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RESEARCH ON THE BREAKEVEN POINT IN MILK AND MEAT PRODUCTION AT RUMINANTS

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Abstract: Profitability in animal production is at the forefront of approaches and activities continuity, and the breakeven point, or equilibrium point from which profit generation begins, must be reached in the shortest possible time. In the present paper, the breakeven point is analyzed for cow's, sheep's, goat's and buffalo's milk, as well as for beef and sheep meat. The study is based on a total of 197 case studies conducted in ruminant farms of the aforementioned species, with average data for 3 consecutive years: 2017-2019, or 2018-2020. It turned out that the breakeven point synthesizes in its structure the levels of important technical-economic indicators of the activity, such as: the level of production and its capitalization price, which give the value of production, as well as variable and fixed costs. Thus, for the threshold of profitability in physical expression, the following average values were highlighted: for cow's milk 5,506.3 l / head, for beef 378.1 kg / head, for buffalo milk 801 l / head, for sheep milk 153.4 l / head, for sheep meat 17.9 kg / head, for goat's milk 216.1 l / head.

Keywords: breakeven point, production, milk, meat, costs

JEL Classification: Q01, Q12, Q13

INTRODUCTION

Break-even point analysis is an economic tool, used to determine the cost structure of a unit or an activity, or to determine the number/quantity of products that must be sold to cover costs. Breakeven is a circumstance where a farm makes neither profit nor loss, but recovers all the money spent. Break-even point analysis is used to examine the relationship between fixed cost, variable cost and revenue. It calculates the minimum number of units to sell and the sales volume needed to cover all expenses before turning a profit.

In the course of agricultural activities, farmers must use this indicator as a decision-making and planning tool, due to its impact, efficiency and accuracy regarding the optimal use of resources, but also as a mean of control (Alnasser, N., Shaban, O. S., & Al-Zubi, Z., 2014).

Break-even point analysis provides information on, on the one hand, the volume of production sold at a certain price, to cover the costs involved, especially the fixed ones (Sintha, L., 2020), and on the other hand, it calculates the price required for a certain level of production, which covers all costs (Gutierrez, P. H., & Dalsted, N. L., 1990).

Kucharski, R., & Wywi l, J. L. (2019) appreciates the fact that break-even analysis is a classic management accounting tool. The changes that take place in the conduct of activities, such as the physical volume of production, the quantification of the impact of a higher turnover, the application of modernization programs constitute economic decisions, the basis of which is based on the knowledge of the level of the critical point (Iacob, S. V., 2014).

MATERIAL AND METHOD

The present paper performs a comparative analysis of the physical and value break-even point for cow, sheep, goat and buffalo milk, as well as beef and sheep meat, based on the results of 197 case studies carried out in farms of ruminants of the previously mentioned species. The data represent the averages for the years 2017, 2018 and 2019 for sheep milk, goat milk and sheep meat and for the years 2018, 2019 and 2020 for cow milk, buffalo milk and beef.

RESULTS AND DISCUSSIONS

Break-even point for sheep's milk

For sheep's milk, this indicator was calculated based on data from 47 case studies - sheep farms from all over Romania. The average milk production was between 29.33 - 146.67 liters/head, as an average of the years 2017-2019.

The physical profitability threshold had an average of 153.35 liters/head, with a minimum of 58.82 liters/head, a maximum of 626.37 liters/head, the standard deviation of 86.73 liters, and the coefficient of variability of 0.57 (Chart 1).

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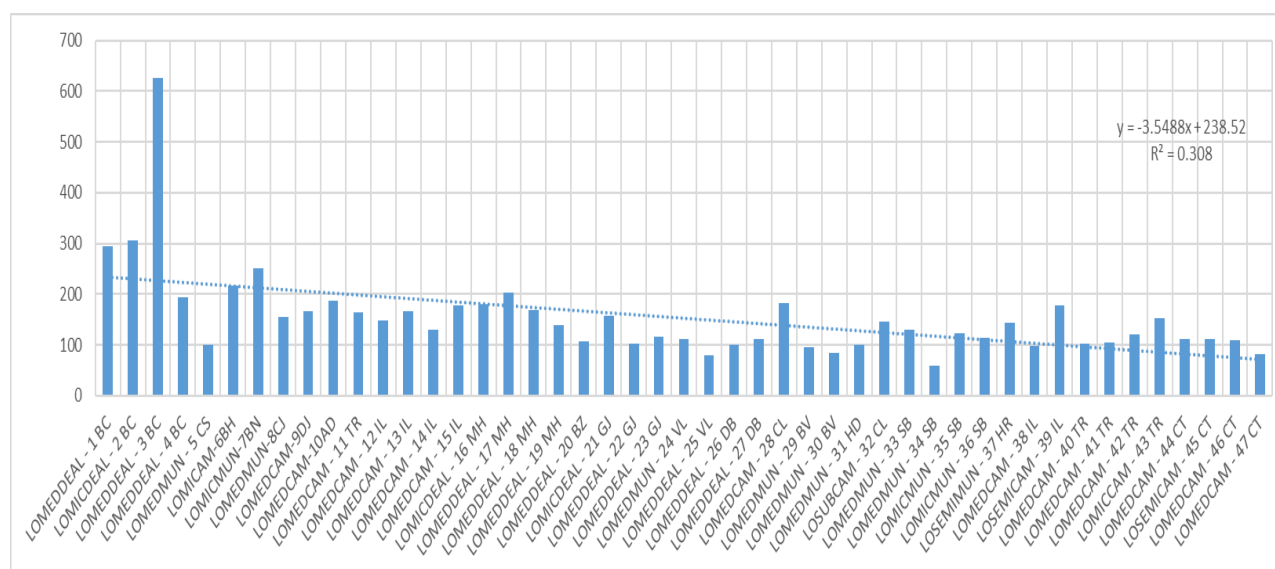


Figure 1 – Break-even point in physical units for sheep's milk

Source: Own calculations

The value profitability threshold was, on average, 490.24 lei/head, with a minimum of 283.07 lei/head, a maximum of 1586.81 lei/head, the standard deviation of 199.45 lei/head and the coefficient of variability of 0.41. The best values of the break-even point were obtained in farms with

advantageous delivery prices, with high herds, with low fixed expenses (Figure 2). The milk recovery prices were between 2.47 - 5.01 lei/liter.

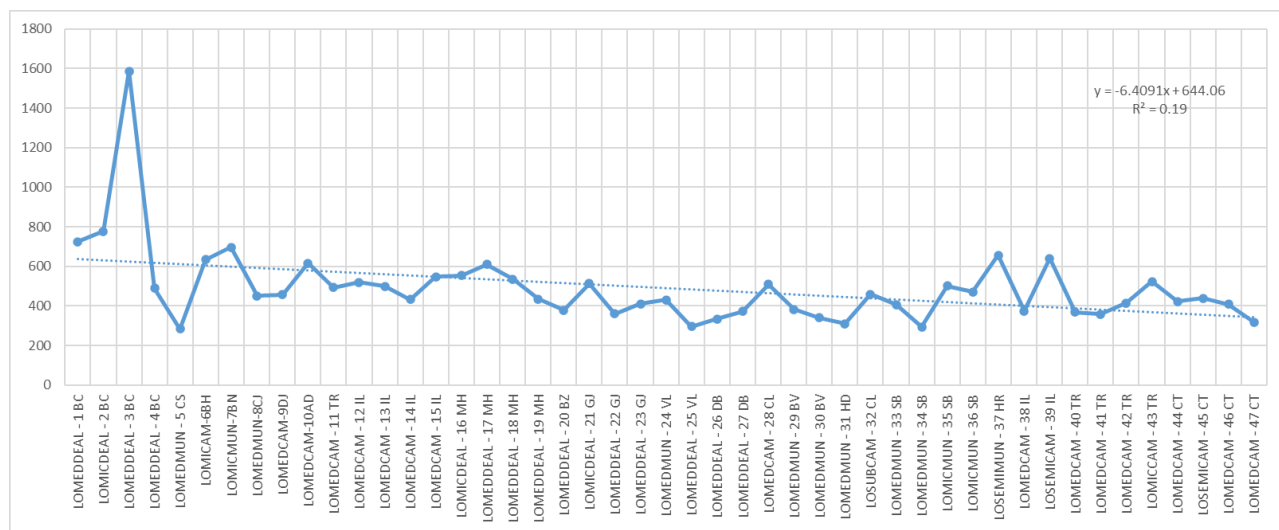


Figure 2 – Break-even point in value units for sheep's milk
Source: Own calculations

The break-even point is a key tool for planning and managing the economic-financial results of a farm, especially in the first years of activity (Rambo, C. M., 2013), it is the point at which farm is able to produce a higher yield than the average cost of productions (Ubal, N. P., 2020).

Break-even point for sheep meat

For sheep meat, break-even point was calculated based on data from 15 case studies. The average production was between 31.67 – 50.0 kg live weight/head, with an average of 38.38 kg live weight/head. The physical break-even point averaged 17.85 kg live weight/head, with a minimum of 7.67 kg live weight/head and a maximum of 31.29 kg live weight/head (Figure 3).

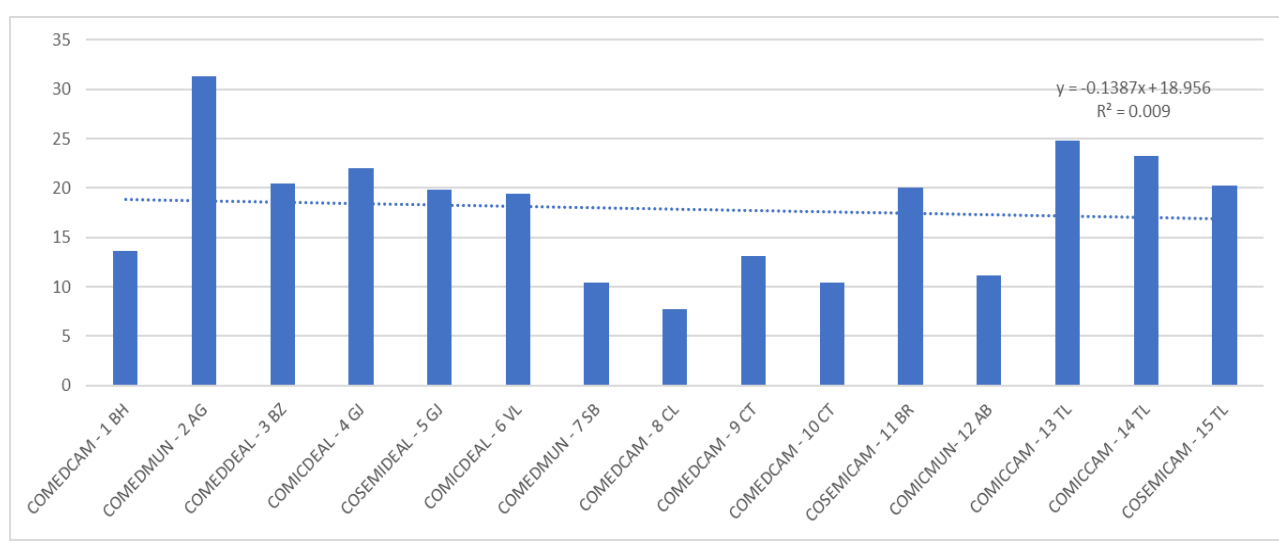


Figure 3 – Break-even point in physical units for sheep meat
Source: Own calculations

The value profitability threshold was, on average, 159.67 lei/head, with a minimum of 67.95 lei/head and a maximum of 322.51 lei/head (Figure 4). Prices for fattened sheep youth, for the period under study, were between 8.19 - 10.31 lei/kg live weight.

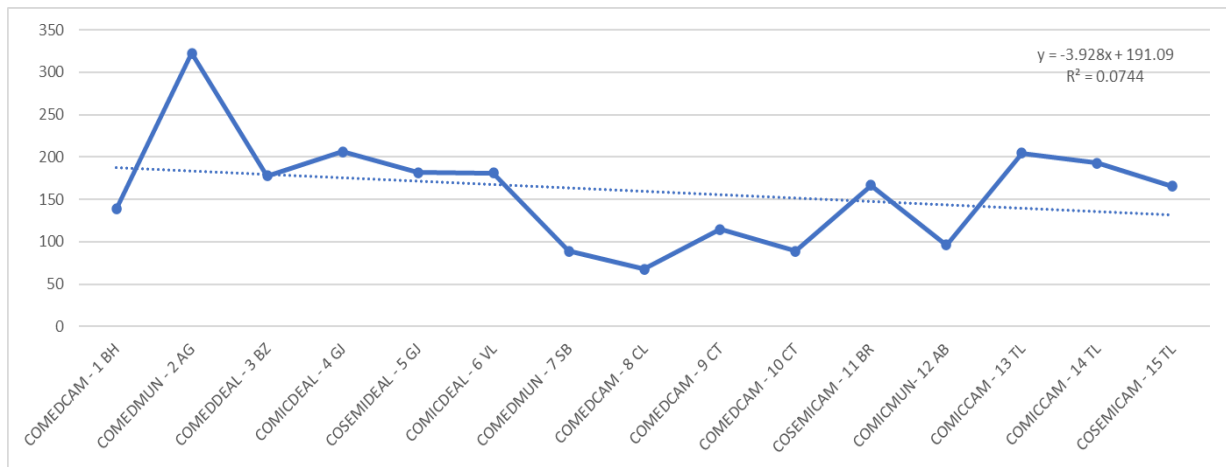


Figure 4 – Break-even point in value units for sheep meat

Source: Own calculations

Break-even analysis is an economic tool used to determine the cost structure of farm activity and to examine the relations between variable, fixed expenses and income earned (Vagner, I., 2020).

Break-even point for goats milk

For goats milk, the break-even point was calculated based on data from 33 case studies. The average milk production was 340.25 liters/head, being between 100.0 and 901.67 liters/head.

Physical break-even point averaged 216.14 liters/head, with a minimum of 99.49 liters/head and a maximum of 377.01 liters/head (Figure 5).

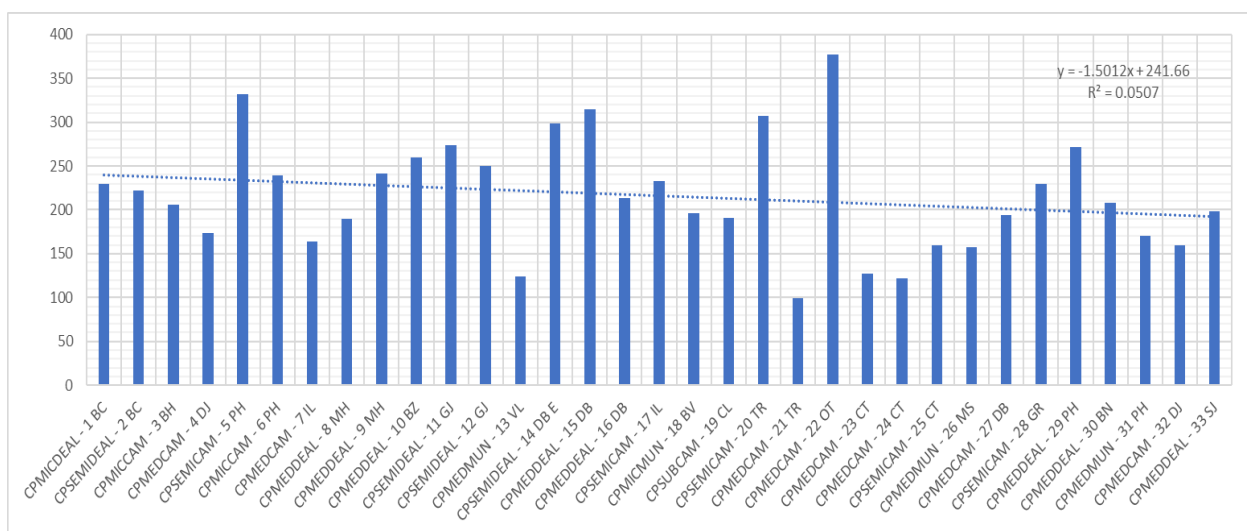


Figure 5 – Break-even point in physical units for goats milk

Source: Own calculations

The value profitability threshold was, on average, 628.08 lei/head, with a minimum of 323.23 lei/head and a maximum of 1102.42 lei/head (Chart 6). The milk recovery prices were between 2.40 - 4.08 lei/liter.

Break-even point in value units was, on average, 628.08 lei/head, with a minimum of 323.23 lei/head and a maximum of 1102.42 lei/head (Figure 6). The milk prices were between 2.40 - 4.08 lei/liter.

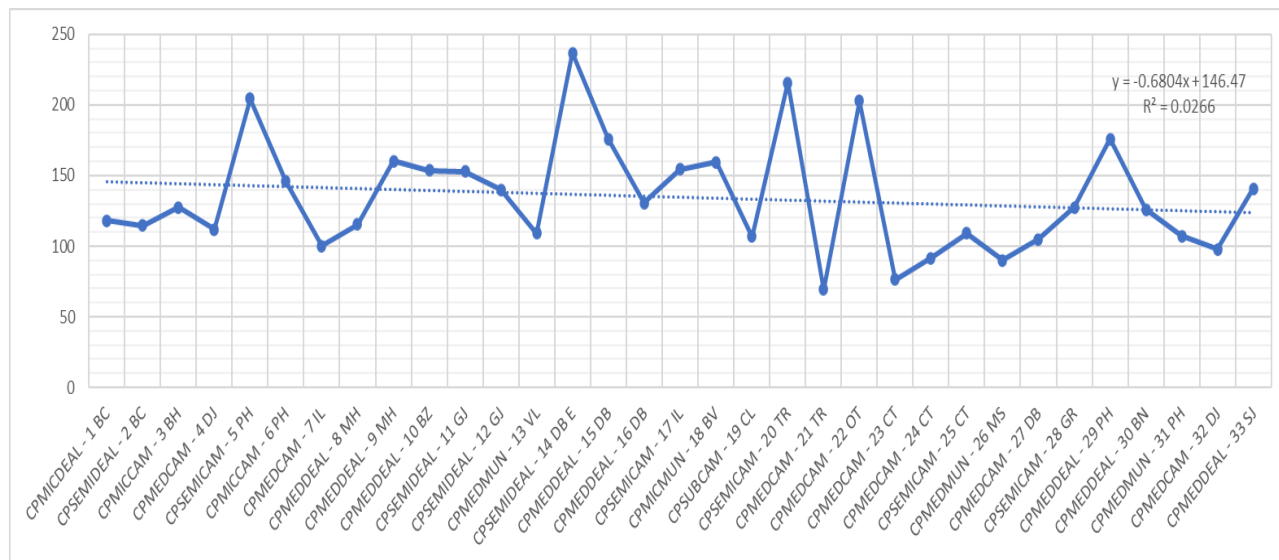


Figure 6 – Break-even point in value units for goats milk

Source: Own calculations

In making managerial decisions of the farm, determining the use of the critical capacity and the minimum acceptable profit is a major objective of the activity and provides a clear picture about the solvency of the farm, based on the fact that the value of the profit and the certainty of its realization are important information, which lead to a successful management (Potkany, M., & Krajcirova, L., 2015).

Break-even point for cow's milk

For cow's milk, break-even point was calculated based on data from 54 case studies. The average milk production was 4554.94 liters/head, being between 2600.0 and 9633.3 liters/head.

The physical break-even point averaged 5506.29 litres/head, with a minimum of 2338.42 litres/head and a calculated maximum of 20401.52 litres/head (Figure 7).

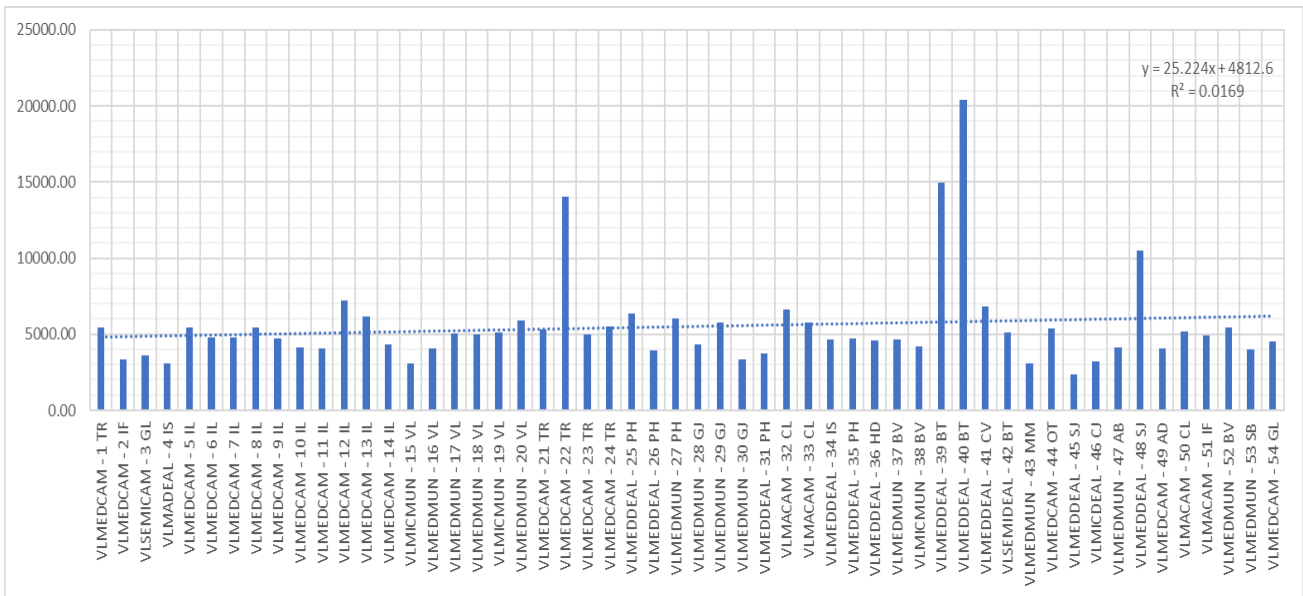


Figure 7 – Break-even point in physical units for cows milk

Source: Own calculations

The value profitability threshold was, on average, 8024.83 lei/head, with a minimum of 5268.66 lei/head and a maximum of 22429.82 lei/head (Figure 8). The milk prices were between 1.10 - 3.67 lei/liter.

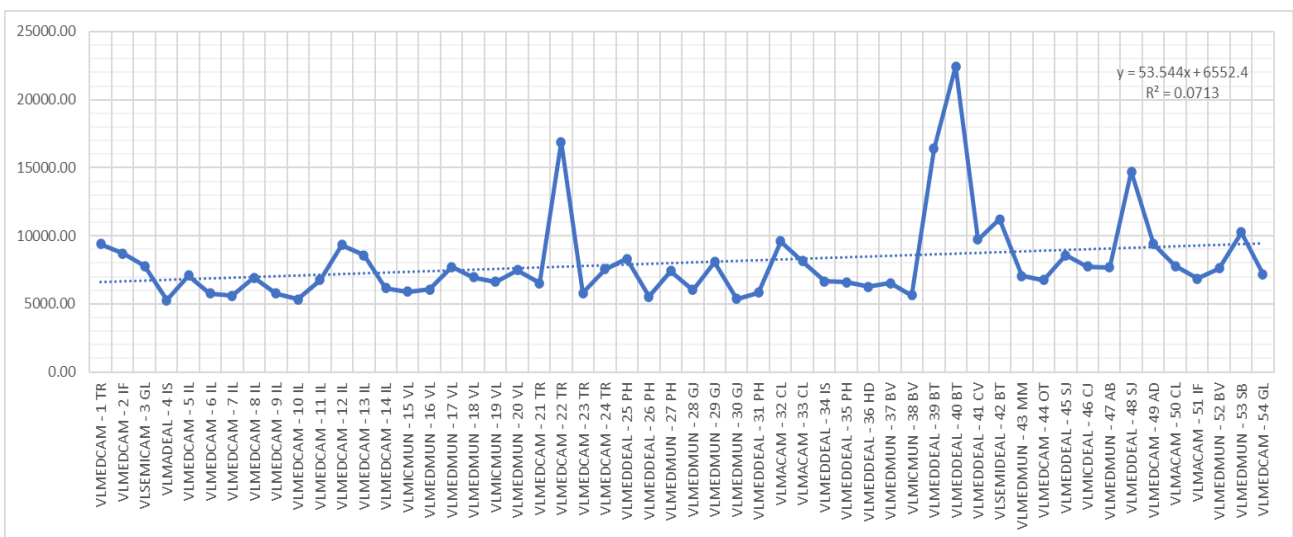


Figure 8 – Break-even point in value units for cows milk

Source: Own calculations

Break-even point for beef

For beef, break-even point was calculated based on data from 30 case studies. Average production was between 340.52 – 684.8 kg live weight/head, with an average of 509.06 kg live weight/head. The physical break-even point averaged 378.14 kg live weight/head, with a minimum of 148.94 kg live weight/head and a maximum of 1070.69 kg live weight/head (Figure 9).

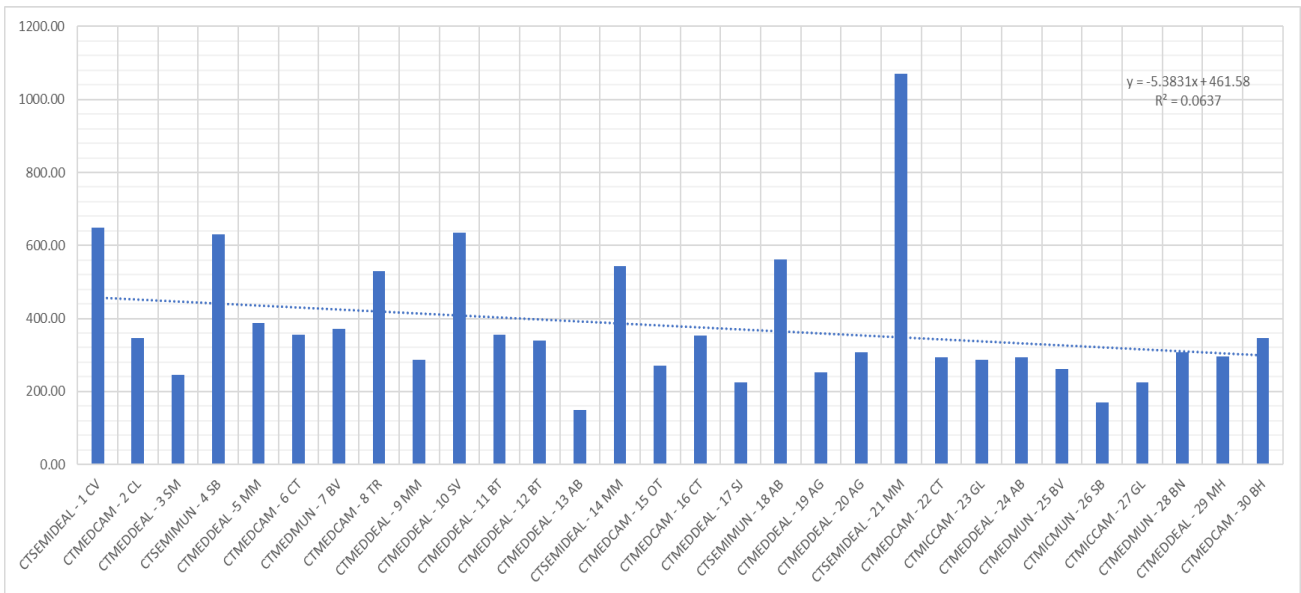


Figure 9 – Break-even point in physical units for beef

Source: Own calculations

The value profitability threshold was, on average, 4151.04 lei/head, with a minimum of 1769 lei/head and a maximum of 8950.94 lei/head (Figure 10). The prices of fattened young cattle, for the period under study, were between 7.67 - 15.43 lei/kg live weight.

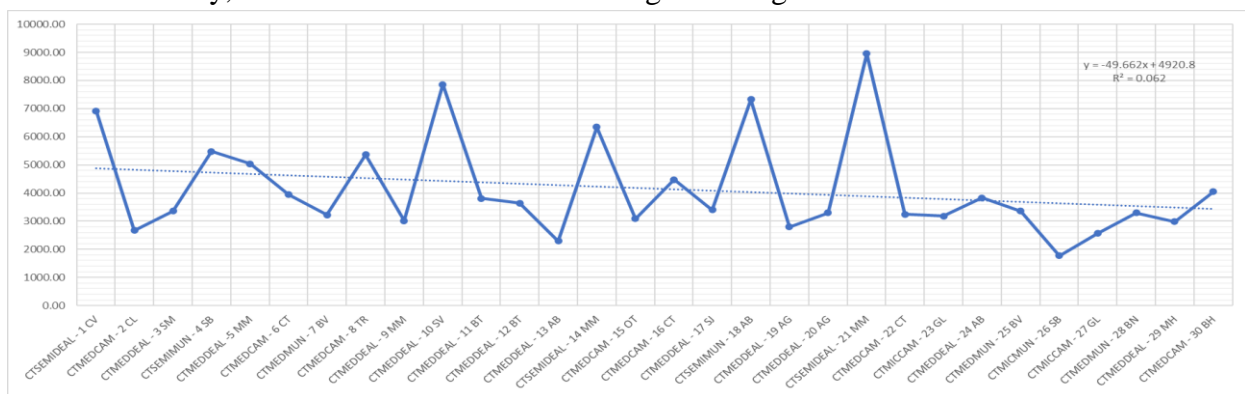


Figure 10 – Break-even point in value units for beef

Source: Own calculations

Break-even point for buffalo milk

The break-even point for buffalo milk was calculated based on data from 23 case studies. The average milk production was 1306.09 liters/head, ranging from 933.3 to 1750 liters/head.

Physical break-even averaged 801 litres/head, with a minimum of 456.12 litres/head and a calculated maximum of 1071.72 litres/head (Figure 11).

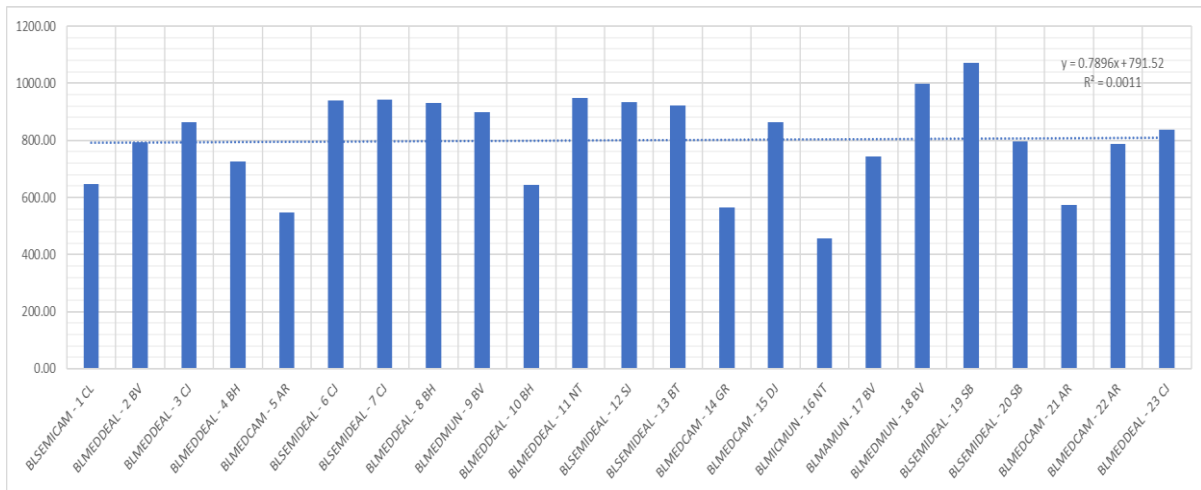


Figure 11 – Break-even point in physical units for buffalo milk

Source: Own calculations

The value profitability threshold was, on average, 3302.51 lei/head, with a minimum of 1987.4 lei/head and a maximum of 4226.81 lei/head (Figure 12). The milk prices were between 3.31 - 5.05 lei/liter.

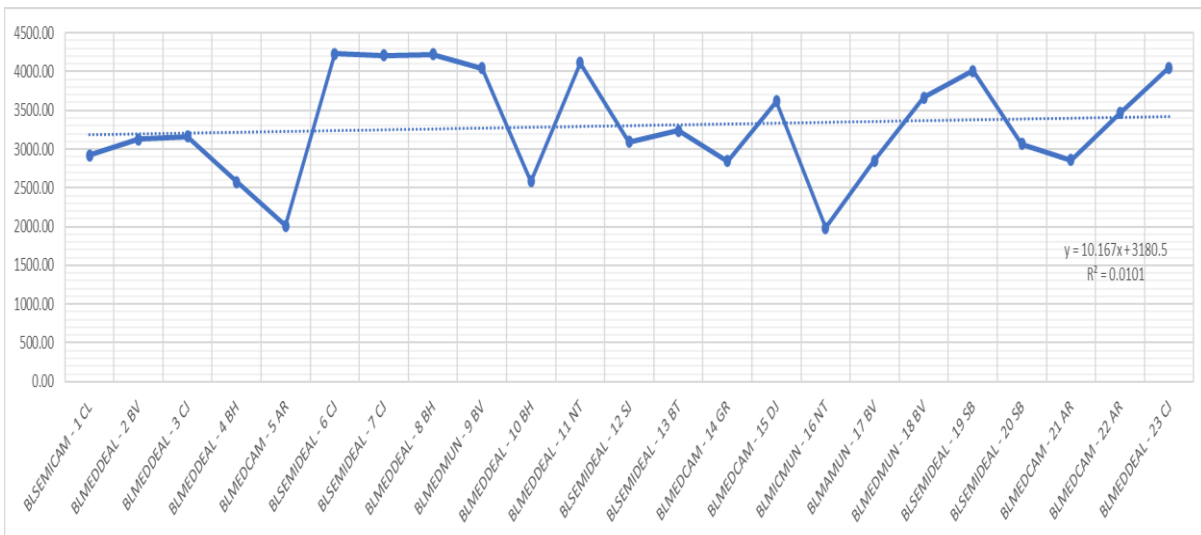


Figure 12 – Break-even point in value units for buffalo milk

Source: Own calculations

CONCLUSIONS

Break-even values for ruminant milk and meat production varied, depending on production levels, prices, farm size, and level of various expenditure categories. Generally, larger farms have lower profitability thresholds, higher security indices, even production level is not very high. They are more flexible, more adaptable to fluctuations in the economic environment, and the farmer can use the various levers of economic recovery, in due time. In the case of small farms, the risk of finalizing activity with a negative result is higher, especially if there are not high productions. This complex indicator gives managers the opportunity to make timely decisions to return to the equilibrium point.

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