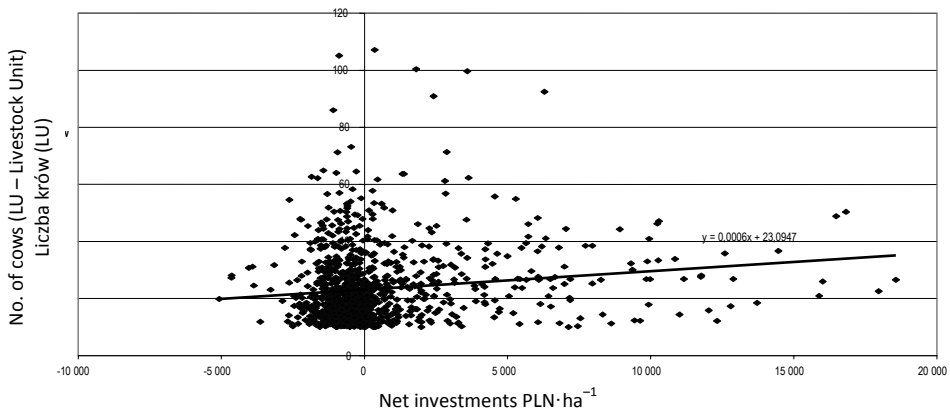


Fig. 5. The value of net investment per hectare of arable land and the number of dairy cows in 2009

Source: Own calculations based on FADN data.

CONCLUSIONS

The analysis of dairy farms data indicated that the level of investment expenditures in the researched units was dependent on the size scale of breeding cows. The highest level of gross investment characterized large and very large farms (with 40–50 and 50 cows and more), unlike small farms (10 ÷ < 20 units). The amount of investment expenditures depended largely on the economic situation at the milk market in Poland. Increasing farmers' income from 2004 to 2008, encouraged their investment activity, whereas in 2009 decrease of spending on investment resulted in the economic crisis. The level of net investment in the studied groups of households reached positive average values, which meant that dairy farms were generally able to reproduce owned property. Own calculation

proved, that investment activity of farms depends on the scale of production. Net investment index per 1 ha of agricultural land increased with scale of production except for the last group (E). This means that a high standard of farm equipment with a larger scale of production may contribute to the high cost of maintenance and excessive depreciation. The analyzed data also indicate a significant differences between selected groups in value of net investment per 1 ha. A large part of the units characterized by a negative value of net investment per ha of agricultural land, which suggests that the level of depreciation exceeded the expenses of the investments.

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NAKŁADY INWESTYCYJNE W GOSPODARSTWACH WYSPECJALIZOWANYCH W PRODUKCJI MLEKA W ZALEŻNOŚCI OD STOPNIA KONCENTRACJI PRODUKCJI

Streszczenie. Celem pracy była próba określenia poziomu wydatków inwestycyjnych gospodarstw rolnych wyspecjalizowanych w produkcji mleka w zależności od skali chowu krów mlecznych. Badaniami objęto gospodarstwa prowadzące rachunkowość rolną w ramach FADN w latach 2004–2009, w których wartość produkcji mleka w wartości produkcji ogółem wynosiła więcej niż 60%. Badania wykazały proporcjonalny związek wydatków inwestycyjnych z liczbą utrzymywanych krów mlecznych. Ponadto zaobserwowano związek pomiędzy aktywnością inwestycyjną rolników a koniunkturą na rynku mleka. W artykule przeanalizowano także poziom inwestycji netto w badanych grupach gospodarstw w przeliczeniu na 1 ha UR, wskazując na duże zróżnicowanie gospodarstw względem badanego wskaźnika.

Słowa kluczowe: inwestycje, produkcja mleka, skala chowu, rolnictwo w Polsce

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