

An Empirical Research on Table Grape Profitability and Market Problems

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Abstract: In this study, econometric analysis of the problems faced by the producers has been made the farmers who produce table grapes and earn their livelihoods by farming (I. Type producers) and the table grapes producers who are insured employees at the same time (II. Type producers) have been calculated. The biggest problem faced by the operators is the marketing problem with a share of 85%. The low price, storage problem and the low number of buyers have been found to be the most important problems that producers experience in marketing. With this research, it has been demonstrated that the market problems and the low number of buyers, which are the biggest problems of the producers having market problems, are the cornerstone of the market problem. It is emphasized that it is important to raise support and incentives considering these results in the policies to be created and to raise the awareness of the producers on the establishment and development of producer cooperatives that will make the producers strong in the market and strengthen the bargaining power.

Key words: Table Grapes • Production • Marketing • Binary Logit

INTRODUCTION

Grape selected as the research topic is an agricultural product that has an important place in Turkey's agriculture. In the ranking of countries with the most grape cultivation area in the world, Turkey is in the top five. First place is Spain with 1.123.644 ha. Spain is followed by China (797.935 ha), France (752.837 ha), Italy (675.818 ha) and Turkey (417.041 ha) respectively. According to data of the Turkish Statistical Institute (TUIK) 2019, 4.100.000 tons of grapes are obtained annually in Turkey. 50.00% (2.050.000 tons) of the grapes obtained are table grapes, 39.00% (1.599.000 tons) are dried grapes and 11.00% (451.000 tons) are wine grapes. The production area of table grapes in Turkey is 2.180.163 decars and the average yield is 2.813 kg/Decar. The table grapes are exported mainly to Russia, Germany and European Union countries (FAO, 2019).

In this study, considering that 50% of grapes produced in Turkey are table grapes which is known for its vineyards and grape leaves, to identify the problems experienced by the producers in the marketing phase and to suggest solutions, by using 2019 data. Thus, this study will help to shed light on solutions of the grape

producers' problems and on the agricultural policies to be established. The marketing problem, which is one of the most important problems faced by the producers, is examined in the research and binary logit model is used to reveal which factors are likely to affect the problems of the producers experiencing marketing problems.

When domestic and foreign literatures are examined, it is possible to come across research on grapes (varieties) or viticulture structure and production costs [1-14]. There is also local literature on grape production problems [15]. However, the most common market problem in production together. Thus, this research aims to add new information to the literature.

MATERIALS AND METHODS

Data Collection Process: The main material of the research is the results of the surveys applied to the producers face to face in September 2019. The secondary materials of the research are the studies (thesis, examination, compilation, etc.) and reports on the subject.

In order to determine the sample size representing the main mass, proportional sampling method was used [16].

$$n = \frac{Np(1-p)}{(N-1)\sigma_p^2 + p(1-p)}$$

In the equation above, n represents sample size, N represents population size, p represents estimation rate (sample size 0.5 maximum), σ_p^2 represents rate variances (in order to reach maximum sample size, table value should have confidence interval of 95%, with 1.96 and 10% margin of error). As the characteristics of the enterprises which formed the main mass were not identified in the beginning, p was determined as 0.5 to maximize the sample size and it was determined as 130 producers.

The Method Followed During the Analysis of Data:

The Binary logit model is used in the analysis of the marketing problem, which is the biggest problem experienced by producers.

Binary choice was used for econometrics applications in which dependent variables are qualitative and bivalent and the most common of them are probit and logit models. The main difference between probit and logit models results from the distribution of error term. While the distribution of error term in the logit model is accepted logistically, it is assumed that error term is normally distributed in the probit model [17, 18]. The logistic regression procedure is the most frequently used method to study producer perceptions and behaviors [19]. A choice model is specified with a dichotomous dependent variable representing the producer’s marketing problems to be explained by a set of variables such as socio-economic factors and some problems experienced. Dependent variable is a dummy and estimated likelihood values change between 0 and 1. The estimation method utilizes the Maximum Likelihood Estimation (MLE) procedure as they provide consistent parameter estimates that are asymptotically efficient [17, 18].

The logit model for a representative producer’s marketing problems *i* can be expressed as follows [17];

$$P_i = F(Z_i) = F(\beta_0 + \beta_1 X_i) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_i)}} \quad (1)$$

- P_i = The probability of i.th producer’s marketing problems to select a specific choice
- F = Probability function
- $Z_i = \beta_0 + \beta_1 X_i$
- β_0 = Fixed coefficient
- β = estimation of parameters for each explanatory variable

In the study, the producers’ marketing problems were converted to 1 and those not producers’ marketing problems were converted to 0. The descriptions of dependent and explanatory variables are shown in Table 1.

Some variables in the logistic model have been converted into categorical variable in order to obtain differences between categories as probability ratio. For the convenience of interpretation, some of the independent variables have been included in the model as dummy variables.

The codings are as follows as the explanatory variable to the model; producers' age (continuous variable), Totalannual income of the household (continuous variable), Classification of the product at the marketing stage, (coded as 0 if not do, 1 if do), Non-agricultural insured working (coded as 0 if not work, 1 if work), Low price problem, (coded as 0 if there is no, 1 if there is), Thinking about the number of recipients is low (coded as 0 if thinker, 1 if not thinker), Need for information about marketing (coded as 0 if no need, 1 if need), factors affecting when buying honey; price, quality, brand, packing and advertising (coded as 1 if

Table 1: Description of the variables specified in the Binary Logit Model

CODU	Variable	Mean	Std. Dev.	Minimum	Maximum
AGE	Producers' Age (Constantly Variable)	52.331	11.563	24.0	74.0
INCOME	Total annual income of the household (Constantly Variable)	7 168.462TL	4284.369	3000.0 TL	31000.0 TL
		1 246.69 \$		521.24 \$	5 391.30 \$
		1 134.25 €		474.68 €	4 905.06 €
CLASS	Classification of the product at the marketing stage	0.392	0.490	0.0	1.0
WORK	Non-agricultural insured working	0.592	0.493	0.0	1.0
PRICE	Low price problem	0.646	0.480	0.0	1.0
RECIPIENT	The number of recipients is low	0.823	0.383	0.0	1.0
INFORMAT.	Need for information about marketing	1.523	0.728	1.0	3.0
FINANCING	Lack of financing	0.169	0.376	0.0	1.0
Dependent variable (Y)	Marketing problems	0.854	0.355	0.0	1.0

1 \$ equals to 5.75 TL and 1 Euro equals to 6.32 TL in september [32]

effective, 0 if not) and having health problems as diabetes (coded as 1 if ill, 0 if not). NLOGIT package program was used to estimate the empirical model results.

The following model was developed to predict factors affecting the probability of Honey consumption. The model was formulated as:

$$Y = \alpha + \beta_0 + \beta_1 \text{AGE} + \beta_2 \text{INCOME} + \beta_3 \text{CLASS} + \beta_4 \text{WORK} + \beta_5 \text{PRICE} + \beta_6 \text{RECEIVER} + \beta_7 \text{INFORMAT} + \beta_8 \text{FINANCNG} + \varepsilon_i \quad (2)$$

RESULTS AND DISCUSSION

General Characteristics of Producers: Knowing the socio-economic structure of the producer is important in providing information about the enterprise structure. General socio-economic characteristics of the producers are given in Table 2. The average age of the producers is 52 and the viticulture experience is 31 years on average. 46.15% of the producers graduate from secondary school. While 40.77% of the producers make their living only from production, 59.23% of them work in various insured jobs besides agricultural production. The monthly income of the producers from the agricultural activities is 1, 118.39 \$ and the non-agricultural income is 128.29 \$ on average monthly. The producers' vineyards consist of an average of 4.98 decares and 1.74 parcels.

Problems of Producers in Table Grapes Production and Marketing: Knowing the problems of agricultural production enterprises is the most important resource for the solution of problems. Table 3 gives the problems faced by producers in table grape production and sources used to solve their problems. The biggest problem faced by operators in production is marketing (85.38%). The second problem faced by the operators after the marketing problem is the high input prices used in production (66.15%) and third is the lack of financing (16.92%). Operators mostly rely on their own experience (98.46%) for the solution of their problems. A similar result can be found in Yener and Seçer [15] research on grape marketing. In their research, they found that the biggest problem in grape production is that the desired quality of product cannot be obtained and the input prices are high.

Table 4 presents the table grape marketing ways of the producers and the problems encountered in marketing. While the producers market 88.46% of the table grapes produced by themselves, they sell 11.54% through the merchant-commission. The three most important problems experienced by the table grape producers in marketing are the low number of buyers, the low price and the storage.

Tapkı *et al.* [20] found the lack of buyers as the most important problem that grape producers face in marketing. Similar results can be found in a study conducted in Bengal. Kundu *et al.* [21] determined the first three of the marketing problems experienced by producers in vegetable products as follows; Storage problem, unstable price and Credit problem. Yener and Seçer [15] found that the low number of buyers is the most important problem among grape marketing problems.

Factors That Affect the Producers to Have Table Grape Marketing Problems: Yielding and healthy production of enterprises can be achieved by reducing the problem experienced. Marketing problem is one of the biggest problems of businesses. In order to reveal which factors affect econometrically producers having market problems, binary logit is made. Those who have market problems are proportioned to those who do not and are taken to the model as dependent variable. Thus, more permanent suggestions can be made by revealing the factors that may affect the market problem statistically. In Table 5, the analysis results of some variables that may affect the producers' marketing problems are given. At a 1% significance level, a positive correlation is expected between the producers experiencing the market problem and the low market price of the product produced and the fact that thinking of the product buyer is low, while a negative relationship is expected between the financial incapacity problems.

Producers who have market problems are affected by 20% more market prices than producers who do not. This result is supported by the finding of Birachi *et al.* [22], Eunice [23], Jaji *et al.* [24], Hung and Khai [25] that revealed a relationship between the price of the pineapple, paddy rice, beans, chili and quantity supplied. This result is also supported by the economic theory of supply which implies that producers produce more of the product with a very high price, thus increase the marketable surplus, while they produce less of the product with a very low price [26].

Again, producers who have market problems in table grape are affected by the shortage of buyers with a rate of 28% compared to those who do not.

However, producers who have market problems face 30% less financing difficulties than producers who do not. In other words, rather than the socio-economic structure of the producers who have market problems, the low price of the product and the shortage of buyers affect them more. From another point of view, those who do not have credit difficulties experience less market problems than those who have.

Table 2: Some socio-economic characteristics of producers

		Frequency	Percent (%)	Mean
Age	Primary School	22	16.92	52.33
	Secondary School	60	46.15	
	High School	43	33.08	
	University	5	3.85	
	Yes	77	59.23	
	No	53	40.77	
	Income from Agricultural Activities			1, 118.39 \$
	Non-Agricultural Income (all salaries and other income in households)			128.29 \$
Viticulture experience (years)				30.64
	Decare			4.98
	Parcel			1.74

1 \$ equals to 5.75 TL and 1 Euro equals to 6.32 TL in september [32]

Table 3: Problems encountered in the production of table grapes and the resources used to solve them

		Frequency	Percent (%)
Problems Encountered in Production	Expensiveness of inputs	86	66.15
	Marketing Problem	111	85.38
	Lack of financing	22	16.92
	Diseases and pests	4	3.08
	Lack of technical knowledge	17	13.08
	Lack of labor	2	1.54
Resources Used to Solve the Problems Encountered	Own experience	128	98.46
	Chamber of Agriculture	54	41.54
	Agricultural agents	33	25.38

Table 4: Grape marketing ways and problems encountered in marketing

		Frequency	Percent (%)
Marketing ways	Markets in person	115	88.46
	Merchant-commission	15	11.54
Problems encountered in marketing	Low price	84	64.62
	Few buyers	107	82.31
	Buyer's failure to pay on time	4	3.08
	Transportation	4	3.08
	Storage	13	10.00

Table 5: Analysis of factors affecting producers to have market problems

	Coefficient	Standard Error	z	Prob. z >Z*	Partial Effect
Constant	1.019	1.970	0.52	0.605	
AGE	-0.011	0.028	-0.38	0.703	-0.001
INCOME	-0.001	0.001	-0.82	0.411	-0.003
CLASS	0.233	0.853	0.27	0.785	0.020
WORK	0.309	0.715	0.43	0.666	0.027
PRICE	2.282***	0.860	2.66	0.008	0.197***
RECEIVER	2.42161***	0.77395	3.13	0.0018	0.280***
INFORMAT	-0.49259	0.43652	-1.13	0.2591	-0.042
FINANCNG	-2.55845***	0.79727	-3.21	0.0013	-0.301***

Note: ***, **, * ==> Significance at 1%, 5%, 10% level

Log Likelihood Function	-36.49306,	Restricted Log Likelihood	-54.07729
Chi Squared [8 D.F.]	35.16844,	Significance Level	0.00002
Mcfadden Pseudo R-Squared	0.3251684		

This result is consistent with the findings of Eunice [23], Jaji *et al.* [24], Bosena *et al.* [27], Muhammed [28], Bongiwe and Micah [29], Tesfaw [30], Mahlet *et al.* [31] reported that access to financing had positive and significant relationship with volume of cotton, teff, cabbage, pepper, potatoes, paddy rice and pineapple supplied to the market, respectively.

CONCLUSION

Considering the socio-economic characteristics of the research region; the average age of the producers is 52 and 46.15% of them graduate from secondary school, ie 8 years of education. While 40.77% of the producers (type I producers) make a living only from producing, 59.23% (type II producers) work in various insured jobs besides agricultural production.

The biggest problem faced by the operators in production is the marketing problem (85.38%). While the producers market 88.46% of the table grapes themselves, they sell 11.54% through the merchant-commission. The low price and storage problem and the low number of buyers have been found to be the most important problems that producers experience in marketing.

According to the analysis results of the variables that may affect the market problem of the producers; Rather than the socio-economic structure of the producers having market problems, the low price of the product and the buyer shortage affect more. From another point of view, those who do not have credit difficulties have less market problems than those who have.

As a result of the econometric analysis, it is determined that the low market price of the product and the low number of buyers constitute the cornerstone of the marketing problem. It is important to include support and incentives in the policies to be created by considering these results and to raise the awareness of the producers on the establishment and development of producer cooperatives that will strengthen the bargaining power and make the producers stronger in the market.

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