THE FACTORS THAT AFFECT SMOKING PROBABILITY AND SMOKING EXPENDITURES IN TURKEY

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Abstract

In this study, effort has been paid to determine the probability of smoking of individuals and demographic and social-economic factors that affect the size of expenditure on smoking. Cross-section data obtained from survey were used in this study. According to econometric estimation results; the factors that have significant impact on the probability of smoking are gender, graduation from higher education, coming to the age of 50 or over, presence of smoking persons among housemates, and income level at or more than 2.000 TLs. The factors that affect the size of expenditure on smoking are gender, income, graduation from higher education, presence of smoking persons among housemates and majority of people smoking in social environment.

Keywords: Smoking, smoking expenditure, logit model, Turkey

1. INTRODUCTION

Smoking is an important problem which never loses its global gravity and requires urgent solution due to the health problems it causes. In Turkey, the Act no. 5727 on "Amending the Law no. 4207 on Prevention and Control of the Harms of Tobacco Products" represents the transition to a more advanced level in terms of the struggle against smoking. This act introduced important changes to the struggle against smoking and brought about positive repercussions in the public.

Smoking is a widespread habit which is extremely harmful to the public health. Some of the factors that affect the importance of smoking for public health include, without limitation, the following; (I) it can form a habit in a very short time, (II) it is easily accessible in every corner of of the globe, (III) it is a threat not only to smokers, but

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also to the non-smokers in a smoking environment.

Another feature of smoking is the fact that, as its harmful consequences do not show themselves shortly, smokers do not pay enough attention (Tekbas et al., 2006), and when they become apparent, it is often too late to quit due to the addiction that it created; (I) it takes a long time for smoking to show its harmful effects, and (II) smokers do not behave sensitive and conscious enough on the harms of smoking, as a result of which smoking-related health problems and deaths increase (Who Mpower, 2008).

Smoke is the only product whose every dosage harms the health of its consumers when it is used according to the recommendation of its producer. It is also the only legally sold product which causes death when used on a regular basis (Who Mpower, 2008). It is known that smoking causes some 50 different diseases, 20 of which are lethal. Smoke hosts more than 4000 chemical substances which are poisonous, irritant, and carcinogen or which eases the appearance of cancer, 50 of which are known to cause cancer (http://www.ssuk.org.tr).

Smoking has the primary rank among preventable causes of death. Number of people dying from smoking is more than the number of people dying from AIDS and malaria. For example, in the USA, smoking is responsible for 20 % of deaths. It is estimated that 45 % of smokers will die due to a smoking-related disease. In the USA, 400 000 people die every year due to smoking-related diseases. In the USA only, some 53 000 people lose their lives due to being in smoking environments. Young kids constitute the group which is most severely affected by smoking (http://www.saglikli kadin.com).

It is a well-known fact that, in Turkey, 90 % of lung cancers are smoking-related; another fact is that non-smoker patients with lung cancer caught this disease due to second-hand smoke. The risk of getting lung cancer for smokers is 20 times more than that of non-smokers (Toraks Foundation, 2005).

There is a vicious circle between smoking and poverty. In all parts of the world, the neediest people are also the heaviest smokers; therefore, it is the poorest people who suffer most from smoking-related diseases. Smoking is the cause of death of some 5 million people every year. One person in every 8 seconds dies from smoking. If current tendency continues, it is estimated that smoking-related deaths will exceed 8 million annually by 2030. In addition, it is expected that more than 80 % of these deaths will be witnessed in developing countries. Fast population growth and legislations insufficient for the fight against smoking compared to developed counties is the reason for which smoking industry focuses on these countries and improve their customer base with aggressive marketing tactics (Who Mpower, 2008). In addition, smoke producers can sell in developing markets those products with high level of bitumen and nicotine which cannot be sold in developed markets due to legal obstacles (Piskin, 2008).

In Turkey some studies have been conducted recently on smoking habits of certain student or occupation groups. For example, studies conducted by Kisioglu et al. (2004), Kutlu & Civi (2007), Kutlu & Civi (2006), Yazıcı & Sahin (2005), Tekbas et al. (2006), Nehir et al. (2007), Ceylan et al. (2005), Orak et al. (2004) are among the most prominent. Some of these studies handle only the health dimension of the problem, while some others focused on behavioural aspects. There are two other

studies similar to this one which handle smoking in its economic aspect based on econometric estimation method: (I) the study conducted by Emec et al. (2006) based on Turkish Statistical Institute (TURKSTAT) Household Budget Survey data of 2003; and (II) the study of Onder (2002 and 2003) based on the TÜİK Household Budget Survey Data of 1994.

2. ECONOMIC ASPECTS OF SMOKING

2.1. Smoking and Related Expenditures in Turkey

Some provisions of the Act on Prevention and Control of the Harms of Tobacco Products came into force on May 19th, 2008, which marks the beginning of a new era in the fight against smoking. Comprehensive limitations are now in force as to smoking-permitted areas. Smoking is prohibited in all closed areas of education, health, commercial, social, cultural, sports and entertainment facilities as well as road, railroad, sea and air public transport. Smoking-related advertisements are almost completely banned. The prohibitions imposed by law are supported by serious monetary sanctions.

According to the estimations of National Committee of Smoking and Health, there are some 17 million smokers in Turkey. Almost 100.000 people lose their lives every year in Turkey due to smoking-related health problems. If current smoking tendency continues, this number is expected to rise to 250.000 people in the next two decades (http://www.sigara.gen.tr).

In Turkey 5.375 billion packs of cigarettes were produced in 2007 (http://www.tapdk.gov.tr). Taking smokers into account, 316 packs of cigarette is consumer per person annually. Turkish people are expenditure 17 million USDs on smoking daily and 6.5 billion USDs annually. In addition, some 2 billion USDs are spent on health due to smoking-related diseases. As a result, annual cost of smoking expenditures and treatment of smoking-related diseases to the Turkish economy reaches some 8,5 billion USDs (http://www.ssuk.org.tr).

Almost two-thirds of smokers live in China. Turkey has the 10th largest smoking population in the world. Smoking rate in Turkey is considerably high when compared to other OECD countries. Turkey ranks 2nd among OECD countries following Greece, where 38.6 % of adult population smokes every day, Table 1. Smoking habit is more common among male population in Turkey.

Table 1. Ratio of Smokers among Adult Populations in Selected OECD Countries, 2005

Countries	Males	Females	Total
Greece	46	31,3	38,6
Turkey	**51,1**	**17,8**	**32,1**
The Netherlands	35	26	31
Hungary	36,9	24,6	30,4
Japan	45,8	13,8	29,2
Spain	34,2	22,4	28,1
Switzerland	31	22,8	26,8
Mexico	39,1	16,1	26,4
Denmark	29	23	26
OECD	29,8	19,3	24,3
Germany	29,8	19,1	24,3
United Kingdom	25	23	24
France	28	19	23
Italy	28,7	16,4	22,3
Belgium	23	16	20
Canada	19,1	15,5	17,3
Portugal	26	9	17
USA	19,1	14,9	16,9

Source: OECD Health at a Glance 2007

51.1% of adult males in Turkey are smokers, compared to 17.8% of females. The ratio of smoking among females is lower than OECD average, but the ratio of smoking among males is considerably higher.

2.2. Smoking Expenditures and Household Budget

Smoking is not only an unhealthy habit but it is also an expensive one. Smoking-related expenditures decrease the level of some vital expenditure which also includes basic needs. Wang et al. (2005) found out that smoking-related expenditures have a negative impact on investments on education, health, insurance and business. This impact of smoking expenditures means that smoking habit not only affects the smoker but it also has negative consequences for non-smoker members of the family (Wang et al., 2005).

Smoking rate increases fast in countries with low and medium income where most of the world population lives. In these countries which are mostly inhabited by low-income households, smoking rate increase, which causes considerably loss of resources (Who Mpower, 2008).

The share of smoking-related expenditures in poorer countries represents an important figure in household budget, which requires renunciation of most basic needs of non-smoker family members. One study conducted in Bangladesh concluded that smoking-related expenditures considerably decrease the share of nutrition of children and other basic expenditures (Efroymson et al., 2001). Another study conducted in China found out that expenditures on smoking and alcoholic drinks per person exceed health-related expenditures (Gong et al., 1995; Wang et al.,

2005).

In addition to inhaling second-hand smoke, the non-smoking members of family feel the negative effect of smoking as the resources that should be allocated to basic needs of the family are spared to smoking and treatment of smoking-related diseases.

As smoking turns itself into an addiction in a short period, smokers do not show serious reactions against changes in the price of tobacco products, for which reason price increase imposed by tobacco companies or an increase in taxes levied on tobacco products do not bring about considerable decline in the demand for tobacco products. As a result, any increase in their price means a growth of the smoking-share of household budget and a decline in the share allocated to other needs.

Hersch found out that price elasticity of smoking-related expenditures vary between -0.4 and -0.6 and that there is a negative correlation between level of income and price elasticity of the demand for tobacco products. According to his data, the reaction against changes in the price of tobacco products is especially negligible in higher income levels (Hersch, 2000). In his study covering the period between 1960 and 2000, Onder found out that price elasticity of the demand for tobacco products is -0.19, which means that the reaction towards an increase in the price of tobacco products is more negligible than the reaction shown in most countries (Onder, 2003).

3. FACTORS THAT AFFECT SMOKING

Literature is filled with several studies with the purpose of presenting the factors that affect the decision to start and continue smoking. These studies have showed that

factors including, but not limited to, the level of education, gender, family and parental characteristics, marital status, peer groups, migration from rural areas to urban areas, advertisements, level of income, availability of tobacco products, status at workplace, number of changes of workplace, work satisfaction, number of daily working hours, level of stress etc. affect the behaviour of starting and continuing smoking (Chen et al., 2004; Hersch, 2000; Bobo, 2000).

3.1. Relation of Level of Education and Income to Smoking

It is known that people in lower positions in social and economic terms are more inclined to smoking. It is expected that, when an individual's level of education and income increases, which are among the most important determinants of one's social and economic status, the probability of smoking should decline. One study conducted in Malaysia and Thailand showed that smoking frequency of the people who had no education is twofold of that of the people with primary education, and that as level of education and income increases, the probability of smoking decreases, This study also displayed that people with more education and income in Thailand are less willing to quit smoking and have less self-confidence in quitting smoking. Similar findings were found in Malaysia, according to which it can be stated that a rise in the level of education and income in developing countries has more limited positive impact on smoking and quitting smoking compared to developed countries (Siahpush et al., 2008). Hersch, concluded in his study for USA that the demand for tobacco products is hardly affected by changes in income. His study displayed that a rise in the level of

education has a very strong negative impact on smoking (Hersch, 2000).

Some studies conducted in Turkey have concluded that a rise in the level of education increases the probability of smoking. In particular the smoking habit of females in Turkey is positively correlated with level of education. The more educated a woman is, the more likely she is to smoke (Toraks Foundation, 2005). Önder and Emec et al. display similar findings.

3.2. Parental Features and Smoking

Some views claim that some features of parents have an impact on the arising of smoking behaviour, among which are the status of parents in working life, whether they are blue-collar or white-collar workers, whether they are hired or self-employed, their education level, their smoking habits etc (Fagana et al., 2005). Some studies determined that when parents smoke, children are more inclined to smoking (Gritz et al., 1998; Flay et al., 1989).

Factors like the pattern of relationship between parents and the child, parental attention paid to the child etc. affect the probability of smoking (Bobo, 2000). In their study conducted on students enrolled at Harran University, Ceylan et al. (2005) concluded that students with smoking family members had a higher probability of smoking compared to other students (Ceylan et al., 2005).

Other than the negative impact of parents on starting to smoking and continuing with smoking behaviour, it also has a series of negative impacts on the health of children. Even if other social-economic and demographic factors are identical, it is known that children who grow up in families with smoking members have weaker

immunity systems, are more exposed to respiratory infections, and are more likely to suffer from malnutrition. It is also known that pregnant people who smoke have higher probability of miscarriage, premature birth and infant death. In addition, when a mother, who is the first provider of health service to the baby and her caretaker, smokes, the health of that child suffers from solemn consequences (Bonu et al., 2004; Hersh, 2000).

3.3. Smoking and Peer Groups

As in the case of all addictive materials, features of the social environment of an individual are among the factors that increase the risk of smoking. School and peer groups are important environmental factors that affect the probability of smoking. School is the first societal unit where individuals establish social relations other than their families and interact with others. Education institutions, which prepare individuals for life and which try to provide them with positive patterns of behaviour, can also be the forums where negative behaviours are developed (Kutlu & Civi, 2007).

Most students start smoking as a result of social interactions or identification efforts. Many studies emphasize the importance of peer groups and social environment in the process of starting to smoke (Yazici & Şahin, 2005). According to Ceylan et al. (2005), one of the most important reasons for starting to smoke is peer groups..

It is generally accepted that spare time activities of an individual during school years and their peer groups when filling their spare time are among the factors that affect smoking. It is also accepted that smoking affects success at school and the yield of education after graduation (Fersterer &

Winter-Ebmer, 2003). In their study where they researched the factors that affect smoking among university vocational schools, Kutlu & Civi (2006) determined social environment and peer groups as the most influential factors among smoking-starters (43.5 %).

A research by a pharmaceutical company conducted on 2510 smoker subjects in USA, Canada, Mexico, France, Germany, Spain, Sweden, United Kingdom, Japan and South Korea, it was found out that peer groups has the biggest share among reasons for smoking with 31 %, whereas family was reported to have a share of 24 % (http://www.zaman.com.tr).

4. DATA

This study, which is conducted with the purpose of determining the basic factors that affect the probability of smoking and smoking-related expenditures, was planned in sectional type. Related data were obtained from a survey conducted in the hometowns of students of Faculty of Economic and Administrative Sciences, Usak University. The survey was conducted on 600 subjects chosen based on simple random sampling method. When surveys that included missing and inconsistent data were eliminated, 453 surveys were left which were believed to be complete and consisting reliable data, based on which analysis were conducted. When distributing the survey forms, attention was paid to make sure that survey sample sufficiently represents the social-economic and demographic elements that affect smoking behaviour. The survey consisted of questions that would determine some social and demographic features including age, occupation, level of education and income,

marital status, smoking behaviour of parents, smoking behaviour of the significant people in childhood years etc. as well as some questions which aimed to find out smoking profiles.

Research data were analyzed by means of transferring to a data program written on File Maker Pro 9.0 database programme. Econometric analysis was conducted by using Eviews 5.0 econometric package programme.

4.1. Social, Economic and Demographic Features of The Research Universe

58 % of respondents were males and 42 % was females (see Table A1 in the appendix). 53 % were between the ages of 18 and 35; 32 % were between 36 and 49; and 15 % were 50 and above. 34 % were single, 61 % were married and living with their spouses, and 5 % were separate or divorced. 2 % of respondent were illiterate, 2 % were literate with no education, 22 % were elementary school graduates, 10% were secondary school graduates, 34 % were high school graduates, 11 % were university vocational school graduates, 4 % had undergraduate vocational degrees, 14 % had other undergraduate degrees, and 1 % had graduate degrees. As regards vocational distribution, 17 % were workers, 20 % were government officials, 9 % were craftsmen, 6 % were farmers, 7 % were self-employed, 6 % were retired, 3 % were retired but working, 12 % were housewives, 12 % were students, and 7 % were unemployed. 43 % of the respondents made less than 1000 TLs[1], 40 % made 1000-1999 TLs, and 12 % earned more than 2000 TLs on a monthly basis. (total 95 %) 8 % of the respondents lived in villages with a population less than 2000; 16 % lived in places where 2001-20,000

people inhabited; 21 % lived in towns with 20,001 – 100,000 people, and 56 % lived in cities with a population bigger than 100,000 people (for more details please see Tables A1 and A2 in the appendix).

51 % of the respondents stated that they smoked on a daily basis, while 4 % said that they smoked occasionally. When we include the occasional smokers into the smoking group, we conclude that 55 % of the respondents were smokers. Accordingly, 55 % of the respondents are smokers, 13 % are non-smokers who used to smoke in the past, and 32 % are people who never smoked. 53 % of respondents live in environments with other smokers. 26 % of respondents were grown in families with no smoking members. 74 % of respondents were grown in families with at least one smoking member. 30 % of 278 married respondents have smoker spouses. 79 % of respondents reported that people generally smoked in their close social environment. 40% of the respondents who never smoked declared that they tried smoking at least once. 12% of these respondents tried smoking before they were 13 (for more details please see Table A2 in the appendix).

11 % of smoker respondents declared that their first experience with smoking was before the age of 13; 68 % reported it as the ages of 13-18, and 21 % stated that they tried smoking for the first time after they were 18. 2 % of respondents started smoking regularly before they were 13; 50 % started when they were 13-18, and 48 % started after the age of 18. Answers to the multiple-choice question which sought the most influential factors that urged them to start smoking displayed peer groups as the most important reason for smoking. Peer groups at school are the most influential peer groups. Other peer groups which urge people to start smoking are

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1 At the time of research 1 TL was equal to 0,77 USDs.

neighbourhood, military and working peer groups relatively. Stress based on economic, family-related and other reasons is reported among the most important reasons that urge people to start smoking (for more details please see Table A3 in the appendix).

93 % of smokers smoke on a daily basis and 7 % smoke occasionally. 97 % of smokers use filtered cigarettes while 3 % prefer other tobacco products. 66 % of smokers declared that they gave no reaction to the price increases in tobacco products. 52 % of smokers declared that they had unsuccessful attempts for quitting smoking in the last year; 50 % reported that they regularly smoked in the presence of their children, while 20 % stated that they occasionally smoked in their presence (for more details please see Table A4 in the appendix).

When the answers to the question which sought the most important reason for continuing smoking, addiction stood out as the most important factor, followed by family-related stress, peer groups, pleasure and economic problems.

5. ECONOMETRIC ANALYSIS

When conducting econometric analysis of the data, binary-logit model estimations were made in order to determine the factors that affect smoking probability of individuals (Table 2); then, ordered logit model estimations were established so that the factors which affect smoking expenditures could be determined (Table 3).

Variables used in models:
Dependent Variables:
Dependent variable of the binary logit model estimated in order to determine the

factors that affect smoking:
Y1 = 1 The subject is a smoker, 0 The subject is a non-smoker.

which is a dummy dependent variable with two values which represents smoking behaviour.

Monthly smoking expenditures is the dependent variable of ordered logit model (Y2) established for the purpose of determining the factors that affect smoking expenditures, which are included in the model as ordered categorical variable. Smoking expenditure (Y2) is grouped into four categories:

0:Subjects with no smoking expenditures,
1: Subjects who spend 5 TLs - 50 TLs,
2: Subjects who spend 50 TLs - 100 TLs,
3:Subjects who spend more than 100 TLs.

Independent variables:
Sex: *D1 = 1 Female, 0 Male.*

Marital Status:
D2 = 1 Married/divorced, 0 Single.

Level of education:
D3 = 1 Secondary school graduate, 0 Others;
D4 = 1 High school graduate, 0 Others;
D5 = 1 Associate or undergraduate vocational degree holder, 0 Others;
D6 = 1 Undergraduate or graduate degree holder, 0 Others.
Subjects with elementary school education or less are taken as the base class.

Age:
D7 = 1 Subject is between the ages of 36 and 49, 0 Others;
D8 = 1 Subject is 50 and older, 0 Others.
Subjects between the ages of 18 and 35 are taken as the base class.

Smoking behaviour of housemates:

D9 = 1 There are smokers among housemates, 0 There are no smokers among housemates.

Smoking behaviour of the housemates in childhood years:

D10 = 1 There were smokers among housemates in childhood years, 0 There were no smokers among housemates in childhood years.

Smoking behaviour of the close social environment:

D11 = 1 Most of the people in close social environment are smokers, 0 Most of the people in close social environment are non-smokers.

Monthly income:

D12 = 1 Monthly income of the subjects is between 1000 TLs and 1999 TLs, 0 Others;

D13 = 1 Monthly income of the subjects is above 2000 TLs, 0 Others.

Subjects with a monthly income of less than 1000 TLs are taken as the base class.

While binary logit model was being formed in order to estimate the factors that affect smoking, different demographic and social-economic factors were experimented as dependent variables, and the model gained its final version after several experiments. While forming the binary logit model, variables related to age, education, sex, marital status, occupation, monthly income, smoking behaviour of co-habitants and smoking behaviour of co-habitants in childhood years were included in the model based on which estimations were established. However, as all dummy variables included in the model in relation to occupational status turned out to be statistically insignificant, they were excluded

Table 2. Estimation Results of Smoking Probability Model

Variable	Coefficient	Standard Error	z-Statistic	Probability
Constant Term	-1.00286	0.43055	-2.3293	0.0198
D1	-0.83510	0.21750	-3.8414	0.0001
D2	0.31574	0.30515	1.0346	0.3008
D3	0.28597	0.39461	0.7247	0.4686
D4	-0.28853	0.31630	-0.9122	0.3617
D5	-0.12618	0.38437	-0.3283	0.7427
D6	-0.78780	0.39672	-1.9858	0.0471
D7	-0.40939	0.30306	-1.3508	0.1767
D8	-0.65070	0.36903	-1.7633	0.0779
D9	0.66418	0.22527	2.9484	0.0032
D10	0.37858	0.25248	1.4994	0.1338
D11	1.08963	0.27084	4.0231	0.0001
D12	0.56552	0.24297	2.3276	0.0199
D13	0.49302	0.33030	1.4927	0.1355

LR statistic (13df) =   73.689
McFadden R2= 0.12
Number of observations = 453

from the final version. Estimation results of the binary model related to the factors that affect smoking probability are given in Table 2.

According to these estimation results, following are determined as the factors that significantly affect smoking probability: sex, holding an undergraduate or graduate degree, presence of smokers among co-habitants, majority of smokers in social environment and a monthly income of minimum 1000 TLs.

It is also possible to calculate the probability value related to two valued dummy dependent variables based on the coefficients estimated in the binary logit model. Using this feature of the model, relative impact on smoking probability of the factors included in the model as independent variables is calculated.

According to the obtained data, the smoking probability of a male, single subject with an education level of elementary school or lower, between the ages of 18 and 35, with no smoking cohabitants at present and in his childhood, whose social environment consists mostly of non-smokers, whose monthly income is less than 1000 TLs is calculated as following:

$$P_I = \frac{1}{1 + e^{-(-1.003)}} = \frac{1}{3.73} = 0.268 = 27\%. \quad (1)$$

Statistical significance of the coefficient of the gender variable (D1) shows that gender has considerably affects smoking probability. According to estimation results, smoking probability of females, which is 13%, is lower than males. Being a female decreases the probability of smoking by 14%. Although some studies showed that gender is an important variable that affects smoking, some others concluded that it does

not represent a significant difference. Generally, it is accepted that smoking probability of a male is higher than that of a female (Bobo, 2000; Hersch, 2000).

When the subject is married or divorced, the probability of smoking increases to 34.5 %. The positive sign of the coefficient of the marital status variable (D2) is not unexpected; however, the fact that this coefficient is not significant statistically is an indicator that marital status is not an important factor that affects smoking. Some studies have found out that marital status is an important factor that affects smoking (Bobo, 2000); on the other hand, some others have display the contrary (Spangler et al., 2001).

When the subject holds a secondary school degree, smoking probability increases (33 %). When he/she holds a high school degree, the probability decreases to 22 %; if the subject has an associate or undergraduate vocational degree, smoking probability is 24 %. The fact that coefficients of these education levels (D3, D4, D5) are not statistically significant proves that holding a higher degree does not make a significant difference on smoking probability.

If the subject has an undergraduate or graduate degree, smoking probability declines to 14 %. The coefficient of this variable (D6) is statistically significant, which means that holding this degree is an important factor which affects smoking probability.

Results obtained related to education level are in considerable agreement with the findings of Önder (2003) where she studied the demand for tobacco products based on the data provided by 1994 dated the TURKSTAT Household Consumption Expenditures Survey. Onder (2003) concluded that as education level increases,

smoking ratio first increases, and then decreases. Negative values of the coefficient of the two dummy variables which were included in the model to represent the age of subjects show that starting to smoke is a higher risk during early ages (before the age of 35), and that the probability of starting to smoke decreases as subject becomes older. If the subject is between 36 and 49, his/her probability of starting to smoke decreases to 18 %. However, the coefficient of this variable (D7) is statistically insignificant. If the subject is 50 or older, relevant coefficient (D8) is statistically significant at 10 % level. When the subject is at the age of 50 or older, smoking probability decreases to 13 %. According to this result, when the subject reaches a certain age, their probability of starting to smoke decreases considerably.

If there were smokers in the childhood environment of a subject, their smoking probability is 35 %. As expected, the sign of the coefficient of this variable is positive, which indicates that subjects who lived with smokers during their childhood have a higher probability of smoking. However, the coefficient is statistically insignificant, which means that this factor does not have an important impact on smoking probability.

The presence of smokers among the people with whom the subject lives increases the probability of smoking to 42 %. According to this result, presence of smokers among the people with whom the subject lives stands out as a factor which significantly increases the probability of smoking.

If there were smokers among the people with whom the subject used to live when he/she was a child, the probability of smoking is 35 %. However, the coefficient of this variable is statistically insignificant, which means that it does not have an important impact on the probability of smoking.

If the close social environment of the subject consists mainly of smokers, the probability of smoking increases considerably to 48%.

Positive signs of the coefficients related to the monthly incomes of the subjects (D12, D13) meant that an increase in the level of income rises the probability of smoking, which is in contrast to the case in developed countries. This result coincides with the finding of Önder (2003) which suggests that as the level of income of the household increases, so does the probability of smoking. If the subject makes between 1000 and 2000 TLs, his/her probability of smoking is 39 %. When the monthly income exceeds 2000 TLs, possibility of smoking becomes 37 %, but its coefficient is insignificant, which means that an increase in the income in high-income groups does not have an important effect on the probability of smoking. As a result, it can be seen that an increase in income after a certain threshold does not have significant impact on the probability of smoking.

Independent variables of the ordered logit model estimated for the purpose of analyzing the factors that affect smoking expenditures are as following: age, education, gender, marital status, monthly income and whether there are smokers at home. In the experiments, all dummy variables included in the model representing occupation and age turned out to be insignificant; therefore, they were excluded from ordered logit model. Occupation is an unimportant factor both on the decision to start smoking and on the amount of smoking expenditures. Estimation results of the logit model whose dependent variable is categorically (Y2) smoking expenditures are provided in Table 3.

Table 3. Estimation Results of Smoking Expenditures Model

Variable	Coefficient	Standard Error	z-Statistic	Probability
D1	-0.99274	0.18924	-5.2461	0.0000
D2	-0.10154	0.21591	-0.4703	0.6381
D3	0.30843	0.33191	0.9293	0.3528
D4	-0.11245	0.27028	-0.4161	0.6774
D5	0.03838	0.31964	0.1201	0.9044
D6	-0.62707	0.34915	-1.7960	0.0725
D9	0.50585	0.18909	2.6753	0.0075
D11	1.16934	0.26031	4.4921	0.0000
D12	0.60516	0.20895	2.8962	0.0038
D13	0.71735	0.29457	2.4352	0.0149
	Limit Points			
LIMIT_1:C(11)	0.74839	0.37053	2.0198	0.0434
LIMIT_2:C(12)	1.52969	0.37607	4.0676	0.0000
LIMIT_3:C(13)	2.98676	0.39276	7.6046	0.0000

LR Statistics (11df) =   80.032
LR Index (Pseudo-R2) = 0.07
Number of Observations = 453

According to regression results:
- females spend less on smoking,
- marital status coefficient (D2) is statistically insignificant, which shows that marital status is not an important factor that affects smoking expenditures,
- four dummy variables are included into the model so that the impact of education level on smoking expenditures could be determined. According to the results, when education level increases from elementary level and below, which is the base class, to secondary school, smoking expenditures increase, whereas when it rises to high school level, they decline. As the education level of a subject increases to vocational high school, his/her smoking expenditures increase; if the level is even higher, namely an undergraduate or graduate degree, smoking expenditures decrease. Among the coefficients of four dummy variables included in the model for determining the education status of subject, only the one which represents undergraduate or graduate level (D6) proved to be statistically significant at 10% level. The coefficient has a negative sign which means that holders of an undergraduate or graduate degree spend less on smoking. It is understood that other education levels do not make a significant difference on smoking expenditures,
- if there are smokers among the people with whom the subject lives, smoking expenditures increase,
- if the close social environment of the subject consists mostly of smokers, smoking expenditures increase,
- coefficients of the two dummy variables included in the model representing the subject's income are significant, which shows that as income increases so does smoking expenditures. One reason can be that, with more monthly income, subjects tend to prefer more expensive tobacco products.

6. COMPARING THE FINDINGS OF OTHER STUDIES

There are two other studies similar to this one which yielded comparable results based on econometric estimation method: (I) the

study conducted by Emec et al. (2006) based on the TURKSTAT Household Budget Survey data of 2003 (Emec et al.,2006); and (II) the study of Onder (2002, 2003) based on the TURKSTAT Household Budget Survey data of 1994. Emec et al. (2006) produced estimations by using two different models in order to analyzes the factors that affect smoking probability and the level of smoking. In these studies, depending on the characteristics of the data set, the smoking probability or smoking expenditures of a household were handled, whereas this study focuses on the smoking probability or smoking expenditures of the subjects individually. This difference means that it is difficult to compare analysis results with all aspects.

In the TURKSTAT data used in mentioned studies, most demographic features belonged to the family head representing the household, which is one of the reasons of the discrepancies in estimation results. In these studies, all variables related to age, sex and occupation consist of the information belonging to the family head (Onder, 2002). For example, if there was smoking expenditures in the household budget, that household was accepted as a smoking one. In reality, if the smoking member is not the family head, the model variables like education, sex, age and occupation were entered in the model with untrue values (Emec et al., 2006). In the studies conducted with the TURKSTAT data, the research was actually on the effect of the factors belonging to the family head on smoking probability and the level of smoking expenditures. In addition, amount of consumed tobacco products was the dependent variable in the second model used in both studies, whereas the dependent variable in the second model of this study is

smoking expenditures. Due to such limitations, the findings obtained in this study are not totally comparable to the findings of Emeç and Önder.

-   Emec et al. (2006) found out that married family heads have a higher probability of smoking than single family heads. This paper does not conclude that marital status represents a meaningful difference on the probability of smoking.

-   Emec et al. (2006) determined a positive correlation between the level of income of a household and smoking probability. This paper also concludes that generally an increase in the level of income raises the probability of smoking.

-   As regards education, this paper concludes that education levels other than the undergraduate or graduate levels, which are included in the model as the highest steps of education, do not have an important impact on smoking probability. According to Onder (2003), as the level of education increases, smoking probability is first higher but then it is lower. Family heads with an undergraduate degree have a lower probability of smoking than elementary school graduates. At education levels lower than an undergraduate degree, as the level increases, smoking probability does not decrease. When they included the variable of education in the model in terms of years, Emec et al. (2006), on the other hand, concluded that more years in education system meant more tobacco addiction. In the model where they included education variable in categorical terms, as education level increased, including high school level, there was a higher probability of smoking. They could not obtain meaningful results for undergraduate and higher levels.

-   According to Onder's estimation results, when the price of tobacco products

increases, smoking probability of household decreases. This paper does not include price changes in tobacco products in the model. However, according to the data obtained from the survey, most respondents declared that they did not show a noticeable reaction towards an increase in the price of tobacco products and that their reduction of smoking was not significant.

- Onder (2003) found out that as income increased, subjects consumed more expensive tobacco products, which raised their smoking expenditures; this paper also concludes that an increase in income raises smoking expenditures.

- According to Onder (2003), as the level of education increases, smoking expenditures first increase and then decrease. If the family head has an undergraduate degree, he/she consumes 6,6 % less than an elementary school graduate. This paper also displays no significant difference until undergraduate level, after which there is significant decrease in smoking expenditures.

- According to Onder, the occupation of the family head is an important factor that affects smoking probability. White collar workers represent a higher probability of smoking than blue collar workers. If the family head is unemployed, he/she has a lower smoking probability. This paper concludes that occupation is an unimportant factor both on the probability of smoking and on the amount of smoking expenditures.

- Önder determined that if the family head was a male, the amount of consumed tobacco products increased. This paper also concludes that males spend more on smoking than females.

- Emeç reported that as age increases, tobacco addiction diminishes. Onder concluded that at the age of 60 and afterwards, the amount of consumed tobacco products significantly decreases. This paper claims that age is not an important factor that affects smoking expenditures, but when the subject is at the age of 50 or above, his/her probability of starting to smoking decreases.

7. CONCLUSION

Smoking is an important problem both in the world and in Turkey due to both the health problems it causes and the size of expenditures that it involves. This paper analyses the factors that affect smoking and the size of smoking expenditures using cross-sectional data obtained from a questionnaire.

The impact of some variables including income, age, sex, marital status, occupation and smoking behaviour of cohabitants in the childhood years on smoking probability and smoking expenditures are studied. For this purpose, binary and ordered logit models are employed and estimations are produced.

According to the findings of the research which looked into smoking probability, following are determined as the factors which have important impact on smoking probability: sex, holding an undergraduate or graduate degree, being at the age of 50 or older, presence of smokers among housemates, and having a monthly income higher than 2000 TLs. Contrary to expectations, more income is a factor that increases smoking probability. Until undergraduate or graduate level, an increase in the level of education, albeit not very important or significant, increases the probability of smoking, which is an interesting finding.

According to the findings of the research which looked into smoking expenditures,

following are determined as the factors which considerably decrease smoking expenditure: being a female, and having an undergraduate or graduate degree. Marital status of the subject does not indicate a significant difference on the level of smoking expenditures. If there are smokers among the people with whom the subject lives, if his/her close environment consists mostly of smokers and if his/her income increases, smoking expenditures rise.

ФАКТОРИ КОЈИ УТИЧУ НА ЗАСТУПЉЕНОСТ И ТРОШКОВЕ ПУШЕЊА У ТУРСКОЈ

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Извод

У овој студији учињен је покушај да се одреди вероватноћа да појединац почне са конзумирањем дувана на основу демографских и социо-економских параметара. Такође, разматран је и трошак који ова навика изазива. За студију су коришћени подаци добијени истраживањем по методи пресека. Према резултатима економетријске анализе, фактори који имају значајан утицај на почетак пушења су пол, ниво образовања, старосна доб, број пушача у породици и ниво месечне зараде.

Кључне речи: Пушење, Трошкови пушења, логит модел, Турска

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APPENDIX

Table A1. General Demographic and Social-Economic Features of the Research Universe

		Number	**Ratio (%)**
Sex	Males	264	58
	Females	189	42
	Total	453	100
Age	18-35	242	53
	36-49	146	32
	50+	65	15
Marital status	Single	156	34
	Married	275	61
	Separate/Divorced	22	5
Level of Education	Illiterate	8	2
	Literate with no education	7	2
	Elementary school graduate	99	22
	Secondary school graduate	44	10
	High school graduate	154	34
	Associate degree holder	52	11
	Vocational undergraduate degree holder	19	4
	Undergraduate degree holder	64	14
	Graduate degree holder	6	1
Occupation	Worker	78	17
	Government official	91	20
	Craftsmen	41	9
	Farmer	29	6
	Self-employed	30	7
	Retired	26	6
	Retired but working	12	3
	Housewife	56	12
	Student	55	12
	Unemployed	33	7
	Other	2	-
Monthly Income (TLs)	Less than 1000	195	43
	1.000-1999	179	40
	2.000+	79	17
Population of the town	Less than 2000	35	8
	2.001–20.000	73	16
	20.001–100.000	93	21
	100.001 +	252	56

Table A2. Smoking-Related Features of The Research Universe

		Number	Ratio (%)
Smoking behaviour	Smokers	250	55
	Quitters	59	13
	Never smokers	144	32
Smoking behaviour of housemates	Smokers	242	53
	Non-smokers	211	47
Smoking behaviour of the housemates in childhood years	Father	240	53
	Mother	8	2
	Both parents	42	9
	Other relatives	46	10
	None	117	26
Smoking behaviour of spouse	Smoker	84	30
	Non-smoker	194	70
Smoking behaviour of social environment	Mostly smokers	359	79
	Mostly non-smokers	94	21
Have the non-smokers tried smoking?	Yes	57	40
	No	87	60
When did the non-smokers try smoking first?	Before the age of 13	7	12
	13-18	26	46
	18+	24	42

Table A3. Characteristics of Smokers

		Number	Ratio (%)
When did smokers try smoking first?	Before the age of 13	27	11
	13-18	170	68
	18+	53	21
When did smokers start smoking regularly?	Before the age of 13	6	2
	13-18	125	50
	18+	119	48
Most important factors that urged smokers to start smoking	—smokers in the family	60	-
	—teachers.	3	
	—peer groups at school	82	
	—peer groups in the neighbourhood	46	
	—peers in the military	25	
	—peers at the workplace	20	
	—the urge to look cool/prove themselves	6	
	—Stress, problems	81	
Smoking frequency	Every day	232	93
	Occasionally	18	7
Type of smoke	Filtered cigarette	243	97
	Wrapped tobacco and other products	8	3

Table A4. Other information on Smokers

		Number	Ratio (%)
Monthly expenditure on smoking (TLs)	50 TLs and less 50-100 TLs 100 TLs+	59 125 66	24 50 26
Daily number of cigarettes	Less than 10 cigarettes Half a pack 1 pack 1 and a half packs 2 packs	34 69 120 18 9	14 28 48 7 4
Reaction towards price increases in cigarettes	Decrease the amount Smoke less expensive products No reaction	43 41 166	17 16 66
Have they tried to quit smoking in the last year?	Yes No	131 119	52 48
Desire to quit smoking	Yes When time comes No	164 57 29	66 23 12
Have they received recommendations for quitting smoking from health personnel during the last year?	Yes No	85 165	34 66
Do they smoke in the presence of their children?	Yes Occasionally No	81 33 49	50 20 30
Most important factors for continuing smoking	—Addiction —Peer groups. —Pleasure —Family-related stress —Economic problems —Work- and workplace-related stress —Other	138 40 33 44 30 17 4	-