

## Research Article

# A Case Study of Probit Model Analysis of Factors Affecting Consumption of Packed and Unpacked Milk in Turkey

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This paper focused on the effects of some sociodemographic factors on the decision of the consumer to purchase packed or unpacked fluid milk in Sivas, Turkey. The data were collected from 300 consumers by using face-to-face survey technique. The sample size was determined using the possibility-sampling method. Probit model has been used to analyze the socioeconomic factors affecting milk consumption of households. Four estimators (household size, income, milk preferences reason, and milk price) in the probit model were found statistically significant. According to empirical results, consumers with lower household size and higher income levels tend to consume packed milk consumption. Our study findings suggest that consumers who were sensitive to price were less likely to consume packed milk and believe that packed milk price is expensive compared to unpacked milk price. Also, milk price was effective factor concerning packed and unpacked milk consumption behavior. The majority of consumers read the contents of packed fluid milk and are affected by safety food in their shopping preferences.

## 1. Introduction

Milk is a unique food item that needs to be available in the market without any shortage since it plays a key role in infant feeding and alleviating nutritional poverty in all other age groups. It has been perceived by consumers as an important source of nutrients, especially calcium for good bone and teeth health [1]. Therefore, it is advisable to consume an adequate amount of milk and milk products for healthy lifestyle [2]. Although intake of a sufficient amount of fluid milk and milk products is recommendatory for healthy lifestyle of humans, consumers' fluid milk consumption behavior and preferences may vary among countries. There is a significant gap between developed and developing countries in terms of fluid milk consumption [3].

Increasing population and income, together with the growing popularity of dairy products, particularly among developing country consumers are a key factor behind strong demand in the medium term. Demand continues to be encouraged by the growing influence of retail chains and

multinational companies in these countries, which is facilitating improved consumer access to dairy products. Also, in many countries consumption is enhanced by government programmes (i.e., school milk). The demand for milk and dairy products is expected to remain particularly strong in important developing dairy markets such as North Africa, the Middle East, and East Asia, but also in more mature markets such as those in the European Union, the United States and Russia. The rate of growth and per capita consumption of milk and milk products remains significantly different among regions. (LDCs) least developed countries consume less than 50 kg per person per year on average, compared with 100 kg per person for developing countries, while the developed regions of North America and Europe consume well in excess of 200 kg per person (in milk equivalent). Such a per capita consumption disparity represents an investment potential and future opportunities for both the domestic and global dairy sectors [4].

However, per capita milk consumption in Turkey is low by any comparison due to Turkish people's consumption

patterns, income levels, and nutritional habits. Turkey is far behind the European countries and the world in milk consumption [5]. In Turkey, annual per capita milk consumption is 26 lt [6]. Per capita milk consumption is 66,9 lt in EU, 90.0 lt in USA, 91.5 lt in Canada, 108.14 lt in Austria, 78.2 lt in New Zealand, 87.2 lt in Russia, 97.0 kg in Sweden, and 80.1 lt in Ukraine [7].

Milk is consumed as unpacked fluid milk and packed fluid milk in Turkey. Unpacked fluid milk, also called street milk in Turkey, refers to milk that is produced at farms without any control and packed fluid milk refers to milk produced under fluid milk technology such as pasteurization or UHT [5]. There are several reasons why some consumers prefer unpacked milk whereas others prefer packed milk. Unpacked milk is preferred by some consumers because it is cheaper than packed milk and delivered at the doorstep with no additional cost. Unpacked fluid milk is mainly delivered to consumers directly by individual farmer distributors in Turkey.

The milk is collected by wholesalers, street milk sellers, and village milk collectors such as local cooperatives and producer organizations [8]. Respective shares of milk processing plants in total milk consumption of Turkey are 27% modern dairy factories, 33% for medium sized establishments and dairies, 20% for uncontrolled producers, and 20% for producers' self consumption [5]. The direct sales performed by street milk sellers are important problems in Turkey because they produce or buy milk from farmers in uncooled, unprocessed, and unpacked form resulting in unhygienic fluid milk and pathogenic organism above tolerable limits. This raw milk which is produced without any control sells to potential consumers living in urban areas [8].

Consumers prefer packed milk because of its guarantee of quality, long shelf life, and packaging to carry and store. The desire to purchase a safe food product is also a reason to prefer packed fluid milk. In fact, not only education, age, income, and other demographic characteristics of consumers influence pasteurized and sterilized milk consumption choices but also factors such as increasing consumer awareness and concerns about health and food safety and advertising play important roles [9].

Because of the current marketing system in Turkey, it would be noted that determination of the socioeconomic and demographic characteristics affecting packed and unpacked milk purchasing behaviors of households is substantially important.

In the literature, many researchers have studied the effects of socioeconomic and demographic characteristics on milk consumption patterns and preferences. Fuller et al. [10] used 2001-2002 urban survey data collected to analyze demographics, cultural factors, and purchasing behaviors influencing the consumption of fresh milk, yogurt, ice cream, and powdered milk in urban areas of China. They also estimate consumption levels and participation equations with tobit and probit models. Hill and Lynchehaun [11] focused on sociodemographic factors affecting (personal values, attitudes, age, and ethnicity, presence of children, education, advertising, taste, packaging quality, food scares, prices, and income) buying organic milk. Hatirli et al.

[2] investigated main factors affecting fluid milk purchasing sources of households in Turkey. From the collected household survey data, a multinomial logit model was estimated to analyze households' choices among unpacked, processed, and processed-unpacked fluid milk alternatives within the utility maximization framework. Pazarlioğlu et al. [5] investigated the demand for both farm milk (unpacked fluid milk), produced without safely controls, and fluid milk (packed fluid milk), produced under fluid milk technology such as pasteurization or UHT, based on the data from a household survey which was carried out in Izmir, the third largest city in Turkey. They conducted an analysis using a Heckman selection model since selection bias was potentially an important problem in this study. Heckman estimations for farm milk and fluid milk were used to check whether Heckman correction was required for each type of milk. Alviola and Capps [12] examined the factors that affect the binary choice decision of buying organic and conventional milk at the household level. They utilized a probit model in characterizing the household choice between organic and conventional milk. Kilic et al. [13] studied consumer characteristics associated with preferences toward fluid milk alternatives. Using consumer survey data from Samsun province of Turkey and multinomial logit model, unpacked and packed fluid milk preferences were analyzed. Negassa [14] analyzed the determinants of consumer likelihood to purchase fluid milk and butter by using probit model. Günden et al. [8] estimate the impacts of factors affecting households unpacked and prepackaged fluid milk demand in Turkey using a bivariate censored system of demand model. Yayar [3] investigated socioeconomic and demographic characteristics of consumers that determine households' fluid milk consumption choices among packed, unpacked and both packed-unpacked milk consumption choices in Tokat province of Turkey.

Whilst several researchers studied general aspects and structure of milk production and consumption in Turkey, few have focused on milk consumption decisions of consumers for regional and provincial, effects of socioeconomic and demographic factors on milk consumption [2, 3, 9, 15, 16].

This paper aims to focus on sociodemographic factors affecting consumers' packed or unpacked milk consumption preferences. In order to reach these aims, we analyze that the milk consumption behavior is associated with socioeconomic and demographic characteristics of the consumers by estimated maximum likelihood as binary probit model.

The paper is structured as follows. Section 1 includes introduction. The next section presents the data, methodology, and econometric specification we used to estimate probit model. The empirical application of probit to Turkish households' milk consumption and empirical results of the study are presented in Section 3. Section 4 covers conclusions.

## 2. Data and Methods

**2.1. Data.** The survey was designed to provide representative household packed and unpacked milk consumption data

for Sivas province, Turkey. The data was obtained by direct interviewing of the individual households of 300 residences. The survey was conducted in June 2009. The sample size was determined using the possibility-sampling method [17]:

$$n = \frac{(Nt^2 \cdot p \cdot q)}{(d^2N + t^2 \cdot p \cdot q)}, \quad (1)$$

where  $N$  is the number of households in Sivas province (63153) [18],  $t$  is  $z$  number which is the required confidence interval (for 95 percent confidence interval  $t = 1.96$ ),  $p$  is possibility for an event to occur (the rate of consuming packed milk, 0.5),  $q$  is the possibility for an event not to occur (the rate of not consuming packed milk, 0.5),  $d$  is acceptable error rate during sampling (0.0564).

The data above is formulated, and the sample size (number of people surveyed) was determined to be 300 according to the required confidence interval and the acceptable error rate. Sivas province was divided into six geographical locations for survey study. These six districts, whose geography represents households that have different income groups in Sivas, were chosen. A total of 300 face-to-face questionnaires were made with randomly selected households. We asked households questions about their milk purchasing preferences and socioeconomic information in the questionnaire form. According to the HDI (human development index) Sivas province occupies 37th rank among 72 provinces showing features of medium human development (MHD) [19]. Therefore, it can be said that Sivas province represents other provinces in this group (MHD). Armagan and Akbay [20] emphasize that it will be more appropriate to improve the marketing system with the knowledge of production and consumption structures. Regional discrepancies are also gaining importance; the data on the consumption of animal food products is limited, though. Therefore, they think it will be practical to study on certain products and to start the study from regional and provincial levels to obtain data.

**2.2. Methods.** In this study, we aimed to determine socioeconomic and demographic factors affecting the decision of the consumer to purchase packed or unpacked milk. Given the dichotomous nature of the consumer, a qualitative response model is appropriate. Qualitative response models relate the probability of an event to various independent variables. Such models are often useful when assessing consumer characteristics that are associated with purchasing decisions [21]. In order to provide a detailed analysis of the behavioral milk preferences, packed milk or unpacked milk, we applied a discrete choice probit model for binary choice (yes, no) responses to the milk consumption preferences question.

The probit model is a statistical probability model with two categories in the dependent variable [23]. Probit analysis is based on the cumulative normal probability distribution. The binary dependent variable,  $y$ , takes on the values of zero and one [24]. The probit analysis provides statistically significant findings of which demographics increase or decrease the probability of consumption.

In the binary probit model, packed milk preference was taken as 1, while unpacked milk as 0. It is assumed that the  $i$ th household obtains maximum utility, it has packed milk preference rather than unpacked one.

The probability  $p_i$  of choosing any alternative over not choosing it can be expressed as in (2), where  $\Phi$  represents the cumulative distribution of a standard normal random variable [25]:

$$p_i = \text{prob}[Y_i = 1 | X] = \int_{-\infty}^{x_i' \beta} (2\pi)^{-1/2} \exp\left(-\frac{t^2}{2}\right) dt \quad (2)$$

$$= \Phi(x_i' \beta).$$

The relationship between a specific variable and the outcome of the probability is interpreted by means of the marginal effect, which accounts for the partial change in the probability. The marginal effect associated with continuous explanatory variables  $X_k$  on the probability  $P(Y_i = 1 | X)$ , holding the other variables constant, can be derived as follows [25]:

$$\frac{\partial p_i}{\partial x_{ik}} = \phi(x_i' \beta) \beta_k, \quad (3)$$

where  $\phi$  represents the probability density function of a standard normal variable.

The marginal effect on dummy variables should be estimated differently from continuous variables. Discrete changes in the predicted probabilities constitute an alternative to the marginal effect when evaluating the influence of a dummy variable. Such an effect can be derived from the following [25]:

$$\Delta = \Phi(\bar{x}\beta, d = 1) - \Phi(\bar{x}\beta, d = 0). \quad (4)$$

The marginal effects provide insights into how the explanatory variables shift the probability of frequency of milk consumption. Using the econometric software LIMDEP [25], marginal effects were calculated for each variable while holding other variables constant at their sample mean values.

Factors influencing consumer attitudes and acceptance of a product may include product attributes, price as well as consumer's social demographic and possible interaction between these factors [26]. In previous studies [2, 3, 5, 8–10, 12, 13, 16, 27–29] characteristics such as household size, gender, age, education, professional status, marital status, household size, household income, ethnicity, price, and advertising were handled as explanatory variables.

In this paper, we assume that socioeconomic and demographic characteristics of the consumers affected the preferences for packed and unpacked milk consumption. These characteristics are gender, age, education, professional status of household head, marital status, household size, income, place of milk buying, reason of milk preference, and milk price.

Therefore, we handled the variables assumed statistically significant in the model. Table 1 shows the definition of variables and their mean values.

We formulate the following hypotheses relating to socioeconomic and demographic factors affecting packed

TABLE 1: Definition of variables.

Variables	Definition	Mean values
MILKPRE (milk preference)	Packed milk = 1, unpacked milk = 0	
GEN (gender)	1 = male; 0 = female	.643
AGE (age)	Age of household head (years)	38.047
EDU (education)	University and postgraduates = 1, otherwise = 0	.377
PS (professional status)	Employed = 1, unemployed = 0	.820
MS (marital status)	Married = 1, otherwise = 0	.783
HS (household size)	Number of people (people/family)	3.953
INC (income)	Average monthly household income; (\$/month/household)	771.797
MILKPLACE (place of milk buying)	Buying supermarket = 1, otherwise = 0	.344338D+07
PREFREA (reason of milk preference)	Packed milk is hygienic and healthy (agree = 1; not agree = 0)	.657
MILKPRI (milk price)	Packed milk price is expensive compared to unpacked milk price (agree = 1; not agree = 0)	.420

and unpacked milk consumption. The main hypotheses are: (a) packed milk consumption is positively related to younger age, higher levels of education, smaller household, higher levels of income; (b) milk prices in relation to packed milk consumption have a negative correlation.

### 3. Results

According to the survey results, the male respondents constitute 64.34% of total respondents while female respondents constitute 35.66% of it. Approximately 41.33 percent of total respondents were between 18 and 35 years of age, while 27.34 percent of the respondents were older than 45 years of age. Average age was 38.04. Educational attainment was classified into five categories, illiterate and primary school graduates (14.33%), secondary school graduates (8.33%), high school graduates (39.67%), university graduate (36.67%), and post-graduates (2.00%) (Table 2).

Households earning less than \$349 constituted 10 percent of total respondents, households earning between \$350 and \$1050 (49 percent) and households earning higher than \$1051 (41 percent) (Table 2). The survey results illustrate that average annual income of households was found \$8003 that was lower than the annual income per capita (\$8215) of Turkey [30].

Average household size was found to be 3,95 people that is lower than the average household size (4.50 people) of Turkey [31]. The most frequent household size is 3-4 people with 50.67%. Average 60.97% of heads of household employed are in paid work and 39.03% are self-employed.

In Sivas, per capita average annual milk consumption is 39.96 kg per capita whereas it is 26 kg in Turkey [32]. In İzmir province per capita annual fluid milk consumption was found 139.68 kg [5] and 48.18 kg in Aydin province [20]. Survey results showed that 71.3 of households preferred packed milk while 28.7% unpacked milk. Some information about consumers who preferred packed milk is reported in Table 2. Consumption of packed and unpacked milk substitutes according to educational level. 41.86% of illiterate

and primary school graduates and 82.30% of university graduates consume packed milk. While 73.33% of consumer in low income group consume unpacked milk, 90.24% of consumer in high income group consume packed. 39.54% of households preferred unpacked milk as a priority because it is cheaper than packed milk. It was found out that the most important reasons were quality (28.64%) and hygiene (28.64%) for packed milk choice of consumers (Table 3).

Respondents consumed unpacked milk provided by home delivery (62.79%) and buying from village (16.28%). Households consuming packed milk preferred supermarket (89.09%) and selling point (10.91%). According to the results, consumers made a point of sell-by date (44.09%), taste (36.82%), and brand (9.09%) for packed milk.

Table 4 presents results estimated from binary probit model. The model has been estimated by the maximum likelihood method. The model is significant at 1% level of probability. The estimated coefficients and standard errors reveal which factors influence respondents consumption intentions for fresh milk consumption. A statistically significant coefficient suggests that the likelihood of consumption of product will increase/decrease as the response of the explanatory variable increases/decreases [33]. The likelihood ratio test statistic results of the model indicate that four variables are statistically significant at 1%, 5%, and 10% levels of probability. McFadden's Pseudo- $R^2$  was calculated, and obtained values indicate that the independent variables included in the probit model explain significant proportion of the variations consumer's to purchase packed or unpacked milk. It was calculated about 0.6889. This value represents that variables placed in the model explain high level of the probabilities of packed and unpacked milk choice of consumers. Correct prediction rate obtained from probit model is 93%. This meant that that the probit model predicts 93% of the cases correctly.

We expected that packed and unpacked milk consumption was influenced by gender, age, education, professional status, marital status, household size, income, milk buying place, milk preferences, and milk price.

TABLE 2: Some socio-economic and demographic characteristics of households.

	Frequency	%
Gender		
Male	193	64.34
Female	107	35.66
Age		
18–25	36	12.00
26–35	88	29.33
36–44	94	31.33
45 or older	82	27.34
Education		
Illiterate and primary school graduates	43	14.33
Secondary school graduates	25	8.33
High school graduates	119	39.67
University graduates	107	36.67
Postgraduates	6	2.00
Income		
Less than \$349	30	10.00
\$350–\$698	147	49.00
\$699–\$1050	82	27.33
More than \$1050	41	13.67
Household size		
1-2 person	50	16.67
3-4 person	152	50.67
5-6 person	79	26.33
7 or more persons	19	6.33

1\$ equals to 1,53 TL in 2009 [22].

TABLE 3: Some information about consumers preferring packed milk.

	Consumed packed milk (%)
Education	
Illiterate and primary school graduates	41.86
University graduates	82.30
Income	
Less than \$349 and \$350–\$698	73.33
More than \$1050	90.24
Most important choice reason	
Quality	28.64
Hygiene	28.64
Place of buying packed milk	
Supermarket	89.09
Selling point	10.91

We tried to include all socioeconomic variables in the model but the variables of gender, age, education, professional status, marital status, and milk buying place were not statistically significant. In other words, in contrast to what

we expected, these variables have no statistically significant effect on the packed or unpacked milk consumption.

The level of education is related to the ability to process more complex information and make decisions [14]. We assume that education level is one of the important factors affecting milk consumption. Surprisingly, we did not find a statistically significant relationship between education level and packed or unpacked milk consumption. Sanchez-Villegae et al. [34] assess differences in cheese and milk consumption across socioeconomic groups in representative samples from several European countries. They found that there was not statistically significant an association between the level of education and consumption of milk when they pooled the estimates from different countries. Negassa [14] found that there was no difference between the households with illiterate heads and household with heads having at least primary education in terms of the likelihood to purchase raw milk. In this study, the effect of education level of the head of household on the household's likelihood to purchase butter is found to be not significant.

Household size was found out an important socioeconomic factor for the probabilities of packed and unpacked milk choice of consumers. In estimated model, household size variable was statistically important at significant level 5% and related negatively. As household size increases, tendency to consume decreases packed milk and increases unpacked fluid milk. This is the expected result of household

TABLE 4: Estimates of the binary probit model.

Variable	Coefficient	Std. error	z-statistic	Marginal effects
Constant	-.5489	.8840	-.621	—
GEN	.3702	.3063	1.209	.0503
AGE	-.0081	.0096	-.843	-.0604
EDU	-.2780	.3498	-.795	-.0216
PS	-.1837	.3706	-.496	-.0275
MS	-.1304	.3040	-.429	-.0192
HS	-.1416**	.0657	-2.155	-.1103
INCOME	.0007**	.0004	1.776	.1067
MILKPLACE	.326D-07	.406D-07	.803	.0222
PREFREA	3.0417*	.3086	9.857	.5515
MPRICE	-.9316*	.2719	-3.426	-.0858
Log-likelihood	-55.924	Akaike I.C.		.4395
Restricted Log-L	-179.742	Schwarz I.C.		.5630
Mc Fadden Pseudo- $R^2$	.6889	HQIC		.4889
$X^2$ ( $df = 11$ )	247.635	Ben./Lerman		.8912
Significance level	.00000	Cramer		.7330
Hosmer-Lemeshow $X^2$	25.457	Veall/Zim.		.8296
Predicted percentage correction	93.00			

Note: (\*\*\*) , (\*\*), (\*) denote significance at the 10%, 5%, and 1% levels, respectively.

size. According to marginal effects, for a household with larger size, the probability of consuming packed fluid milk decreased by 11.03%. This can be explained by allocation of household income to use it in other food goods due to the increase in household size. In this case, packed milk with the lower price is preferred instead of packed milk. Günden et al. [8] emphasized that households with more members could be closely correlated with budget constraints, which imply that this group's demand for unpacked milk is income-and/or price-oriented. Similar to our study results, Kilic et al. [13] found that increasing household size decreased the probability of consuming packed fluid milk compared to unpacked fluid milk. Tiryaki and Akbay [16] implied that the household size was getting bigger; the household would tend to consume unprocessed fluid milk instead of consuming processed fluid milk. Yayar [3] household size had a negative impact on the probability of packed fluid milk consumption versus unpacked fluid milk consumption. In contrast to the findings, Alviola and Capps [12] found that household size negatively affected both conventional and organic milk consumption.

Income level of households is one of the factors affecting their packed and unpacked milk consumption behavior. It is hypothesized that families with low income may consume more unpacked milk when milk prices are lower. As expected, household's income level affects the household's packed milk consumption positively. The positive and statistically significant coefficients imply that the household income increased; the household tended to consume unpacked milk instead of packed milk. As it is seen in Table 4, marginal effects of income variables indicate that households with the high income are 10.67% more likely to consume packed milk. According to our results, households preferred

unpacked milk (39.54%) as a priority because of being cheaper than packed milk. It is a known fact that unpacked milk was unhygienic. Therefore, it is said that households tend to the consumption of unpacked milk because of their economic difficulties. Günden et al. [8] implied that consumers at higher income levels would tend to curtail the consumption of unpacked milk and simultaneously substitute more packed milk with increased income as the household regards the consumption of unpacked milk as "inferior good." Tiryaki and Akbay [16] found that as household income increased, then household would tend more to consume processed fluid milk instead of choosing unprocessed fluid milk. The effect of income is the largest on the probability of consuming processed fluid milk. Also, the findings of Dong and Kaiser [35], Fuller et al. [10], Zhang and Wang [36], Bus and Worsley [37], Vandermerch and Mathus [27], Hatirli et al. [2], Celik et al. [28], Jonas and Roosen [38], Yayar [3] are consistent with our research findings.

It is hypothesized if a consumer believed that packed milk was healthier and values being healthy, then he/she would likely have a positive attitude towards purchasing packed milk. Hygiene and health was a significant estimator of the consumers' milk consumption choices. There is significant and positive relationship between packed milk consumption and the estimator. This means that a household gives tendency that consuming packed milk increases but unpacked milk decreases. These results indicate that consumer awareness for safer milk consumption has increased. Marginal effects of hygiene and health are the largest on the probability of consuming packed milk. In consideration, to marginal effects the consumers who believe that packed milk is hygienic and healthy are by 55.15% more likely to

prefer packed milk instead of unpacked milk. Similar studies support our study findings by Pazarlioğlu et al. [5], Akbay and Tiriyaki [9], Kilic et al. [13], Günden et al. [8].

Milk price was determined as other main factors affecting households' packed and unpacked milk consumption behavior. Price was the primary reason mentioned in the survey for not purchasing packed fluid milk, as it was perceived as being quite expensive compared to unpacked fluid milk. In average, Turkish consumers have been sensitive to price of foods which they consume [13]. This variable was found out to be significant at 1% level and was related negatively. This sign indicated that consumers who were sensitive to price were less likely to consume packed milk. Households believe that packed milk price is expensive compared to unpacked milk price. The results support the hypothesis that households' milk consumption choices are related to the belief that packed milk price is expensive compared to unpacked milk price. According to the results, implied that consumers preferred price of packed milk are expensive compared to unpacked milk were less likely to consume packed milk. When milk price increased, the probability of packed milk consumption decreased 8.58%. Our study findings are supported by Kilic et al. [13] who reported the statistically significant and negative coefficients of PRICE variable for packed fluid milk equation. Hatirli et al. [2] emphasized that survey results showed that there is about twofold price difference between unpacked and processed fluid milk. Due to price concerns, many households were more likely to select unpacked and processed-unpacked fluid milk and less likely to choose processed fluid milk.

#### 4. Conclusions

This study focused on the socioeconomic and demographic factors influencing milk consumption in Sivas, Turkey. In order to analyze the socioeconomic and demographic factors, we employed the binary probit model.

The findings of this study revealed that consumer's socioeconomic characteristics affected unpacked and packed fluid milk consumption preferences. The results from binomial probit model, household size, income, milk preferences reason, and milk price are significant and associated with packed and unpacked fluid milk consumption.

Results show that larger households are more likely to purchase packed milk. Also, results implied that the higher income level of households, the more likely the households would purchase packed milk. In addition, effects of hygiene and health are the largest on the probability of consuming packed milk. Consumers believe that packed milk is hygienic and healthy to prefer packed milk instead of unpacked milk. Also, milk price was effective factor concerning packed and unpacked milk consumption behavior. Our study findings suggest that consumers who were sensitive to price were less likely to consume packed milk and believe that packed milk price is expensive compared to unpacked milk price. The majority of consumers read the contents of packed fluid milk and are affected by safety food in their shopping preferences. Also, the most important reasons were hygiene and quality for packed fluid milk choice of consumers.

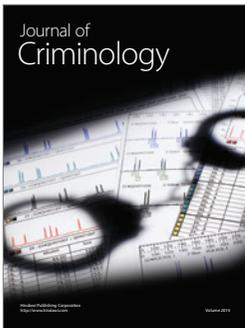
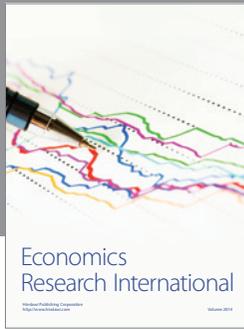
In the light of the findings, the necessary policies are needed as providing accessibility to adequate price, healthy, safety food and a mechanism reached to the level of per capita milk consumption in developed countries. In addition, we expect that our study results will benefit private and public organizations and companies in Turkey marketing strategies (e.g., pricing design, promotion strategies, etc.) for milk consumption by looking at specific consumer preferences. Despite the fact that Turkish government has prohibited selling of unpacked milk by law, unpacked milk produced and sold in unhygienic conditions by street sellers is still delivered in Turkish milk markets without any inspection. We suggest that Turkish Government should take necessary measures and regulate unpacked milk selling. Also, it is needed to establish and regulate some standards for milk market. Households who are more interested in packed milk consumption tend to have higher income and lower household size. Packed milk is slightly more expensive than unpacked milk, so price is a barrier to some consumers. Furthermore, there are opportunities to increase packed milk consumption by reducing the price. That is, households are willingness to desire packed milk consumption. So, it is suggested packed milk consumption should be promoted and encouragement.

Since the study makes use of cross-sectional data, it would be appropriate to imply the study does not include the other factors over a period of time and the socioeconomic and demographic characteristics of each member of the households in each province of Turkey. So, it may limit the ability to estimate factors affecting packed or unpacked milk consumption.

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