Analysis of Factors Affecting on Live Weight Gain Cost in Cattle Fattening Farms: The Case of Erzurum Province

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Abstract: Although, cattle fattening have an important role in region economy and is one of the most important component of agricultural activities, region farmers have not still earned a considerable income from cattle fattening so that they are not used the production inputs effectively. This is partly because of farmers' inputs. Because of these reasons, the aim of this study is to determine the factors, which have negative effects on effectiveness, to analyze the efficiency levels of the factors on the cost of kg live weight gain in cattle fattening farms and to derive the implications from these effects. The primary data obtained from 129 cattle fattening farms in Horasan, Oltu, Pasinler Towns, Erzurum Central district and their villages. These villages were chosen by Objective Sampling Method. Cattle fattening farms were chosen by Simple Random Sampling Method according to their cattle stocks. The results show that the estimated parameters were statistically important and comply with economic theory. Lengthy of fattening period, daily live weight gain and increase in farm capacity have a negative effect on production cost. Being effective on providing inputs and having higher capacity minimize the cost of production in cattle fattening farms of research area.

Key words: Cattle fattening, cost function, farm, live weight gain, regression analysis, Turkey

INTRODUCTION

Cattle are considered to have been one of the first animals domesticated by man for agricultural purposes. They were tamed to provide milk, meat and hides and for draft purposes (CT, 2008). Animal husbandry is an important component of modern agriculture. It has been practiced in many societies since, the transition to farming from hunter-gather lifestyles. Modern farming techniques seek to minimize human involvement, increase yield and improve animal health. Economics, quality and consumer safety all play a role in how animals are raised. Cattle today are the basis of a multi-billion dollar industry worldwide. The international trade in beef for 2000 was over $30 billion and represented only 23% of world beef production (Clay, 2004).

The world cattle population is estimated to be about 1.3 billion head. India is the nation with the largest number of cattle, about 400 million, followed by Brazil and China, with about 150 million each and the United States, with about 100 million. Africa has about 200 million head of cattle, many of which are herded in traditional ways and serve partly as tokens of their owner's wealth. Europe has about 130 million head of cattle (SC, 2007). The cattle population in Turkey is about 11 million. The ratios of culture, cross and domestic breeds are 26, 43 and 31%, respectively. Turkey with about 74 million population, of which 27.3% lives in rural areas, has about 3.1 million farms. Seventy percent of the farmers deal with animal husbandry (TUB, 2008).

Due to high proportion of domestic breeds, small scale subsistence farms and poor animal feeding and shelter conditions, meat and milk production levels in Turkey are quite low as compared to Europe. While, average carcass weight per cow in EU is 279 kg head⁻¹ in EU-25, it is 196 kg head⁻¹ in Turkey (Report, 2006).

All these statistical data show that the productivity in animal husbandry farms in Turkey is quite low. To improve the productivity and performance of the farms, farmers have to be educated and informed about what breeds to rear and how to feed and care them. Keeping good quality breeds and feeding and caring them properly will improve the success and profitability of farms significantly. The success and sustainability of farms also depend on how well the new generation is. Many researches were carried out to explore the effective factors (such as breed, gender, food, environment etc.) on the growth and weight gain of cattle (Yanar et al., 1997; Fiems et al., 1998; Topcu, 2003, 2008; Topcu and Demir, 2005; Topcu et al., 2008) and to find out the optimum conditions.

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On the other hand, the cattle fattening activity has a
digger important than other agricultural activities to
nourish sufficiently and to save necessary capital for the
region economy. Cattle fattening is a farm activity that
enlarges the employment possibilities, that uses current
labor steadily and that provides a more productive
research condition. Cattle fattening has an important role
to reduce the income distributions inequity and
agricultural income disorder by using the agricultural
products which are not utilized as raw material for
industry and decreasing uncertainty deriving from natural
condition and target market (Topçu and Demir, 2005).
The developments in the country economy,
increasing importance of international relations and
adaptation efforts for competition conditions in global
markets have based on economical effectiveness and
rational production. On the other hand, cost analyses and
accounting data are need to compare with similar farms, to
help the farmers’ production planning when the number of
agricultural activities in farms is much >1 activity,
to use the scarce sources effectively, to enlarge
employment possibilities and to provide more profitable
agribusiness.
Concentrated and rough feed plants areas are 39 and
14% of total feed plants area in Erzurum, respectively
(PDAD, 2005). As for labor in the region farms, active
and inactive labors are 69 and 55% per farm, respectively
(Topçu, 2004). To use feed plants and to benefit from
inactive labor are very important for cattle fattening farms.
Plant production has been continued for about 6 months
due to a long winter season and harsh climate in Erzurum.
In this period, cattle fattening supplies liquidate supply to
the farm and meets farmers’ necessary needs. Cattle
fattening are carried out indoor areas without depending
on inconvenient weather conditions and cattle are ready
for sale at the end.
Cattle fattening farms in the investigation area has
occurred scattered and small-scale farms with very bad
management organization by using traditional production
methods for decade. These conditions cause technique
and economic ineffectiveness for the formation of the
market prices at the factor and product markets. Under
these conditions, the one way decreasing the production
cost is to arrange with only certain input-output
combinations, so farms’ net income could be increased
(Topçu, 2004a). The aim of this study, is to analyze the
cost factors affecting on kg live weight gain in cattle
fattening farms of Erzurum Province.

MATERIALS AND METHODS
The main material of this investigation consisted of
data obtained from survey studies which were conducted
in cattle fattening farms in Erzurum Center district and
Pasinler, Horasan, Oltu towns and their villages. There
were 3573 farmers who were engaged in cattle fattening
under village conditions and they had between 5-50 heads
in Erzurum (Yavuz, 1992). It was reported that these
farmers who conduct cattle fattening under village
conditions had <50 heads cattle. If the farms had more
ones than 50 heads cattle, they would define as the
commercial farms (PDAD, 2005; Yavuz, 1992). Therefore,
farms with more ones than 50 heads cattle are except for
this research.
Firstly, farmers who conduct cattle fattening in
Erzurum’s Centre district, Pasinler, Horasan, Oltu towns
and in their villages were selected according to cattle
fattening records of Erzurum Provincial Directorate of
Agriculture. On the other hand, the difficulties applying
questionnaire to the cattle breeders who make indoors
cattle fattening was taken into consideration. Farmers
which make cattle fattening in indoor areas consisted of
59% of the population of all farms and 66% of the cattle
stocks of the province live in these farms (PDAD, 2005).
Because of these reasons, the investigation area had
enough qualities to represent farms that do cattle
fattening in Erzurum Province.
Objective Sampling Method could constitute the first
stage of other sampling methods. In an investigation on
the physical input usage levels of some important
agricultural products and their cost, firstly villages where
these products are very common could be chosen as
objective. And then Simple Random Sampling Method
may be used with sampling from these villages
(Topçu, 2004b).
The villages in Erzurum’ Centre district, Pasinler,
Horasan and Oltu towns and their villages where the
fattening cattle is common, were chosen by using
Objective Sampling Method. In the selection of farms,
3573 cattle fattening farms were taken as targets in
Erzurum Province. In Erzurum’ Center district, Horasan,
Pasinler and Oltu towns and their villages, 465, 637, 650
and 365 farms were chosen, respectively and all of them
have made indoors cattle fattening (PDAD, 2005). That is,
2117 farms were used for pilot areas. Sampling farms were
chosen among these 2117 farms with 5% significant level.
Farms were grouped according to social-economical and
technical conditions and financial structures. Survey
numbers according to towns were given in Table 1.
The primary data were used for regression analysis
with some additional variables. For this end, double
logarithmic functional form and enter regression model
were chosen to estimate the relationship between
dependent variable and independent variables (Table 2).
SPSS 15.0 statistical software program was used for
regression analyses.
Multiple double logarithmic regression model can be written as follows:

\[ \text{CAM} = f(\text{ISK}, \text{BSU}, \text{GCA}, \text{YMF}, \text{HAF}, \text{IGU}, \text{D}_1, \text{D}_2, \text{D}_3, \epsilon) \]

**Dependent variable:**

\[ \text{CAM} = \text{Cost of live weight gain} \quad (\text{kg}^{-1}) \]

**Independent variables:**

- **ISK**: Farm capacity as Cattle Animal Unit (CAU)
- **BSU**: Total cattle fattening period (day)
- **GCA**: Daily live weight gain (kg CAU^{-1})
- **YMF**: Daily average feed price (\text{kg}^{-1})
- **HAF**: Buying animal price (\text{CAU}^{-1})
- \text{D}_1**: Influence of Horasan town
- \text{D}_2**: Influence of Oltu town
- \text{D}_3**: Influence of Pasinler town

Coefficient estimates were obtained using Ordinary Least Squares (OLS). Individual and group significance of these coefficients were tested using t and F tests, respectively. Multicollinearity among variables was detected by calculating the Variance Inflating Factor (VIF). The presence of auto-correlation was assessed using Durbin-Watson d statistic (Gujarati, 2005; SPSS 15.0, 2006).

**RESULTS AND DISCUSSION**

In the regression model, regression coefficient (R^2) was evaluated as 0.81. OLS estimates of the model coefficients are listed in Table 2. Given the F-statistic 262.94 (p = 0.000), we reject the null hypothesis that all slope coefficients are equal to zero.

The overall amount of multicollinearity present in the model was measured by calculating the Variance Inflating Factor (VIF). The calculated values of VIF were between 1.1 and 2.2, indicating acceptable levels of multicollinearity since these values fall between 1.0 and 2.5. Durbin-Watson d statistic has been used to detect the existence of auto-correlation. Since, the computed d value (2.08) lies between d_1 (1.78) and 4-d_1 (1.57), there is no evidence auto-correlation (Kalayci, 2005).

**CONCLUSION**

Estimated econometric production model was finely explained by determined independent variables owing to high regression coefficient (R^2), F and t-values at 1 and 5% significant levels, statistically. It was observed that farm capacity, cattle fattening period, daily obtained live weight gain costs, considerably. Buying feed and animal material prices have an important ratio, about 65%, among variables costs (Topcu, 2004a, 2008). These high price-inputs, which had an important ratio on production cost affected the cattle fattening activities negatively.
weight gain had an effect on decreasing live weight gain cost kg⁻¹. The current prices of animal feed and fattening animal material which was bought by farm owners are fairly high level. Due to this reason, high prices have an important effect on the increasing costs.

As the fattening animals were taken into consideration at the present time, the closer farm capacity and cattle fattening period to get the optimum production level, the more income could obtain and the easier live weight gain could be increased to higher levels. Moreover, farmers could decrease the input costs by paying an more effective role in region’s input market, by acting and associating under some organizations. In this way, the farmers could decrease the live weight gain costs by arranging a better management organization both at the input markets and their farms.

REFERENCES


