

The psychosocial behaviour of young Spanish smokers

Rosa Duarte · José Julián Escario ·
José Alberto Molina

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Abstract This paper studies the psychosocial behaviour of Spanish smokers between the ages of 14 and 18, with the aim of identifying the factors associated with both the decision to consume tobacco and the quantities to consume. To that end, a Type II Tobit model is used, which is estimated by using data drawn from the Spanish Surveys on Drug Use in the School Population corresponding to 1994, 1996, and 1998. The results show that the two decisions are strongly associated with a number of psychosocial determinants. In particular, evidence was found that the probability of smoking and the quantity consumed are positively related to variables such as the age of the adolescent, his/her disposable income, or education failure. The estimates also show that the realization of informative campaigns about the risk of tobacco and other substance abuse reduces both the proportion of smokers and the number of cigarettes consumed.

Keywords Psychosocial behaviour · Young people · Smoking · Tobit

Although individuals usually seek to maximize behaviour utility when making rational choices consistent with their preferences, it is nevertheless the case that many consumers, whilst seemingly wishing to choose one thing, in fact choose another. For example, utility maximizing individuals may be unhappy about being smokers and may express a sincere desire to quit. The most direct benefit from quitting would be to avoid the loss of earnings and utility that results from an unhealthy lifestyle. However, most smokers fail to quit because of the difficult and unpleasant psychological process of enduring the withdrawal symptoms. The nicotine content of tobacco makes smoking addictive and this is reinforced by the fact that people draw psychological comfort and reassurance from continuing to

R. Duarte (✉) · J. J. Escario · J. A. Molina
Department of Economic Analysis, University of Zaragoza, Zaragoza, Spain
e-mail: rduarte@unizar.es

smoke (Prochaska, Diclemente, & Norcross, 1992; Suranovic, Goldfarb, & Leonard, 1999; Warner, 1986).

Considering that tobacco smoking has come to be regarded as perhaps the best example of a harmful pattern of consumer behaviour, the prevention of this addiction is the most straightforward way to avoid the damage to health caused by smoking (e.g., arteriosclerosis and coronary heart disease, chronic obstructive pulmonary disease, strokes, as well as cancers of the lung, larynx, oesophagus, mouth, and bladder) (Bartecchi, Mackenzie, & Schrier, 1994). Thus, preventive measures, for example, informative campaigns on the risk of smoking or restrictions on smoking in public places, must be especially targeted to young people (Mackenzie, Bartecchi, & Schrier, 1994). It is well established that most individuals who acquire this habit do so during their school years and, if these measures fail, the addictive character of tobacco implies that a high percentage of these young smokers will continue to smoke for the rest of their lives (Suranovic et al., 1999).

Acquiring the smoking habit in adolescence is particularly worrying given the psychologically vulnerable nature of this age group. As is well established, adolescence involves developmental tasks that are particular to this stage of life; for example, establishing one's own identity and independence from the family, which may lead to the individual adopting risky patterns of behaviour, such as smoking (Hawkins, Catalano, & Miller, 1992). Furthermore, adolescents may regard smokers in a favourable light, in the sense that individuals who smoke are more likely to be thought of as having what might be considered as social assets, such as being "tough" and "cool" (Comité Nacional para la Prevención del Tabaquismo, 1998). Thus, this specific age-related psychosocial behaviour, together with the high personal and social costs associated with quitting, becomes particularly important when formulating and evaluating effective anti-smoking policies.

The economic literature has mainly focused on prices as the fundamental variable when seeking to influence smoking behaviour and, as a consequence, when designing anti-smoking policies (Chaloupka & Grossman, 1996; Chaloupka & Wechsler, 1997; DeCicca, Kenkel, & Mathios, 2000; Douglas & Hariharan, 1994; Evans & Huang, 1998; Gruber & Zinman, 2000; Lewit & Coate, 1982; Lewit, Coate, & Grossman, 1981; Wasserman, Manning, Newhouse, & Winkler, 1991). Additionally, the psychosocial theories that explain the consumption of addictive substances have enjoyed substantial development. In this context, we can cite the Risk Behaviour Models, which represent a more integrated consideration of the individual in a way that combines the cognitive, affective, and social factors that have the effect of increasing the risk of drug consumption in particular groups of individuals (Bry, 1983; Bry & Krinsley, 1990; Hawkins et al., 1992; Newcomb & Félix-Ortiz, 1992).

Given all this background, and in the general context of these Risk Behaviour Models, our particular focus in this paper is to follow the recommendations of the U.S. Surgeon General's Report on Preventing Tobacco Use Among Young People (US Department of Health and Human Services, 1994) and concentrate on a number of psychosocial factors associated with the smoking habit. Thus, in addition to considering some standard socio-demographic variables, such as gender, age, working parents, or individual income, our hypothesis is that other important groups of variables, namely perceived smoking prevalence in the family environment,

personal and social behaviour, or the mounting of information campaigns at school, all have a significant influence on the smoking behaviour of the adolescent (Botvin, Botvin, Michela, & Baker, 1991; Cecil, Evans, & Stanley, 1996; Chassin, Presson, Sherman, Corty, & Olshavsky, 1984; Dinh, Sarason, Peterson, & Onstad, 1995; Doherty & Allen, 1994; Hu, Flay, Hedeker, & Siddiqui, 1995).

Our particular objective is to analyse the psychosocial behaviour of Spanish smokers between the ages of 14 and 18. In particular, we use the information provided by the three totally independent available waves from the Spanish Surveys on Drug Use in the School Population (1994, 1996, and 1998), in order to analyse the psychosocial characteristics associated with the decision to smoke, and of how much to smoke. To that end, we estimate a Type II Tobit model where the individual decides whether or not to smoke and, if so, how much to smoke. Our empirical results will hopefully allow us to obtain a better understanding of smoking behaviour among young people, which must be the starting point of any effective policy aimed at reducing smoking among the adolescent population.

At this point it is interesting to establish the socio-political environment in which young people are making their smoking decisions. Since the publication in 1964 of the U.S. Surgeon General's Report, which was that country's first widely publicized official recognition that cigarette smoking is a cause of cancer and other serious diseases, most governments have implemented numerous anti-smoking policies. Spain is no exception, with its national Parliament having passed a number of laws introducing regulatory changes in tobacco consumption. Having said that, it should be noted that none of the laws aimed at regulating the tobacco consumption behaviour of young people were adopted during the sample period of our study. The first of these, adopted in 1978, restricted tobacco advertising and promotion on public television. A subsequent law, passed in 1982, directly banned advertising which acted as an incentive to consumption (with a transitory period of 2 years), restricted the public places and private worksites where people could smoke, imposed health warning labels to be placed on cigarette packets and, finally, banned the sale of tobacco products to adolescents younger than 16. The third law, dating from 1988, introduced new limitations on the number of public places where people could smoke, particularly on public transport, in hospitals and schools, and also imposed more severe warning labels on cigarette packets. The most recent law, approved in 1992, limited the tar and nicotine content of cigarettes and established further new restrictions concerning the places where people could smoke. In addition to these national laws, the European Union has promoted several programmes aimed at reducing the number of cancer-related deaths caused by tobacco consumption, with one of the most important initiatives being to launch information campaigns directed at the school-age population.

The psychosocial framework

Recent developments in the models that explain the use of addictive substances appear to have concentrated on two fundamental points. First, the recognition that biological, psychological, and environmental determinants are present in the consumption of drugs. Second, the central importance of the environment, with this

ranging from the close, that is to say, family or peer group, through to the school or workplace, and even as far as the institutional level, with the latter being characterized by legal regulations on the use of such substances. In this context, advances have been made in the development of the so-called Risk Behaviour Models or Risk and Protection Models (Hawkins et al., 1992), with special emphasis being placed on the adolescent population.

The studies of Bry (1983), Bry and Krinsley (1990), and Newcomb and Félix-Ortiz (1992) were amongst the first to apply these Risk Factor Models in an attempt to explain the consumption of addictive substances. More specifically, these authors argued that it is possible to identify different risk and protective factors, with the former including everything that increases the probability of substance use or related problems, and the latter being that which helps to safeguard people from this substance use. Risk factors include biological, psychological/behavioural, and social/environmental characteristics. In this line, the “risk and protection models” have incorporated many of the aspects of the psychological theories on addictive drug use, such as social learning theory (Bandura, 1977), problem behaviour theory (Jessor & Jessor, 1977), or the biopsychosocial model (Leigh & Reiser, 1980; Schwartz, 1982), as well as simultaneously offering a range of proposals for prevention.

Thus, one of the key points of the risk behaviour models is that, after identifying the risk determinants that underlie problem behaviour, they can be used as good predictors of other manifestations of problem behaviour. Moreover, these models pay special attention to the relationships in the individual’s more immediate environment, that is to say, the family or peer group.

Despite the unavoidable specificity that surrounds individual behaviour, the psychological literature has identified the main risk factors that from a generic perspective influence that behaviour. It has gone on to offer some general results. First, the domains are time-varying (Botvin, Botvin, Michela, & Baker, 1991; Hawkins et al., 1992). Moreover, some risk factors that affect problem behaviour, such as drug use, are also determinants of other forms of similar behaviour, for example, crime, teenage suicide, or dropping-out from school. If we turn our attention once again to the adolescent age group, we can note that the U.S. Surgeon General’s Report points to the particular interest in tobacco consumption for adolescents. This report identifies the main risk factors for the onset and persistence of tobacco consumption as follows:

- (1) socio-demographic factors associated with the onset of tobacco use, which include being an adolescent from a family with a low socio-economic status;
- (2) environmental risk factors for tobacco use, including the accessibility and availability of tobacco products, perceptions by adolescents that tobacco use is normative, peers’ and siblings’ use, and approval of tobacco use, as well as the lack of parental support and involvement as adolescents face the challenges of growing up;
- (3) behavioural risk factors for tobacco use, which include low levels of academic achievement and school involvement, lack of skills required to resist influences to use tobacco, and experimentation with any tobacco product;
- (4) personal risk factors for tobacco use, including a lower self-image and self-esteem than peers, the belief that tobacco use is functional, and the lack of

self-efficacy in the ability to refuse offers to use tobacco. For smokeless tobacco use, insufficient knowledge of the health consequences is also a factor.

Data

The data used in this work come from the three available Spanish Surveys on Drug Use in the School Population corresponding to 1994, 1996, and 1998, carried out by the Spanish Government's Delegation for the National Plan on Drugs. These independent surveys contain complete information on both individual and family socio-demographic characteristics, as well as on some related psychosocial factors. All this information has been obtained directly from the adolescents surveyed, who anonymously answered a questionnaire on tobacco use. Their parents were not present during the interviews, nor were they informed about their children's responses; this reduced underreporting in the tobacco questions (Evans, Hansen, & Mittlemark, 1977; Warner, 1978). The data set contained 22,578, 19,191, and 18,346 feasible observations for 3 years, with all the respondents being between 14 and 18 years old. The information was collected in different public and private centres of secondary education and vocational training. To ensure a representative sample, the stratification was first performed by region in order to select the centres. Once chosen, a random selection procedure was then used to determine the classrooms where the adolescents were to be interviewed.

Table 1 contains the definitions, means, and standard deviations of the variables for the total sample. The dependent variables for the two equations of the model are *Smoking* and *Cigarettes*, with the first indicating whether or not the adolescent is a smoker and the latter indicating the mean consumption per day over the last 30 days.

We consider a number of independent variables grouped into two blocks: (1) those standard variables that correspond to the socio-demographic situation of the adolescents and their parents (*Gender*, *Age*, *WorkingMother*, *WorkingFather*, *NoStudiesMother*, *PrimaryStudiesMother*, *SecondaryStudiesMother*, *UniversityStudiesMother*, *NoStudiesFather*, *PrimaryStudiesFather*, *SecondaryStudiesFather*, *UniversityStudiesFather*, *Working*, *Income*), and (2) some specific psychosocial characteristics relative to the social habits of young people (*FamilySmoking*, *EducFailure*, *Membership*, *Reading0*, *Reading1*, *Reading2*, *Reading3*, *Reading4*, *Information*).

Table 1 offers a brief descriptive analysis of all these variables. According to the sample, 31.2% of Spanish youngsters between 14 and 18 have smoked more than one cigarette a day during the last 30 days. Moreover, the mean daily consumption of cigarettes is 2,339 for the entire sample, a value that increases to 7,568 cigarettes a day if we only consider smokers. With respect to the independent variables, we can note that 48.6% of the individuals surveyed are males and 51.4% females, and that the average age is 15.8 years. We can also observe that 43.4% of adolescents have a working mother, and 86.4% have a working father. Only 9.3% of young people have a part-time job out of school hours, whilst the mean income of all the adolescents surveyed is 11.53 Euros per week. As regards the psychosocial factors, we can see that 64.9% of youngsters live with other individuals who smoke, 53.3% are members of some association of a political, religious, or sporting type, and, finally, 43.4% study at a school or vocational training centre which organizes information campaigns on the risks associated with tobacco consumption.

Table 1 Definitions of variables and sample characteristics

Variable	Definition	Mean (Std. deviation)
Smoking	This takes the value 1 if the young person smokes more than one cigarette per day during the last 30 days and 0 otherwise	0.312 (0.463)
Cigarettes	Daily consumption of cigarettes	2.339 (4.815)
Gender	This takes the value 1 if the young person is male and 0 if female	0.486 (0.500)
Age	Age of smoker	15.795 (1.483)
Working	This takes the value 1 if the mother works and 0 otherwise	0.434 (0.496)
Working Father	This takes the value 1 if the father works and 0 otherwise	0.864 (0.343)
NoStudies	This takes the value 1 if the mother has no studies and 0 otherwise	0.125 (0.331)
Primary Studies	This takes the value 1 if the mother has a basic school certificate and 0 otherwise	0.630 (0.483)
Secondary Studies	This takes the value 1 if the mother has a secondary school certificate or vocational training qualification and 0 otherwise	0.127 (0.332)
University Studies	This takes the value 1 if the mother has a university diploma or a university degree and 0 otherwise	0.119 (0.323)
NoStudies	This takes the value 1 if the father has no studies and 0 otherwise	0.101 (0.301)
PrimaryStudies	This takes the value 1 if the father has a basic school certificate and 0 otherwise	0.600 (0.490)
Secondary Studies	This takes the value 1 if the father has a secondary school certificate or vocational training qualification and 0 otherwise	0.140 (0.347)
University Studies	This takes the value 1 if the father has a university diploma or a university degree and 0 otherwise	0.159 (0.366)
Working	This takes the value 1 if the young person has a part-time job out of school hours and 0 otherwise	0.093 (0.291)
Income	Available income per week by the young person in constant 1998 Spanish pesetas	1,917.937 (1,957.640)
Family Smoking	This takes the value 1 if the young person lives with other individuals who smoke and 0 otherwise	0.649 (0.477)
EducatFailure	This takes the value 0 if the young person has not had to repeat a school year, 1 if he/she has had to repeat only one year, and 2 if he/she has had to repeat more than one year	0.458 (0.671)
Membership	This takes the value 1 if the young person is a member of some association of a political, religious, or sport type and 0 otherwise	0.533 (0.553)

Table 1 continued

Variable	Definition	Mean (Std. deviation)
Reading0	This takes the value 1 if the young person has not read a book or magazine in the last 30 days and 0 otherwise	0.086 (0.280)
Reading1	This takes the value 1 if the young person has read a book or magazine less than once a week in the last 30 days and 0 otherwise	0.172 (0.377)
Reading2	This takes the value 1 if the young person has read a book or magazine between one and three times a week in the last 30 days and 0 otherwise	0.228 (0.420)
Reading3	This takes the value 1 if the young person has read a book or magazine between four and six times a week in the last 30 days and 0 otherwise	0.230 (0.421)
Reading4	This takes the value 1 if the young person has read a book or magazine daily during the last 30 days and 0 otherwise	0.285 (0.451)
Information	This takes the value 1 if the young person studies at a school which has information campaigns on the risks associated with tobacco consumption and 0 otherwise	0.434 (0.496)

The stochastic specification

In order to model the smoking behaviour of young people, we specify a Type II Tobit model, which allows us to assume that the individual decision process of adolescents is simultaneous. In other words, only those adolescents who decide to participate in consumption, simultaneously report a strictly positive quantity smoked (Amemiya, 1985; Maddala, 1983). We have chosen this model in preference to the alternative proposed by Cragg (1971) and used, for example, in Chaloupka and Wechsler (1997), where the two decisions, to participate and to consume, are modelled sequentially. The problem with this latter approach, in the particular context of smoking behaviour, is that the individual could decide to be a consumer and, in a second stage, given the market conditions, could report null consumption. In our view, however, as was argued in Maddala (1983), it is more reasonable to assume that both decisions are taken at the same time, i.e., participation and consumption are, in fact, simultaneous rather than sequential decisions. A further justification for our approach is that the Type II Tobit model allows us to take into account the correlation between both equations. Finally, as Manning, Duan, and Rogers (1987) pointed out, although the predictions of the two-part model are, on average, nearly unbiased, they may be substantially biased over certain subranges of the dependent variables.¹

The Type II Tobit model is formed by two equations. The first is given by the Probit model and takes the form of a selection equation, which discriminates between smokers and non-smokers. The second, described as a regression equation, relates the quantity demanded to the explanatory factors of this demand. The formulation of this simultaneous equation model is given by:

$$Y_{1i} = \begin{cases} 1 & \text{if } Y_{1i}^* = x'_{1i}\beta_1 + u_{1i} > 0 \\ 0 & \text{otherwise} \end{cases}$$

$$Y_{2i} = \begin{cases} Y_{2i}^* = x'_{2i}\beta_2 + u_{2i} & \text{if } Y_{1i} = 1 \\ 0 & \text{otherwise} \end{cases}$$

where β_1 and β_2 are vectors of parameters, x_{1i} and x_{2i} are vectors of individual characteristics and u_{1i} and u_{2i} are non-observable random variables. Associated to these variables, Y_{1i}^* and Y_{2i}^* are latent variables that indicate, first, whether or not the individual is a smoker and, second, the quantity demanded conditional upon whether the individual has decided to be a smoker in the first stage.

Given the nature of the two decisions, it is to be expected that there will be non-observable effects that influence the two equations, as a result of which we assume that the errors are not independent. In particular, we assume that the errors (u_{1i} and u_{2i}) follow a bivariate normal distribution with zero mean and covariance matrix:

$$\Sigma = \begin{pmatrix} \sigma_1^2 & \sigma_{12} \\ \sigma_{12} & \sigma_2^2 \end{pmatrix} = \begin{pmatrix} 1 & \rho\sigma_1\sigma_2 \\ \rho\sigma_1\sigma_2 & \sigma_2^2 \end{pmatrix}$$

¹ We have also estimated the two-part model, which provides very similar results, with these being available upon request.

where ρ is the correlation coefficient. We have imposed $\sigma_1^2 = 1$ as a normalising assumption because we observe only the sign of Y_1^* .

We estimate both equations using a Heckman two-stage method. This method estimates the participation equation in the form of a Probit model and uses the inverse Mills ratio function of the Probit model as an additional variable in the regression equation, which will be estimated by ordinary least squares. This inverse Mills ratio takes the form of $\lambda = \phi_1/\Phi_1$, with ϕ_1 and Φ_1 being the density and distribution functions, respectively, of the standard normal evaluated at $x'_{1i}\beta_1$. In addition, we compute heteroskedastic-consistent standard errors.

Empirical results

As has been stated in the previous section, the model has been estimated using a Heckman two-stage method. In order to control for regional unobservable differences, we have introduced dummy variables, which refer to the 17 Autonomous Regions of Spain, given that their omission could attribute unobservable regional effects to policy variables. At the same time, we have tested the exogeneity of three variables, which take into account the adolescents' habits, namely *EducFailure*, *Membership*, and *Reading*. To that end, we have used a Hausman-type test (Hausman, 1978), which enables us to treat these variables as exogenous in the model. In particular, this test consists of two steps. In the first, the habits' variables are estimated by ordinary least squares using as explanatory variables the other variables used in the model, plus a number of additional variables that allow us to identify the equations. In the second step the fitted variables are added to the model and an F -statistic test is computed. The values of F in the first and second equation are 0.911 and 1.977, respectively, in such a way that the hypotheses of the exogeneity of the variables cannot be rejected. Additionally, we have estimated the model without the variables related to habits. The results are very similar to those presented here, in terms of sign and significance, which gives more confidence and consistency to our strategy and results.²

Starting with the socio-demographic variables (Table 2), our results are in line with those of previous studies of young people (Chaloupka & Grossman, 1996; Chaloupka, Tauras, & Grossman, 1997; Douglas & Hariharan, 1994; Gruber & Zinman, 2000; Lewit, Coate, & Grossman, 1981; Tauras & Chaloupka, 1999; Wasserman et al., 1991). Thus, the estimation of the Tobit equations first reveals that while adolescent females have a higher probability of being smokers, they nevertheless consume more or less the same quantity as their male counterparts. Moreover, we can observe the positive effect of age on the probability of being a smoker, as well as on the quantity smoked, as can be inferred from the quadratic (linear) relationship between the *Age* variable and the first (second) decision analysed.

The inclusion of the family variables reveals some interesting and significant facts. Both estimations show that the probability of being a smoker, as well as the quantity consumed, is higher among those adolescents whose father is unemployed or among those whose mother works outside the home. The absence of the mother at home

² These results are available from authors upon request.

Table 2 Estimation results

Participation		Consumption	
Variable	Parameter	Variable	Parameter
Intercept	-5.268*** (-13.629)	Intercept	-5.201* (-1.841)
Gender	-0.429*** (-27.916)	Gender	-0.072 (-0.675)
Age	0.492*** (10.920)	Age	0.740** (2.275)
AgeSquared	-0.012*** (-9.394)	AgeSquared	-0.012 (-1.291)
WorkingMother	0.074*** (4.808)	WorkingMother	0.370*** (3.541)
WorkingFather	-0.106*** (-4.974)	WorkingFather	-0.725*** (-5.179)
PrimaryStudiesMother	-0.027 (-1.118)	PrimaryStudiesMother	-0.184 (-1.033)
SecondaryStudiesMother	-0.030 (-0.941)	SecondaryStudiesMother	0.056 (0.240)
UniversityStudiesMother	-0.040 (-1.116)	UniversityStudiesMother	-0.023 (-0.089)
PrimaryStudiesFather	-0.001 (-0.030)	PrimaryStudiesFather	-0.295 (-1.617)
SecondaryStudiesFather	0.026 (0.803)	SecondaryStudiesFather	-0.086 (-0.371)
UniversityStudiesFather	0.104*** (3.045)	UniversityStudiesFather	0.265 (1.108)
Working	0.093*** (3.568)	Working	0.935*** (4.634)
Income	0.260*** (31.284)	Income	1.494*** (22.136)
IncomeSquared	-0.015*** (-22.891)	IncomeSquared	-0.066*** (-13.244)
FamilySmoking	0.302*** (19.335)	FamilySmoking	1.112*** (9.657)
EducFailure	0.257*** (20.474)	EducFailure	1.391*** (16.222)
Membership	-0.102*** (-7.834)	Membership	-0.415*** (-5.563)
Reading1	-0.147*** (-4.992)	Reading1	-1.371*** (-5.601)
Reading2	-0.224*** (-7.847)	Reading2	-1.972*** (-8.423)
Reading3	-0.293***(-10.051)	Reading3	-2.072*** (-8.819)
Reading4	-0.334*** (-11.653)	Reading4	-1.947*** (-8.277)
Information	-0.074*** (-5.049)	Information	-0.369*** (-3.626)
T94	0.113*** (6.035)	T94	0.213* (1.679)
T96	-0.006 (-0.350)	T96	0.085 (0.677)
		Inverse Mills ratio	2.430*** (25.372)
No. observ.	36,410		11,655
Log. Likel	-20,219.1		-35,919.6

t-statistics in parentheses

*Significant at the 10% level

**Significant at the 5% level

***Significant at the 1% level

could reduce her control over the habits of her adolescent offspring and, perhaps, allow the adolescent to smoke with a lower probability of being discovered. Moreover, given that the percentage of female smokers is higher among women who work outside the home, this result could indicate a higher permissiveness with respect to their offsprings' smoking habits.

Second, with respect to the level of education attained by the father, this variable can be interpreted as a proxy for cultural habits in the family, or as a predictor of belonging to either a rural or an urban environment. Here, we can observe that the proportion of smokers is higher among those adolescents whose father has a university degree. One tentative explanation for this apparently surprising result could be that in rural areas, where the proportion of fathers with a university degree is lower than in urban areas, adolescents have fewer opportunities to smoke without their parents' knowledge. However, we do not find a significant influence in the second equation.

With respect to the variables that specifically analyse the economic situation of the young people, we can observe that if the adolescent has a part-time job out of school hours, this has a positive and significant effect on the probability of smoking and on the quantity consumed. We can also note that the effects of *Income* and *IncomeSquared* variables are increasing, although not proportional, in both decisions. According to this characteristic, and while it is possible for young people with low incomes to smoke cigarettes, for example by requesting them from their friends, it is clear that a higher or a permanent consumption will require the individual to have a higher income.

Similarly, and regarding the psychosocial factors, we first find a positive and significant relationship between the presence of smokers at home and education failure, on the one hand, and the probability of starting to smoke, and the consumption level, on the other. Our results concerning the presence of smokers within the family confirm the hypothesis, advanced by sociologists and psychologists that adolescents are more likely to smoke if their parents, siblings, or other family members also smoke (Chassin, Presson, Rose, & Sherman, 1996; Chassin, Presson, Sherman, Montello, & McGrew, 1984; Dinh et al., 1995; Oygard, Klepp, Tell, & Vellar, 1995; Smith & Stutts, 1999). There are two possible explanations for this result. The first is that tobacco consumption among adolescents is subject to the “bandwagon effect” (Leibenstein, 1950). The second is that these individuals obtain cigarettes “free of charge,” or at reduced rates, from their parents, older siblings, or other smokers in the family. In this sense, one direct policy measure aimed at preventing smoking among young people would be to mount school-wide information campaigns to which all family members are invited.

Turning now to the *EducFailure* variable, our results are once again consistent with the well-known finding that smoking and years of completed schooling are negatively related (Kabat & Wynder, 1987; DeCicca, Kenkel, & Mathios, 2000, 2002; Sander, 1995; Viscusi, 1992). In this sense, we can also offer some interpretations of the relationship between education failure and the probability of smoking. As DeCicca, Kenkel, and Mathios (2002) point out, education performance can be a proxy for time preference. Another interpretation is that higher ability students smoke less because these individuals are presumably more intelligent and, therefore, use their mental ability to rapidly absorb and act upon information about the harmful effects of smoking. A third interpretation is that there exist other variables that act as determinants of both schooling and smoking behaviour, for example, differences in “social class” (Farrell & Fuchs, 1982).

The entertainment habits of young people influence both the decision of whether or not to smoke and, if so, the quantity to consume, in the same direction. In this regard, our results are consistent with those of earlier studies (Tauras & Chaloupka, 1999). We find that, after controlling for other factors, if individuals belong to political, religious, or sporting associations, or dedicate part of their leisure time to reading, these activities appear to not only reduce access to tobacco, but also to limit the quantity consumed.

Finally, with respect to the *Information* variable, our results are again in accordance with those of previous studies, which have shown that youngsters who attend classes which include informative campaigns on the problems associated with tobacco and other drugs present a lower probability of smoking than their counterparts who attend schools that do not follow this practice (Farrell & Fuchs, 1982; Hsieh, Yen, Liu, & Lin, 1996; Kenkel, 1991; Schneider, Kein, & Murphy, 1981; Viscusi, 1991).

As regards this particular result, and taking into account that the survey is limited to asking only whether the adolescent has or has not received information at school, we have attempted to shed more light on this interesting aspect by consulting different teachers from a range of schools. Sadly, their responses have added little to our knowledge beyond the fact that each school decides of its own volition whether or not to organize information campaigns and, additionally, the way in which they offer such information. We have noted that, in general, the school that supplies this kind of information concentrates its activities by organizing some conferences around the celebration of World No Tobacco Day.

Summary and conclusions

In this paper, we have tried to shed more light on the smoking behaviour of adolescents, in the hope that legislators can use our findings in their policy-making decisions. In this regard, the fact that during the 1990s approximately 30% of young Spanish people were habitual smokers, together with the implications this has for the adult population in future years, leads us to believe that if we want to have a Spanish society that is smoke-free, then a number of significant policy measures are required. In light of our results, we find that a greater sense of independence on the part of young people with respect to their parents is positively correlated with the proportion of young smokers and with cigarette consumption. For example, we have observed that those adolescents with a high income, or those living in a more permissive family or in a family environment of smokers, contribute to a larger proportion of young smokers consuming at a higher level.

Given that smoking behaviour acquired in adolescence usually becomes an addiction by adulthood, the protection of young people from personal, family, or social pressures to smoke should be regarded as a public policy priority. Rather than broadly targeting the adolescent population, it may be more effective to tailor these programmes towards the needs of this high-risk audience.

However, when assessing the policy implications of our results, it is important to recognize that developing economically efficient policies to discourage smoking is inherently difficult. Here, we should recall that virtually all proposals for reducing smoking have been fraught with controversy, as they may impinge on the individual rights of both smokers and non-smokers and/or threaten the financial well-being of firms connected with the production and distribution of tobacco products.

Finally, we would like to say that, despite the fact that we have taken into account the endogeneity problem of some variables, the use of panel data, rather than several sets of cross-section data, would provide us with more confidence in our results with respect to the existence of individual unobserved effects. This, in turn, would give us more confidence in the causal nature of the identified associations between variables. As a consequence, future research should investigate these relationships when appropriate panel data become available.

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