The Gross Margin of Beef Farms – the Case of Kosovo and Albania

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The gross margin of beef farms – the case of Kosovo and Albania

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Abstract. The aim of this paper was to analyze the economic efficiency of beef farms in Kosovo and Albania. It’s a descriptive and quantitative survey and the random sampling technique was used to select the respondents, in Kosovo 35 farms, managing mainly Simmental breed; and in Albania 19 farms, mainly Holstein and crossbred beef breeds. Two methods of data analysis were used, namely: descriptive statistics, and gross margin analysis. Data on: meat production, farm expenses and returns, fodder production, and feed bought in the market for each farm were recorded during the first half of 2016. In Kosovo, the Gross Margin per Calf is 230.13 Euro, the price of meat sold 2.32 Euro/kg and the slaughtered weight 517.88 Kg; while in Albania these figures are 173.10 Euro, 2.6 Euro/kg and 277.89, respectively. It is a must that extension service to train the farmers for better: management of their farm, feeding system, fodder production, animal health etc.

Key words: gross margin per farm, income per farm, meat cost, fattening calves.

Introduction

Agriculture and rural development continue to play an essential role in the economy of Kosovo and Albania, being assessed as a motor of economic development. Both countries continue to be predominantly rural economies with 9.1 percent of the GDP generated by agriculture in Kosovo [10], and about 18% in Albania [23]. Agriculture is also the largest employing sector, accounting for it employs about 35% of the active force in Kosovo [18] and 40% in Albania [7]. The growth of livestock production is very important for the economic development of the two countries. The cattle sector is one of the most important sub-sectors in agriculture of both countries as it provides about 98% of milk and 60.4% of meat in Kosovo [6], and 85% of milk and 44.7% of meat in Albania [8]. Small-scale farming system is dominant for beef production, in both countries, and such farms continue to produce in the traditional way and market their animal origin products through informal channels. The number of cattle in Kosovo is approximately 260 000 of which 115 000 heads are slaughtered every year. While in Albania these numbers are 470 000 and 120 000 respectively. In Kosovo one farm family as average is managing 3.9 cattle and it is estimated that today there are about 91,200 livestock farms [1], while in Albania are managing 2.29 cattle [8].

¹ Cituar nga Zeqiri, M.: Konkurrueshmëria e Qumështit dhe Mishit të Gjedhit në Republikën e Kosovës. Doktorature e mbrojtur ne Universitetin Bujqesor te Tiranes. Shkurt 2018
Beef production in both countries is a secondary activity and is focused on calf fattening that comes from dairy farms mainly oriented to milk production (mainly Holstein crossbred in Albania [4] and Simmental in Kosovo).[2]

Livestock production in both countries suffers from a low level of competitiveness, due to low production efficiency and high production costs, and producers are forced to accept low incomes by not complying with imported products [24], [4].

In Kosovo, most of the imported beef is coming from the imported live animals, mainly from Serbia, Croatia, Bulgaria, and Czech Republic [11], while in Albania most of it is imported as frozen meat from Latin America [12].

One way to compare enterprises that make use of the same resources on the property is by using the gross margins. For a farm enterprise the gross margin is one measure of profitability that is a useful aid to enterprise planning. The starting point for construction of cash flow budget and assessment of whole farm profitability can be the calculation of gross margin. Also it can be used to assist in assessing the opportunity to develop new farm enterprises. Gross margin profit is the difference between the annual gross income for that enterprise and the variable costs directly associated with the enterprise. The requirement into the future will be to maintain profitable farming systems in the face of ever increasing cost structures and production challenges. Improving our skill and knowledge of all aspects of our farm business will be the key to meeting the challenge. In farm business management, the focus is on getting the most from existing land and assets [19].

Standard gross margin is the barometer of efficiency at crop level allowing the comparison between various production targets in vegetal and animal sectors of the EU agriculture. Gross margin is proportionally influenced by gross product and reverse proportionally by variable cost [14].

"The advantage of gross margin is the fact that it allows the comparison, in terms of profitability, between various activities running in a farm" [16]. The gross margin is recognized as an important benchmark for success in determining competitive production capability, and is used in comparing enterprise across the EU within the Farm Accountancy Data Network [5]. While PwC (2011) concludes that margin analysis is a neglected measure in the company. Valuable knowledge can be gained by understanding what exactly is affecting your margin. Gross margin analysis for revenue management factors can be very helpful because analysis can determine your key issues. Once issues that negatively affect the gross margin are understood, measures can be taken to improve the situation.

The gross margin method began to be used in the early 1960's, in the United Kingdom, to analyze and plan the revenues from agricultural holdings [15]. The gross margin method is easy to use and that was the reason for its widespread use. This method comprises three phases for a given product: (i) gross income calculation, (ii) variable cost and its structure, and (iii) gross margin calculation per unit of surface or animal.

One of the major prerequisites for increasing beef production in the country and the number of calves for fattening is the farm profit [20]. Meat production is an important component of agricultural production as well as of the gross domestic product in general and furthermore it contributes to employment. Most studies [22], [21] emphasize that weight gain is the main factor for the farms fattening calves.

Profitability variability and economic efficiency of fattening operations are also heavily influenced by the price of calves slaughtered [20]. But on the other hand, the input costs, especially feeding costs, are the main factors affecting the cost of production [13]. To achieve success in competitive markets fattening calf prices should reflect changes in feed prices [25].

This paper aimed to make a comparison between the profitability of beef farms in Kosovo and Albania. In addition, the paper presents an analysis of beef production in various farms and also

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2 From the visit and interviews of the 35 beef farms of the study conducted by the first author of this paper.
the main aspects of economic efficiency for increasing profitability and competitiveness in beef sector. For this purpose, the data were collected from farms of seven regions of Kosovo and six regions of Albania. They were processed according to the specific methodology for calculating the gross margin and profit.

The results provide some information that can help farmers who manage beef farms, as well as all stakeholders in the meat industry to improve economic performance.

**Materials and Methods**

This study, in both countries, was conducted to collect farm data pertaining to revenue and expenses on beef farms to make an economic analysis based on gross margin. The gross margin is calculated as the difference between total income and the variable cost. Variable cost includes the cost of:

- feed (from farm fodder production and feed bought in the market),
- labor (from family member and hired labor),
- veterinary service (including and insemination),
- water,
- electricity,
- transportation, and miscellaneous.

The random sampling techniques were used to select the respondents. In Kosovo were monitored and interviewed 35 beef farms, while in Albania were monitored 19 beef farms. In both countries the interviewed took place during the first half of 2016.

Data collection: In both countries, a structured questionnaire was used for collection of all information related to beef farming. In each country the questionnaires were discussed with a panel of three specialists, to verify its content and validity, as well was tested with three farmers, to avoid confounding questions and for clarity. Face-to-face interviews were conducted. According to the questionnaire the following data were recorded:

- Daily body gain of calves in fattening;
- Production of farm meat;
- Quantity of meat sold;
- The price of meat sold;
- Expenses on fodder products;
- Expenses for animal feed purchased on the market;
- Expenses for veterinary service;
- Expenses for electricity, water, travel, land rent, and fuel;
- Annual wage of workers;
- Farm Income from meat sales ($P_{meat}$).

In addition to the incomes and expenditures (cited above), technical data has been collected, such as:

- type of animal feed used (including premix),
- the percentage of feed consumed compare with total expenses,
- the percentage of compound feed compare with total expenses.

Data analysis: For data analysis was developed a model in Microsoft Excel program, while the statistical data processing was done with Statgraphics Centurion XVI.

**Results and Discussions**

**Kosovo**

The Gross Margin per fattening calves is an important measure to determine how successful it has historically been to operate meat production from calves into fattening as an indicator of financial success and for the future.
Data on the number of fattening calves per farm, slaughter weight, calf weight at the beginning of fattening period, daily weight gain, fattening days, meat price sold, Income per Farm (IpF) meat, variable cost per farm, Gross Margin per calf (GMpC), the cost of one kg of meat, the market sales ratio vs total beef production, the price of meat sold, the cost of feed to the variable cost and the cost of the concentrate to the cost of feed are summarized in Table 1 below:

<table>
<thead>
<tr>
<th>Country</th>
<th>No. of farms</th>
<th>No. of fattening calves per farm</th>
<th>Slaughtered weight (kg/head)</th>
<th>Weight at the beginning of fattening (kg/head)</th>
<th>Daily body gain (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kosovo</td>
<td>35</td>
<td>17.38</td>
<td>517.88</td>
<td>135.29</td>
<td>1,301</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Country</th>
<th>Days in fattening</th>
<th>Meat sold vs meat produced (%)</th>
<th>Price of meat sold (€/kg)</th>
<th>IpF meat (€)</th>
<th>Variable cost per farm (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kosovo</td>
<td>294</td>
<td>100</td>
<td>2.32</td>
<td>24792</td>
<td>19 920</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Country</th>
<th>Gross margin per calf (€)</th>
<th>Meat Cost (€/kg)</th>
<th>Feed expenses vs variable cost (%)</th>
<th>Concentrate feed vs feed (€/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kosovo</td>
<td>230.13</td>
<td>1.99</td>
<td>43.42</td>
<td>55.65</td>
</tr>
</tbody>
</table>

From the processing of the data obtained by the questionnaire, it appears that on farms with 1-10 fattening calves there are significant differences between farms that breed 1-10 fattening calves and those with over 11 heads:

- Farms are managing 5-120 heads of fattening calves with an average of 17.38 heads.
- Small farms (30% of them) have an average loss of € 152.3 for calves (from € 64 to € 289 for calves), while in medium farms only 20% of them come with an average loss of € 155.7 per calf (€ 37.1 - € 374.9 per calf).
- The initial weight of calves ranges from 50 kg up to 320 kg of
- Specialized fattening farms which mainly buys the calves from the import. The live weight at the end of fattening period ranges from 200 to 800 kg. Most small farms sell the calves when reach the weight of 200-650 kg, while large farms sell them when are 500-750 kg.
- The calves in this study have reached the slaughtering weight in 180-540 days, with a daily gain variation of 638 to 2080 gr/day/calf. While the sales price of meat is € 2.2-€ 3.0 Euro/kg of live weight.
- In the large farms the daily gain is 11.7% higher than in small farms or 1454 g/calf/day versus 1240 g / calf / day.
- The sales price is 6.2% higher in large farms (2.42 €/kg compared to 2.27 €/kg in small farms).
- IpCalf has a variation from € 515 Euro to € 1913 Euro, while GM for a calf varies from -374.9 Euro to 970.5 Euro.
- The cost per 1 kg of living weight varies from € 1.66 to € 2.82, but the cost of small farms is 12.45% higher than large farms or (€ 2.058 vs € 1.83).
- The cost of feed to variable costs varies from 25.0 to 77.6%. Large farms have an indicator of 43.13% while small farms 43.55%.
- The cost of concentrate feed on the cost of feed varies from 21.7 percent to 78.1 percent, where the cost of small farms is 57.2 % and the large farms 52.3%.
• Small farms (13%) have benefited on average per farm € 404 (for animal feed) from MAFRD subsidies, while 47% of medium-sized farms have benefited on average € 7868 (for investment).
• Small farms (35%) receive advice from the public extension service, while for the medium farms this figure is 47%, which also affects the best breeding of fattening calves.
• Small farms (70%) buy calves from bazaar without knowing their origins, while medium farms buy from the farms known to them, and this is one of the reasons they have better calf daily body gain.
• Small farms buy calves in a weight much less (80%) than large farms, which in some cases have not completed the breeding season.

Albania

The technical data for the beef farms in Albania are summarized in Table 2 below:

<table>
<thead>
<tr>
<th>Country</th>
<th>No. of farms</th>
<th>No. of fattening calves per farm</th>
<th>Slaughtered weight (kg/head)</th>
<th>Weight at the beginning of fattening (kg/head)</th>
<th>Daily body gain (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albania</td>
<td>19</td>
<td>47,63</td>
<td>277,89</td>
<td>111,84</td>
<td>0,870</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Country</th>
<th>Days in fattening</th>
<th>Meat sold vs meat produced (%)</th>
<th>Price of meat sold (€/kg)</th>
<th>IpF meat (€)</th>
<th>Variable cost per farm (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albania</td>
<td>188,16</td>
<td>100</td>
<td>2,60</td>
<td>35 961</td>
<td>27 716</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Country</th>
<th>Gross margin per calf (€)</th>
<th>Meat Cost (€/kg)</th>
<th>Feed expenses vs variable cost (%)</th>
<th>Concentrate feed vs feed (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albania</td>
<td>173,10</td>
<td>2,19</td>
<td>63,4</td>
<td>53,02</td>
</tr>
</tbody>
</table>

Variation in the number of heads for fattening calf farms is very large, ranging from 6 heads to 400 heads, however, farms with 15 to 25 calves dominate.
• Large farms manage 87.1 heads of fattening calves, while small farms only 12.1 heads.
• The initial weight of calves ranges from 35 kg (farms to fattening their calves) up to 230 kg of specialized fattening farms which mainly buys the calves from the import. The live weight at the end of fattening period ranges from 200 to 450 kg. Most small farms sell the calves when reach the weight of 200-220 kg, while large farms sell them when are 350-450 kg.
• The calves in this study have reached the slaughtering weight in 70-300 days, with a daily gain variation of 571.4 to 1 200 gr/day/calf. While the sales price of meat is 2.17-3.07 Euro/kg of live weight.
• In the large farms the daily gain is 6.7% higher than in small farms or 903.4g/calf/ day versus 847.0g / calf / day.
• The sales price is 2.3 % higher in small farms (2.65 €/kg compared to € 2.59 in large farms) but this is because part of them sell their own meat not in the regular and approved markets. The variable farm cost varies from € 1 087.6 to € 239 103.7.
- IpCalf has a variation from €178.7 to €1448.9, while GM for a calf varies from € -5.65 Euro to €751.5.
- The cost per 1 kg of living weight varies from €1.66 to €2.82, but the cost of small farms is 1.41% higher than large farms or (€2.16 vs €2.13).
- The cost of feed to variable costs varies from 55.4 to 71.3%. Large farms have an indicator of 64.64% while small farms 63.19%.
- The cost of concentrate feed on the cost of feed varies from 42.8% to 65.7%, where the farms with most calves having the highest percentage of the report because they use more concentrate feed that is purchased (and has a price high), compared to farms with up to 20 calves that use less concentrates and a portion of maize is own production.

Several researchers [13], [20] report large variation in relation to the cost of feed at variable cost (43.24-85.9%). Of all the cost items, the highest standard deviation was for the feed cost, which indicates a high variability and the opportunity for optimizing and reducing these costs.

The challenge for beef farmers is to select the feeding system which provides adequate nutrition for the beef production system, while minimizing both fixed and variable costs. Producing and utilizing home-grown feed crops at low cost requires very good levels of management to ensure a high yield of highly digestible herbage is achieved [2], [24], [4].

The higher the price you get for your livestock, the greater the income - but not necessarily the profit. Successful producers aim to improve product quality (red meat) and evaluate selling options to maximize the price received, or to minimize price fluctuations. However, producers have a much greater chance of improving profitability by managing the quantity of product produced and controlling cost structures [3].

The Statgraphics Centurion XVI program was used for statistical data processing for the indicators listed below:
- IpF meat vs the number of calf in fattening;
- Meat cost (€) vs weight gain;
- The cost slaughtered weight (carcass).

The results are as follows:

![Graph](image)

Fig. 1. IpF meat vs Number of fattening calves. There are differences between the IpF meat and the correlation coefficient in the farms of both countries.

Kosovo: IpF meat = -8382.64 + 1909.78 * Heads of calves in fattening. The correlation coefficient is equal with 0.985676, showing a strong relation between variables.

Albania: IpF meat= 11556.953 + 576.622 * fattening calves. The correlation coefficient is equal with 0.6738 showing a relatively strong relation between variables. Since the P-value in the ANOVA table, for both cases is less than 0.05, there is a statistically significant relationship between IpF meat and number of calves in fattening at the 95.0% confidence level.
Fig. 2. Meat cost (€) vs Calves daily gain. There are differences between the Meat cost (€) in relation with the calves daily gain and the correlation coefficient in the farms of both countries. Kosovo: Meat cost (€) = 2.596 - 0.466*calf daily gain (Kg). The correlation coefficient equals -0.3406, indicating a relatively weak relationship between the variables. Albania: Meat cost (€)= 3.656-1.117*calves daily gain (Kg). The correlation coefficient equals -0.1512, indicating a negative relatively weak relationship between the variables. Since the P-value in the ANOVA table, for both cases is less than 0.05, there is a statistically significant relationship between meat cost and calves daily gain at the 95.0% confidence level.

Fig. 3. Meat cost (€) vs Calves finnishing weight (kg). There are differences between the Meat cost (€) in relation with the calves finishing weight in both countries, while the correlation coefficient is in the same level. Kosovo: Meat cost (€) = 2.598 - 0.001*calf finishing weight. The correlation coefficient equals -0.3626, indicating a relatively negative weak relationship between the variables. Albania: Meat cost (€)= 2.596 - 0.466*calf daily gain (Kg). The correlation coefficient equals -0.3943, indicating a relatively weak relationship between the variables. Since the P-value in the ANOVA table is less than 0.05, there is a statistically significant relationship between meat cost and calves finishing weight at the 95.0% confidence level.

Conclusions

Kosovo and Albania are not sufficient in beef production and will take time to increase the production near the needs of consumers. The public and private extension agents should find ways to make the farmers aware of the relative importance of all their financial inputs, in terms of their contribution to the cost of
production per kilogram of meat produced on the farm. In addition, the extension task is to train farmers for improving the management of production as it is still the decisive factor in profitability.

In Kosovo, the Gross Margin per Calf is € 230.13, the price of meat sold € 2.32 per kg and the slaughtered weight 517.88 Kg; while in Albania these figures are € 173.10, € 2.6 per kg and 277.89, respectively.

Several farms in both countries have negative Gross Margin and is a must for extension service to train farmers to keep the financial record per each crop and production. The extension service needs to train the farmers for better: management of their farm, feeding system, fodder production, animal health etc.

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