Socio-economic Determinants of Red Meat Consumption in Turkey: A Case Study

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Abstract

In the study, it was aimed to determine socio-economic factors affecting red meat consumption habits and consumer preferences of families, living in urban areas of Tokat province. The factors affected red meat consumption preferences of consumers were analysed using binary logistic regression model. The basic material of the study consists of the original data from surveys, obtained face to face with consumers living in urban areas in Tokat, Turkey. The survey was completed between June and July in 2009. According to the results from binary logistic regression analysis; gender, education, household size and income are significant and associated with red meat consumption. A negative relationship was determined among red meat consumption, education level and household. It is expected that this results have important implications for the supermarket, butchery shop and other food supplier industries in the research area and policymaker.

Keywords: Red meat consumption, Consumer behaviour, Logit model, Turkey

Türkiye'de Kırmızı Et Tüketiminin Sosyo-ekonomik Belirleyicileri: Örnek Bir Çalışma

Özet

Bu çalışmada, Tokat ili kentsel alanda yaşayan tüketicilerin kırmızı et tüketimi ve tercihlerini etkileyen faktörlerin belirlenmesi amaçlanmıştır. Tüketicilerin kırmızı et tüketimlerini etkileyen faktörler binary lojistik regresyon modeli kullanılarak analiz edilmiştir. Haziran ve Çalışmada Temmuz 2009 yılında tüketicilerden yüz yüze görüşme tekniği kullanılarak elde edilen orijinal veriler kullanılmıştır. Binary lojistik regresyon analiz sonuçlarına göre, cinsiyet, eğitim, hane halkı büyüklüğü ve gelir faktörleri tüketicilerin kırmızı et tüketimlerini etkileyen faktörler olarak belirlenmiştir. Kırmızı et tüketimi ile hane halkı büyüklüğü ve eğitim düzeyi arasında negatif yönlü bir ilişki mevcuttur. Çalışmadan elde edilen sonuçların gıda üretimi yapan firmalar, süpermarketler, kasaplar ve bu sektöre yönelik politika yapıcılar için yararlı olacağı düşünülmektedir.

*Anahtar Kelimeler:*Kırmızı et tüketimi, Tüketici davranışı, Logit model, Türkiye

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Introduction

It is not possible to increase the economic and social well-being, to live healthy and strong for working properly unless a society can be fedan adequate and balanced. An adequate and balanced dietis not only essential requirement for the vital activities of individuals but also it is a basic condition for the development of the whole society. To ensure adequate and balanced diet, consumers need to consume animal foods is inevitable. Also, one of the most important requirements for a healthy and balanced diet should be around 40-50% animal originated of daily consumed protein (Gogus,1986; Gokalp, 1986).

Meat continues to be an important nutrient for human health and development for many consumers, particularly in the developed world (Alison et al., 2010; Isikli et al., 2011). Many factors such as wealth, volume of livestock production and socioeconomic status of consumers could explain the higher consumption pattern of meat by Western populations. Other factors influencing meat consumption include sex, age, religion, body mass index (BMI) and total energy intake, as reported by the European Prospective Investigation into Cancer and Nutrition (EPIC) cohort (Alison et al., 2010; Krystallis and Arvanitoyannis, 2006).

Nowadays, the level of consumption of animal products is considered as an indicator of countries' development. This is because animal protein foods, such as the meat, milk, and eggs are importance in human nutrition. Recently, in developing countries such as Turkey, the structure and amount of consumption of animal products has been increased as parallel with social and economic developments (Kan and Direk, 2005).

According to data of 2010, it is reported that the amount of red meat consumed per capita is 10-12 kg/ year in Turkey. However, supply and consumption of red meat due to off the record data is estimated around 25 kg. This rate, per capita, is average 70 kg per year in EU countries and is around 73 kg in the USA (MFO, 2010). This amount is quiet lower than those from developed countries. According to the State Planning Organization of Turkish Republic, demand for animal products is 13.26 kg per person in Turkey, 2010 (SPO, 2010).

Red meat consumption has been affected by many factors, such as the annual population grow thrate, the changes in population structure, consumer choice, product quality, price, consumer education, hygienic meat characteristics, religious beliefs, health issues, climate, traditions and food-relate dads except other economic reasons in Turkey (Icoz, 2004).

Marketing researches, carried out by researchers, in order to evaluate the purchasing attitude of consumers are being inevitable in the developing technology and competition condition. Therefore, the role of marketing research has risen to eminence in todays' marketing conception. Findings of researches are provides new and important knowledge to the firms, producers and consumers.

There have been many marketing researches, examined the factors, affecting the consumption of meat and meat products on consumers in Turkey and the world. These researches useda large number of modeling methods for consumption structures of consumers (Bellemore and Barret, 2006).

Becker (2000) developed a model for analysis of consumer behavior towards food. This model was intended to bridge the gap between the objective quality approach pursued in food sciences, the product characteristics approach, and the subjectively perceived quality approach, the product attribute approach as pursued in the consumer behavior literature. It was presented the results of the consumer survey for Germany in the study. According to the results, extrinsic cues played an important role for quality selection in the shop. Akbay (2005) determined that meat consumption rose due to increasing the household income, in Kahramanmaras province of Turkey. Bonne and Verbeke (2006) studied on Belgian Muslim's motivational structure and behaviour towards fresh meat consumption in general and halal meat consumption in particular. The study consisted of two parts. The first part focused on meat consumption behaviour, place of purchase and socio-demographics while the second part was based on the MEC theory. Karli and Bilgic (2007) tried to determine factors, affecting consumption of meat and meat products according to standard continuously demand models in Sanliurfa province. Yen et al.(2008) used the nine-equation system, consisting of the dietary knowledge equation and the demand equations for beef, pork, poultry, and fish at home and away from home, estimated with the maximum simulated likelihood (MSL) procedure. Sepulveda et al. (2008) used logistic regression analysis for determining the factors, affecting beef, had quality label, consuming preferences in Spain. Jung and Koo (2000) analyzed the consumption behavior of meat and fish products in Korea, by estimating the Linear Approximate Almost Ideal Demand System (LA/AIDS). Gossard and York (2003) used ordinary-least-squares (OLS) regression to assess the effects of social structural factors on meat consumption. Jabarin (2005); Tosun and Hatirli (2009) used the logit model for analyzing the main socio-economic factors, affecting preferences of families with the purchase places of red meat. Karakuset al. (2008) studied the structure of meat consumption in the

classical sense. Cankurtet al.(2010) tried to determine factors affecting the choice of beefin households using logistic regression model in Izmir province. Bourdeu (1984) emphasized that social class and education appeared to have a substantial influence on meat consumption. Interestingly, income did not influence total meat consumption. Hatirli et al. (2007) aimed to estimate Linearized Almost Ideal Demand System (LA/AIDS) for red meat, fish and chicken using cross-section data collected from central district of Isparta province. Goodwin et al.(1990) analyzed purchasing behaviors of consumers of beef and pork meat type susing the logit model. Adisen (1999) reported that frequency and amount of meat and meat products consumption depends on education level. Verbeke et al. (2000) has been analyzed by probit method influences of television and advertising expenditures on meat consumption of house holds in Belgium. Kara et al. (2004) determined that gender, education, income level and number of households are important in the consumption of meat and products. Malabayabas et al. (2009) estimated the demand elasticity for fresh pork, chicken and beef in the Philippines. They analyzed the relationship between and among these three commodities based on the computed elasticity with price and income as the primary considerations. The Nonlinear Quadratic Almost Ideal Demand System (NQAIDS) approach was used in estimating the demand systems for fresh meat in the Philippines using seemingly unrelated regression (SUR). Results showed that there is a clear difference in the patterns of fresh meat consumption among households belonging to different income groups based on the price and income elasticities. Kadanali et al. (2010) has analyzed the factors, affecting consumers' preferences for meat purchasing place. He found out that there is no relation ship between income level of consumers and choice of place of meat purchase. Yaylak et al. (2010) used the logistic regression method in order to determine beef, sheep, and goat meat consumption preferences (consume, not consume in Odemis town, Izmir. It is found out that gender, age, education and income levels have significant effect on choosing beef, sheep and goat meat of consumers.

To protect human health and educate the future generations, it must be shown sensitivity on which consumption of red meat and red meat products are important and necessity. In this respect, more accurate results will be obtained with determination of individual consumption habits about how to be balanced diet.

Based on this fact, the purposes of the research were to determine consumer preferences on the red meat consumption and to explore the socio-economic factors affecting red meat consumption in the households of Tokat province, Turkey.

Material and Method

The basic material of the study was obtained from randomly selected 300 consumers using face to face questionnaire in Tokat province. The questionnaire was carried out in June-July, 2009.

The sample size of the research was calculated to be 300 using following equation (New bold, 1995). This method was usedin many studies to achieve the maximum size of the sample (Armagan andAkbay2007; Pazarlioglu et al. 2007; Uzunoz et al. 2011).

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

n =Sample size, N = population size, p =probability of the situation being searched (it is assumed 0.50 to reach maximum sample size),

σ_p^2 = Probability variance.

Initially, properties of the mainmass of consumers forming were not known; therefore, P was taken 0.5 so as to maximize the volume of sample, then appropriate sample volume was determined. At first, neighborhood number in the rural area was determined for finding out the households' number to survey. Primarily, these neighborhoods were divided into geographical regions for representing the city center. In determining these neighborhoods, it was paid attention to represent the entire income and education groups. Determining of consumer numbers, interviewing for the survey in each district was based on ratio of total population in the settlements (Engin deniz and Cukur, 2003; Armagan and Akbay, 2007; Pazarlioglu et al., 2007) and sample consumers were selected randomly.

It is considered to the sample consumers were representative to the Tokat population in terms of income level, household size and education level criteria.

Questionnaires were made by using face to face interview technique. Households answered questions regarding their preferences of red meat consume and provided socioeconomic information about factors affecting red meat consume in the questionnaire form.

Since the red meat consumption was expressed in binary (yes or no), in this study, socio-economic factors affected red meat consumption preferences of consumers living in urban areas of Tokat province were analyzed using binary logistic regression models (Logit). In the study, if

consumer purchasing meat gets value 1, if consumer does not prefer purchasing meat gets value 0. Logit model, explaining the logistic distribution function, could be written as follows (Greene, 2011).

$$Pi = E(Y_i = \frac{1}{X_i}) = \frac{1}{1 + e^{-(\beta_i + \beta_2 X_i)}}$$

The average annual red meat consumption is 6.83 kg in Tokat province. Consumers consumed less red meat than 6.83 kg per year were accepted below the average of Tokat red meat consumption. Consumers, consumed more red meat than 6.83 kg per year, were accepted above the average of Tokat red meat consumption. To explain the possibility of consuming or not consuming of red meat consumption, average red meat consumption per person was taken into account 6.83 kg per year in Tokat province. In the evaluation, if meat consumption is 6.83 kg per year or above, (P_i) is accepted 6.83 kg per year. If meat consumption is lower than 6.83 kg per year, it is accepted $(1-P_i)$. Accordingly, $P_i / (1-P_i)$ are ratio of the average probability for a consumer, consuming less red meat consumption than average to consuming more than average (6.83 kg per year) (Erdal and Esengun, 2008). In this case, logit model as following;

$$P_i = \ln(\frac{P_i}{1 - P_i}) = \beta_1 + \beta_2 X_i$$

β_2 represents coefficient slope, X_i represents independent variable.

Accordingly, a unit change in X can be estimated with the logarithmic rate how to change the probability of less red meat consuming of more red meat consuming.

In econometric analysis, the main question was which factors determine the purchase of red meat? For this aim, in this study, red meat consumption were analyzed taking into consideration consumers' gender, age, marital status, spouse's employment status, educational status, employment of household head, household size, and income. LIMDEP package program was used to estimate the empirical model results.

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

MEATCONS= β_0+ β_1GEN + β_2 INC + β_3AGE + β_4 EDU + β_5MS + β_6HS + β_7 HHEMP + β_8 PEMP + ε_i

Table 1: Demographic Characteristics of the Consumers and Definition of the Variables Used in the Model.

Variables and Definition		Frequency	(%)
GEN (Gender): (Female 1, Male 2)	Female	146	48,7
	Male	154	51,3
AGE (Age): 16-29 years 1, 30-43 years 2 and over 44 years 3	16-29 years	94	29,7
	30-43 years	108	34,2
	Over 44 years	114	36,1
MS (Marital Status): Married 1, single 2	Married	230	76,7
	Single	70	23,3
PEMP (Partner's Employment Status): Employed 1, unemployed 2	Employed	87	37,8
	Unemployed	143	62,2
EDU (Education): Up to primary school 1, high school 2 and university degree and above 3	Up to primary school	83	27,7
	High school	124	41,3
	University degree and above	93	31,0
HHEMP (Head of Household Employment Status): Employed 1, unemployed 2	Employed	226	75,3
	Unemployed	74	24,7
HS (Household Size): Continuous variable	1-2 Person	39	13,0
	3 Person	56	18,7
	4 Person	94	31,3
	5 Person	60	20,0
	6 Person	29	9,7
	7 Person	22	7,3
INC (Income): Low income (250-1000 TL/month*) 1, middle income (1001-2000 TL/month) 2 and high income (over 2001 TL/month) 3	Low income (250-1000 TL*)	105	35,0
	Middle income (1001-2000 TL)	132	44,0
	High income (Over 2001 TL)	63	21,0

* TL: Turkish Liras and 1 $ equals to 1,565 TL (Turkish Liras) in June (CBRT, 2010).

Results and Discussion

Consumers' red meat consumption status and red meat consumption possibilities were examined in urban areas of the province of Tokat in this study. Demographic characteristics of the consumers were given in Table1.
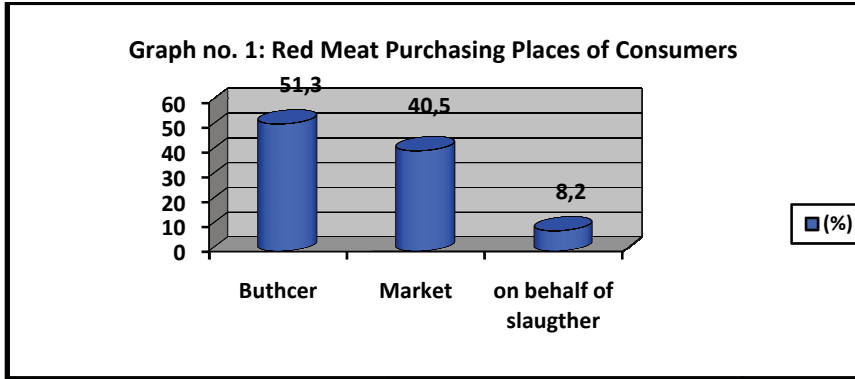
Consumers are 48.7% female and 51.3% male. Average consumer age was found out 34.19 years. Average ages of female and male consumers were 32.53 and 35.30, respectively. According to the research results, 76.7% of consumers was married, others was single (Table 1).

Consumers' Spouses have worked around 37.8%, while they have not worked about 62.2%. Education levels of consumers were grouped as illiterate, literate, graduated from primary school primary school and secondary school. They are consisted of 27.7% of all consumers. 41.3% of consumers' graduated from high-school and 31.0% of them graduated from university. 24.7% of consumers' are unemployed, 75.3% of them are employed. Average urban household number was calculated as 4.17 people in Tokat (Table 1).

In this study, assessments were done according to three different income groups with aid of frequency distribution for monthly household wages. Those who earn between 250-1000 TL are classified low-income group, those who earn between 1001 and 2000 TL are classified middle-income group, and middle-income consumers, and those who earn 2001 TL and above are classified as high-income group. According to the results, 35.0% of the consumers were belonged to low-income group, 44.0% of the consumers were belonged to middle-income group, and 21.0% of the consumers were belonged high-income group, and an average income was 608.71 TL (Table1).
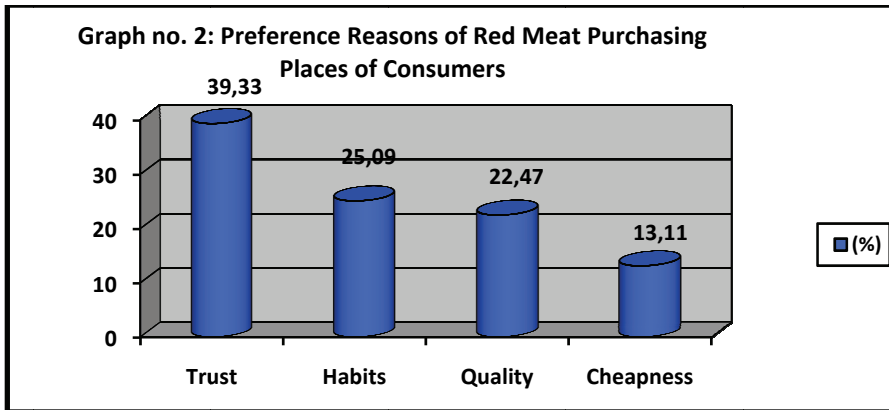
According to Meat and Fish Organization report, red meat consumption per person is 6.89 kg per year (MFO, 2010). In this study, average annual red meat consumption was found out 6.83 kg in the urban area in Tokat. Similar findings has been obtained in Izmir (7.03 kg per year) (Cankurt et al., 2010) and (5.87 kg per year) in Aydin (Ulas, 2011).

Consumers buy red meat from butchers (51.3%) in urban areas of Tokat. Consumers know the seller, cutting sites and trust; therefore they trust butchers. 40.5% of consumers buy meat from supermarket and 8.2% of them prefer to cut a live animal themselves (Graph1).

Graph no. 1: Red Meat Purchasing Places of Consumers

51,3   40,5   8,2

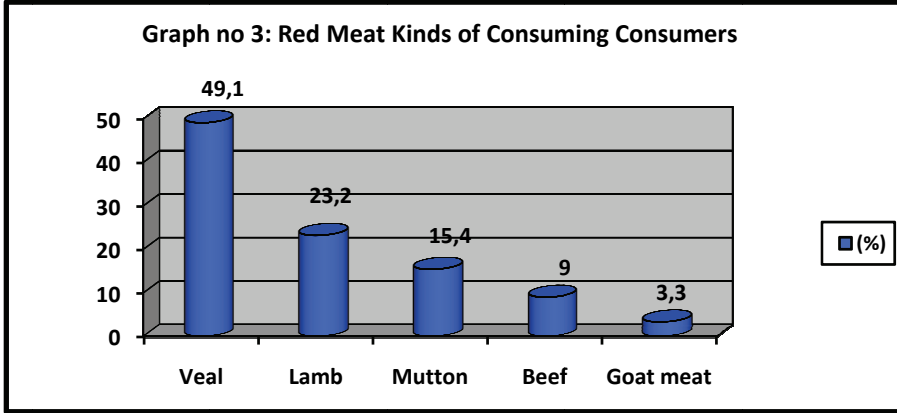Buthcer   Market   on behalf of slaugther

(%)

39.33% of consumers preferred red meat because of their high nutritional value, but habits (31.84%) is second an important factor in meat consumption. 22.10% of consumers prefer red meat for health reasons, while 4.87% prefer that reaching meat store is easy. 1.87% of respondents choose red meat due to low price. Those people buy live animal and slaughter themselves. In this way, it costs less.

Consumers purchase red meat where they trust (39.33%). Habits (25.09%), quality (22.47%) and cheapness (13.11%) are among the reasons for preferring by customers (Graph2).

Graph no. 2: Preference Reasons of Red Meat Purchasing Places of Consumers

39,33   25,09   22,47   13,11

Trust   Habits   Quality   Cheapness

(%)

Each society consumes food that is available. Red meat consumption is related directly to livestock capacity. Society consuming culture is affected by beliefs, attitudes, habits, presence of existing animals and plants, and even land structure. According to this study, veal is preferred 49.1% ratio;

lamb is preferred 23.2% ratio, mutton is preferred 15.4% ratio, beef is preferred 9.0% ratio and goat meat is preferred 3.3% ratio (Graph3). Similar results are obtained in studies in different regions (Van, Gaziantep and Aydin) (Atay et al., 2004; Karakus et al., 2008; Ulas, 2011).

Graph no 3: Red Meat Kinds of Consuming Consumers

Veal	Lamb	Mutton	Beef	Goat meat
49,1	23,2	15,4	9	3,3

Most consumers consume about 40.1% among processed meat products in urban areas of Tokat. Who escape from consumption of process sedor frozen meat (22.5%) are tend to consume fresh meat. Salami and hotdog are preferred about 9.4% and 3.7% respectively. Ready meat balls consumption is 17.2%, ready Adana is 2.6% and4.5% consume all of them.

It is important which factors affect consuming preferences for marketers to develop strategies for decision maker, manufacturer, broker and marketing expert. Most of individual social demographic factors play a key in determining both the probability participation and the quantity consumed level of the red meat (Karli and Bilgic, 2007). Binary logistic regression model was used for analyzing of socio economic factors, affecting consumers' preferences and estimated with the maximum likelihood method. Estimation results of the model are given in table no.2. Variables of age, marital status, head of household employment status and spouse's employment status have been excluded from the model as they have not been found statistically significant at the level of 10%. Thus, gender, education, household size and income have been used as the variables affecting the probability of fish consumption. In conclusion, the below-mentioned equation has been formed as the final model.

$$\text{MEATCONS} = \beta_0 + \beta_1 \text{GEN} + \beta_2 \text{EDU} + \beta_3 \text{HS} + \beta_8 \text{INC} + \varepsilon_i$$

Red meat consumption, belonged binary logistic regression model was found out significant in 1% level. McFadden pseudo coefficient of determination (R^2) was calculated about 0.16.

Gender is considered to be an important factor in consumer behavior. According to gender, consumption patterns show differences. This variable was used model in with considering that women consume less red meat than men. Gender in red meat consumption is another variable, included in the model. It was found out that there is a positive correlation at a significance level of 5% between gender and red meat consumption. Each unit changing in gender increases about 15.77% red meat consumption. In other words, women red meat consumption is likely 15.77% more than men (Table 2). Gossard and York (2003) found that gender had a strong influence on meat consumption in US residents. They implied that men physiologically required more meat than women due to the average differences in weight.

Table 2: Meat Consumption Results Related to Binary Logistic Regression

Variables	Coefficient	Standard error	Z statistics	Probability	Mean	Marginal Probabilities (%)
Constant	-0,481	1,146	-0,420	0,675	---	-10,52
GEN	0,721	0,315	2,286	0,022	1.686	15,77
EDU	-0,203	0,107	-1,903	0,057	5.020	-4,44
HS	-0,308	0,095	-3,248	0,001	4.176	-6,73
INC	0,410	0,194	2,116	0,034	1.860	8,96
Log likelihood	-180,066		Akaike IC		1.260	
Restricted Log-L	-191,640		Schwarz IC		1.371	
McFadden Pseudo-R^2	0,160		BIC		1.372	
X^2 (df:8)	23,167		HQIC		1.305	
Significance Level	0,003					

Consumereducation level was found out an important factor for healthy diet behavior. This variable is included in the model because better-educated families have better nutritional awareness. According to analysis results, it was found out that there are negatively and statistically significant relationship at 5% level between education level and red meat consumption.

It was determined when educational level rise, red meat consumption decreases about 4.4%. Education level has 4% marginal effect on red meat consumption (Table 2). Supporting study results, education has an inversely related to beef and total meat consumption. That is, people more education eat less beef and meat than the others (Gossard and York, 2003). Karli and Bilgic (2007) emphasized that a higher educational attainment diminished with the probability of red meat consumption in Sanliurfa, Turkey, because a higher human capital endowment provided more information to a consumer about the red meat to be source cholesterol and some other chronic disease. In their study, Liu and Deblitz (2007) found that consumers were well educated and possessing a good income as important purchasing criteria for beef consumption in China.

Household size is considered asa variable for explaining the amount of red meat consumption. This variable is included in the model because red meat can be consumed more by large families. However, red meat consumption has statistically decreased with increasing number of individuals in the family. There is anegative relationship between redmeat consumption and household size. It was statistically in 5% level. In addition, household size has a marginal effect about -6.7% in red meat consumption (Table 2). That is, red meat consumption decreases around 6.7% in each unit increasing in household. Families, who had more household size, have been found low income. Families, who had low income, have been determined low education level. When household size increases, red meat consumption decreases. The reason can be that red meat consumption declines once house hold rises. Leahy et al. (2011) found that household size, age, income and education explained meat and fish consumption in Ireland.

Family income is main factor, determining their consumption behavior. This variable is included in the model because low-income families may consumemorered meat when red meat prices are lower. There is a positive relation ship between red meat consumption consumers' income level and it is statistically significant at the level of 5%. People, earned 1689.6 TL consumered meat, while people, made 953.7 TL don't consumered meat. Red meat consumption in creases when income level increases. Income level has statistically around 8.96% marginal effect on red meat consumption (Table2). Each unit increase in consumer income increases about 8.96% red meat consumption. In Ireland, Leahy et al. (2010) found that there was a Kuznets-like relationship between income and meat expenditure. For the poor, an increase in income results in higher meat expenditure. The global average income, meat consumption levels off and at very high levels of per capita income vegetarianism increased.

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