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Full Length Research Paper

Analyzing the factors affecting civil cheese consumption: The case of Erzurum province in Turkey

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This study was performed in Erzurum in 2009 to identify the factors affecting civil cheese consumption. The sample number was set to be 272 based on Proportional Sampling Method. Ordered Logit Analysis was used for detection of variables effective in consumption. It was concluded that there is a positive relationship between consumption of dairy products and birthplace, marital status, continuing affairs of consumers with their villages while they are away whereas a negative relationship was found between their consumption and monthly income.

Key words: Civil cheese, consumption, Erzurum, ordered logit.

INTRODUCTION

Sufficient and well-balanced diets play a crucial role in maintaining and improving the health of the individuals. Cereals, meat and meat products, milk and milk products, vegetables and fruits are the most essential components of a well-balanced diet. Meat and meat products as well as milk and milk products are foods obtained from animal husbandry. Dairy products such as cheese, yoghurt, butter and milk powder are among the most important protein sources.

According to manufacturing industry records about dairy products, yoghurt production (51%) has the largest proportion. Production of processed drinking milk is (22%), white cheese (14%), kashar cheese (3%) and milk powder in a very little proportion (0.4%) of the total (Tan and Erturk, 2002). Production of white, kashar and other kinds of regional cheeses in primitive dairies and family-owned companies do not have reliable records. Turkey has a variety of both regional and industrial type of cheese. Civil cheese is produced especially in Erzurum, Kars and Bayburt provinces in Eastern Turkey. It is skim string cheese manufactured from cow, sheep or goat milk. Civil cheese is made by fermenting the amount of milk left under the skim machine while the milk is being processed. The cheese is produced generally from skim milk (Kara et al., 1999; Anonymous, 2010). Civil cheese is named as *leaf, telpanir, tischill ve zwirn* in Russia and Armenia, as *fadenkäse* in Germany, as *halep* in Syria and as *guajaqueno* in Mexico (Anonymous, 2010). Civil cheese is not a regional cheese anymore, and it started to be sold in large metropolitan markets (provinces such as Istanbul, Ankara, Bursa). Cheese is a suitable food for dieters and people suffering from high cholesterol because of its low calorie and low fatty content. Since long-duration of high temperature is applied during manufacturing, it does not pose a health risk (Anonymous, 2010).

In a study on cheese consumption carried out in USA, consumption by household is analyzed using IHS Double–Hurdle Model. It has been concluded that, the

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Table 1. Distribution of sex of the consumers within civil cheese consumption groups (%)

Civil cheese consumption	Female	Male	Total
None	2.57	1.84	4.41
Sometime	16.18	8.46	24.63
Always	40.07	30.88	70.96
Total	58.82	41.18	100.00

income and the ages of the household affect the consumption positively while for the Black and Asian people it affects negatively. Yen and Jones (1997), Dagdemir (2000), Pape (2004), Kamber (2005), Arnade et al. (2008) and Gabay et al (2009) also conducted studies based on cheese production and marketing.

The purpose of this study was to identify the factors affecting civil cheese consumption in Erzurum as well as effectiveness of these factors. Consumption of civil cheese is on the rise, and to determine the factors influencing the consumption is every essential in terms of directing the tendencies of consumers and increasing the production.

MATERIALS AND METHODS

The data were acquired from face-to-face surveys conducted in 2009. Survey number was set to be 272 based on Proportional Sampling Method (in 95% confidence interval and 5% mean deviation) (Newbold, 1995; Miran 2003). The questionnaire was implemented with a total of 272 randomly selected consumers in the district of Yakutiye, Aziziye, Palandöken in Erzurum Province.

Limited Dependent Variable Regression Models were used to identify dependent variable. Dependent variable showing two conditions indicates the probability of existing and not, existing of an event. In the case that an event happens, dependent variable becomes '1', if it does not, it becomes '0' (Gujarati, 1995; Yavuz 2001). Ordered logit is a generalization of the popular logit analysis, used for ordinal multinomial dependent variables. It can be thought of as an extension of the logistic regression model for dichotomous dependent variables, allowing for more than two (ordered) response categories. The ordered logit model allows the dependent variable (cheese consumption level) to assume values which are in order. Dependent variable, level of civil cheese consumption, is divided into three groups (none: 0, sometime: 1, always: 2).

In this study, do not eat civil cheese at all (Y = 0), sometimes consume (Y = 1) and those who consistently consumed (Y = 2) were included. Limited dependent variable econometric model is shown the following equation. Hence:

$$y_i^* = \beta_0 + \beta_1 X_i + [$$

Where, the left hand side (y_i) is refers to the level of cheese consumption. y_i^*, Unobserved civil cheese consumption level, y_i, Level of civil cheese consumption, y_i, 0 if $y^* \leq 0$, indicating the consumer don't eat civil cheese at all (none), y_i, 1 if $0 \leq y^* < \mu$, indicating the consumer sometime consume (sometime), y_i, 2 if $\mu \leq y^*$, indicating the consumer always consume (always). μ is unknown parameters to be estimated with an estimated β. In the right hand side of the model presents explanatory variables, x, a constant and the error terms.

The explanatory variables using in the econometric analysis are as follows. Birthplace (Birthplace of the consumer (Erzurum: 1, Others: 0)), residence (Duration of residence in Erzurum), marital status (Marital status of the consumer (Married: 1, Other: 0)), income (Monthly income of the consumer), food Expenditure (Average monthly food expenditures of the consumer), continuation of affairs with village (Link with the village of the consumer), milk products expenditure (Average monthly expenditure of milk products)

RESULTS AND DISCUSSION

In survey area, females and males constitute respectively 58.82 and 41.18% of the consumers participated in the survey. The percent of females and males stating that they always consume civil cheese were 40.07 and 30.88%, respectively (Table 1). The proportions of consumers born in Erzurum or in another provenience were 81.99% and 18.01, respectively. The people who never consume civil cheese constitute 1.47% of consumers from Erzurum. On the other hand, 64.34 % of the consumers from Erzurum always purchase civil cheese. In another study, 2.94% of participants never consume civil cheese and 6.62% of them always consume civil cheese (Table 2).

The ages of the consumers participated in the survey varied between 17 and 72. The distribution of age groups was as follows: 10.29% between 17 and 25, 66.54% between 25 and 50, and 23.16% between 50 and 72. People between the ages of 25 to 50 make up the largest proportion of the people who never or always consume civil cheese (Table 3).

When the education level was taken into account, analphabetic people made up the smallest proportion with 2.57% whereas high-school graduates made up the largest proportion with 28.68 percent. While 4.41% of these consumers never consume civil cheese, 25.00% of

Table 2. Distribution of birthplace of the consumers within civil cheese consumption groups (%).

Civil cheese consumption	Other	Erzurum	Total
None	2.94	1.47	4.41
Sometime	8.45	16.18	24.63
Always	6.62	64.34	70.96
Total	18.01	81.99	100.00

Table 3. Distribution of age of the consumers within civil cheese consumption groups (%).

Civil cheese consumption	17-25	25-50	50-72	Total
None	1.84	2.21	0.37	4.41
Sometime	4.78	16.54	3.31	24.63
Always	3.68	47.79	19.49	70.96
Total	10.29	66.54	23.16	100.00

Table 4. Distribution of education level of the consumers within civil Cheese Consumption groups (%).

Education	None	Sometime	Always	Total
Illiterate	0.00	0.37	2.57	2.94
Literate	0.00	0.74	7.72	8.46
Primary school	0.37	1.47	15.81	17.65
Secondary school	0.00	4.04	10.30	14.34
High school	1.84	7.72	19.12	28.68
University	2.20	10.66	15.07	27.94
Total	4.41	25.00	70.59	100.00

them sometimes consume and 70.59% of them always consume it (Table 4). The income of the consumers varied between 450 and 4000 Turkish Liras (TL) and their average income was 1620.63 TL. The consumers' food expenditure was approximately 562.19 TL. As they allocate 67.75 TL of the food expenditure for dairy products, they spend 37.60 TL of this amount on purchasing cheese. 16.42 TL of the money allocated for total cheese expenditure is spent for civil cheese (Table 5).

In order to analyze the factors affecting consumption of civil cheese, we ran an ordered logit regression model of civil cheese consumption against consumer socio-economic characteristics. The explanatory variables in the model, the estimation results and Odds Ratio are shown in Table 6. LR $\chi^2_{(7)}$ value of the ordered logit regression model (p=0.000) shows that the model is statistically usable. Although the relationship between the time spent in Erzurum and consumption is not statistically significant, its influence is as expected. The time spent in Erzurum affects the dependent variable positively. Namely, as the time spent in this city increases, the individuals get accustomed to the taste of civil cheese and begin to consume it. Although the effect of food expenditure is statistically insignificant, its affect is again as expected. The more proportion of monthly income is allocated for food expenditures, the more amount of money is allocated for purchase of civil cheese. Accordingly, as the proportion for food expenditures increases, the consumption of civil cheese increases (Table 6).

There is a positive relationship between civil cheese consumption and birthplace. People born in Erzurum consume more amount of civil cheese than the other people do. The ones born in Erzurum get accustomed to taste of civil cheese since very young ages. This means that this cheese type appeals to the taste buds of people born in Erzurum more than those only residing in Erzurum. This result is statistically significant (p<1%). In the research area, the probability of people born in

Table 5. Descriptive statistics of variables.

	Minimum	Maximum	Mean	Std. dev.
Income	450	4000	1620.63	740.02
Food Expenditure	100	1200	562.19	236.35
Milk products expenditure	20	200	67.75	36.81
Cheese expenditure	15	100	37.60	20.67
Civil cheese expenditure	0	48	16.42	10.98

Table 6. Ordered Logit estimation results.

	Coefficient		Std. error	Odds Ratio		Std. error
Birthplace (Erzurum: 1, Others:0)	1.3626	*	0.4399	3.9064	*	1.7182
Residence	0.0098		0.0121	1.0099		0.0122
Marital status (Married: 1, Others: 0)	0.7405	**	0.3492	2.0971	**	0.7322
Income	-0.0005	**	0.0002	0.9995	**	0.0002
Food expenditure	0.0010		0.0009	1.0010		0.0009
Continuation of affairs with village	1.5813	*	0.3300	4.8614	*	1.6042
Milk product expenditure	0.0108	**	0.0052	1.0108	**	0.0053
/cut1	-0.6969		0.5555	-0.6969		0.5555
/cut2	2.1841		0.5591	2.1841		0.5591
Log likelihood =	-156.7095			-156.7095		
LR chi2(7) =	93.48	*		93.48	*	

*0.01, **0.05 in significant level.

Erzurum to be in the group of people consuming always civil cheese is 3.91 times higher than the probability of being in the group consuming it sometimes or never, compared to people born in somewhere else. Similarly, probability of people born in Erzurum to be in the group consuming civil cheese always or sometimes is 3.91 times higher than the probability of being in the group consuming it never, in comparison with the other people (Table 6).

There is also a positive relationship between civil cheese consumption and marital status. Married people consume more civil cheese compared to single ones. This result is statistically significant (p<5%). Compared to single consumers, the probability of married consumers to be in the group consuming always civil cheese is 2.10 times higher than the probability of being in the group consuming it sometimes or never. In a similar manner, the probability of married people to be in the group consuming civil cheese always or sometimes is 2.10 times higher than the probability of being in the group consuming it never, compared to single ones (Table 6).

There is a negative interrelation between civil cheese consumption and income of the consumers. That is to say, civil cheese consumption decreases as the income of the consumer increases. One of the most important reasons is that consumers whose incomes rise begin to consume different types of cheeses. Another important reason for this is the decline in the affairs between the consumers whose incomes are growing and the village. This is a statistically significant result (p<5%). In the survey area, as the income of the consumers increase 1 TL, the probability of being in the group of people consuming always civil cheese will 0.05% times less than the probability of being in the group consuming it sometimes or never. In the survey area, as the income of the consumers increase 1 TL, the probability of being in the group always consuming civil cheese will be 0.05% times lower than the probability of being in the group consuming it sometimes or never. In other words, the consumers whose incomes are growing tend to be in the group consuming it never (Table 6).

There is again a positive interrelation between civil cheese consumption and continuation of affairs with village. Namely, the consumers who are in touch with

their villages consume more amount of civil cheese. These consumers can determine the amount of the civil cheese they need, and they may order it from the producers they know. In brief, the consumers have access to mouth-pleasing civil cheese through a producer they trust in. This finding is statistically significant ($p<1\%$). The probability of consumers having no connections with their villages to be in the group consuming always civil cheese will be 4.86 times higher than the probability of being in the group consuming it sometimes or never, in comparison with people being in touch with their villages. Similarly, the probability of consumers in touch with their villages to be in the group consuming always or sometimes civil cheese will be 4.86 times higher than the probability of being in the group consuming it never, in comparison to ones whose affairs with their villages have been diminished (Table 6).

There is a positive relationship between civil cheese consumption and average monthly expenditure on dairy products. Namely, as the proportion of the money allocated for dairy products increases, the proportion allocated for civil cheese also increases. This is again a statistically significant result ($p<5\%$). In the research area, as the average monthly income of the consumers increase 1 TL, the probability of being in the group of people always consuming civil cheese will be 1.01 times higher than the probability of being in the group consuming it sometimes or never. Correspondingly, as average monthly expenditure on diary products increases 1 TL, the probability of being in the group always consuming civil cheese will be 1.01 times higher than the probability of being in the group consuming it sometimes or never. That is to say, the consumers allocating more money for dairy products tend to be in the group consuming civil cheese (Table 6).

Conclusion

There is a positive relationship between civil cheese production and birthplace, marital status, continuation of affairs with village and dairy products expenditure. In the survey area, consumers born in Erzurum tend to purchase civil cheese in much more amount in comparison with ones born in other provinces. In order to increase the civil cheese consumption of the people living in Erzurum but not born there, this cheese type should be taken to markets in more hygienic conditions and as a convenience food in suitable packages. People who stay in touch with their villages consume more civil cheese than the other group. The accession of the other group -whose village affairs has diminished- to civil cheese produced in hygienic and quality conditions should be facilitated. The proportion of the money that consumers allocate for dairy products should be increased to ramp up the civil cheese consumption. For his purpose, the awareness of the consumers about the goodness of milk and milk products can be raised. The civil cheese, which is purchased widely in Erzurum, should be released on the market after branding processes as means to ramp up its countrywide purchase. Additionally, advertisement putting emphasis on the naturalness and quality of animal products may contribute to increases in its countrywide sales.

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