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Research Article

Analysis of Producers Preference in Morkaraman Sheeps with Logit and Probit Models

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Abstract

Sheep has a very importance for the farmers. Farmers went to produce very large amount meat, milk and wool. However, there are some boundary factors for performance evaluations. When viewed from this angle, Morkaraman sheep, one of the domestic sheep breeds, has a special place approximately 21.5% of assets in Turkey constitute sheep sheep Morkaraman. The morkaraman race, which is resistant to harsh climatic conditions, is cultivated especially in Eastern Anatolia. Some basic yield average of this race; live weight 55kg, lactation milk yield 55.1 cm, tail weight 4 kg, lactation time 145 days and wool yield 2 kg. This study was carried out in 2011 in the provinces of Karlıova and Solhan in Bingöl province. Pre-prepared questionnaires were filled with interviews with producers. The sample number was set at 126 and went to these businesses. Milk yield, lactation period, milking time and daily average milk yield were determinated logit and probit estimating models. At the end of the study, Logit model was reported to be more appropriate than probit model. Membership of organization and daily averages milk yield were found no significant, but negatively related with the adoption of improved producers in this study. But, distance of output markets was significantly ($P<0.05$). Milk yield was very important for each estimating models.

Key words: Morkaraman sheeps, Bingöl, Logit, Probit models.

Morkaraman Koyunlarında Üretici Tercihlerinin Logit ve Probit Modeller ile Analizi

Özet

Koyun yetiştiriciliği üreticiler için çok önemlidir. Yetiştiriciler çok miktarda et, süt ve yün üretmek isterler. Bununla birlikte, performans değerlendirmeleri için bazı sınırlılıklar vardır. Bu açıdan bakıldığında yerli koyun ırklarından birisi olan morkaraman ırkı koyunların özel bir yeri vardır. Türkiye koyun varlığının yaklaşık %21.5 ini morkaraman koyunları oluşturmaktadır. Sert iklim koşullarına karşı dayanıklı olan morkaraman ırkı özellikle Doğu Anadolu bölgesinde yetiştirilmektedir. Bu ırka ait bazı temel verim ortalamaları; canlı ağırlık 55kg, laktasyon süt verimi 55,1 cm, kuyruk ağırlığı 4 kg, laktasyon süresi 145 gün ve yapağı verimi 2 kg'dır. Bu çalışma Bingöl ilinde Karlıova ve Solhan illerinde 2011 yılında gerçekleştirilmiştir. Önceden hazırlanmış anketler üreticilerle yapılan görüşmelerle doldurulmuştur. Örnek sayısı 126 olarak belirlenmiş ve bu işletmelere gidilmiştir. Süt verimi, laktasyon süresi, sağım süresi ve günlük ortalama süt verimi, logit ve probit tahmin modellerini belirlemiştir. Çalışmanın sonunda Logit modelinin probit modelden daha uygun olduğu belirlenmiştir. Organizasyon üyeliği ve günlük ortalama süt verimi anlamlı bulunmamıştır, ancak bu çalışmada üretici şartlarının iyileştirilmesinin benimsenmesiyle negatif olarak ilişkili bulunmuştur. Pazarın üretim yerine uzaklığı önemli olmuştur ($P<0.05$). Her bir tahmin modeli için süt verimi çok önemli bulunmuştur.

Anahtar kelimeler: Morkaraman koyunları,Bingöl,Logit,Probit Model.

Introduction

Turkey is in a position to matter anyway in terms of diversity and the production of sheep breeds in the world. However, this feature is related to the multiplicity of numbers rather than the characters affecting the yield and efficiency (Yargıcı et al., 1986). In general, sheep breeding is mostly small and has extensive farms. Therefore, it

is seen that animals are insufficient in terms of care and nutrition. Accordingly, the efficiency is reduced. This can usually be shown adaptation to inadequate care and feeding conditions for breeding of native breeds is done in Turkey. Even though low yields from genetic factors in domestic sheep breeds are generally taken, the extensively applied aquaculture approach shows that the existing genetic potential cannot be utilized (Eliçin and Okuyan, 1975; Eliçin et al., 1989).

Morkaraman breed is one of the most common breeding breeds. Some basic yield average of this race; live weight 55kg, lactation milk yield 55.1 cm, tail weight 4 kg, lactation time 145 days and wool yield 2 kg cm (Kayalık and Bingöl, 2015). When the carcass characteristics of Morkaraman sheep were examined, average live weight gain was determined as 220g / day, rough and concentrated feed consumption was 5.5 kg, 1 kg live weight gain was 6 kg, carcass weight was 30 kg and carcass yield was 50% (Kayalık and Bingöl, 2015). The preference of Morkaraman sheep and their production for the market is related to the way these products are put on the market, the product quality and the pricing.

There is widespread agreement among many factors in the food sectors. The food markets are linked to the ability to develop differentiated products. Consumers preferences differ among consumer segments are able to increase consumer loyalty and move competition away from the purely cost and price-based competition (Grunert et al., 2004). Animal-derived products are very important for human health. Accordingly, a large number of animal-related products have been marketed. The proliferation of products in the market has also started to affect consumers' preferences. Serious distances have been taken in the consciousness of producers and consumers with the work of states and non-governmental organizations.

Consumers' view is important in the consumption of products of animal origin. The opinions of the producers are even more important. The researchers found that the level of education, gender and the level of income are dominant in the consumption of red meat (Akçay and Vatansever, 2010; Karakaya and Kızıloğlu, 2017). Because of the opinions of the farmers on the animals can be evaluated as a sign of the quality of production. As the education level increases, the amount of chemical fertilizer use decreases (Asfaw and Admise, 2004). Logit and probit models are commonly used models for the management of enterprises and in-house production models. They are used to solve problems analytically and make them more understandable. Studies using logit and probit models have also been frequently used and implemented in agriculture. Different results were obtained in different studies. (Asfaw and Admisse, 2004) found that the use of chemical fertilizers decreased as the level of education increased. Factor efficiency is a very important issue for the evaluation of production. How the producers produce and how they evaluate it is also important for the consumer. Much work has been done in relation to logit and probit models (Karakaya and Inci, 2014; Idrisa et al., 2012; Ajibefun, 2006; Baldock., 2000; Steenkamp., 1990). The most important issue addressed in these studies was the impact of technological developments on consumption.

However, İnci et al., (2014), Karakaya and İnci (2014), Karakaya and Kızıloğlu, (2014) have assessed the building from a socio-economic point of view. They pointed out that the increase or decrease in the level of income affects meat consumption preferences. Socio-economic perspective affects the perspective of producers and consumers (Idrisa et al., 2012). Morkaraman sheep are the most important animal source of our country. Especially because it has been very well adapted to the conditions of our country, it is successfully cultivated almost everywhere in the country.

In this study, we use some framework in addressing questions on what products of Morkaraman sheep's quality for producers.

Material and Methods

This study was carried out in 2011 in the provinces of Karlıova and Solhan in Bingöl province. Morkaraman farming is concentrated in these two villages. Pre-prepared questionnaires were filled with interviews with producers. The results of these surveys are the primary data sources of our work. In the study, the sample volume was determined using the random probability sampling method (Collins., 1986). The sample number was set at 126 and went to these businesses. After the surveys were completed, the sorting process was carried out. Logit and probit estimation models were used in the study (Ajibefun, 2006; Wabbive et al., 2006). Age (X_1), education (X_2), farm size (X_3), number of members of the organization (X_4), milk yield (X_5), lactation period (X_6), milk time (X_7), average daily milk yield X_8), distance to foreign markets (X_9) was used as variables.

What logit and probit do, in essence, is take the the linear model and feed it through a function to yield a nonlinear relationship. Whereas the linear regression predictor looks like:

$$\hat{Y} = \alpha + \beta X$$

The logit and probit predictors can be written as:

$$\hat{Y} = f(\alpha + \beta X)$$

Logit and Probit functions are given below (Gujarati, 1992);

$$F_i(\beta X_i) = \frac{\exp(\beta X_i + \varepsilon_i)}{1 + \exp(\beta X_i + \varepsilon_i)}$$

$$\Pr(Y_i = 1) = \Phi\left(\frac{-\beta' X_i}{\sigma}\right)$$

Variables examined in regression analysis are either continuous can also be intermittent, and this data structure depending on the different regression models can be used (Önder and Cebeci, 2002). Logit and probit models consist of special cases of generalized linear models. logite and probit models may need to be applied if some of them are continuous and some are not continuous. Logit and probit models are among the most suitable models to be used in such situations. Probit and logit models are among the most popular models. The dependent variable is a binary response, commonly coded as a 0 or 1 variable. The decision/choice is whether or not to have, do, use, or adopt. Examples include whether a consumer makes a purchase or not, and whether an individual participates in the labor market or not.

The logit model, one of the alternative approaches to the Linear Probability Model, is derived from the cumulative logistic distribution function. Among the models describing the change in the intermittent random variables, the most commonly used are the two dependent variables. Parameter estimates of such models cannot be obtained by the ordinary least squares method. For this reason logit transformation is used (Özer, 2003). The Probit Model, which is one of the regression models in which dependent variables or response variables have 0-1 values, in other words, is two-tailed, is based on McFadden's Theory of Benefits (Tarı, 2015)The probit regression log-linear approach is an alternative to addressing categorical dependent variables. Like the logit and logistic regression, the probit regression focuses on the transformation of the likelihood that the dependent variable Y equals 1.

Logit transformation is the natural logarithm of OR (odds ratio), whereas the function used is the inverse of the standard normal cumulative distribution (Oğuzlar, 2005). Probit model i. It is assumed that the decision of the individual is dependent on an unobservable benefit index. The greater the value of the index, the greater the likelihood that the decision will take place. As comparison criteria;

R^2 ($R^2 = \frac{ESS}{TSS}$), AIC ($AIC = -2\log(L) + 2k$) and BIC ($BIC = -2\log(L) + k\log(n)$

were used. AIC and BIC are widely used, AIC stands for Akaike Information Criteria and BIC stands for Bayesian Information Criteria (Çağlayan and Astar, 2010). Although these two terms refer to model selection, they are not the same. There may be a difference between the two approaches for model selection. AIC can be called a measure of the suitability of any estimated statistical model. BIC is a type of model selection between the parametric models class with different parameter numbers. The cumulative normal distribution model is also known as the normative model. Statistical analyzes of the obtained data were performed using the SPSS 21 program.

Results and Discussion

In this study, logit and probit Model were examined and a real application was made. The analysis results of the data were obtained with logit and probit. The logit and probit estimates for the obtained data are given in Table1. When the table is examined, it is seen to identify factors which influence on efficient production of Morkaraman sheep among farmers. The coefficient of education, farm size, milk yield and distance of output markets were found to be significant ($P<0.01$).

However, milk time was found to be significant ($P<0.01$) for logit and probit models. This explained to us, education, farm size, milk yield and distance of output markets are very important for producers. Age, lactation periods and daily averages milk yield were not found to be significant. Membership of organization and daily averages milk yield were found no significant, but negatively related with the adoption of improved producers in this study. Distance of output markets was significantly ($P<0.05$). It seems that the profitability decreases as you move away from the market. This can be considered an expected situation. Because the distance increases, additional costs arise. This increases the cost of production.

Proximity to distance of output markets can be an important factor in determining the likelihood of adoption. Farmers those are close to markets because they take the advantage of their

proximity and tend to adopt the innovation and growth for their market (Sayili, 2006) explained that most farmers want to close markets and technological areas. The obligation of the consumers to determine the strategy appropriate to the consumer's mass in an environment where the markets are the main determinant makes him feel more (Baldock, 2000).

Table 1. Results of logit and probit model

Likelihood Adoption	Logit Model		Probit Model	
	Coefficient	S. Error	Coefficient	S. Error
Age	0.0152	0.0061	0.0781	0.0049
Education	0.3054**	0.0711	0.4288**	0.0937
Farm Size	0.0366**	0.0034	0.1692	0.0224
Membership of organization	-0.3271	0.0255	0.0524	0.0012
Milk Yield	1.0387**	0.1941	0.9850**	0.0251
Lactation periods	0.4205	0.0884	0.5672	0.0440
Milk Time	0.6880*	0.0225	0.7183*	0.0337
Daily averages milk yield	-0.1096	0.0048	-0.0599	0.0074
Distance of output markets	-1.0685**	0.1255	-1.1822**	0.0882
R^2	71.36		69.12	
AIC	2.638		3.058	
BIC	13.962		14.855	

When the comparison criteria were compared, it was observed that the R^2 value was higher than the probit model in logit model. In addition, AIC and BIC values were lower in Logit model than Probit model. Accordingly, the success of the logit model can be said to be better than the probit model.

The distribution problem, which expresses the transfer of goods and services according to the needs of consumers, manifests itself as a separate marketing component. The distance to the center of the production area, the transportation and distribution of the markets is felt as a problem. It is also seen that the problem of high transportation costs brought about by this problem is in the second place (Sayılı, 2006; Şahin and Gül, 1996) explained that the price of the product has changed not only according to the distance but also according to the characteristics of the production situation and the enterprises. In the study of (Altuntaşı and Duru, 2007), it was understood that there is no relation between brand addiction and gender and education, there is a meaningful relationship between income and age variables and brand dependency (Tunca and Duru, 2015). Have similar results in terms of the results we have achieved in our work on bee products (Karadavut and Taskin, 2014).

The consumption of poultry meat increased according to the level of education of consumers in urban areas. The results of our research and the results of researchers are similar, indicating that people's reactions are similar. Cultural similarity has brought about similarities in reactions. Consumption culture does not show itself only on the basis of life. At the same time, it shows itself by increasing the speed of life. It also affects the consumption habits and the reaction towards consumption in particular.

After comparing the logit and probit coefficients, it was found that the two models gave approximately the same result and there was no significant difference between them. Both models can be used in analysis of data. However, it is more convenient to use the logit model in terms of both the cut-off of the dependent variable in our application and the ease of calculation (Squires et al., 2001; Sall et al., 2002). It is believed that these findings will provide important benefits for the purchase of products, prices, distribution.

The field of study is homogeneous in terms of education level. Since there is a significant relationship between education level and perception, the education level of the target is seen as a factor to be taken into consideration in the studies of promotion. The low number of animals per farm is another problem (Koyuncu and Bakirtaş, 2005). Low-cost production leads to many field problems such as cost, product quality, and access to the market. The producers prefer to produce in areas where the market is most intense, and the market is concentrated in places where producers want to produce (Squires et al., 2001; Bamire et al., 2002). A wide variety of regional development policies applied throughout our planned period in our country. Issues like poverty and income disparity, unqualified labor force, inability to develop institutional capacity in the locality, migration from rural to urban and population movements between illusions, distorted urbanization are in fact due to the

reflection of the fundamental problems of Turkey's economic structure on the social domain.

Conclusion

Logit model was found to be more successful. Logit model is more dynamic than probit model. Due to this feature is also highly adaptable. It can be used in many different studies successfully. The results of this study are believed to be a serious source for future studies. Especially if one of the variables is categorical, it is recommended to use this model because of the higher success rate. It is necessary to pay attention to the superiority of the model selection criteria and how to use them. In fact, all criteria are examined and compared according to their structure. The performance of each criterion will be different according to the structure of the model. In this study, attention was paid to this study and each metric criterion yielded separate results for each model.

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