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ECONOMIC VIABILITY OF SMALL FARMS

D. Atanasov*

Economics department, Agricultural University – Plovdiv, Plovdiv, Bulgaria

ABSTRACT

Economic viability is an important prerequisite for sustainable development of the farms, which according to The European Commission (2001) means ability to generate sufficient incomes from their activities and also sustaining long-term production potential (1).

The majority of Bulgarian agro-producers are small-family enterprises that in the complex European institutional environment are facing serious issues in their competitiveness and economic efficiency. This underlines the question – How do these farms continue to operate and why they still produce agricultural products, and do not get out of business?

The objective of this study is to find out the answer of the above question, by examining in depth the socio-economic factors affecting the overall viability of small-family farms.

The results show that small farms do not necessary pursue economic efficiency, but are dependant on the positive income results from the farming business, before calculating alternative costs.

Key words: alternative cost, economic viability, economic efficiency, system flexibility.

INTRODUCTION

Farms in order to be sustainable have to be first of all economically viable, which means that they are able to generate sufficient revenues from their activities and can maintain long-term production potential (1). For the assessment of economic viability different indicators could be used, such as resource availability, productivity of resources, financial strength, profitability, income from agricultural activities, diversity and flexibility of the system, stability of the production process, etc. (2), (3). The specific characteristics of farming systems in Bulgaria and in particular the small ones require the use of at least two indicators for assessing their economic viability: efficiency and system flexibility.

(1) Efficiency

Basic determinant of the economic viability of the farm is its production and economic efficiency or the way it uses its resources and turns them into useful goods. System's efficiency shows the relationship between the input resources and the output products and it's linked to competitiveness and vitality (1). Scarcity of resources and the inability some of them to be replaced by others, requires their use to be in a way that maximizes the long-term outcomes of the economic activity. The list of factors that determines the economic efficiency of a farm is long. Strong influence have the purchase prices of production, the prices of resources used, technology, infrastructure, institutional environment, government support. Some researchers argue that the most important thing for a farm, in a market economy is to generate enough income and be profitable. If the farmer does not work efficiently and do not earn enough, he/she must find ways to improve the working methods or seek other alternative employment (4).

An important point in the research is the methodology for calculation of the revenues and

***Correspondence to**: *Dimo Atanasov, Economics department, Agricultural University – Plovdiv, 12"Mendeleev"str., 4000 Plovdiv, Bulgaria, tel. 032 / 654 492, 0885/843553, e-mail: atanasov.au@abv.bg*

costs of the farming systems. The result obtained after deducting production costs from total revenue of the farm is called "gross economic result". Depending on the legal status of the farm, to the gross economic result is added or deducted statutory income or expenses in order to get the "taxable income", on the basis of which is calculated the tax due. After deduction of tax expenditure and financial obligations of the farm to banks, credit institutions and others (if such exist), remains the "disposable income for the farmer". When the opportunity cost is removed from that, the rest is the "pure economic result" or "net income". Opportunity cost or in other words "missed benefits" from farmer's own resources is the value that he/she would have received from these resources, if they were invested in another business. Normally, the business alternative with the lowest risk should be taken for the comparison. It is difficult to determine whether all resources have alternative uses, especially in agriculture. For agricultural land the option to rent out could be considered as the alternative with lowest risk that can provide stable income (rent). For opportunity cost of humane resources (labor), although with some convention can be accepted the minimum wage in the country. Conditionality is linked to the low mobility of labor resources in agriculture, especially taking into account the relatively high age of employees and the existing in many areas of the country high unemployment rate. That means that there is not always such an alternative, however the purposes of the study allows the compromise with the minimum wage to be accepted. For the sake of grater precision of the results a more sophisticated methodology for assessment the opportunity cost of labor could be developed. The opportunity cost of capital resources was most difficult to determine. The majority of farms in Bulgaria and in the Plovdiv region are very small, do not keep any records and use very old and depreciated equipment, which hinders the evaluation of their assets. The research applies the market method to assess the value of equity in these farms. Larger and modern farms provide information and necessary data from the books. The value of equity for the purposes of the research is compared to its alternative revenue if the same amount of money was deposited in a bank on the average interest rates during the year. After calculation of income and expenditure based on the above methodology the assessment of farms efficiency continues with an analysis of the indicators: *disposable income* and *profitability*.

A. Disposable income determines the behavior of farmers in the specific business climate and their desire to continue work. Income is an economic form of realization of ownership of a production factor. Each of the production factors generates income: income from labor is the salary, income from capital is the interest, income from agricultural land is the rent and income from entrepreneurship is the profit (3). When a producer uses own labour, land and capital the disposable income is grater because he/she does not subtract their cost. This affects mostly small family farms, which mainly use their own labor, capital and land resources. It is not uncommon also larger farmers to have own land and capital or to use family work, but their share is smaller. In order to achieve comparability between different types of farms, when assessing their disposable income, opportunity costs is included in the analysis.

Disposable income = Total revenue – (Production costs + Labor costs + Tax + Financial costs)

The level of disposable income is crucial for the economic viability of enterprises and the living standards of farming families. From an economic perspective it is important the amount of disposable income to be above the level of opportunity costs. Imagine a point where disposable income is equal to the opportunity costs of alternative uses of own resources at the lowest level of risk. In this research that is called *"critical point of income"*. If farmer's income is below the critical point in the long term, economic logic suggests that he/she would have made more income if abandons current business and invest the resources (labor, land, capital) in an alternative activity.

Critical point of income = Disposable income / Opportunity cost = 1

B. Profitability. For profitability assessment of a business the "pure economic result" or "net income" is used, calculated as the difference between total revenue (including subsidies) and total costs (including alternative cost of own land, capital and labor). Profitability is the price at

which profit is derived, which most often is done by comparing results to expenses.

Profitability = pure economic result / total cost
This indicator shows the amount of money (levs, euros) earned from 1.00 lev or euro embedded in the business. For the sake of clarity and readability, the results obtained are presented in percent. Based on the level of profitability farms are evaluated.

The overall economic efficiency of the farming system is assessed as an average between the scores of the two sub-indicators *disposable income* and *profitability*.

Table 1. *Average economic results of dairy farm sample in Plovdiv region, 2011*

Indicator	1-4 cows	5-9 cows	10-20 cows	21-50 cows	> 50 cows
Total revenue incl. subsidies (levs)	**11 784**	**22 206**	**47 050**	**94 646**	**200 595**
Total revenue excl. subsidies (levs)	**11 023**	**20 318**	**39 557**	**78 442**	**177 495**
- Costs of production (levs)	8 079	13 193	30 934	68 073	160 681
= Gross economic result (levs)	3 705	9 013	16 116	26 573	39 914
= Gross econ. result excl. Subsidie s(levs)	2 944	7 125	8 623	10 369	16 814
- Tax (levs)	471	904	1 882	2 954	3 991
- Tax excl. subsidies * (levs)	441	786	1 582	1 778	1 347
- Financial costs (levs)	0	1 017	2 300	5 933	11 667
= Disposable income (levs)	**3 234**	**7 092**	**12 186**	**17 686**	**24 256**
= Disposable income excl. subsidy (levs)	**2 503**	**5 323**	**4 740**	**2 658**	**3 797**
- Alternative costs (levs)	3 561	5 135	6 535	6 833	11 147
= Pure econ. result (net income) (levs)	**- 327**	**1 957**	**5 399**	**10 853**	**13 109**
= Pure econ. result excl. subsidy (levs)	**- 1 058**	**188**	**- 1 794**	**- 4 175**	**- 7 347**

Source: Own survey, 2007 – 2011

Some valuable conclusions could be made on the bases of **Table 1**. Obviously in 2011 none of the farms create positive net income, when the equation does not count the subsidies. This was the case in all five years of the study. Even dough support is included in the equation the smallest farms (1 – 4 cows) still have negative net income. The average net income of the next group is positive, but is very small. Why do these farms not leave the business, if they make negative or not enough net income or profit? The answer is because they mainly use own resources and don't calculate alternative cost. What is important for them is the disposable income. As it can be seen on tabl.1 all farms that keep ten or more cows have disposable income higher than alternative cost when subsidies are included in the equation. If no subsidies were paid all of them would have been under the critical point of income. That proves the theory that big farms are more dependable on government support than small ones.

(2) System flexibility
Sustainable agricultural systems should be flexible to a wide range of shocks and stress, and also be able to restore its vitality after such shocks and continue functioning. Agricultural enterprises are susceptible to many socio-economic, environmental and institutional impacts: product prices and prices of resources, demand for the products, competition, support levels, as well as changing requirements for quality and safety of production, animal welfare, environmental protection and others. The flexibility of the system or its ability to respond and adapt to dynamic internal and external factors, depends largely on its organization and management, technological level, diversification of resources and sources of income, share of own resources, etc. In this study two of them are examined: *share of own resources* and *diversification of income*.

A. Share of own resources. In agriculture the main groups of resources used are land, labour and capital. For this purpose three coefficients are calculated: coefficient of financial independence, coefficient of family labour and coefficient of own land. The share of own resources is assessed as an average of the three coefficients.

Financial independence
The sample of 30 farms showed high levels of financial independence. Over 80% of the farm's

capital is own. The higher the farms size the lower degree of financial independence. Most of the small producers, keeping between 1 and 4 cows operate with 100 % own capital (equity). The value of this indicator for the group of farms with 5 to 9 cows is slightly lower and in the period 2007 – 2011 varies between 0,91 and 0,94. These results demonstrate the conservative policy of small farms in using of borrowed capital (debt). The reasons for this, according to surveyed farmers are many but the main ones are the high cost of credit and the relative instability of the market of cow milk, where purchase prices vary constantly and make it unpredictable. Larger farms that do everything possible to meet the EU requirements for production and marketing of milk and milk products, are more open to the use of borrowed capital. Short deadlines for categorization of farms, larger production volumes with better purchasing prices of milk proved strong institutional and economic incentive for many farmers. As a result in recent years, they invest borrowed funds for building modern farms. Estimates of the financial independence of farms in the sample size 10 – 20 cows for 2007 – 2011, range between 0,80 and 0,86 and the trend is gradually decreasing. In the group of farms, breading from 21 to 50 dairy cows, the estimates are between 0,69 and 0,74 while the largest farms (over 50 cows) are in the range 0,66 – 0,72.

Family labour

Smallest farms in the survey have the highest proportion of own labour used in the production process. This is not surprising because in such small enterprises there is no need for hiring of additional workers. Only temporarily additional help could be required, but the workers are not hired permanently. Even in farms with herd size from 5 to 9 dairy cows there is not enough work for full employment of outside people. In the group of farms with 10 – 20 cows, the independence from external labor is evaluated at 61 – 66 %, which indicates that farms in this size rely on hired workers for about 1/3 of the activities. The share of employed labor increases to about half (51 – 53 %) in the farms with 21 to 50 cows. The largest holdings in the sample are dependant about 75 % on hired external labor, which means that in the 2007 – 2011 period the coefficient of own labour varies in the range 0,24 – 0,28.

Own land

The survey results show that in general the farms in the sample cultivate agricultural land, which is about 2/3 owned and 1/3 rented. This ratio does not change during the entire period of observation. The highest rates of private land have the smallest producers with 1 to 4 cows (between 80 % and 0,87 %), which translates in coefficients of 0,80 – 0,87. In the group with 5 to 9 cows the coefficient of own land varies between 0,73 and 0,76. In the 10 to 20 cows group about 50 % of the land in use is own and 50 % rented. This is the group with the lowest coefficient of own land (around 0,50). The next group (21 – 50 cows) is characterized by higher stability coefficient, which in the period 2007 – 2011 is close to 0,67. The largest farms also show relative stability in the use of their own land resources and the above mentioned coefficient is at 0,59 during 2007 – 2009 and at 0,57 for 2010 and 2011.

The share of own resources, calculated as average of the coefficients of financial independence, own labour and own land is demonstrated on **Figure 1**.

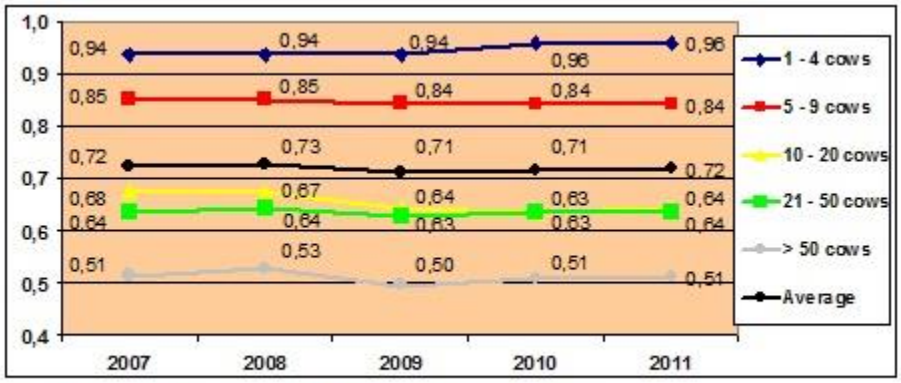

Fig.1 Share of own resources in different size dairy farms

The larger the farm, the smaller the share of its own resources, which makes it highly dependent on external factors. Based on the indicator *"share of own resources"*, it could be concluded that small farms are more viable than large ones, because they are less dependant on such external factors.

B. Diversification of income. Diversification is an effective approach to revitalize local economies, creating employment opportunities, alternative income and improve living standards, according to current theoretical models for sustainable development and economic growth (5). The motivation of a farmer to diversify its production structure is based on the principle to produce several different products and to receive revenues from various sources, because even if one of them suffers a loss or decrease of income that will be compensated by the others and the farm could survive. In the study the Shannon index is used, which fully accounts the diversity of income and their degree of uniformity in the total revenue.

I shanon = – Sum p_i ***ln*** p_i where *i* is between *1* and *k, k* is the number of income sources, p_i is the share of income source *i, and* $i=1,2...k$, $p_i = n_i / N$, where n_i is the income from source *i, N* is the amount of all income of the farm. The minimum value of the index is 0 (the farm is not diversified) and maximum is lnk (the farm has several different sources of income and they are relatively equal. Assessment of diversification is based on these parameters. The farm scores 0 if I shannon = 0 and 1 if I shannon = lnk. If I shannon is larger than 0 and smaller than lnk, then the assessment of diversification is equal to the ratio I shannon: lnk.

The results from the survey (2007 – 2011) show that diversification of economic activities and sources of income in the sample of dairy farms gradually increases. The average number of income sources for farms with 1 to 4 dairy cows is 2.83. The situation is similar for farms with 5 to 9 and 10 to 20 cows. Both groups larger farms (21 to 50 and over 50 cows) have on average 2.5 income sources. Economic activity that most often accompanies dairy production is meat production. An important source of income is the government support (subsidies), that more than 70% of sampled farms receive.

The average estimates of diversification of farm's income sources in the whole sample have improved over the period 2007 – 2011, approximately by 10,8%. This is due to varying degrees of change in the estimates of individual groups **(Table 2)**.

Table 2. *Evaluation of dairy farms diversification of income, according herd size*

Group	coefficient 2007	coefficient 2008	coefficient 2009	coefficient 2010	coefficient 2011	change 2007 – 2011
1 – 4 cows	0,654	0,656	0,623	0,636	0,693	5,96 %
5 – 9 cows	0,671	0,636	0,631	0,627	0,639	- 4,77 %
10 – 20 cows	0,504	0,447	0,460	0,552	0,564	11,90 %
21 – 50 cows	0,445	0,413	0,479	0,546	0,579	30,11 %
> 50 cows	0,364	0,340	0,431	0,444	0,449	23,35 %
Average	**0,528**	**0,498**	**0,525**	**0,561**	**0,585**	**10,80 %**

Source: Own survey, 2007 – 2011

It is evident that the values of the different farm groups on this indicator are not high, which is understandable, given the relatively small number of income sources. Generally diversification is greater in smaller farms and gradually decreases with the increase of farm size.

CONCLUSIONS

The negative trend in the production potential of Bulgaria's dairy sector, as well as the dropping number of milk cows, is a sign of weakening the sustainability of this business. The small farm size, outdated equipment, poor infrastructure and adverse market conditions limit the effectiveness and profitability of dairy farming. Analysis show, that in such environment, further aggravated by the CAP, there are structures that reinforce their positions and manage to adapt and evolve. These are bigger farms, having at least 10-20 cows, market oriented, producing quality milk and able to meet hygiene requirements. They show stability

in their development, better economic efficiency and social commitment. Farms keeping 1-2 cows, from an economic perspective do not create enough income for their owners and have not the necessary hygienic conditions for production of quality milk. Their social role however is undeniable, as they provide employment and livelihood for many people. In some areas of the country, where business alternatives are limited, the industry is of vital importance and eventual cessation of employment, due to non-compliance with modern standards and norms can cause social unrest. Therefore, great care must be taken and consistent policies implemented in economic, social, and environmental dimensions. In this respect, the rural development program and its measures for assistance of livestock keeping must be used effectively to help creation of new and modernization of existing farms, for selection and pedigree breeding activity, and to improve social capital in these regions.

An important prerequisite for sustainable development of agriculture is the state of agricultural land market. Farmers participate on the market by selling, buying or renting land. Dairy farms need land to grow forage crops or grass. The legislation about agricultural land market in Bulgaria, during the last 20 years has been changed too many times, creating difficulties to farmers (6). Another factor impacting the overall performance of the sector is the support that farmers receive, after country's accession to the EU. Until 2007 farmers had the only option to use funds from SAPARD program, under which 3500 projects were implemented, totaling around 600 million Euro. Despite the huge budget, a small part of the funds have reached the small farmers, accounting nearly 95% of all farms. In 2007 SAPARD program was replaced by the "Rural Development Program 2007-2013" (7).

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