THE ANALYSIS OF SUBREGIONAL DIFFERENCES IN COST EFFICIENCY OF POLISH DAIRY FARMS USING THE FADN DATABASE[1]

Tadeusz Sobczyński*, *Anna M. Klepacka***, *Cesar Revoredo-Giha****, *Wojciech J. Florkowski*****

*Department of Economics of Agricultural Production, University of Technology and Life Sciences in Bydgoszcz, Poland
Head of Department: prof. dr hab. inż. Sławomir Zawisza
**Warsaw University of Life Sciences – SGGW, Poland
***Scotland's Rural College, UK, ****University of Georgia, USA

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A b s t r a c t. The cost efficiency of the dairy subsector has been analyzed using data for two FADN regions and four subregions in Poland for the period 2004/05-2007/08. The cost efficiency indexes have been calculated for each farm from two FADN regions and two other FADN regions after each was further subdivided into two subregions. Both regional and subregional analyses revealed large differences in relative cost efficiency of dairy farms in each area. In particular, the subregional analysis suggests that Podlaskie and Łódzkie subregion seem to have a relatively larger number of very efficient dairy farms followed by the Wielkopolskie and Kujawsko-Pomorskie subregion. Overall, however, every region seems to have a large number of farms, which could improve their cost efficiency. Given the location of dairy processors, dairy farms in the two mentioned subregions and the region of Pomorskie and Mazury have a relative advantage, while the subregion Mazowieckie and Lubelskie has an easy access to the largest market represented by Warsaw and surroundings. The dairy industry may generate some jobs in subregions leading in milk production, especially if the elimination of milk quota in 2014 will increase demand for milk and dairy products in neighboring countries leading to expansion of milk production.

INTRODUCTION

Price milk volatility has increased on the European and world milk market since 2007 [Wysokiński, Jarzębowski 2013]. Particularly, the 2007-2008 price fluctuations revealed the need for comparative analysis of milk production costs across the European and Polish dairy farms [Ziętara 2010]. Wojciech Ziętara [2012] also suggested a need for evaluation of the relative competitiveness of Polish dairy farms against the European Union (EU) farms. Kołoszyc [2013] stated that the global financial and economic crisis of 2008 affected every aspect of the dairy industry including production.

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Barnes et al. [2011] reported on cost efficiency of farms, including dairy farms across the EU countries. Results indicated a relatively strong position of the Polish dairy sector. In an earlier study, Revoredo-Giha and Renwick [2010] analyzed the cost efficiency of nine farm types in five EU countries using the FADN data base for the period 1995-2007 including those for Poland and Hungary for the period of 2004-2007. According to the results, dairy farms showed a similar level of cost efficiency across farm sizes and across four FADN regions in Poland. However, Parzonko [2013] noted a clear polarization of milk producing areas in Poland. In particular, the diverting milk procurement trends between Podlaskie and Podkarpackie Voivodships between 2004/2005 and 2010/2011. Sobczyński et al. 2013] suggested undertaking a subregional analysis in the future to further discern the relative cost efficiency across various milk producing areas in Poland.

This paper examines the cost efficiency of dairy farms, while accounting for regional and subregional differences. Regional and subregional differences in particular, allow to anticipate the relative strengthening or weakening of the dairy sector. Dairy industry can become more regionally concentrated driven by the natural resource base most suited for milk production. In addition, the subregional differences implicitly indicate the ability of dairy farms to create additional jobs in rural areas. The unemployment rate is high in rural areas of Poland and some leading milk producing areas experience a high unemployment rate. The non-farm jobs are limited, especially in certain areas [Klepacka 2012]. Outmigration has intensified after Poland's accession to the EU in 2004, and the opening of labor markets in many of the older EU member-countries. As a result, the local labor availability changes because laborers can find better paying jobs abroad. Dairy farms typically use more labor than other farm types. Therefore, this study results provide a measure of cost efficiency at the regional and subregional level that measures possible ability of dairy farms to respond to cost cutting pressures, while implicitly painting picture of the sector's role in the rural labor markets, especially those suffering from outmigration and depopulation.

POLAND'S DAIRY SECTOR BEFORE AND AFTER THE EU ACCESSION

Livestock production dominates in Polish agriculture. The share of farm sales revenue generated by livestock or livestock product sales increased from 53.4% to 62.2% between 2004 and 2011, respectively [Abramczyk 2013]. Milk production assured a steady demand for labor and guaranteed regular revenues. As a result dairy farms enjoyed a steady income and employment stability.

The annual milk production rapidly declined from 16 bil liters in 1989 to about 11.5 bil liters in 2000 [Lira 2013] following the adoption of the market-based resource allocation mechanism. Only after the accession to the EU in 2004, Poland's milk production begun to increase slowly within limits permitted by the CAP. The production reached 12 bil liters in 2011. However, earlier farmers responded to market prices by increasing the marketable share of milk production from 73.5% in 1989 to 80% in 2010 [Lira 2013].

Parzonko (2013) noticed the increasingly visible regional differences in milk production. Domańska (2013) stated that the Pomorze and Mazury regions held the competitive advantage in milk production over other regions, followed by Małopolska and Pogórze. Mazowieckie and Podlaskie Voivodships placed third according to Domańska [2013]. Sobczyński et al. [2013] applied cost efficiency measures and placed the FADN defined Podlaskie and Mazowieckie as well as Wielkopolskie and Śląskie regions as most efficient in dairy production.

In recent years, there has been a notable concentration of processing capacity as the dairy processing cooperative sector undergoes cost-induced re-structuring. Increased cost efficiency could lead to less expensive raw milk supplied to processing plants, especially if processed by cooperatives where dairy farmers are shareholders.

COST FRONTIER ESTIMATION APPROACH

An inefficient farm could improve its efficiency through better input use [Langemeier 2010]. The current study limits its scope to cost efficiency. It uses the stochastic cost frontier model implying that the most efficient farms are located on the frontier function. The cost efficiency index ranges from zero to one, i.e., the highest efficiency level. The fixed effects stochastic cost frontier model can be written in the following way [Kumbakhar, Knox Lovell 2003], where i denotes farms and t the periods:

$$\ln E_{it} = \ln C\,(Q_{it}, W_{it}, \tau_t; \Omega) + v_{it} + u_i \qquad (1)$$

In equation (1), $\ln E_{it}$ is the logarithm of the observed expenditure and $\ln C\,(Q_{it}, W_{it}, \tau_t; \Omega)$ is the logarithm of the deterministic cost function that depends on the outputs Q_{it}, the input prices W_{it}, a deterministic trend τ_t to capture technological change, and a vector of parameters Ω. The statistical error is represented by v_{it}, which is assumed to be independent and identically distributed with mean zero and variance σ_v^2. The time invariant inefficiency term u_i is positive.

The estimation of the stochastic cost frontier (i.e., $\ln C\,(Q_{it}, W_{it}, \tau_t; \Omega) + v_{it}$) and the inefficiency terms (i.e., u_i) requires the choice of a functional form for the deterministic part of the stochastic cost frontier (i.e., $\ln C\,(Q_{it}, W_{it}, \tau_t; \Omega)$). A generalized multiproduct translog cost function [Caves et al. 1980] was selected because it imposes fewer a-priori restrictions than other functional forms commonly used for the task. As explained by Caves et al. [1980] in the context of multiproduct estimation, some outputs might not be present on a farm, and therefore the logarithm used in the translog function will produce an error. Instead, they propose the use of a Box-Cox transformation to substitute for the logarithm of the output terms. It should be noted that the Box Cox transformation is only one of the possibilities. Therefore, this paper applies f(Q) = Q, which provides a hybrid between the translog function and the quadratic function. Thus, for the case of n inputs and m outputs, the cost function is given by:

$$\ln C\,(Q_{it}, W_{it}, \tau_t; \Omega) = \alpha_0 + \varphi_0 \tau_t + \varphi_0 \tau_t^2 + \sum_{j=1}^{n} \alpha_j \ln W_{jt} + \tfrac{1}{2} \sum_{j=1}^{n}\sum_{k=1}^{n} \beta_{jk} \ln W_{jt} \ln W_{lk}$$
$$+ \tfrac{1}{2} \sum_{j=1}^{m}\sum_{k=1}^{n} \delta_{jk}\, f\!\left(Q_{jit}\right)\ln W_{kt} + \sum_{j=1}^{m} \gamma_j f\!\left(Q_{jit}\right) + \tfrac{1}{2} \sum_{j=1}^{m}\sum_{k=1}^{m} \rho_{jk}\, f\!\left(Q_{jit}\right) \cdot f\!\left(Q_{kit}\right) \qquad (2)$$

As the stochastic cost frontier is a cost function, it has to satisfy the properties of any cost function [Chambers 1988]. Price homogeneity and symmetry were directly imposed in (2) through the following restrictions to the parameters (3):

$$\sum_{j=1}^{n} \alpha_j = 1;\ \sum_{j=1}^{n} \delta_{jk} = 0;\ \sum_{j=1}^{n} \beta_{jk} = 0;\ \sum_{k=1}^{n} \beta_{jk} = 0;\ \sum_{j=1}^{n}\sum_{k=1}^{n} \beta_{jk} = 0;\ \beta_{jk} = \beta_{jk} \qquad (3)$$

A stochastic cost frontier using a panel data fixed effects model considers inefficiency as a time invariant [Schmidt, Sickles 1984, Kumbakhar, Knox Lovell 2003, Greene 2005]. A common problem in the estimation is that the use of a fixed effect model precludes the use of time invariant variables. However, in the context of cost function estimation, this can be overcome due to the fact that the parameters associated with input prices can be estimated from the cost share equations, where the inefficiency term (i.e., the fixed effect terms) do not appear.

The equation to be estimated is presented in (4), where the intercept in (4) is $\alpha_{0i} = \alpha_0 + u_i$.

$$\ln E_{it} = \alpha_{0i} + \varphi_0 \tau_t + \varphi_0 \tau_t^2 + \sum_{j=1}^{n} \alpha_j \ln W_{jt} + \frac{1}{2}\sum_{j=1}^{n}\sum_{k=1}^{n} \beta_{jk} \ln W_j \ln W_k + \frac{1}{2}\sum_{j=1}^{m}\sum_{k=1}^{n} \delta_{jk} f(Q_{jit})\ln W_k$$
$$+ \sum_{j=1}^{m} \gamma_j f(Q_{jit}) + \frac{1}{2}\sum_{j=1}^{m}\sum_{k=1}^{m} \rho_{jk} f(Q_{jit}) \cdot f(Q_{kit}) + v_{it} \qquad (4)$$

The dataset does not contain input prices for each farm. However, in the context of cross section estimation, the approach is to assume that all farmers face the same prices [e.g., Alvarez, Arias 2003]. However, for estimating a cost function using panel data it is possible to introduce prices, assuming that all the farmers face the same input prices within a year (i.e., across farms), but that prices change over time.[2]

Equation (4) was estimated for five inputs (i.e., n) and three outputs (i.e., m). Given the high number of parameters to be estimated, the following econometric procedure was employed. First, the system of $(n-1)$ cost shares was computed, using Iterative Seemingly Unrelated Regression Equations (ISURE) and imposing the constraints in (3). This step provided the values for all the terms in (4) that were associated to input prices. Second, all the remaining parameters of the cost function, except the fixed effect terms (i.e., output terms not associated with prices) were estimated using the within estimator (ordinary least square applied to the variables expressed as deviations of the means by farm as in Hsiao [1993]). Finally, the fixed effect terms used in the construction of the relative cost efficiency indices were estimated from equation (4) by evaluating the function at the mean value of the variables by farm [Atkinson, Cornwell 1993, Kumbakhar, Knox Lovell 2003, Pierani, Rizzi 2003][3].

As shown in Kumbhakar and Knox Lovell [2003], the relative cost efficiency index (CEI$_i$) for a sample size N was computed as equation (5) based on the estimated fixed effect intercepts (i.e., α_{0i}), where for the most cost efficient producers it has a value equal to one:

$$CEI_i = \exp\{-(\hat{\alpha}_{0i} - \min_i\{\hat{\alpha}_{0i}\})\} \qquad i = 1,...,N \qquad (5)$$

The results of the cost function estimations for two large FADN regions and four subregions provided insights into cost efficiency differences and were used to calculate elasticities of substitution among the input categories. The majority of the calculated elasticities are statistically significant and all have the expected signs with the exception of the energy elasticity of substitution, which has a positive sign and is statistically significant in the Dolnoslaskie and Opolskie subregion. The subregion is not a major area of dairy farm location[4].

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[2]   In a different context, similar assumptions can be found in the estimation of demand systems, where price elasticities are sometime estimated from time series because of the lack of variability of prices in cross section datasets [Hsiao 1993, p. 206].

[3]   The farm level estimated fixed effects used to compute the relative cost efficiency indices were assumed to be constant over time due to the short period covered by the sample (in the best case, information was available for some farms for eight years) [Kumbakhar, Knox Lovell 2003, p. 170].

[4]   Results of estimation are not shown due to space limitations, but are available from the authors upon request.

DATA

The study uses data from the Farm Accounts Data Network (FADN) database, which includes annual records of a wide range of financial and non-financial data for a selection of full-time farms across the EU. In case of Poland, the data used were available only since 2004/2005, that is after the country's accession to the EU. This resulted in an unbalanced panel dataset.

Costs and outputs by farm type were computed directly from the FADN data. Costs were allocated to one of five groups: materials (e.g., feed, fertilizer); energy; labor (i.e., all labor used including that of the farmer, farm family, business partners, and hired workers); land (owned and rented) and capital (e.g., rent, depreciation). The three outputs were considered: crops, livestock, and other outputs, all of them in real terms.

The estimation of cost functions requires input prices. But, FADN data include only input expenditures and not the paid input prices paid (or quantities used). Therefore, Eurostat's input price indices data (base year 2004) were used for agricultural materials, energy, and capital as an estimate of prices paid by farmers. The labor and land input prices were estimated from the FADN data.

The national FADN farm panel consists of farms participating voluntarily, therefore, the panel may not be fully reflective of Poland's dairy sector. Farms with very small herds are likely underrepresented. However, the study focuses on the competitiveness of producers and their ability to create jobs in rural areas rather than milk self-supply, the primary reason behind a small animal herd.

The data are annual observations for the period 2004/2005-2007/2008. The unbalanced panel included 1,877 farms, but a total of 3,840 observations is used in this study. Farms were located in a number of administrative regions, which were grouped by the national reporting agency in four large regions including the Mazowieckie-Podlaskie, Wielkopolsks-Śląsk, Pomorze-Mazury, and Małopolska-Podgórze. For the purpose of this study, of the first two regions each was subdivided into two subregions to account for subregional differences in cost efficiency. The four subregions were Wielkopolskie and Kujawsko-Pomorskie, Dolnośląskie and Opolskie, Mazowieckie and Lubelskie, and Podlaskie and Łódzkie. The reported farm data included all standard information in the FADN data base. Rural jobs are particularly needed in the two latter subregions, although Kujawsko-Pomorskie also experienced a relatively high rural unemployment.

ESTIMATION RESULTS AND IMPLICATIONS

The cost efficiency index was calculated for every farm in the region or subregion against the most efficient farm in a particular area. The results are comparable among farms within an area, but not across areas because the most efficient farm, which serves as the benchmark, is different in every region or subregion. The efficiency indicators are relative with respect to the frontiers represented by the most efficient producer or producers. For example, a cost efficiency coefficient equal 0.5 implies that the cost at the frontier is 50 percent of the observed cost at that particular farm in one of the studied areas. The maximum potential cost reduction at that farm resulting from cost efficiency improvement is 50 percent. The way in which costs are reduced is not determined in this study but left to the farmer. In real world situation, a farmer facing a decrease of revenues may withdraw from production altogether, or improve the dairy farm cost efficiency by a fraction that would adequately compensate the revenue fall.

The distribution of dairy farms in each area according to various levels of cost efficiency is illustrated in Figures 1 through 4 and refer only to subregions because of the limited article length. Figures show a wide distribution of farms in terms of their relative cost efficiency. In different areas the potential for improvement varies. The area cross comparison is indirect and based on the concentration of cost efficiency indicators in area-specific range and the number of dairy farms with low cost efficiency index.

The Pomorskie and Mazury FADN region shows a few farms with very high cost efficiency on or near the cost frontier, but the vast majority of farms appears to have large reserves to improve their cost efficiency. An earlier paper suggested that that area is the most efficient milk producing area, but the analysis was based on qualitative assessment [Domańska 2013].

Małopolska and Pogórze shows much different distribution of farms based on their cost efficiency indicator. A handful of efficient farms is clearly outnumbered by the vast majority of farms with the cost efficiency coefficient values below 0.5. Sobczyński et al. [2013] indicated that his area was not likely to remain an area of commercial dairy production. Others suggested that any dairy should focus on organic or niche market production, where the latter involves value adding activities such as production of local cheese. The area is characterized by relatively high rural unemployment and dairy can contribute to job creation if on-farm or local cheese making becomes widely spread. There is potentially country-wide demand for regionally made cheese.

Four figures depict the distribution of farms according to their relative cost efficiency in subregions. Figure 1 shows Wielkopolska and Kujawsko-Pomorski subregion. Similarly to the two FADN regions, there is a small group of cost efficient dairy farms establishing a frontier that at present is unattainable by the majority of farms. However, the number of farms in a subregion exceeds that of Pomorze and Mazury region. The majority of farms can seek improvement in cost efficiency and likely remain competitive in milk production because there is a well developed subregional processing capacity.

A couple of dairy farms with relatively high cost efficiency sets the benchmark for others in Dolnośląskie and Opolskie subregion (Fig. 2). The dominant portion of farms is associated with the cost efficiency indicator that is less than 0.3. Costs at farms with that level of efficiency can be reduced by up to 70 percent. But, it remains unclear if farmers would chose to improve because the area comprises of two districts with very different
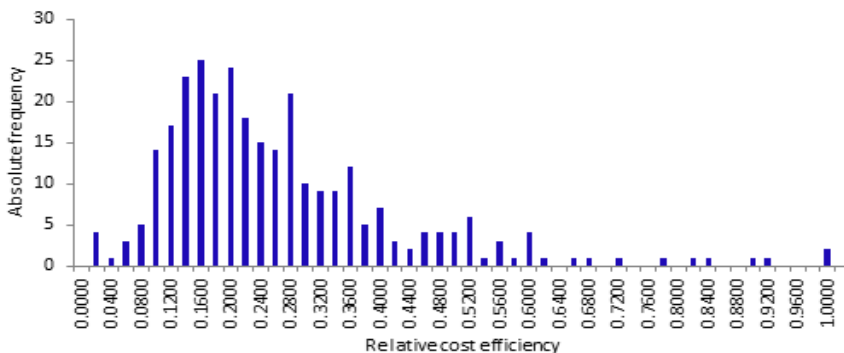

Figure 1. The distribution of dairy farms in terms of cost efficiency in FADN subregions of Wielkopolska and Kujawsko-Pomorskie, Poland
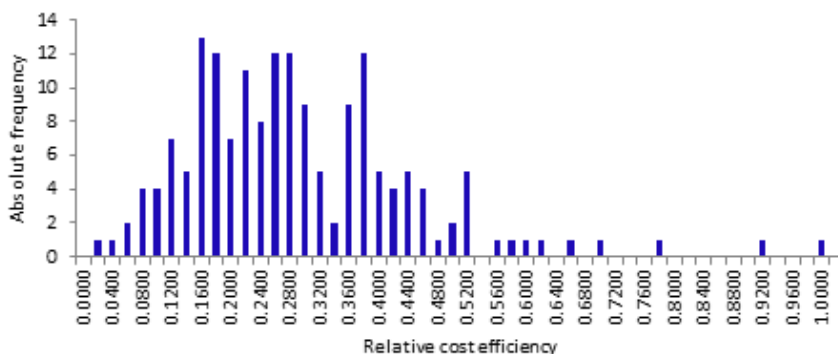Source: Authors' calculations based on estimation results using the FADN data.

Figure 2. The distribution of dairy farms in terms of cost efficiency in FADN subregions of
Opolskie and Dolny Śląsk, Poland
Source: Authors' calculations based on estimation results using the FADN data.

farming culture and farm structure. The subreginoal demand for dairy products is high because this area leads the country in yogurt consumption and is high consumer of cheese, but less of fluid milk. Subregional dairy processing capacity may be less developed, but farmers could supply milk to processors in other areas or neighboring countries.

The next two figures (Fig. 3 and 4) show the relative cost efficiency of another subdivided FADN region. Figures 3 shows the relative cost efficiency of dairy farms in Mazowieckie and Lubelskie area and the frontier delineated by a very few farms. For the majority of the dairy farms the value of cost efficiency indicator ranges from 0.26 to 0.40 suggesting substantial opportunities for cost reduction. The dairy processing capacity is large in Mazowieckie Voivodship and the sprawling Warsaw and its suburban areas represent a highly concentrated market posing little challenge in terms of logistics and distribution. Therefore, the dairy sector in this area, having ability to reduce cost while at the same time located near processing facilities and large market, is posed to remain competitive in the foreseeable future should competitive pressure increase.

Finally, the subregion perceived as having the largest potential for dairy production (mostly Podlaskie Voivodship) shows that the cost frontier is determined by a few farms (Fig. 4), but in the number similar to that of the whole FADN region of Pomorskie and Mazury. The majority of farms has the cost efficiency indicator value between 0.22 and 0.52 suggesting opportunities for cost reduction. Because several large processing facilities are located in the area, the dairy plants can be supplied with a large volume of raw milk lowering the transportation costs. The relatively short transportation distance from farm to the processing plant is an important source of competitive advantage for the dairy sector there given the subregion location away from major demand centers.

An important aspect of competitive advantage of the dairy sector is not captured by the FADN data reporting framework in Poland. Namely, the dairy production area of Podlaskie Voivodship, included in Mazowieckie and Podlaskie FADN region and the dairy producing area in Warmińsko-Mazurskie Voivodship included in Pomorskie and Mazury FADN region, are in the same geographic area split by administrative boundaries delineating the two FADN regions. Therefore, to assess the cost efficiency of dairy farms
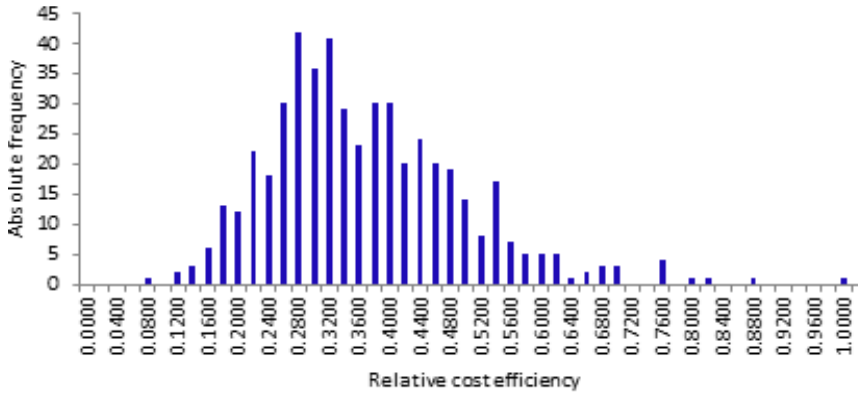
Figure 3. The distribution of dairy farms in terms of cost efficiency in the FADN subregions of
Lubelskie and Mazowieckie, Poland
Source: Authors' calculations based on estimation results using the FADN data.
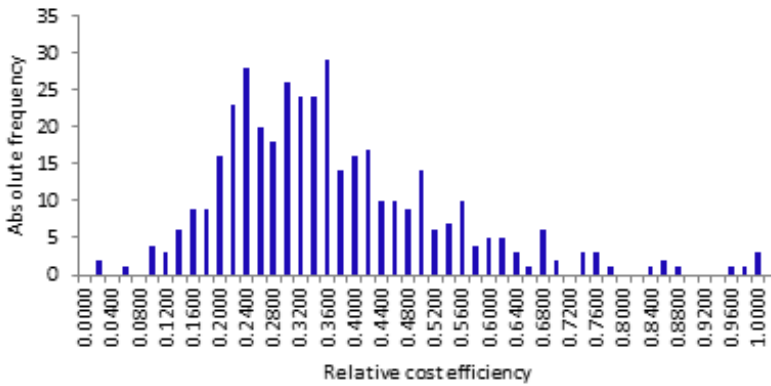

Figure 4. The distribution of dairy farms in terms of cost efficiency in the FADN subregions of
Podlaskie and Łódzkie, Poland
Source: Authors' calculations based on estimation results using the FADN data.

and their competitiveness the analysis should focus on a sample of dairy farms from re-designed subregions. In particular, the sample of dairy farms from the above mentioned Voivodships should be created ignoring the currently applied division dictated by FADN regions. Moreover, such analysis could also paint a better picture in terms of job creation potential in the dairy production and processing.

CONCLUDING REMARKS

This study was undertaken in order to evaluate the possibilities of cost reduction by dairy farms evaluated at a lower aggregation level than the FADN regions in Poland in response to conclusions of an earlier analysis [Sobczyński et al. 2013]. By establishing possibilities for cost reduction both the dairy sector and policy makers gain insights into the potential response to changes in prices or broader cost competitive pressures exerted by external factors.

In particular, Wielkopolska and Śląsk as well as Mazowieckie and Podlaskie representing two FADN regions were divided into two subregions, i.e., Wielkopolska and Kujawsko-Pomorskie, Dolnośląskie and Opolskie, Mazowieckie and Lubelskie, and Podlaskie and Łódzkie, respectively. Such subregions closely account for the actual regions of dairy production concentration, historically determined farm structure, natural resource endowment, and the milk processing plant location. Also, the suberegions better reflect the area dairy farm numbers than the large aggregated FADN regions.

The artificial formation of FADN regions is evident. The cost efficiency histograms suggests differences in production costs. Cost efficiency comparisons are valid only within the region because the cost frontier is determined by the most efficient farm or farms. A number of very efficient farms is limited in each region, but relatively highest in the Podlaskie and Łódzkie subregion. The remaining farms in each region appear to have substantial reserve and capacity for cost reduction. Whether such opportunities will be realized depends on each farm operator and external pressures such as the access to milk processing plants. Some farms show very low cost efficiency and likely will cease to produce milk in coming years or will be absorbed by larger farms, some of which, depending on the region or subregion, may not continue dairy production. Farms like that seem to be located in Małopolska and Pogorze FADN region, in particular.

The potential for cost reduction suggests that the competition among farms in the defined subregions will continue in the foreseeable future. It will be interesting to see how the subregional dairy production will respond to the expected changes in the dairy industry after April 1, 2013, when milk quotas will be abolished in the EU. Poland›s dairy exports have been increasing in recent years, but mostly involved processed dairy products such as yogurt and cheese. If Polish dairy producers exploit their potential for cost reduction, there could be opportunities for further exports increase including exports of fluid milk to destinations not constrained by transportation costs.

Dairy farms utilize more labor than field crop farms and the continuing development of that subsector of agriculture could offer, however limited, job opportunities. Enlargement of herds eventually will require hired labor to improve economic returns. Already, between 2009 and 2010, the employment in agriculture increased by about 2,400 jobs [*Rocznik satystyczny...* 2011], but the data do not provide details about the farm type or geographical area, where the new jobs were added. However, the general trend of an increase in agricultural employment is consistent with both the demographic changes and reversal of migration due to the shrinking job market in other EU countries. The full demonstration of the financial crisis in 2008 and the subsequent economic slowdown in many EU countries led to a decrease in demand for labor. Lower labor demand and the lack of prospects for a speedy recovery caused many job-seeking migrants from Poland to return home. The reverse migration increased the supply of labor, including the labor in rural areas and areas where outmigration was largest.

The elimination of milk quotas planned for 2014, if associated with increased demand for dairy in Poland's neighbors, could increased the local rural demand for labor. At the same time, the economic growth is expected to accelerate in the euro zone in 2014, which could translate into renewed job-seeking migration from Poland. Still, as the new generation enters the job market in Poland, there is no immediate threat of labor shortage in rural areas. This is especially true of areas located in eastern and north-eastern Poland, some of which have well developed dairy sector.

Among the limitations of the study is the potential imprecision of deflating prices of inputs and outputs. The lack of price information in the FADN data set also forces the assumption that farmers across regions and subregions face identical prices. Although not completely unreasonable because of the lack of other obstacles than transportation costs, some potential imperfection in pricing inputs can occur. In addition, the labor cost likely varies across regions due to wage and cost of living variation and could have affected the results.

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Tadeusz Sobczyński, Anna M. Klepacka, Cesar Revoredo-Giha,Wojciech J. Florkowski

ANALIZA SUBREGIONALNYCH RÓŻNIC EFEKTYWNOŚCI KOSZTÓW W POLSKICH GOSPODARSTWACH MLECZNYCH NA PODSTAWIE DANYCH FADN

Streszczenie

Efektywność kosztów w subsektorze mlecznym analizowano na podstawie danych z dwóch regionów FADN i czterech podregionów w Polsce w okresie 2004/2005-2007/2008. Indeksy efektywności kosztów wyliczono dla każdego gospodarstwa z dwóch regionów FADN i podzielanych z nich dwóch subregionów. Analiza na poziomie regionów i subregionów wskazała na duże różnice we względnej efektywności kosztów gospodarstw mlecznych w każdym obszarze. Analiza subregionalna wskazała, że pod względem najwydajniejszego gospodarstwa w danym obszarze, subregion podlaskie-łódzkie miał większy udział wysoko wydajnych gospodarstw niż subregion wielkopolskie-kujawsko-pomorskie. Ogólnie, na każdym obszarze znajduje się duża liczba gospodarstw, które mogłyby poprawić efektywność kosztową. Ze względu na położenie przetwórców mleka, gospodarstwa mleczne mają względną przewagę w dwóch wymienionych subregionach i w regionie Pomorskie-Mazury, natomiast subregion mazowieckie-lubelskie ma łatwy dostęp do największego rynku reprezentowanego przez Warszawę i okolice. Przemysł mleczarski może tworzyć miejsca pracy w podregionach wiodących w produkcji mleka, szczególnie jeśli weliminowanie kwot produkcji mleka w 2014 r. spowoduje wzrost popytu na mleko i produkty mleczne w krajach sąsiednich i doprowadzi do wzrostu produkcji mleka.

Coresspondence address:
Dr inż. Tadeusz Sobczyński
University of Technology and Life Sciences (UTP) in Bydgoszcz, Poland
Dr Anna M. Klepacka
Warsaw University of Life Sciences – SGGW, Poland
Dr Cesar Revoredo-Giha
Scotland's Rural College, UK
Prof. Ph DWojciech J. Florkowski
University of Georgia, USA
email: wojciech@uga.edu, anna_klepacka@sggw.pl