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STUDY ON THE AVERAGE MARKETED MILK AS A MEASURE PROFITABLENESS THRESHOLD IN DAIRY FARMS

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Abstract

The paper purpose was to estimate the threshold of the average marketed milk as a starting point of profitableness growth using a sample of 6 dairy farms from the Southern Romania. The collected data belonged to the year 2013 and were processed using Grigoroiu's method. The estimated average marketed milk threshold varied between 5,506 kg per cow and year in case of F1, the maximum level and 4,719 kg per cow and year in case of F3, the minimum level. The average level for all the six dairy farms accounted for 5,059.16 kg. All the 6 farms were profitable, because they recorded a a positive difference between the real average marketed milk and the estimated profitableness threshold. The additional marketed milk varied between +88 kg per cow and year in case of the farm F2 and 1,053 kg per cow and year, the maximum difference, registered in case of the farm F4. Profit varied between Lei 123.2 per cow/year in case of the farm F2, the lowest level and Lei 1,684.8 in case of the farm F4, the highest level. As a conclusion, dairy farmers could use this useful tool to determine the average marketed milk threshold where profitableness starts growing in their own farm. In this way, they could better manage resources and mainly production costs in order to increase economic efficiency in dairy farming.

Key words**:** *dairy farms, average marketed milk, profitableness, threshold*

INTRODUCTION

Marketed milk is the main source of income in dairy farms. [8] The amount of sold milk is determined by milk production of which milk consumed for calf feeding should be subtracted. [6] Also, income coming from milk is a function of milk price.

Profitableness means as income to cover production cost and assure an additional value named profit.

For this reason, it is very important as a dairy farmer to know which marketed milk production level represents the threshold of profitableness. [3]

In 2006, Grigoroiu Eugen proposed a new method for establishing the threshold of average marketed milk production where profitableness starts growing in dairy farms. His method takes into account annual production cost per fed cow, average marketed milk production, average live weight of a calf at birth, a transformation coefficient of calf in milk, average milk selling price, and birth rate in a dairy farm. [4] Kopecek in 2002 and Popescu Agatha in 2014 affirmed that profit variation depends on marketed milk and production cost [6,8]

In this context, the present paper aimed to use Grigoroiu method to estimate the threshold of the average marketed milk as a starting point of profitableness growth using a sample of dairy farms from the Southern Romania.

MATERIALS AND METHODS

In order to carry out this study, a sample of 6 dairy farms was selected from the Southern part of Romania in the year 2013.

The following technical and economical indicators were taken into considerations: average marketed milk production/cow/year, Q_m, (kg/year), annual production cost per fed cow, P_c, (Lei/cow/year), calf average live weight at birth, W_b (kg), a calf transformation index in milk (k=5), average milk selling

price, P_S (Lei/kg), and birth rate in the dairy farm, B_r(%).

The calf transformation index in milk, k=5, is closely linked to Live stock units(LU) which regard cow equivalents to other animal categories. For a 0-1 month calf and weighting 0-50 kg, a live stock unit is 0.247 as mentioned by Nix in 2003 [2,7]

Birth rate is very important in a dairy farm as it has a deep impact on the replacing rate of culled cows and is also used in the design of livestock structure as Czister Ludovic affirmed in 2010 [1]

Grigoroiu method (2006) was used to estimate the threshold of average marketed milk where profitableness starts growing. [4,5]

The mathematical formula is given below:

$$Q_{M\,est} = \frac{C - W_b * k * P_s * B_r}{P_S * B_r} \qquad (1)$$

In the author's opinion, the activity in the dairy farm is a profitable one when:

$C - (Q_M * P_s + W_b * k * P_s) * B_r = 0,$ (2)

meaning that at this point profitableness is equal to zero, as production cost per cow and year is equal to income coming from marketed milk and from calf at birth transformed in marketed milk.

The estimated threshold of the average marketed milk indicates the minimum milk amount which should be delivered per cow and year. Any additional amount of milk higher than the estimated threshold means profit and any amount of marketed milk lower than the estimated threshold means loss.

The primary data were collected from farm bookkeeping.

The average of each indicator was determined using the formula:

$$\overline{X} = \frac{X_1 + X_2 + ...X_n}{n} \qquad (3)$$

Finally, the estimated value of the average marketed milk production threshold was compared with the amount of milk sold by each farm and the positive difference reflected the profit per farm and year.

RESULTS AND DISCUSSIONS

The technical and economic indicators specific to each dairy farm are presented in Table 1.

Table 1.The primary data by farm in the year 2013

Farm	Number of dairy cows	Production cost/cow/year Lei/cow/year	Calf average live weight at birth Kg/head	Average milk price (Lei/kg)	Birth rate (%)
F1	25	7,030	40	1.4	88
F2	30	6,696	41	1.4	84
F3	18	6,762	39	1.6	86
F4	22	7,096	42	1.6	87
F5	28	7,235	38	1.6	85
F6	50	7,198	37	1.7	88
Average/farm	28.83	7,002.83	39.5	1.55	86.33

Source: Farm bookkeeping in the Southern Romania, 2013 [9]

The 6 dairy farms from the South part of Romania were characterized by 28.83 average farm size in terms of number of dairy cows, an average production cost per fed cow per year accounting for Lei 7,002.83/cow/year, 39.5 kg average calf live weight at birth, Lei 1.55 per milk kilogram sold in the market and 86.33 % average birth rate.

The number of dairy cows per from varied between 50, the maximum number in case of the farm F6 and 18 the minimum farm size, in case of the farm F3.

Production cost per cow and year varied between Lei 7,235,the maximum level in case of the farm F5, and Lei 6,696 per cow and year, the minimum level in case of the farm F2.

The average live weight of the calf at birth varied between 37 kg, the minimum level in case of the farm F6 and 42 kg in case of the farm F4.

The average milk price varied between Lei 1.4 per kilogram in case of the farms F1 and F2, Lei 1.6 per kilogram in case of the farms F3, F4 and F5, and Lei 1.7 per kilogram, the maximum price, in case of the farm F6.

Birth rate varied ranged between optimum level, from 84 % in case of the farm F2 and 88 % in case of the farms F1 and F6.

The estimated average marketed milk threshold is presented by farm in Table 2. Its values varied between 5,506 kg per cow and year in case of F1, the maximum level and 4,719 kg per cow and year in case of F3, the minimum level. Its average level for all the 5 farms accounted for 5,059.16 kg.

Table 2. Estimated average marketed milk threshold by farm (kg/cow/year)

$$Q_{M\,est} = \frac{C - W_b * k * P_s * B_r}{P_S * B_r}$$

	F1	F2	F3	F4	F5	F6
Average marketed milk threshold	5,506	5,488	4,719	4,887	5,129	4,626

Source: Own calculations.

Making the difference between the achieved average marketed milk and the estimated average marketed milk threshold, it was noticed that all the farms registered additional average marketed milk, that is all of them are profitable farms. The additional marketed milk varied between +88 kg per cow and year in case of the farm F2 and 1,053 kg per cow and year, the maximum difference, registered in case of the farm F4.

Multiplying these differences by milk price, it resulted profit per cow and year, whose value was ranking between Lei 123.2 in case of the farm F2, the lowest level and Lei 1,684.8 in case of the farm F4, the highest level.(Table 3).

Table 3.Comparison between the estimated average marketed milk threshold, and achieved average marketed milk, additional marketed milk and profit per cow/year by farm

Farm	Estimated average marketed milk threshold Kg/cow/year	Achieved average marketed milk Kg/cow/year	Additional average marketed milk Kg/year/cow		Profit Lei/cow/year
			Kg/year/cow	%	
F1	5,508	5,673	+167	103.03	233.8
F2	5,488	5,576	+88	101.60	123.2
F3	4,719	5,670	+951	120.15	152.1
F4	4,887	5,940	+1,053	121.54	1,684.8
F5	5,129	5,922	+793	115.46	1,268.8
F6	4,626	4,777	+144	103.11	244.8

Source: Own calculations

CONCLUSIONS

The estimated average marketed milk threshold varied between 5,506 kg per cow and year in case of F1, the maximum level and 4,719 kg per cow and year in case of F3, the minimum level. Taking into consideration, all the six dairy farms, its average level accounted for 5,059.16 kg.

All the 6 farms recorded additional average marketed milk, that is a positive difference between the real average marketed milk and the estimated profitableness threshold. Therefore, all of them are profitable farms.

The additional marketed milk varied between +88 kg per cow and year in case of the farm F2 and 1,053 kg per cow and year, the maximum difference, registered in case of the farm F4.

As a conclusion, profit per cow and year varied between Lei 123.2 in case of the farm F2, the lowest level and Lei 1,684.8 in case of the farm F4, the highest level.

Therefore, Grigoroiu's method could be successfully used by dairy farmers in order to determine the average marketed milk threshold where profitableness starts growing in their own farm.
This could be a useful tool for a farm management mainly regarding production costs in order to increase economic efficiency in dairy farming.

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