

## **ECONOMIC CONSEQUENCES OF FINANCING DAIRY CATTLE FARMS IN THE PODLASKIE PROVINCE FROM EU FUNDS\***

Zofia Kołoszko-Chomentowska

Faculty of Management, Białystok University of Technology, ul. Wiejska 45A, 15-351 Białystok, Poland

### **Abstract**

The aim of the study was to evaluate the effect of subsidies given to dairy cattle farms on their economic performance. Analysis covered 132 farms from the Podlaskie province that participated in the Farm Accountancy Data Network during 2005–2007. Farm net value added and family farm income were the terms used in the analysis. The return on equity was also calculated. Income parity was defined as the ratio of family farm income per hour of own labour to parity rate. All values were expressed in current prices. Analysis showed that all the analysed farms received European Union subsidies. During 2005–2007, these farms received a total of almost 7 million zloty, mainly in the form of direct payments (area payments) and compensatory payments for less favoured areas (LFA). The economic performance of the farms has improved. Farm net value added increased by 13.1%, farm income by 17.1%, and return on equity by 20%. Income from work performed by the farmer and his family was almost twice as high as the parity rate.

**Key words:** dairy cattle, subsidies, income

Dairy cattle have considerable economic and social importance. They are an important source of regular income on many farms, and milk continues to be the cheapest source of animal protein for human nutrition (Krzyżanowska, 2000). Since Poland joined EU structures, milk-producing farms have been an integral part of the European and world markets. In 2008, Poland became one of the 6 largest producers of milk, next to Germany, France, Great Britain, Holland and Italy. The total milk produced by these countries accounted for more than 70% of the milk production volume in the European Community, with Poland accounting for 6.6% (Agricultural..., 2009). Membership of the single European market has exposed Polish farms to competition from both domestic producers and foreign farms. There is competi-

---

\*This work was financed from statutory activity, project no. S/WZ/2/09.

tion in terms of production quality and cost. Technological processes have to be improved to satisfy the requirements of the Common Market and to meet consumer expectations for milk quality. Herd size and production costs are most often regarded as factors with the greatest effect on milk production efficiency (Okularczyk, 2004, 2005; Isermeyer et al., 2007). Production costs can be rationalized by the introduction of novel solutions. It is therefore necessary to modernize farms in order to increase production efficiency and to create competitive edge. The modernization process requires considerable financial outlays and the investment of own resources may be a problem even for economically sound farms. Some farms use external sources in the form of credit and loans, but they are not available to all farms because of their low credit standing. From the time Poland joined EU structures, agricultural subsidies have gained considerable importance. Financed from public (domestic and EU) funds, they help to modernize agricultural production while increasing farming income, because EU policy accounts for influencing the creation of technological and economic progress. According to the guidelines of the Lisbon Strategy, investment instruments should prevail over instruments directly supporting farming income and lead to maximized production in the long term. In this way, agricultural development would become sustainable through a stronger reliance on market mechanisms (Floriańczyk, 2008). The extent to which farmers use different instruments in support of agriculture reflects their activity in gaining funds for farm development, their inclination for investing, and the ability to consolidate the potential of a competitive farm.

The aim of the study was to evaluate the effect of subsidies given to dairy cattle farms on the economic performance of these farms.

### **Material and methods**

The analysis was based on data from farms in the Podlaskie province that participated in the EU Farm Accountancy Data Network (FADN) (Farm..., 1989). By law, the data are collected by the National Research Institute of Agricultural and Food Economics. One of the areas of FADN interest are commercial farms with important contributions to creating the added value in agriculture. The analysis was restricted to 132 farms that represent the “dairy cattle” type and participated in the FADN system without a break from 2005 to 2007. The results were related to other farms involved in the FADN system.

The analysis uses the terms income and net value added in accordance with the FADN nomenclature. Family farm income (SE 420) corresponds to the payment for using the farm’s own production factors for operation and the payment for the entrepreneur’s risk (in the analytical part, it is abbreviated to farm income). The farm’s operation accounts for plant production, animal production and other farm-based production that includes provision of services, rental of machinery, or revenue from farm tourism. Net value added (SE 415) corresponds to the payment for fixed factors of production whether they be external or family factors and reflects the income gen-

erated by all owners of production factors involved in farm operation (Goraj et al., 2004). The return on equity (ROE) was calculated as the relationship between profit and equity capital. Own labour costs were estimated to calculate the return on equity. The cost of the work performed by the farmer and his family was estimated as parity rate per hour of labour of the annual average net earnings in the national economy. The income parity was calculated as the ratio of the income from family farm per hour of own labour to parity rate. All values were given in current prices.

## Results

The data concerning the analysed farms show that both small and large farms are engaged in milk production, as evidenced by differences between the farms in the endowment of production factors (Table 1). Total farm employment ranged from 0.68 to 4.3 of full-time workers with a small contribution of hired labour. Agricultural area in the largest farm was 20 times that in the smallest farm. There were even greater differences between the farms in the endowment of technical means of production, with the assets ranging from 61,300 to 1,677,500 zloty. A consequence of the differences in production factors is the economic size of farms, which ranged from 2.13 ESU (European Size Unit) for very small farms to 40.29 ESU for large farms.

Table 1. Characteristics of dairy cattle farms

Item	Descriptive statistics			
	mean	min.	max.	sd
European Size Unit	13.21	2.13	40.29	6.35
Agricultural area (ha)	23.20	3.82	79.98	12.62
Total employment (AWU <sup>1</sup> )	1.87	0.68	4.30	0.44
Farm employment (FWU <sup>2</sup> )	1.86	0.56	4.30	0.43
Total assets (thous. zloty)	453.3	61.3	1677.5	246.9
Total animals (LU <sup>3</sup> )	24.68	3.65	80.67	12.08
including dairy cows	18.38	2.69	68.92	9.25
Stocking density (LU/ha)	1.75	0.42	6.41	0.71
Milk yield (kg/cow)	4648.03	2101.69	9931.87	1151.14

<sup>1</sup>Annual Work Unit.

<sup>2</sup>Family Work Unit.

<sup>3</sup>Livestock Unit.

Source: own calculations based on FADN data.

Average dairy herd size was 18.38 livestock units (range of 2.69 to 68.92), with large variation in milk yield. The difference between the minimum and maximum cow productivity was almost five-fold.

All the farms benefited from EU subsidies, receiving a total of almost 7 million zloty in 2005–2007. The structure of subsidies was dominated by direct payments (area payments), with compensatory payments for less favoured areas (LFA) ranking

second (Table 2). The proportion of these two financial instruments in all subsidies was 88.9% and 87.9% in 2005 and 2007, respectively, and 65.3% in 2006. These instruments are popular because their purpose does not have to be documented and it is fairly easy for farmers to deal with the formalities.

Table 2. Value and structure of subsidies to dairy cattle farms in 2005–2007

Item	Years		
	2005	2006	2007
Total subsidies (zloty) including:	1 583 686.44	3 620 270.21	1 683 985.15
area payments (%)	64.1	48.6	65.0
LFA payments (%)	24.8	16.7	22.0
agri-environmental payments (%)	0.0	9.8	2.8
investment subsidies (%)	9.2	22.8	8.1
others (%)	1.9	2.1	2.1
Subsidy per farm (zloty)	11 997.62	25 859.07	12 661.54
Subsidy per ha of UAA (zloty)	506.14	1160.74	534.70
Subsidy per LU (zloty)	481.63	1071.58	505.82
Subsidy per LU (EUR) <sup>1</sup>	122.91	269.83	134.06

<sup>1</sup>Conversion into EUR based on the payment calculation rate used by the Polish Agency for Restructuring and Modernization of Agriculture.

Source: own calculations based on FADN data.

Most subsidies were received in 2006 (52.6% of subsidies obtained in the analysed period). In addition to area payments and compensatory payments for less favoured areas, subsidies for investment played a significant role. In that year, farm owners made investments using EU subsidies, as evidenced by a high proportion of subsidies obtained for this purpose (22.8% in 2006 vs. less than 10% in the other years) (Table 2). As a result, subsidy per farm and per unit of area in 2006 was over twice that in the other years.

Agri-environmental payments were of secondary importance. Farmers only benefited from them in 2006 and 2007, and their proportion did not exceed 10%. The group of other subsidies whose proportion averaged 2% included semi-subsistence support and production subsidies.

The data in Table 3 show improvements in the production and economic performance of the analysed farms. Value of production increased in all the farms, but the increase was lower in total farms than in milk production farms, which were characterized by a higher proportion of animal production in the value of agricultural production. Total family farm income in 2005–2007 increased by 17.1% in dairy cattle farms compared to 20.9% in the other farms. A similar trend was observed per unit of area. The income per 100 zloty of fixed assets increased by more than one-fourth in milk production farms and was much higher than in the other farms. Equally large differences were observed for the return on equity in favour of specialized farms. This parameter is the best overall indicator of economic efficiency.

There was a considerable increase in farm income per annual work unit (AWU of 13.1% and 19.3%, respectively), considering that the differences in employment were very small (from 1.88 to 1.89 AWU in specialized farms and from 1.82 to

1.84 AWU in the other farms). A more objective picture will be obtained if we compare income per hour worked by farmer and his family with the average net earnings in the national economy. Seen from this angle, the income in the analysed farms was higher, depending on the year, by 86% to 90% in specialized farms and by 76% to 90% in the other farms.

Table 3. Economic performance of farms in 2005 and 2007

Item	Dairy cattle farms			Other farms		
	2005	2007	rate of change (2005 = 100)	2005	2007	rate of change (2005 = 100)
Value of production (zloty)	118 867.06	138 072.29	116.2	116 199.84	133 401.31	114.8
including animal production (%)	88.9	82.2	92.5	79.7	73.6	92.3
Net value added (zloty)	71 425.65	80 767.11	113.1	68 675.84	78 288.97	114.0
Total farm income (zloty)	65 643.38	76 863.79	117.1	61 899.56	74 846.07	120.9
Total farm income per ha of UAA (zloty)	2 769.76	3 245.94	117.2	2 491.23	3 011.26	120.9
Farm income per 100 zloty of fixed assets (zloty)	14.59	18.31	125.5	14.91	17.25	115.7
Return on equity (%)	7.56	9.08	120.1	3.14	5.41	172.3
Contribution of subsidies to farm income (%)	28.9	22.8	78.9	57.4	45.9	79.9
Farm income per AWU (zloty)	37 346.04	42 256.41	113.1	34 804.75	41 528.29	119.3
Farm income per FWU (zloty)	35 288.02	40 819.70	115.7	32 716.50	39 698.01	121.3
Farm income per hour of own labour (zloty)	16.10	18.64	115.8	15.26	18.68	122.4
Ratio of farm income per hour of own labour to parity rate <sup>1</sup>	1.86	1.90	102.2	1.76	1.90	108.0

<sup>1</sup>Parity rate based on average annual earnings of employees working in the national economy (according to Central Statistical Office of Poland).

Source: own calculations based on FADN data.

## Discussion

Support of farms from public funds is one of the essential activities of Common Agricultural Policy aimed at restructuring the agricultural sector. By design, some

instruments that support agricultural restructuring do not stimulate the growth of farming production because they are transferred to farms and thus have an effect on agricultural income. This situation occurred in the farms under study. All income indicators increased but in the all farms group, these values were characterized by a twofold greater proportion of subsidies compared to dairy cattle farms (Table 3). In this case, public aid has definitely improved the material status of family farms, as indicated by improved income parity. In 2005, because income parity could not be achieved without subsidies, they were social rather than pro-growth in nature. In a study by Bułkowska (2009), dairy cattle farms achieved better economic performance than other farms but the proportion of subsidies in farm income was similar in both groups. It can therefore be assumed that the improved economic and production performance of milk-producing farms in the Podlaskie province resulted from the better use of factors involved in the production process, although these farms achieved a positive financial result regardless of whether they were supported with subsidies or not (taking into account large differences depending on herd size). Similar results were obtained by Skarżyńska (2010) for farms with the number of dairy cows averaging 19.7 LU.

In Slovakia, the level of subsidy per livestock unit was 133 euros in 2007 (Chovan and Stefanikova, 2008). A similar value of this indicator was found in 2007 in the farms analysed in the present study, whereas the more than twofold higher level of support in 2006 was due to the large proportion of investment subsidies.

In the European Union countries, 55% of dairy farms generate profit without subsidies (Isermeyer et al., 2007). Subsidies improve this result. In non-EU countries (e.g. Norway and Switzerland), where milk product costs and prices are high, various economic policy instruments are used to increase sales in the internal markets, make them more competitive on the world market and thus increase production profitability (Lehmann, 1998).

The results obtained by dairy farms from the Podlaskie province are much better than in similar farms from south-eastern Poland, where the income per full-time worker in 2006 was half the average wage in the national economy (Žmija and Czekaaj, 2008).

In summary, public funds allocated to dairy cattle farms improved their production and economic results and these farms have the capacity to develop and consolidate their competitive potential. Of particular importance is the return on equity, because it ensures that farms will continue to grow and is indicative that strategic decisions are made on the farms. The contribution of investment subsidies was considerable. It is expected that farm management results will further improve over the next years because the income effect of investments is shifted in time. Probably this is not the only cause, but the inflow of funds does have a considerable effect on farmers' decisions concerning the development of their farms. Subsidization of agricultural production does not always yield a significant increase in results, and account should be taken of the increase in production costs, which generally rise more rapidly than the prices of agricultural products. However, UK research has shown that even so, subsidized milk production continues to give best results (Hadley, 2006).

## References

- Bułkowska M. (2009). Wsparcie środkami PROW 2004-2006 i SPO „Rolnictwo” inwestycji w gospodarstwach specjalizujących się w chowie krów mlecznych. *Rocz. Nauk. Stow. Ekon. Roln. Agrobiz.*, XI, 5: 26–32.
- Chovan V., Stefanikova M. (2008). Analysis of dairy sector in Slovakia. European Dairy Farmers Congress, 18–20 June, Groningen, The Netherlands.
- Floriańczyk Z. (2008). Produktynowość polskiego rolnictwa w pierwszych latach członkostwa w UE na tle wybranych krajów europejskich. Raport PW, nr 12, IERiGŻ-PIB, Warszawa, ss. 9–22.
- Goraj L., Mańko S., Sas R., Wyszowska Z. (2004). Rachunkowość rolnicza. Wyd. Difin, Warszawa.
- Hadley D. (2006). Patterns in technical efficiency and technical change at the farm-level in England and Wales 1982–2002. *J. Agr. Econ.*, 57, 1: 81–100.
- Isermeyer F., Lassen B., Braunschweig S.W. (2007). New EU member states vs old EU member states – Results of the cost of production comparison. *Europ. Dairy Farm. Congr.*, 27–29 June, Nitra, Slovakia.
- Krzyżanowska Z. (2000). Analiza skutków Agendy 2000 na rynku w Polsce. FAPA, Warszawa.
- Lehmann B. (1998). Analyse und Massnahmen zur Steigerung der Wettbewerbsfähigkeit der Schweizerischen Weich- und Halbhartkäseunternehmen. Studie für die SGWH. ETH, Zürich.
- Okularczyk S. (2004). Long-term profitability of cow milk production. *Ann. Anim. Sci.*, 4, 1: 181–186.
- Okularczyk S. (2005). Optimum scale of milk production in light of economic studies. *Ann. Anim. Sci.*, 5, 2: 379–385.
- Skarżyńska A. (2010). Wyniki ekonomiczne wybranych produktów rolniczych w latach 2005–2008. Raport PW, nr 176, IERiGŻ-PIB, Warszawa.
- Żmija J., Czekaj M. (2008). Efektywność ekonomiczna gospodarstw z chowem bydła mlecznego w Polsce Południowo-Wschodniej. *Rocz. Nauk. Stow. Ekon. Roln. Agrobiz.*, X, 3: 611–616.

Accepted for printing 5 X 2010

ZOFIA KOŁOSZKO-CHOMENTOWSKA

**Ekonomiczne skutki finansowania gospodarstw z chowem bydła mlecznego w woj. podlaskim ze środków UE**

STRESZCZENIE

Celem pracy była ocena wpływu dotacji udzielonych gospodarstwom prowadzącym chów bydła mlecznego na wyniki ekonomiczne tych gospodarstw. Analizą objęto 132 gospodarstwa z woj. podlaskiego uczestniczące w Polskim FADN w latach 2005–2007.

W analizie posłużono się pojęciami wartości dodanej netto i dochodu z rodzinnego gospodarstw rolnego. Obliczono również wskaźnik rentowności kapitału własnego. Parytet dochodowy obliczono jako relację dochodu z rodzinnego gospodarstwa rolnego na 1 godzinę pracy własnej do stawki parytetowej. Wszystkie wartości wyrażono w cenach bieżących.

Analiza wykazała, że wszystkie gospodarstwa korzystały z dotacji pochodzących ze środków Unii Europejskiej. Łącznie w latach 2005–2007 gospodarstwa te otrzymały prawie 7 mln zł głównie w postaci dopłat bezpośrednich (dotacji obszarowych) i z tytułu gospodarowania w niekorzystnych warunkach (ONW). Nastąpiła poprawa wyników ekonomicznych. Wartość dodana netto zwiększyła się o 13,1%, dochód z gospodarstwa o 17,1%, a rentowność kapitału własnego o 20%. Dochód z pracy własnej rolnika i jego rodziny wyniósł prawie dwukrotność stawki parytetowej.