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The Econometric Analysis of Factors Affecting the Demand for Frozen Food; The Case Study in Erzurum Province

Murat Külekçi* Adem Aksoy, Abdulkadir Topaloğlu

Department of Agricultural Economics, Faculty of Agriculture, Ataturk University, 25240-Erzurum-Turkey

*Corresponding Author
E-mail: mkulekci@atauni.edu.tr

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Abstract

In this study, the factors affecting the demand of families living in Erzurum province Central County towards frozen food have been studied to be identified. The number of samples has been determined as 335 ea by means of the unclustered one-stage simple random sampling method based on the universe rates. In the research, the consumption method has been guessed through multi logistic regression analysis. The forward stepwise technique has been used to understand whether the independent variables are important or not for logistic regression.

There is a positive relationship between such independent variables as the education level and status of the mother and the income of the family and the consumption of frozen food. It has been found out that the increase of the education level of the mother and the income of the family raise the consumption of frozen food.

Key Words: Demand, frozen food, modellingg.

INTRODUCTION

The agriculture sector in Turkey has a great potential as the geographical and ecologic properties are appropriate. The sector has a serious importance in terms of meeting the need of the country population for essential food products, providing raw materials for the industry sector, improving demand for industrial goods and contributions to the national revenue and export. The frozen food industry has an active role in making use of Turkey's said potential.

It is very significant for consumers and producers that the agricultural goods are well-protected and that they are available in internal and external markets in every season. Therefore, one of the most applicable ways is freezing products in order to balance the production and marketing as well as utilization of especially easily-decaying food.

While the annual frozen food consumption per person is 51 kg in the USA, it is 23 kg in Europe. As for Turkey, it is just 0.4 kg. It is seen through the numbers that the frozen food consumption of Europe will be increasing in many years. By these numbers, we see that the consumption in Turkey is 46 times less than Europe and 100 times less than the USA. This shows that the frozen food sector will be a rapidly growing sector [1].

A study was conducted to determine the releationships between frozen food consumption and socio-economics traits in Erzurum province. In that study, unclustered probability sampling method was used. They found that there was a linear connection between frozen food cunsumption and income level. The number of education person living at study area were higher than those of uneducated and illitareted persons. In addition, as the number of person in family increased. It was determined that consumer prefer frozen foods because of easy preparation of frozen foods and the rational use of their times. The most-important in formation source on frozen food is television with 35,5% [2].

Senaur, who searches the consumption trends in the USA food system and the importance of them in the food system, has investigated how the democratic qualities of a family, life styles, division of the market and introduction of women into business life affect consumption habits in is research. He has found out that especially with the increase of the importance of women in business life, consumption habits have changed and the consumption of frozen food has increased [3].

MATERIAL AND METHOD

The data of the research consists of information obtained by face-to-face interview with families who were selected through sampling method in Erzurum province Central County. The survey forms used in previous studies related to the subject have been reorganized in a way compatible to the purpose, the prepared survey form has first been used in a pilot region. Thanks to the results obtained by those pilot surveys, the deficiencies of survey forms have been supplied and main surveys have been prepared.

The number of samples in this study has been set through the "Unclustered One-Stage Simple Random Sampling Method Based on The Universe Rates". In consumer researches, this sampling method is used when there is no information about the qualities (variance) of the universe [4].

n = t 2 (P.Q) (E)2

t = %95, 0 the t table number showing the level of importance

b = Sampling stage

P = the probability of the realization of said event

Q = the improbability of the realization of said event

E = the error accepted in the sampling

The unclustered one-stage probability sampling method will be in the above-stated formula (b = 1) and the formula will be turned into the above-stated formula.

According the results of the pilot survey conducted in this study, it is accepted that 70% of people living in Erzurum province center buy frozen food. This rate gives the maximum sample volume in the level of permitted error rate. In this study,

5% margin of error has been accepted. Therefore, the number of samples to be accepted has been determined by means of the below-stated method and the number has been set as

n = (2)2 (0.7)(0.3) (0.05)2 = 336

Dadaşkent and Palandöken, which are among Kazım Karabekir and Yakutiye sub municipalities situated in Erzurum province Central County, where the main population lives, are grouped together as they have similar socio-economic qualities. Districts that can represent high, middle and low income groups in stratification have been set depending on the information obtained from the Metropolitan Erzurum Municipality Science Affairs Department Chairmanship, Erzurum Social Solidarity and Cooperation Fund, State Statistics Institution Social Surveys Department. Out of the determined districts; Kazım Karabekir district represents the high income group, Aziziye district the low income group and Hacı Ahmet Baba district the middle income group. The families with whom to conduct the surveys have been determined in a random way.

The data obtained through the survey in the study have been installed on the computer by means of a specific coding plan and variance analysis, hypothesis tests, multi variance and autocorrelation have been done using Shazam package program [5]. In this study, the aim of using distraction analysis is testing whether there are important differences between the average qualities of two groups defined before the analysis. The distraction analysis has been conducted with two groups of families that buy and do not buy frozen food.

RESULTS AND DISCUSSION

In the research, the consumption model has been determined by means of multi-logistic regression analysis method. In order to understand whether independent variables are important or not, the forward stepwise has been used for logistic regression.

Logistic regression models are those which show the relationship between variables measured through a weak scale. Generally, the realization of an asserted thing is marked as 1 while the opposite is marked as 0. As the normalcy supposition cannot be possible usually, t and F tests are not used in the goodness- of-fit tests of the model. Instead, non-parametric tests such as chi-square (x^2), G^2 are used [6]. In this study, qualities that differentiate families consuming frozen food and not have been determined and regression analysis has been conducted and a model for demand has been formed. At the end of the analysis, independent variables that have made it the most possible to differentiate the groups are found.

At first, the variables that differentiate these two groups have were thought to be income level, status of the mother, education level of the mother, duration of living in the city, the father's job, possession of a microwave oven, possession of a deep freeze, possession of a house, possession of an automobile, number of working members, life period of the family, number of the family members and the average food expenditures. In the model formed among these variables through experiments, education level of the mother, number of the family members, status of the mother, possession of a deep freeze, possession of a house, possession of an automobile, life period of the family and income level have been accepted as independent variables because they can explain the model well.

Model of frozen food consumption:

CFF= f (ELM, NFM, SM, PH, PA, PDF, LPF, IL)

In the equation:

CFF	:	Consumption of Frozen Food
ELM	:	Education Level of the Mother
NFM	:	Number of the Family Members
SM	:	Status of the Mother
PH	:	Possession of a House
PA	:	Possession of an Automobile
PDF	:	Possession of a Deep Freeze
LPF	:	Life Period of the Family
IL	:	Income Level

In the supposition using these said variables, the right grouping rate has been found as %91.1. The model's chi-square (x^2) test statistic is 38.673. Under the light of all these studies, the below model has been formed.

As it can be seen in this model, those consuming frozen food have differed from those not using frozen food in terms of many factors. When we examine the P-VALUE of variables in sd: 8 degree of freedom under 5% importance level, education level of the mother, number of family members, status of the mother, possession of a house, life period of the family and level of income are quite important (Table 1)

Table 1. Results of the Demand Model for Frozen Food

	Coefficient	Standard error	Wald	P-value	Sd	Exp(B)
α	−3.406	1.453	5.499	0.019	1	0.033
ELM	1.097	0.222	24.349	0.000	1	2.996
NFM	−0.527	0.173	9.271	0.002	1	0.590
SM	0.103	0.698	0.022	0.003	1	1.109
PH	0.624	0.392	2.533	0.012	1	1.866
PA	0.063	0.705	0.008	0.929	1	1.065
PDF	−0.339	0.780	0.188	0.664	1	0.713
LPF	−0.638	0.200	10.184	0.001	1	0.528
IL	2.047	0.399	26.281	0.000	1	7.746

While the independent variables of education level of the mother, status of the mother, possession of a house, possession of an automobile and level of income are directly proportional with the consumption of frozen food, the independent variables of number of family members, possession of a deep freeze and life period of the family are inversely proportional with the consumption.

The independent variables that affect the families' consumption of frozen food in a positive way are the education level of the mother, status of the mother, possession of a house- and income. Possession of a house and automobile are directly related to prosperity. The priority of needs of a family that does not have a house and a family that does will be different. In this research, possession of a house has been thought as an indicator of real prosperity. A family that has a house will be more interested in its other needs in the second stage. Therefore, possession of a house is an important explanatory variable in the model for frozen food consumption.

It can be concluded according to the consumption model seen in Table 1 that as the number of family members increases, the consumption of frozen food decreases. It can be said that families with few or no children consume more frozen food. The possession of deep freeze is unimportant in explaining the model. It cannot be said that people owning deep freeze consume more frozen food. Income level is directly proportional with the consumption of frozen food. Income may be inadequate in presenting personal prosperity under some circumstances.

One must adjust one's income according to the needs. However, it can be said that people having high income levels demand frozen food quite a lot. The income forecaster in the model is meaningful and important to explain the model. There is a meaningful relationship among the independent variables of the education level of the mother, number of family members, status of the mother, possession of a house, life period of the family and income. There seems to be no meaningful relationship between the possession of an automobile and deep freeze and the model.

In Table 2, the supposed data of new group membership done with 8 independent variables has been examined. According to Table 2, 93.3% of 193 families consuming frozen food at the beginning have been supposed to continue consuming and that 6.7% of them to stop consuming. Although there are 143 families that did not use to consume frozen food previously, 11.9% of this group has been supposed to be included in the consuming group and 88.1% to remain in the same group.

Table 2. Supposition of Group Membership in Logistic Regression Analysis

Existing Group	Supposed Group Membership					
	Number of Families	%	Consumer		Non-consumer	
			Family	%	Family	%
Not Consuming Frozen Food	143	42.6	17	11.9	126	88.1
Consuming Frozen Food	193	57.4	180	93.3	13	6.7
Total	336	100.0				91.1

To sum up, it is seen that this model is a valid and applicable model. According to the findings and results of the research, consume of frozen food is related to the prosperity and most of the people consuming frozen food have a summer house, deep freeze, microwave oven, automobile and house.

The results obtained from the model support the previous literature studies. There seems to be a positive relationship between the independent variables as the education level of the mother, status of the mother and income of the family and the consumption of frozen food. The increase of the mother's education level, working and the increase of the family income increase the consumption of frozen food. In a research on "the Consumer Behaviors and the Attitudes and Behaviors of Consumers in Ankara Province Towards the Frozen Fruit and Vegetables", the consumption and usage of frozen fruit and vegetables has been examined. It has been stated that the education level of family members affect the purchase of frozen food. It has been detected that as the education level of family members increases, the consumption of frozen food increases in a positive way[7]. In a similar research conducted with 220 families living in Thessalonike region in Greece; factors affecting the consumption of frozen meat have been set. As a result, it has been found out that the income level of the family, education level of the mother, whether she works or not and possession of a deep freeze affect the consumption of frozen food in a positive way [8].

Frozen food is an attractive field of activity for industrialists because their added value is high and they are very appropriate for export as well as the fact that they face an increasing domestic demand. Rich natural resources such as soil, water and climate diversity of Turkey, its appropriate geographical status between the Western and Eastern markets, the increasing population and growing economy show that the importance of frozen food will continue in the future, too.

The frozen fruit and vegetables sector in Turkey is a field of activity that has started to develop completely regarding to export. The increasing urbanization rate and also the increase in the demand for practical as well as healthy food have created a significant demand increase in domestic consumption recently. Although there is an important increase in the demand rate, Turkey is considerably behind the developed countries in terms of the consumption of frozen food.

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