Tobacco Cessation: A Study of Individuals

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Abstract

Nowadays, smoking is one of the highest preventable causes of morbidity and death. This paper, estimates the characteristics of former Smokers versus Smokers, what factors influence success in quitting and its consequences. We use data from the *Inquérito Nacional de Saúde* and we select individuals that were current or former Smokers. Some differences between Smokers and former Smokers were observed in variables such as: age, education level, cohabitation and region. Some tobacco related variables such as the number of cigarettes smoked per day or the time spent with other Smokers seems to influence smoking cessation. Also, we were able to find differences in health related variables such as Body Mass Index and in some diseases that may play an important role in smoking cessation.

Introduction

It was during the 60s that the relationship between tobacco usage and some diseases was established in the first studies about the subject. Nowadays, according to the World Health Organization (WHO), "tobacco is the leading preventable cause of death in the world, with an estimated 4.9 million deaths a year".

It is largely known that tobacco causes dependence through nicotine, one of its main components. Moreover it seems there is also an addictive component on the action of pulling out a cigarette as well as the social factor of the act of smoking. This makes the cigarette one of the most addictive legal products in the market, if not the most addictive.

Apart from the medical aspects of Tobacco, Tobacco is also present in many other aspects of the Society being one of the most powerful industries of the world. This, however, didn't prevent the many anti-tobacco campaigns that emerged, nor the highly taxation to which this product is subject.

To what Health is concerned all forms of tobacco contain carcinogens. The most common diseases provoked by tobacco are cancer and diseases that affect heart and lungs.

Socially speaking 50 to 60% of Smokers began to smoke at the age of fifteen while 90% of Smokers started smoking before the adult age. Moreover it is said that the smoking act is influenced by both psychological and social conditions and that tobacco consumption is epidemic.

Our study aims to understand what the characteristics of individuals who have ceased smoking are. What are their social background, their smoking history and their health.

Methods

Data Collection

Data for our study was taken from 4th *"Inquérito Nacional de Saúde"* (INS - National Health Study), a survey held by "*Observatório Nacional de Saúde"* together with *"Instituto Nacional de Estatística"* and that collects information about the Portuguese population's health.

From the main database we decided to drop out Proxy-respondents due to some possible misleading information. We also dropped out individuals under the age of fifteen not only because it is the common age to initiate the smoking habit, but also because they are considered too young to give accurate answers. All incomplete information about an individual was rationale to eliminate that individual from the database.

To complete we dropped out all individuals that have never smoked. This gave us a database composed by 8.015 individuals where 4.219 (53%) are Smokers and 3.796 (47%) are former Smokers. Given that we want to explain which variables influence Smoking Cessation, our dependent variable is a dummy that takes the value 0 for Smokers and the value 1 for former Smokers.

Variables

We have already our dependent variable. But which variables can influence Smoking Cessation? We have selected a bundle of variables divided in three categories that we want to test.

Demographic variables: Age; Gender that takes the value 0 for men and 1 for women; Education Level divided in four categories "Less than Compulsory", "Compulsory Education", "Secondary Education" and "Higher Education"; Cohabitation stating whether the individual live alone (0) or with someone else (1); Region taking the possibilities "Norte", "Centro", "Lisboa e Vale do Tejo", "Alentejo", "Algarve", "Madeira" and "Açores"; Income.

Smoking Related Variables: Initiation Age; Cigarettes per day; Time spent with Smokers with a scale that begins at "Never", "Few Time", "Some Time", "A lot of Time", "Almost Every Time" and ends in "Every Time".

Health Related Variables: Medical Appointments that consists on the number of medical appointments over the last three months; Body Mass Index; A set of eight dummy variables that indicates the appearance of respiratory, cardio and cerebral vascular, neurological and other diseases before and after the initiation of the habit (diseases that appeared after the age of sixty-five were not taken in account).

Throughout literature, there are some references to other variables that are good predictors of smoking cessation. Unfortunately, not all of them are available in the INS. Among these variables are the Fagerström test, attempts to cease smoking and some specific genetics.

Summary Statistics

The sample is divided between Smokers and former Smokers, being that Smokers are more prevalent (53%).

In Table 1.1 we can look at the statistics for Demographic Variables (base categories shadowed). Our sample is divided unevenly between males and females (71 and 29% respectively). The characteristics of each group are different as well. In fact, more than a half of the male population is former Smoker, while only 38% of the women's group is former Smoker.

[Table 1.1]

66% of the population has completed compulsory schooling. Surprisingly, the highest percentage of former Smokers belongs to the group of individuals without an education level. However, the percentage of former Smokers in Higher Education is still higher than Secondary and Compulsory School, as suggested in literature.

The majority of the population lives in cohabitation, moreover, there seems to be some different behaviours across each group. Individuals not living in cohabitation represent lower percentages of former Smokers than those living in cohabitation.

Although the INS is equally distributed across regions, missing values and dropped individuals have created some inequality, especially on the Madeira region. There seems to be a significantly higher prevalence of smoking in autonomous regions (Madeira and Açores) maybe given the lower prices faced by consumers.

As for the continuous variables, mean age is 50. Smokers, however, seem to be younger than former Smokers, suggesting there is an ageing factor related to the success of smoking cessation. These differences don't seem so pronounced in income, although former Smokers appear to have higher incomes than Smokers, as suggested in literature.

In Table 1.2, we can see so me descriptive statistics of Tobacco Related Variables.

[Table 1.2]

It is interesting and intuitive that the higher percentages of former Smokers belong to the groups that spend little or no time with Smokers. This might suggest that being in the presence of other Smokers makes smoking cessation harder. However, according to INS data, 66% of former Smokers never ask Smokers not to smoke in their presence. Also, 35% of Smokers do not avoid the habit in the presence of Non-Smokers.

The literature suggests that the older the individual starts smoking the easier it is to quit the habit.

Initiation age mean doesn't seem to be significantly different for each group in our data, although it is slightly higher for former Smokers as suggested.

In our data, former Smokers used to smoke more cigarettes per day than current Smokers. However, literature suggests that more dependent Smokers have lower probability to be successful. On average, individuals have ceased smoking at the age of 37.

Health Related Variables descriptive statistics are described in Table 1.3. Dummy variables, however, cannot be read as before. In this case, although each line is a dummy ("yes" or "no" choice), only "yes" is represented. So, in diseases appearing before the initiation age, "overall" means the percentage of population that already had that kind of disease before the initiation age, while in diseases after initiation, "overall" expresses the percentage of population who were affected by new diseases of that kind.

[Table 1.3]

It seems that the diseases the individuals had before initiating the smoking habit don't influence that much the decision to stop smoking. In fact, individuals initiated smoking knowing they had that disease, which didn't prevent them to start. However, it might be the case that some diseases, such as respiratory, provoked more adverse effects leading to higher former Smokers percentage.

Diseases that appear after initiation age are different. They are more like a shock to the individual's health, influencing the decision and success of smoking cessation. Hereby, it is not surprising to see higher percentage rates of former Smokers for every group of diseases, with three of them higher than 50%. Note that the exception is the neurological diseases which can be explained by the main characteristics of this kind of diseases. Neurological diseases often go hand in hand with addictions; this means that if a Smoker suffered from a neurological disease it would be harder to quit smoking than if he had not that kind of disease.

On average, former Smokers have more medical appointments than Smokers, which might suggest a greater care for health from former Smokers or a greater need to stop smoking.
Body Mass Index seems to be significantly higher for former Smokers. This is in accordance with the literature. When smoking cessation occurs, there is a usual increase in weight. So, higher current Body Mass Weight is correlated with being a former Smoker.

Having explored all variables that will be included in the model, we can say that the median individual is a man that has completed the compulsory education. He is around 47 years old, his monthly income is around 1051€ and he lives in cohabitation. He started smoking at the age of 16 and smokes 20 cigarettes per day. During the day, he is never in contact with other Smokers. He has visited the doctor once in the last three months, he didn't have any disease before initiation age and his health has stayed alright as he was not diagnosed with any chronicle disease after initiation age. He has a body mass index of 25,1.

Econometric Model

We have a binary dependent variable which implies that we need a binary model to test our variables.

The binary model answers to the question "given the characteristics, what is the probability that I'll have a certain output?" being the output a 0-1 variable:

$$P(y=1|x) = P(y=1|x_1, x_2, ..., x_k)$$

In our case, we have a 0-1 dependent variable expressing whether the individual ceased smoking or not and the explanatory variables giving the characteristics of that individual.

The choice of the function to use depends on the assumption we make on the distribution of the error term. The most usual ones are the Probit and the Logit functions. However given that Smokers are more common we used a Cloglog function in order to accommodate for that greater amount of 0 observations. Moreover, in order to make sure that we had consistent results we did not worry about the loss of some efficiency and computed all models with standard errors robust to heteroskedasticity and we used the 5% level of confidence.

Estimation Results

Coefficients and t-statistics are described in Tables 2.1, 2.2 and 2.3.

In the demographic variables group, all variables have the expected results in terms of the sign. There is evidence that the older an individual is, the higher the probability to succeed and that a female has a lower probability to succeed than a male. However, while Age is significant, Gender is not.

[Table 2.1]

To live in cohabitation also increases the probability of smoking cessation and it is significant. A higher level of education and higher income also increase the probability of being successful. We can see that the Education Level is significant (it is significant at least for one dummy) as well as Income.

Açores and Madeira, as expected, have a lower probability of being successful than the Norte region. Moreover, these regions are significant on their own. Other regions have the same pattern in relation to Norte, although not all of them are significant. Overall, we can admit the significance of this variable.

In relation to the Tobacco Related variables, all of them seem to be significant.

Looking at Time spent with other Smokers, we conclude that spending time with other Smokers, whether it is few time or a lot of time, decreases the probability of succeeding

in relation to not spending time at all. All comparisons with no time spent with Smokers are significant.

As for what Initiation Age and Cigarettes per day is concerned, given their quadratic form, interpretation is slightly different. We will look to these variables more deeply later on.

To conclude, we need to refer to Health Related Variables.

Both Body Mass Index and Medical Appointments seem to be significant in the predicting smoking cessation. In the case of Medical Appointments, the higher the frequency in the last three months, the higher the probability of smoking cessation. In relation to Body Mass Index, given its quadratic form, we will wait for its interpretation.

In terms of the health history of the individual, the diseases that seem to play an important role are the ones that appear after smoking initiation. There is not a single type of disease that has appeared before initiation age that is considered significant. This makes sense because they also did not prevent the individual from initiating smoking consumption.

[Table 2.2]

[Table 2.3]

Diseases that appeared after smoking initiation do not behave like the previous ones. All of them have intuitive signals. Respiratory, Cardio and Cerebral Vascular and Other diseases that appear after smoking initiation seem to increase the probability of smoking cessation, while Neurologic diseases prevent individuals from being successful at it. Surprisingly, Respiratory diseases are not significant. However, maybe these diseases do not seem so relevant for individuals as Cardio and Cerebral Vascular diseases, for example, to induce them to cease their habit.

Specification Test

Pregibon's Link Test (1,15) indicates that the model has an appropriate relationship between the dependent and the independent variables, reporting that the specification of the model is correctly done.

Results Interpretation

Although we can interpret the sign of the coefficients and their significance, we cannot measure the impact that a change in a variable can have in the probability of smoking cessation success. In order to do so, we need to compute marginal effects. Odds and Relative Risk ratios also give us a good approach on how variables can determine probability of success.

Having as reference the median individual, marginal effects for Cloglog model are described in Tables 3.1, 3.2 and 3.3.

[Table 3.1]

We can say that for the median individual, being one year older increases the probability of success by 0.01. Moreover, being female decreases probability by 0.026 Cohabiting increases probability of success by 0.14 if compared with individuals that do not live in cohabitation. All levels of education (less than compulsory, compulsory and secondary) decrease the probability of being successful (in 0.06, 0.08 and 0.07 respectively) comparing with higher education. As for the Region the individual lives in, the regions of Açores and Madeira have the highest decrease in probability in relation to Norte region with 0.08 and 0.18 points decrease. The other regions have also less probability to be successful than Norte region (Centro, -0.004; Lisboa e Vale do Tejo, -0.029; Alentejo -0.055; Algarve, -0.044).

Being a logarithm, Income cannot be interpreted as the previous variables. In fact, what its coefficient means is that a one unit increase in income increases the probability of success by 2%.

[Table 3.2]

As far as Tobacco Related variables are concerned, if an individual spends time (some time, a lot of time, almost everytime, everytime) with other Smokers, its probability of smoking cessation success will decrease by 0.10 (0.23, 0.34, 0.33, 0.33) points comparing with individuals that do not spend time with other Smokers.

[Table 3.3]

Finally, as far as Health related variables marginal effects are concerned, we can say that the increment of one medical appointment in the last three months increases the probability of smoking cessation by 0,008.
On the clinical history side, and taking only into account the significant variables, the individuals that are subject to a neurological disease after initiating their consumption have their probability to cease smoking decreased by 0,068 in relation to the ones who do not suffer that health shock. On the other side, individuals that had Cardio and Cerebral Vascular diseases after smoking, increase their probability of success by 0,036 in relation to individuals that did not have this problem.

The interpretation of quadratic Covariates

The omission of the interpretation of Cigarettes per Day, Initiation Age and Body Mass Index was on purpose. The inclusion of the quadratic form for these 3 variables makes the interpretation of their marginal effects somewhat interesting to analyse because the dependence on some individual i will not only be present in $\frac{\partial F(z)}{\partial z}$ but also in $\frac{\partial z}{\partial X_i}$.

Analyzing the following graphics where the lighter line represents the marginal effects while the darker line represents the density of the covariate obtained through a Kernel distribution estimate we can see that the marginal effect of Initiation Age can be increasing or decreasing. However, for decreasing values the frequency of the occurrence is too small to be considered. Which means that, as suggested by literature, the later the individual starts smoking, the greater the probability of success. Looking at table 6.2 we get the same result. For the median individual one year more in Initiation Age increases the probability by 0,7 points.

Moreover, if we were only looking at marginal effects, we would say that the higher the number of cigarettes smoked per day the greatest the probability of succeed in smoking cessation. This is not necessarily false but the frequency of highly dependent smokers is too low to be considered relevant. Highly dependent Smokers might feel more adverse effects from their consumption, experiencing more desire to stop smoking and probably given them the determination to cease smoking but while the marginal effects are high, the frequency of this kind of individual is low. In fact for high frequencies the marginal effect is more or less constant increasing just a bit in the

range of 30-40 cigarettes smoked per day. For the median individual, smoking one more cigarette per day will increase the probability of stop smoking by 0,7 points.

[Figure 1]

[Figure 2]

[Figure 3]

As for what Body Mass Index is concerned the marginal effects of it are clearly increasing for high frequency levels. This would mean that increasingly Body Mass Index is a factor of higher probability of success. For the median individual one more point in Body Mass Index increases the probability of success by 0,67 points.

The Relative Odds Ratio and the Relative Risk Ratio

Relative Odds Ratio (ROR) is a common and convenient way to interpret dummy variables.

Looking at Tables 4.1, 4.2 and 4.3 we can say that an individual living in cohabitation has an OR 1.76 higher in smoking cessation than an individual not living in cohabitation. But an individual living in cohabitation has 1.34 (RR) times greater probability of being successful in smoking cessation than an individual not living in cohabitation. Being Female decreases the likelihood of success. Males are 1.05 (0.9509-1) times more likely to be successful than Females. Also, individuals living in every other region are less likely to be successful than individuals living in the Norte region. As for Time spent with other Smokers, individuals that are never in the presence of other Smokers are the ones with greater probability of being successful.

[Table 4.1]

[Table 4.2]

[Table 4.3]

On the Health Related dummy variables side, and considering the significant ones, we can report that individuals that had Cardio and Cerebral Vascular diseases after smoke initiation have 1.07 greater probability to stop smoking than the individuals who did not present these kind of diseases.

Moreover, individuals who did not have any Neurological disease after smoke initiation have a 1.14 (0.8746-1) greater probability of being successful at smoking cessation.

Conclusions

The results obtained from the analysis of the INS data are in line with our expectactions. First, older individuals have a higher probability of being former smokers than younger individuals.

Moreover, although not significant as in some studies in the literature, men are more successful quitters than women. Apart from the psychological differences between men and women maybe there is a need for anti-tobacco campaigns to be more focused in women and in young adults. Second, individuals with higher education have a higher probability to succeed in smoking cessation. Third, individuals that live in cohabitation also have a higher probability of successfully quitting.

Every region in Portugal is less successful in quitting than the North especially Azores and Madeira, where prices are lower. The effect of income, is not statistically significant but the suggestion we get from the analysis is that individuals with higher incomes are more successful in smoking cessation. Those two results combined give an interesting perspective of the relationship between individuals, income and price of tobacco. Individuals do not seem to be affected by income in their decision to quit smoking. However they react when prices are different. Regions where the price is lower are the regions that register a lower prevalence of former smokers. This suggests that increasing taxes on tobacco may be a successful component of an anti-tobacco policy.

Individuals spending less time with smokers tend to be more successful than individuals spending more time with smokers. Moreover, the number of cigarettes smoked per day also seems relevant in the process of quitting. Former smokers seem to have been more dependent on tobacco than actual smokers. Initiation age also seems to play an important role in smoking cessation. Here, however, there seem to be two different groups. For individuals that started smoking at younger ages, the later the initiation the higher the probability of success in quitting. For; the other group, made of individuals that started smoking at an older age, the later the initiation the lower the probability of success.

Health status developments play a role in the quitting decision. Cardio and cerebral vascular diseases that appear during the smoking years seem to play an important role in quitting smoking, and they are even more relevant than the appearance of respiratory diseases. This is probably due to the higher mortality rate of cardiovascular diseases. On the contrary the appearance of

neurological diseases makes smoking cessation more difficult. Diseases that appeared before the start of tobacco consumption do not seem to have any explanatory power in regards to smoking cessation.

Medical appointments seem to influence smoking cessation. The higher the number of doctor appointments the higher the probability to succeed. The Body Mass Index also shows an interesting pattern with two different groups. For individuals with BMI in the "normal" range, the probability of being former Smoker goes up as the BMI increases. However, for obese individuals the probability of quitting decreases the higher the BMI.

Our results were obtained with data from 2005 and 2006. In 2008, Portugal introduced a new law limiting tobacco consumption in public areas. Studying the impact of this law on tobacco consumption would be in an interesting research project by itself. In particular, one could study smoking cessation attributable to the law and examine whether those characteristics are related to the findings in the present study.

Annexes

Table 1.1: Summary Statistics

		Dummy Variables			
		Overall	Smokers	Ex-Smokers	Median
Demographic Variables	**Gender**				Male (0)
	Male	71,29%	48,98%	51,02%	
	Female	28,71%	61,71%	38,29%	
	Education Level				Compulsory School (2)
	Higher Education	12,02%	50,88%	49,12%	
	Secondary Education	13,80%	59,95%	40,05%	
	Compulsory Education	65,72%	53,52%	46,48%	
	Less than Compulsory	8,46%	36,28%	63,72%	
	Cohabitation				Yes (1)
	No	27,07%	66,12%	33,88%	
	Yes	72,83%	47,61%	52,39%	
	Region				
	Norte	14,39%	48,05%	51,95%	
	Centro	12,35%	45,56%	54,44%	
	Lisboa e Vale do Tejo	16,43%	51,03%	48,97%	
	Alentejo	13,94%	50,04%	49,96%	
	Algarve	18,28%	52,15%	47,85%	
	Açores	18,09%	61,24%	38,76%	
	Madeira	6,53%	63,29%	36,71%	
		Continuous Variables			
		Overall Mean	Smokers	Ex-Smokers	Median
	Age	49,65	45,06	54,76	47
	Income	1385,77*	1.344,26	1.432,09	1501*

Table 1.2: Summary Statistics

		Dummy Variables			
		Overall	Smokers	Ex-Smokers	Median
Tobacco Related Varibles	**Time spent with other smokers**				Few (5)
	Never	20,93%	34,94%	65,06%	
	Few	41,50%	48,47%	51,53%	
	Some time	23,07%	63,22%	36,78%	
	A lot of time	8,80%	74,47%	25,53%	
	Almost everytime	4,32%	71,68%	28,32%	
	Everytime	1,39%	70,27%	29,73%	
		Continuous Variables			
		Overall Mean	Smokers	Ex-Smokers	Median
	Initiation Age	17,11	16,99	17,21	16
	Cigarettes per day	20,83	18,29	23,86	20

Table 1.3: Summary Statistics

		Dummy Variables			
		Overall	Smokers	Ex-Smokers	Median
Health Related Variables	**Diseases before Initiation**				
	Respiratory	4,00%	53,58%	46,42%	No (0)
	Neurological	1,42%	68,42%	31,58%	No (0)
	Cardio and Cerebral Vascular	0,45%	86,11%	13,89%	No (0)
	Other	0,31%	88,00%	12,00%	No (0)
	Diseases after Initiation				
	Respiratory	8,28%	45,63%	54,37%	No (0)
	Neurological	9,94%	55,96%	44,04%	No (0)
	Cardio and Cerebral Vascular	23,02%	36,48%	63,52%	No (0)
	Other	9,18%	33,83%	66,17%	No (0)
		Continuous Variables			
		Overall Mean	Smokers	Ex-Smokers	Median
	Medical Appointments	1,09	0,94	1,27	1
	Body Mass Index	25,61	24,77	26,54	25,1

Table 2.1: Estimation Results

		Cloglog	
		Coef.	z
Demographic Variables	**Age**	0,0280	18,88
	Gender (base cat.: Male)		
	Female	-0,0719	-1,30
	Education Level (base cat.: Higher Education)		
	Less than Compulsory	-0,1936	-1,92
	Compulsory Education	-0,2402	-3,29
	Secondary Education	-0,2291	-2,62
	Cohabitation (base cat.: No)	0,3977	7,71
	Region (base cat.: Norte)		
	Centro	-0,0074	-0,10
	Lisboa e Vale do Tejo	-0,0771	-1,10
	Alentejo	-0,1518	-2,11
	Algarve	-0,1241	-1,80
	Açores	-0,2365	-3,40
	Madeira	-0,5259	-5,44

Table 2.2: Estimation Results

		Cloglog	
		Coef.	z
Tobacco Related Variables	**Initiation Age**	0,0521	3,46
	Initiation Age^2	-0,0012	-3,63
	Cigarettes per day	-0,0031	-0,59
	Cigarettes per day^2	0,0004	4,16
	Time spent with other smokers (base cat.: Never)		
	Few	-0,2882	-6,00
	Some time	-0,6802	-11,26
	A lot of time	-1,1320	-11,50
	Almost everytime	-1,0498	-7,84
	Everytime	-1,0772	-4,85

Table 2.3: Estimation Results

		Cloglog	
		Coef.	z
Health Related Variables	**Body Mass Index**	0,2585	5,41
	Body Mass Index^2	-0,0036	-4,22
	Medical Appointments	0,0224	2,36
	Diseases before Initiation		
	Respiratory	0,1268	0,98
	Neurological	0,2929	1,40
	Cardio and Cerebral Vascular	-0,4512	-0,63
	Other	-0,1374	-0,14
	Diseases after Initiation		
	Respiratory	0,0190	0,22
	Neurological	-0,1876	-2,62
	Cardio and Cerebral Vascular	0,0981	2,13
	Other	0,0831	1,26
	Constant	-6,7770	-9,56

Table 3.1: Marginal Effects at Median

		Cloglog $e^{z}e^{-e^{z}}\left(\beta_i + 2\beta_{i+1}X_i^m\right)$
Demographic Variables	**Age**	0,0103
	Gender (base cat.: Male)	
	Female	-0,0263
	Education Level (base cat.: Superior Education)	
	None	-0,0701
	Compulsory School	-0,0881
	Secondary School	-0,0827
	Cohabitation (base cat.: No)	0,1406
	Region (base cat.: Norte)	
	Centro	-0,0027
	Lisboa e Vale do Tejo	-0,0282
	Alentejo	-0,0552
	Algarve	-0,0452
	Açores	-0,0853
	Madeira	-0,1823
	LN(Income)	0,0200

Table 3.2: Marginal Effects at Median

		Cloglog $e^{z}e^{-e^{z}}\left(\beta_i + 2\beta_{i+1}X_i^m\right)$
Tobacco Related Variables	**Initiation Age**	0,7004
	Cigarettes per day	0,7008
	Time spent with other smokers (base cat.: Never)	
	Few	-0,1034
	Some time	-0,2294
	A lot of time	-0,3456
	Almost everytime	-0,3269
	Everytime	-0,3332

Table 3.3: Marginal Effects at Median

		Cloglog $e^{z}e^{-e^{z}}(\beta_i + 2\beta_{i+1}X_i^m)$
Health Related Variables	**Body Mass Index**	0,6693
	Medical Appointments	0,0082
	Diseases before Initiation	
	Respiratory	0,0466
	Neurological	0,1071
	Cardio and Cerebral Vascular	-0,1583
	Other	-0,0500
	Diseases after Initiation	
	Respiratory	0,0070
	Neurological	-0,0680
	Cardio and Cerebral Vascular	0,0361
	Other	0,0306

Table 4.1: Odds and Relative Risk Ratios

		Logit	Cloglog
		Relative Odds Ratio	Relative Risk Ratio
Demographic Variables	**Gender (base cat.: Male)**		
	Female	0,8893	0,9509
	Education Level (base cat.: Superior Education)		
	None	0,7315	1,0323
	Compulsory School	0,6557	0,8543
	Secondary School	0,7268	1,0076
	Cohabitation (base cat.: No)	1,7559	1,3417
	Region (base cat.: Norte)		
	Centro	0,9842	0,9949
	Lisboa e Vale do Tejo	0,8695	0,9475
	Alentejo	0,7747	0,8979
	Algarve	0,8399	0,9161
	Açores	0,6991	0,8434
	Madeira	0,4865	0,6732

Table 4.2: Odds and Relative Risk Ratios

		Logit	Cloglog
		Relative Odds Ratio	Relative Risk Ratio
Tobacco Related Variables	**Time spent with other smokers (base cat.: Never)**		
	Few	0,6341	0,8295
	Some time	0,3810	0,7488
	A lot of time	0,2248	0,5166
	Almost everytime	0,2438	0,5540
	Everytime	0,2287	0,5413

Table 4.3: Odds and Relative Risk Ratios

		Logit	Cloglog
		Relative Odds Ratio	Relative Risk Ratio
Health Related Variables	**Diseases before Initiation**		
	Respiratory	1,1471	1,0890
	Neurological	1,5060	1,2089
	Cardio and Cerebral Vascular	0,4689	0,7147
	Other	0,8361	0,9073
	Diseases after Initiation		
	Respiratory	1,0704	1,0131
	Neurological	0,7145	0,8746
	Cardio and Cerebral Vascular	1,2110	1,0686
	Other	1,2392	1,0580

Figure 1: Initiation Age - Marginal Effects and Kernel Distribution

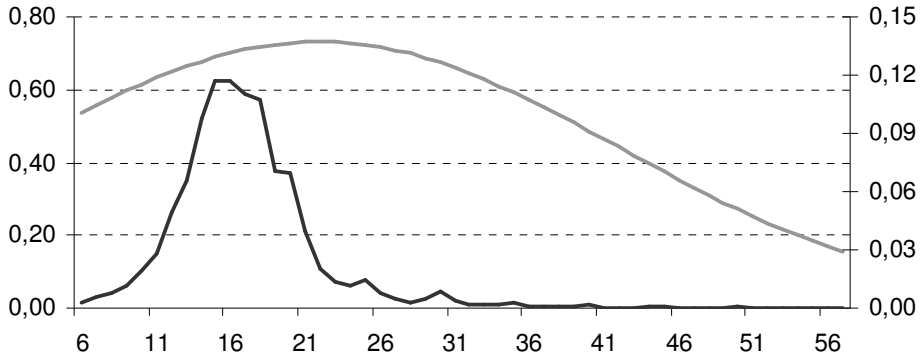


Figure 2: Cigarettes per Day - Marginal Effects and Kernel Distribution

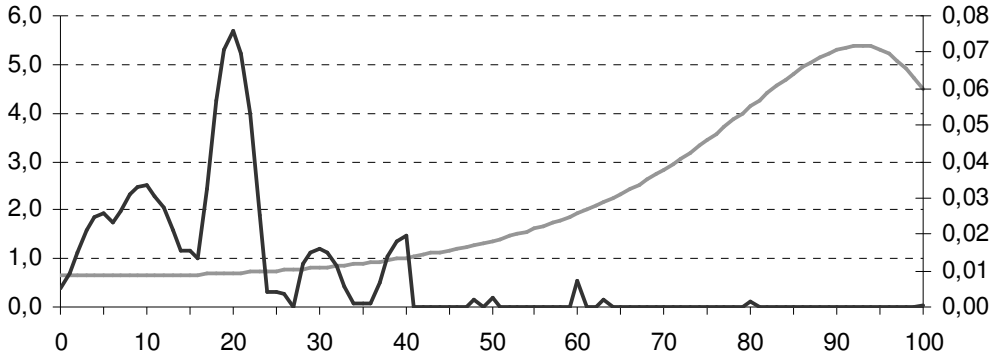
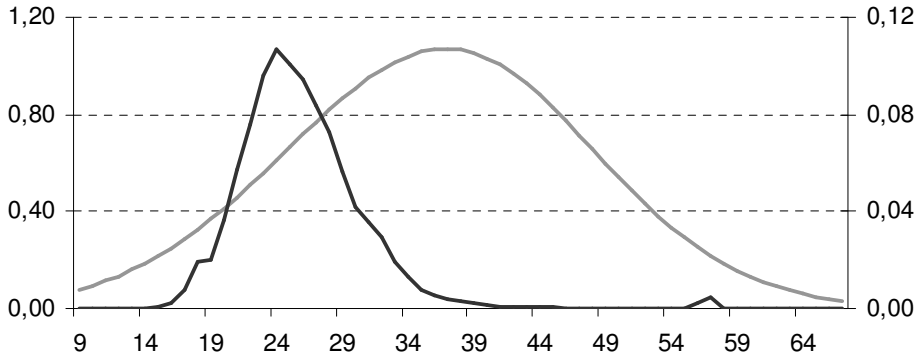


Figure 3: Body Mass Index - Marginal Effects and Kernel Distribution



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