Impact of Cigarette Prices and Tobacco Control Policies on Smoking Onset Among Young People in Albania

Tobacconomics Working Paper Series

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Paper No. 22/9/1
September 2022

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Abstract

Background

Albania has a high smoking prevalence, especially among young people. More than half of males aged 25 to 34 smoke tobacco products, and most ever daily smokers starting smoking daily before 18 years old. There is a lack of understanding of the determinants of tobacco use initiation among youth, which is addressed by this study.

Methodology

To assess the effect of price, tobacco control policies, and other relevant factors on youth smoking onset in Albania the authors used microdata from the Global Youth Tobacco Survey in Albania for 2004, 2009, 2015 and 2020. The study utilizes a split-population model, widely considered one of the most effective methodologies for addressing this type of research.

Results

Price (mainly driven by fiscal policies) has a strong impact on the decision to initiate smoking among teenagers. An increase of price by 10 percent reduces the likelihood of smoking initiation by five percent. Also, non-fiscal tobacco control policies appear very effective – the implementation of laws to control the consumption of tobacco in public environments had a significant effect in reducing the initiation of smoking among youths. Teenagers who are exposed to smoking by peers are 90 percent more likely to start smoking. When close friends smoke, the likelihood to initiate smoking is almost 2.5 times higher. Teenagers who have a family member that smokes in their home are 65 percent more at risk than teenagers who are not exposed to smoking in their home. Having at least one parent who smokes increases the likelihood of smoking initiation by 23 percent; having both parents smoke increases likelihood of initiation by 40 percent.

Conclusions

A combination of policies including, increasing taxes, strengthening enforcement of laws to control tobacco use in public spaces, and implementing public health mass media campaigns to educate especially young people about the dangers of smoking could prove effective in reducing smoking onset.

Introduction

Research Background

Early-age smoking is a central challenge for tobacco control efforts. The earlier in life a cigarette is smoked, the higher the likelihood that individuals will become regular or daily smokers (Lewit et al., 1981). Therefore, to reduce smoking prevalence, it is crucial to tackle smoking initiation among young people.

The evidence suggests that higher taxes that result in an increase in cigarette prices are especially effective in reducing the probability of smoking among youth, due to specific socio-economic conditions of this age group (Ross & Chaloupka, 2004). Youth are consistently more responsive to cigarette price changes than adults due to a higher share of tobacco expenditure in overall expenditures, and typically have lower smoking addiction because of shorter smoking histories (Ross & Chaloupka, 2004; Nikaj & Chaloupka, 2014; Palali & van Ours, 2019).

Other factors that influence tobacco initiation include parental smoking status, smoking behaviors in the family or among friends, tobacco control policies in public places and in schools, and the extent to which youth are exposed to tobacco control regulations and media advertising against tobacco. These regulations include banning smoking in certain public spaces and minimum age purchase restrictions for cigarettes (see Guindon et al., 2019; Asare et al., 2019; Stoklosa et al., 2022).

While these findings are demonstrated in previous studies, it is important also to understand their relative importance within the country-specific context. Therefore, this research examines youth smoking behaviors particularly by exploring the effects of tobacco tax policies (controlling for other tobacco control interventions) on smoking initiation in Albania, a country with high smoking prevalence. According to the Survey on Tobacco Consumption in Southeast Europe (STC-SEE) carried out in 2019, tobacco use in Albania is especially high among young people, with more than half of males aged 25 to 34 smoking tobacco products, and with most ever daily smokers starting smoking daily before 18 years old (Gjika et al., 2020). The issue becomes more critical considering that Albania has also the second youngest population in SEE after Kosovo. Accordingly, the results of this study are useful to inform coherent recommendations for policymakers.

Recent studies have shown that excise tax increases on cigarettes have been instrumental for reducing tobacco consumption in Albania (Zhllima et al., 2021). However, the continuing low prices and affordability of cigarettes suggest strongly that there is significant space to further utilize fiscal policies to help discourage smoking. Moreover, tobacco excise levels in Albania are the lowest among all SEE countries and far below the EU excise minimal levels (which as of 2022 is €90 euros per 1,000 cigarettes) (*ibid*).

In this context, higher taxation may be an especially effective tool in halting youth tobacco initiation and reducing youth smoking, alongside enforcement of tobacco control restrictions and anti-tobacco advertising. However, there is a scarcity of relevant economic research, particularly explaining the effect of tobacco control policies on discrete groups including among youth.

The overall objective of the study is to explore the effects of tobacco control policies, specifically tax and price, as well as nonprice tobacco control policy interventions, on tobacco initiation among Albanian youth. Furthermore, other factors that can contribute to smoking initiation are considered. The study utilizes a split-population model, widely considered one of the most effective methodologies for addressing this type of research question.

The paper is structured as follows: section two reviews the literature; section three describes the methodological approach; section four provides the results of the study which is followed by a section discussing the results. The final section summarizes the main conclusions and recommendations.

Literature Review

A large body of literature in recent decades has demonstrated the factors influencing smoking onset among youth in various parts of the world. Attention has been given to smoking onset at early ages as well as to the decisions of young smokers to quit smoking (DeCicca et al., 2008). Considering that the decision to start smoking is different from the decision to continue smoking, authors have used models of smoking initiation based on longitudinal data (Palali & van Ours, 2019). For several decades, researchers have shown that price and factors affecting price increases, specifically taxes on tobacco, are the main factors associated with lower hazards of starting smoking (see Lewit et al., 1981; Chaloupka & Grossman, 1996; Chaloupka, 1999; Czart et al., 2001; Tauras et al., 2001; Ding, 2003; Zhang et al., 2006; Nonnemaker & Farrelly, 2011; Kim et al., 2012; Guindon, 2014; Joseph & Chaloupka, 2014).

Despite the overwhelming research findings that demonstrate the central role of price in preventing tobacco initiation, there have also been a few studies which find weak or no evidence for such a claim such as Douglas (1998) and Douglas and Hariharan (1994). Also, Gruber and Zinman (2000) find that early teenagers are less price sensitive compared to older teenagers, but there is no clear reasoning for such behavior. DeCicca et al. (2008) find no effects of tobacco prices on the onset of smoking among young people in the United States of America. Kostova et al. (2017) in a study on youth smoking in China argue that low price sensitivity is related to the ability to select other brands in the case of price increases. In related research, Forster and Jones (2001) and López

Nicolás (2002) find that prices have a very weak effect on initiation, while remain decisive in the quitting decision.

In addition to price increases, research also demonstrates that nonprice tobacco control policies are decisive in reducing tobacco initiation. For example, López Nicolás (2002) find that intensified health warning campaigns were very effective in discouraging smoking initiation. Tauras et al. (2001) found that minimum purchase age laws have a negative significant impact on smoking initiation, while youth access restrictions (signs posting at points of sale, vending machines placements and penalties for vendor sale violations) do not have a significant impact on smoking initiation, mainly due to weak enforcement level. Later studies find that restrictions on smoking in public places or workplaces can directly affect cigarette consumption by making it harder for people to smoke, especially reminding young individuals about the negative effects of smoking (Palali & van Ours, 2019).

Research also demonstrates that tobacco advertisements play a role in persuading youngsters to start smoking (Palali & van Ours, 2019). According to Asare et al. (2019), teenagers exposed to cigarette advertisements and who were offered free cigarettes are more likely to smoke. Exposure to point-of-sale advertising is another risk factor and strong predictor of smoking initiation (Henriksen et al., 2010). In contrast, being exposed to anti-smoking media messages and to pictorial warnings is associated with a lower likelihood of smoking (Stoklosa et al., 2022). Therefore, in the early stage of tobacco control policies, bans on advertisement and health warnings on packages have been two of the most important instruments for removing the encouragement toward smoking (Blecher, 2008) and smoking initiation (Pierce et al., 2012).

In addition, access to school-based programs of education against tobacco are also included in studies observing school children (Pierce et al., 2012). However, the effect of these programs is mixed, at best usually with small or no effect sizes (Flay, 2009; Thomas et al., 2013).

Gender or sex differences in the effect of price on youth smoking are frequently reported in the literature. Cawley et al. (2004; 2006) find higher cigarette prices decrease the probability of smoking initiation among males but have no impact on female smoking initiation. Similarly, Nikaj and Chaloupka (2014) suggest that males may be more responsive to cigarette price changes. Tauras et al. (2013) find that compared to male adolescents, female adolescents are more responsive to price change. Similarly, Nonnemaker and Farrelly (2011) find that although both sexes are price sensitive, females are more tax and price sensitive than males.

Peers and peer relationships are important factors involved in tobacco

initiation. A review of Kobus (2003) finds that the likelihood for smoking initiation increases for non-smokers who affiliate with smokers. Suranovic et al. (1999) argue that although teenagers expect no benefits of smoking and find no interest to smoke, friends' initiation and encouragement may affect perceived potential benefits. Influence of peers on smoking initiation is confirmed by many other studies (Powell & Chaloupka, 2005; O'Loughlin et al., 2009; Oh et al., 2010; McKelvey et al., 2014).

In addition to peer effects, another highly influential factor is the presence of smokers in the family. Smoking by parents is a statistically significant determinant of smoking initiation (O'Loughlin et al., 2009; Odukoya et al., 2013; Asare et al., 2019). Hill et al. (2005) find that less parental smoking, more strict family monitoring and rules, and stronger family bonding negatively influence the likelihood to start daily smoking from age 10 to 21. Higher levels of parental education contribute negatively to regular smoking initiation (Vellios & van Walbeek, 2016). In contrast, Hiemstra et al. (2012) find no association between parental smoking and smoking onset.

The relevant literature on countries with fragile democracy or post-socialist countries remains scarce. For instance, none of the predictors of smoking initiation mentioned in this section have been explored in Albania. Indeed, studies in relation to smoking initiation are limited only to few sociodemographic characteristics (Toci et al., 2014; Toci et al., 2017), thus prices and other tobacco control instruments have not been thoroughly empirically examined. Considering this major research gap, this paper focuses on exploring the main predictors for smoking onset among Albanian youth, with focus on influences of both prices and tobacco control policies during the period of 2004–2020. The study includes some main factors influencing smoking as described in this section.

Cigarette Price and Tobacco Control Policies in Albania

Albania´s tobacco market consists primarily of cigarette imports (Rama et al., 2018; Gjika et al., 2020), which usually account for more than 70 percent of domestic tobacco consumption. The rest of tobacco consumption is mainly based on hand-rolled tobacco produced by domestic tobacco farms and firms, a small share of domestic cigarettes produced illicitly, and smuggled cigarettes or roll-your-own tobacco from other countries. Currently, there is no domestic tobacco manufacturing industry that produces factory-made cigarettes for final consumers in Albania. During recent years, the average annual import of cigarettes (or cigarette packs) has been around 150 million cigarette packs, corresponding to a range of EUR 52–56 million per year. The overall import of manufactured cigarettes during recent years has been in gradual decline—in 2020, recorded imports were 131 million cigarette packs (EUROSTAT, 2021).

Over the past decade, tobacco consumption in Albania has been decreasing both in terms of prevalence and smoking intensity. Yet over 42 percent of men and 7 percent of women in Albania use tobacco, which is higher than the global average. Tobacco use among youth remains a major concern (Zhllima et al., 2021). According to the Global Youth Tobacco Survey (GYTS, 2020) 15.3 percent of adolescents (ages 13 to 15 years old), 20.2 percent of males and 9.9 percent of females, currently use tobacco products.

The increase of excise taxes began in the early 2000s - the biggest increase in excise tax was implemented in 2006, when the rate increased from ALL 2,500 per 1,000 sticks to ALL 4,000 per 1,000 sticks. However, as specified in Rama et al. (2018) and Zhllima et al. (2021), the current level of specific excise remains among the lowest in the SEE region and is far from the minimum excise level required by the European Union.[1] On a more encouraging note, and different from most neighboring countries, Albania assesses only a specific excise tax on tobacco and tobacco products that has recently been increasing regularly. There is no ad valorem tax on cigarettes.

Changes in excise taxes, except in 2003, have been associated with increasing prices over the last twenty-five years. Due to excise tax increases, as well as cumulative inflationary effects, the prices of cigarette packs in Albania have increased by almost five times from 1995 to 2020. However, cigarettes have not become less affordable. Cigarette prices increased approximately about the same as the average yearly rate of growth in Gross National Disposable Income (more than 6.1 percent for the same period). Figure 1 illustrates the trend of the deflated retail price of cigarettes.

In addition to the gradual increase of specific excises, the Government of Albania began to embrace several tobacco control policies since 2000 including the adoption of a set of "National Tobacco Control Provisions" which in 2001 banned tobacco advertising on television, radio, print media, and billboards. In addition, Law No. 8717 requires the use of health warnings and the disclosure of tobacco product ingredients as well as places restrictions on smoking in public places.

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[1] The tobacco excise regime requirements are of high relevance to the screening process in the negations to accession for EU (part of Chapter 16). In order to meet the EU target, the country will need to almost double the current excise rate (53 Euro per 1,000 cigarettes) to reach the required minimum of 90 euros per 1,000 cigarettes. Additional information is provided on: https://ec.europa.eu/taxation_customs/taxation-1/excise-duties/excise-duties-tobacco_en

Figure 1. Inflation-adjusted price per cigarette 20-pack in Albania in ALL[2]

Source: Authors' own elaboration based in INSTAT (2021)
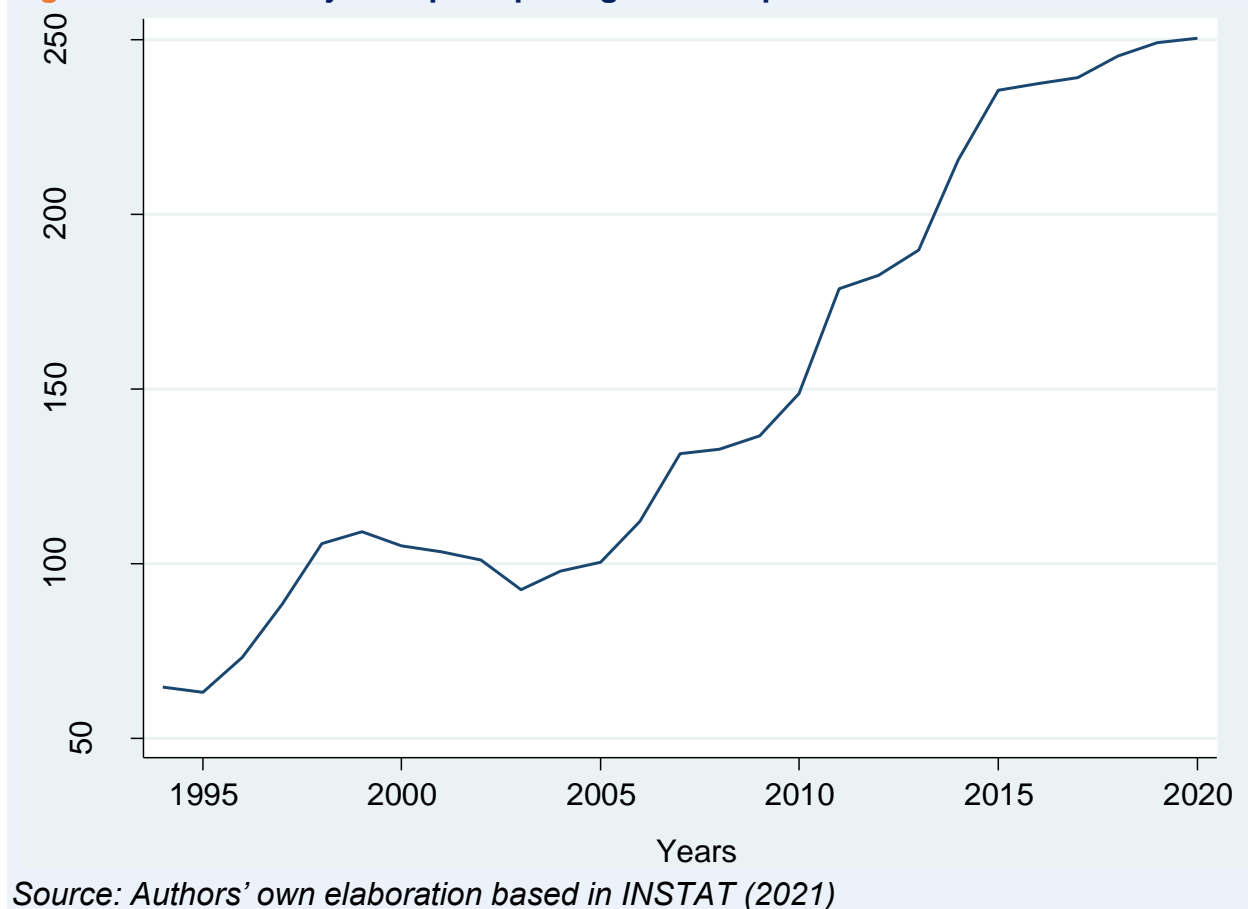
Faced with the continuing high smoking prevalence, the government stepped up the fight against smoking by adopting a new law in November 2006 (Law no. 9636, dated 6.11.2006, "On the Protection of Health from Tobacco Products"), which prohibits all types of advertising, promotion, and sponsorship of tobacco on radio, television, print media, etc. The law also reasserts the minimum age of sale for tobacco. Law enforcement during the early post-socialist transition has been generally weak, particularly considering that the state was emerging from complete collapse during the socio-economic and political conflict of the late 1990s. Thus, the real impact of tobacco control policies during that period is not clear.

Subsequent amendments in 2013 and 2014 included several measures such as: settling of the level of fines for each administrative offense or misconduct regarding the production and sale of tobacco products; inclusion of educational programs for the protection of health from tobacco products; and for smoke-free environments, penalties for

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[2] ALL is denoted as Albanian lek. Calculation for illistrative purpose in Euro are made based on the 2021 average exchange rate which is EUR 1 equal to ALL 121.5.

business owners and smokers when caught smoking in closed public spaces (e.g., bars) (Table 1) – these measures were largely enforced.

Table 1. **Tobacco control policies (variables) from 2001-2019**

Law	Specific measures against tobacco use	Implementa-tion year
Law no. 8691, date 16.11.2000, "On the Production and Marketing of Tobacco and Cigarettes."	Ban on sale of single sticks (from open packs)	2001
Law no. 9636, dated 6.11.2006, "On the Protection of Health from Tobacco Products"	Ban on smoking in public/inner areas/ Fines for the management of restaurant, bars, and cafes. Ban on media advertising Ban on selling to children under 18 Ban on open cigarettes sale reinforced	2007
Law No. 65/2013 "For some additions and changes in Law no. 8691, dated 16.11.2000 "For the production and trade of tobacco and cigarettes", as amended".	Introduction of fines for production and trade.	2013
Law No. 76/2014 "For some additions and changes in the law No. 9636, dated 6.11.2006, "For the protection of health from tobacco products", as amended"	Introduction of fines for a person who smokes in a closed space	2014

Source: Authors' own elaboration.

Considering the potential relevance to smoking initiation, and law enforcement environment, we incorporate in the econometric analysis the latest relevant tobacco control policies, particularly those of 2013 and

2014. The main reasons for choosing these years are due to the reassertion and specifications in terms of fines which made the earlier legal base on tobacco control more applicable and binding to the tobacco control norms and the breaking of the law more costly for economic operators.

Methodology

Data

The study analyzes micro-level data from the Global Youth Tobacco Survey (GYTS) conducted in 2004, 2009, 2015, and 2020. The GYTS is a cross-sectional school-based survey on the use of tobacco products among school children aged 11 to 17 years old. The survey collects information with the purpose of providing evidence in guiding the implementation of tobacco prevention and control programs (GYTS

Collaborative Group, 2015). The GYTS methodology is standardized globally which facilitates comparison of tobacco-related data at the national, regional, and global levels.

GYTS is a nation-wide survey. Sampling is chosen using a two-stage sample design, where in the first stage, primary and secondary schools are selected with a probability proportional to enrollment size. The school size in terms of number of pupils is decisive in being selected, meaning the more students the school has the more probable it is for the school to be selected. In a later stage, within each selected school, the classes are chosen randomly. The survey is based on a structured questionnaire consisting of several topics such as children's knowledge and attitudes toward smoking, prevalence of tobacco use, the role of advertising and media in tobacco use, and access to cigarettes. The Albanian GYTS administered in 2004 covered 4,682 students, 4,771 in 2009, 4,672 students in 2015, and 5,388 students in 2020, for a total of 19,513 students interviewed.

Data analysis

There are several principal methodologies used to estimate the relationship between cigarette policy controls and smoking onset for youth (Kobus, 2003; Suranovic et al., 1999; Guindon, 2014), which can be categorized into two: those modeling smoking behavior, namely starting, and quitting as binary events within a discrete

choice framework; and those using duration models. We chose to utilize a duration/survival analysis (Douglas & Hariharan, 1994; Forster & Jones, 2001; Kidd & Hopkins, 2004; Göhlmann et al., 2010; Guindon, 2014; Kostova et al., 2015; Vellios & van Walbeek, 2016; Gonzalez-Rozada & Montamat, 2019; Stoklosa et al., 2022) because it enables the use of incomplete information from individuals who may not have experienced smoking initiation before the end of the data collection. Observations from these individuals are considered right censored and excluding these individuals distorts the distribution of event duration (Singer & Willet, 1993; Guindon, 2014).

Standard survival models implicitly assume that all individuals under observation will eventually experience the event of interest (initiate smoking) (Guindon, 2014; Palali & van Ours, 2019). However, this is very restrictive for smoking onset, as a share of individuals may never initiate smoking no matter how long we observe them. To relax this assumption, like previous authors (Nonnemaker & Farrelly, 2011; Kostova et al., 2015; Vellios & van Walbeek, 2016) we use the split population survival model, or cure model, to analyze the impact of price policies on the smoking onset of youth in Albania. A split population model weights the likelihood of each observation by using the estimated probability that the individual will ever start smoking (Guindon, 2014). These models suppose that a proportion of the population never

fails (i.e., initiates smoking) and estimate the hazard rate for the remainder of the population that has a positive probability of initiating smoking. Splitting the population into two groups—the group that will not fail and the other group that will eventually fail—makes the model more accurate in analyzing smoking onset. Scholars have used this method to analyze the effect of cigarette price on smoking initiation (Asare et al., 2019; Stoklosa et al., 2022; Guindon, 2014; Gonzalez-Rozada & Montamat, 2019; Franco-Churruarin & Gonzalez-Rozada, 2021). More precisely, the (log) likelihood contribution for i[th] person with a survival time of t years is:

$$ln(L) = \sum \{c_i ln[k * f(t|s_i = 1, x_i(t))] + (1 - c_i)ln[1 - k + k * S(t|s_i=1, x_i(t))]\}$$

where:

c_i=1 if individual *i* ever smoked; s_i=1 if individual *i* will eventually start smoking and 0 if they never do; z_i: time-invariant covariates; $x_i(t)$: time varying covariates.

k is the probability of smoking; $f(t|si = 1, x_i(t))$ is the conditional density function of starting smoking at the observed starting age;

$k * S(t|si=1, x_i(t))$ is the probability of starting after the age observed in the survey.

To estimate the split population model, data must be organized in a pseudo-longitudinal format. We infer the year of smoking initiation by the self-reported question on the initiation age: "*How old were you when you first tried a cigarette?*" Knowing the respondent's current age at the year of the interview, we can track the smoking status of the students from the year of first exposure of smoking until the year of initiation for those initiating or until the year of the interview for those students that never initiated. This pseudo-longitudinal

dataset enables us to analyze the effects of tobacco policies from 1994 to 2020.

Variables and estimation strategy

Similar to Asare et al. (2019) the dependent variable used in the study analysis is smoking initiation. The age of smoking initiation was created from the answer to the questions "How old were you when you first tried a cigarette?" The self-reported age of initiation in all GYTS were provided in two-year intervals (such as 8–9 years old, 10–11 years old etc.). We randomly selected between the upper or the lower age of the interval, as long as it was not higher than the current age of the student during the interview year. Students that did not report their current age or provided contradictory information regarding smoking initiation were removed from the analysis (325 and 528 students, respectively).

The hazard of smoking initiation is modeled as a function of cigarette prices, non-price tobacco policies, gender, parental smoking behavior, and peer smoking behavior.

$$\text{Hazard of smoking initiation}$$
$$= F(price; \ nonprice \ policies; gender; parental \ smoking \ behavior;$$
$$peers \ smoking \ behaviuor)$$

According to the literature, one of the most important variables that explains smoking (initiation or cessation) is the cigarette price (Mayne et al., 2019). Our pseudo-longitudinal dataset that contains information regarding the behavior of smoking initiation in youth covers the period 1994–2020. We integrated it with average price of cigarettes for the period 2003–2017 as provided by INSTAT (Albanian Institute of Statistics). For the period 1994–2002 and 2018–2020 we calculated the cigarette price from the yearly change of Consumer Price Index for cigarettes as reported by INSTAT. The price is constant across the country. The very limited geographical dimension of the country and the unified tax regulations translate into low or no price differentials. A limitation of using averaged cigarette price is the fact that it does not permit the capturing of price dispersions (price differences by brand), which may have been smoked by the respondent in the time of initiation (Palali & van Ours, 2019).

We further assess the responsiveness toward price by sex. By interacting the price variable with sex, we can estimate the impact of cigarette prices on smoking initiation by gender (see Table A1 in the Appendix for summary statistics of the variables).

We analyze the effect of other non-price tobacco control policies on the smoking initiation of young people in Albania. As explained in the previous section we include in our analyses all the most important tobacco control policies the government has implemented during the relevant period, such as in 2013 and 2014, the introduction of fines for violating smoke-free regulations (for both businesses and smokers).

The study also includes other factors related to demographics such as gender, and contextual factors related to the social environment including peer smoking habits and parental smoking behavior. To assess peers' smoking habits, we use the variable "Most of the peers smoke" that measures the effect of being in a class in which most students smoke. To analyze the impact of parental smoking behavior we used the variable "A family member smokes in home premises" that captures the impact that a parent's habit of smoking on the home premises has on smoking initiation of young people. We also conducted various checks to assess the robustness of our estimates.

We use a cubic polynomial specification as the functional form for the duration dependence in the hazard function in all specifications.

Results

Descriptive statistics

The total number of individuals observed in the samples of the four waves is 19,513. The number of smokers is 4,476 individuals (1,893 females and 2,539 males). The prevalence of current smokers is 11.46 percent.

Table 2. Descriptive statistics of the full observed sample

| Indicator	Explanation of the indicator	Value
Age	The average age of the respondents at the time of the interview (in years)	14.30
Age of initiation	Average age of the respondents when they first tried a cigarette (in years)	13.10
Smokers (%)	Dummy variable that indicates the respondents that have ever tried or experimented with cigarette smoking, even one or two puffs.	35.95

Source: Authors own elaboration based on GYTS data

Age of smoking and smoking initiation indicate features of children's behaviors. The average age of smokers is 14.67 years old. There is no significant difference in the average age of smokers between males and females (14.66 vs. 14.68). The average age of smoking initiation is 13.10 (12.97 females versus 13.27 males). Half of the smokers initiated smoking before age 13, while 90 percent before age 15 years old. Only 1 percent of respondents initiated smoking before 8 years old.

The hazard to initiate smoking during early youth is always important. As demonstrated by Lewit et al. (1981), the younger the smoker, the more likely they will smoke as adults. Figure 2 shows the trends of the risks of initiating use of tobacco products in Albania by gender in the period 1995–2020. The graph shows

that the risk of initiation increased more than proportionally after the age of 13 for both groups (equal to 8th grade). Females have lower chances of smoking initiation, with an approximate 30-percentage point difference compared to males, even though there is no difference in age initiation between the groups. A Nelson-Aalen hazard model describes the cumulative risk of initiation. Young females face a lower cumulative risk than young males. The cumulated risk of initiation before age 15 is approximately 50 percent for males, almost double the accumulated risk of females at the same age. This difference between the sexes in the cumulative initiation risks increases with age.

Figure 2. Hazard to initiate smoking by gender in the period 1995-2020
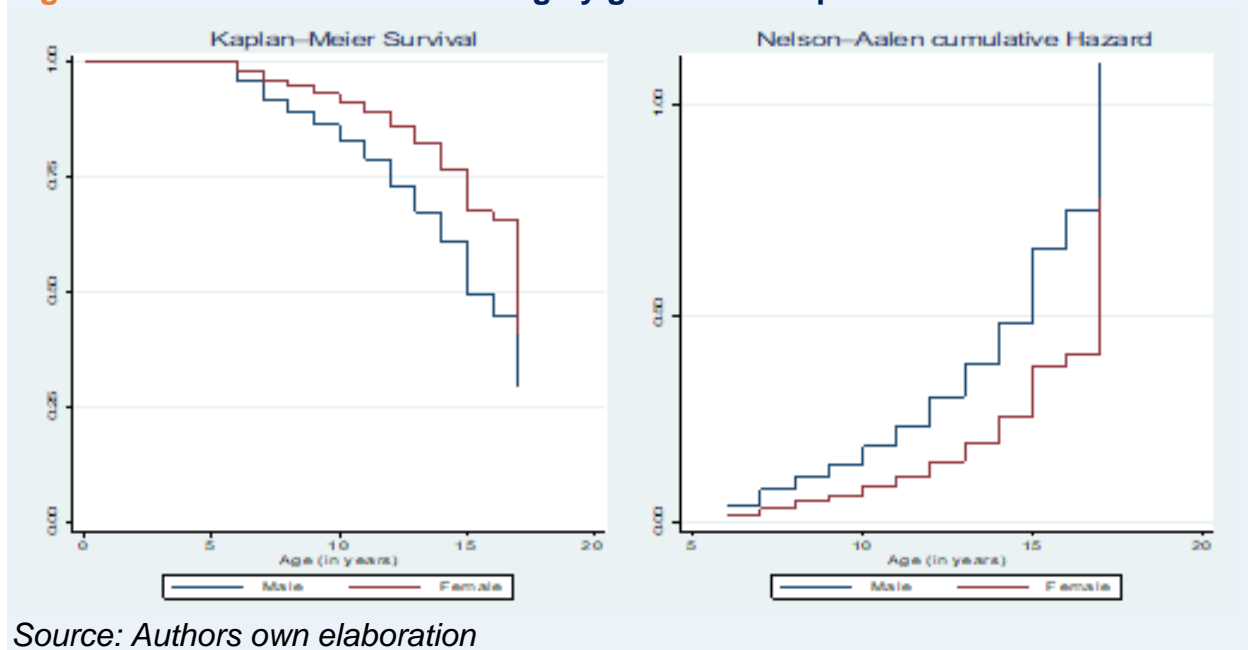
Source: Authors own elaboration

Results of the Split Population Model

Table 3 reports the results from the split population model. Model 1 is our baseline model while Model 2 presents the estimates of the sensitivity to the cigarette price by sex. The estimates are expressed in exponents and values below 1 are interpreted to reduce the hazard of smoking by the distance to 1, while those above 1 increase the hazard of smoking initiation by the amount over 1.

Model 1's results suggest that price has a strong impact on the decision to initiate smoking among teenagers in Albania of 0.3 percent per ALL. In other words, at the average price of ALL 158 per pack, a 10 percent increase in price (almost ALL 16) will reduce the hazard of smoking initiation on average by almost 5 percent (=16*0.3 percent).

Price is a negative predictor of smoking for both males and females (see Model 2). Demand for tobacco is more inelastic among males compared to females. The differences in the coefficient between males and females suggest that increments in cigarette prices reduce the probability of smoking initiation for females by a greater percentage than for males. An increase of 10 percent in price (ALL 158) would reduce on average the likelihood of smoking by almost 8 percent among females (with a confidence interval that ranges from 6 to 10 percent) which is four times higher when compared to males (2 percent with a confidence interval from 0.2 to 2.5 percent). Furthermore, the sex of the individual appears statistically significant also in Model 1, suggesting that males are almost 50 percent more likely to initiate smoking than females.

Beyond price, peer smoking is also an important predictor of smoking initiation. Teenagers who are exposed to smoking by other students in their grade are 90 percent more likely to start smoking (Model 1). We found that youngsters who were exposed to cigarette smoking at home are more likely to smoke. Thus, teenagers who have a family member that smokes in the home are 65 percent more at risk than teenagers who are not exposed directly to smoking in their home.

Policies related to tobacco control in Albania have a strong effect in reducing smoking initiation in young people. Policies introduced in 2013 and 2014 appear to have significantly reduced the number of young smokers from initiation by almost 30 percent and 20 percent respectively.

Table 3. **Split population survival model**

Hazard of smoking initiation	Model 1	Model 2
Price of cigarettes	0.997***	
	(0.001)	
Price*Female		0.9950***
		(0.001)
Price*Male		0.9987**
		(0.001)
Business fee for smokers' Policy	0.709***	0.703***
	(0.064)	(0.064)
Individual fee for smokers' Policy	0.826**	0.818**
	(0.069)	(0.068)
Female	0.499***	
	(0.018)	
A family member smokes in home premises	1.654***	1.620***
	(0.056)	(0.055)
Most of the peers' smoke	1.894***	1.847***
	(0.075)	(0.073)
Observations	119754	119754
Cure probability	0.111***	0.0671***
Standard errors are shown in parentheses. We control for duration dependency in all specifications $* p < 0.10, ** p < 0.05, *** p < 0.01$		

Robustness checks

The results in Table 3 are robust to different specifications. We employ different variables to measure the importance of the family and peer smoking behavior in this section.

We check the robustness of our estimates and further investigate the importance of the family smoking behavior (Models 3 and 4 in Table A2 in the Appendix) by replacing the variable A family member smokes in home premises with variables such as: one

parent smokes—a dummy that captures the significance of a smoking parent on smoking initiation; and both parents smoke takes a value of 1 in case both parents are reported to be smokers. The estimates of our baseline model do not change, confirming the robustness of the findings.

We find that smoking in the home most influences the initiation of smoking in young people. Having at least one parent that smokes make a child almost 23 percent more prone to initiate smoking compared to 40 percent if both parents smoke. These findings highlight the importance of parental smoking habits on the decision of young people to initiate smoking.

In Model 5 in Table A3 in the Appendix we replaced the variable "Most of peers' smoke" with the variable "Most of the close friend's smoke". The risk for young people initiating smoking with close friends that smoke is almost 2.5 times higher than for those who have close friends that do not smoke.

Discussion of Results

The estimates from all the models suggest price is a significant predictor of smoking initiation among teenagers in Albania. The models generate consistent coefficients for price suggesting that price increases negatively influence smoking onset. The results of the model show a large effect of price with similar weight to Kostova (2013), Gonzalez-

Rozada and Montamat (2019) and Asare et al. (2019). The results provide solid evidence for the need to strengthen tax increases so that they outpace inflation and economic growth thereby driving down youth smoking, including smoking onset.

The effect of price on smoking initiation varies by sex. Opposite to Nonnemaker and Farrelly (2011), Tauras et al. (2013) and Cawley et al. (2004; 2006) we find that price is a predictor of smoking initiation for both males and females. However, like Nikaj and Chaloupka (2014) there are differences in price response, where males appear more inelastic compared to females.

Sex also appears statistically significant for smoking onset. Being male increases the odds for smoking initiations by more than 50 percent. The coefficient for male indicates that it is associated with an increase in the probability of ever starting smoking, but not the age at which the habit is initiated. This result is consistent with the current gender stereotypes in adult smokers. Different from other Western Balkan countries, Albania experiences a very large sex disparity in terms of tobacco prevalence. One argument which can find support from socio-cultural studies is that smoking is only socially acceptable among men in the Albanian culture (Dervishi & Koçi, 2008).

Peer smoking also predicts smoking initiation. Teenagers who have friends who smoke are more likely to start

smoking. In addition, those who have classmates smoking are more prone to initiate smoking. The study findings are similar to Powell et al. (2005), O'Loughlin et al. (2009), Oh et al. (2010), and McKelvey et al. (2014) providing evidence that tobacco use is sometimes linked to a social habit.

The onset of smoking is frequently based on group smoking since in the beginning stage, youth are occasional and light smokers who "borrow" most of the cigarettes they smoke from friends (DeCicca et al., 2002). Using mass media anti-smoking campaigns and strengthening educational programs against tobacco to reduce use of tobacco among school pupils may mitigate social pressure toward smoking.

Smoking status of the parent is a positive predictor of smoking initiation. Similar to other studies (O'Loughlin et al., 2009; Odukoya et al., 2013; Asare et al., 2019), it appears likely that in Albania smoking habits transmit intergenerationally from parents to their offspring. Given the fact that parental smoking is a positive predictor of smoking onset, anti-smoking campaigns can be more effective if they appeal more to parental responsibility rather than warning teenagers against smoking-related health risks. Education and awareness messages are suggested to be prepared for parents, particularly pointing to their importance as role models for their children. Considering that tobacco use prevalence in Albania is much higher for males (Gjika et al.,

2020), the messages should address parents' but particularly the father's role in preventing smoking onset for children.

We found that children who were exposed to cigarette smoking at home were more likely to smoke. As found by Göhlmann et al. (2010), access to smoking within households likely makes warnings against the health risks of smoking less credible to children.

Policies related to tobacco control have a positive role in reducing smoking initiation. Like other authors (Guindon et al., 2019; Palali & van Ours, 2019; Stoklosa et al., 2022) we found that policies including forbidding smoking in public spaces (restaurants, bars) associated with penalties have a statistically significant and negative effect on smoking initiation. One reason for the success of these tobacco control policies is enforcement, which may differ from other countries in the region—well-known restaurants have been fined and such cases have been made public by the media, and as a result, tobacco control policies in public place have been largely enforced.

The study has several limitations. Few variables related to the access to anti-tobacco education in schools, tobacco advertising, ready cash for smoking, family wealth and parents' education level, as well as student experience of smoking in closed spaces were available to include due to inconsistent structure of questions among GYTS rounds. In addition, prices

of cigarettes by type of brand were not collected in all GYTS. However, despite these limitations the study captures most tobacco onset predictors and is solid evidence supporting tobacco control policies in Albania and countries with similar institutional environment.

Conclusions

This research contributes to the existing literature on tobacco use onset by providing an econometric analysis on smoking onset using a split population model to obtain onset price impact on the age of starting to smoke, and to evaluate the importance of other determinants of smoking onset. Such studies remain scarce in Eastern Europe and in most low- and middle-income countries.

The research finds that price is a predictor of smoking initiation among teens in Albania. In addition, policies related to tobacco control have a positive role in reducing smoking initiation. Our findings suggest that further tax increases are likely to contribute to a stronger decline of smoking rates and decrease smoking initiation among youth. As Göhlmann et al. (2010) emphasize, even if an excise tax increase results in a delay of smoking onset rather than permanent abstinence, it is again more likely to have positive health effects and lower smoking intensity.

In addition, considering the relative inelasticity of tobacco use, higher excise tax on tobacco would also generate more fiscal benefits. Based on estimates provided by Zhllima et al. (2021), higher tobacco taxes leading to higher tobacco product prices will not only improve public health but also will result in higher government revenues.

The empirical evidence presented suggests that in addition to cigarette price, other variables like sex, parental and peer smoking, (especially household smoking within the home) significantly affect smoking initiation. Population-level education and awareness messaging to address parental behaviors and other household dimensions, particularly by pointing to their importance as role models for their children and as an educative environment in preventing smoking onset.

A combination of increasing taxes and strengthening enforcement of laws to control tobacco use in public spaces could prove more effective in reducing smoking onset. Intensive policies introduced to protect youth from tobacco and promoting smoke free environments is significantly important for reducing tobacco initiation in the future. Similarly, because illicit tobacco is generally less expensive and therefore more accessible to young people, efforts by the Government of Albania to ratify the Protocol to Eliminate Illicit Trade in Tobacco Products will benefit future cohorts. Research (Hoffman & Tan, 2015) demonstrates that these policies are the effective government interventions.

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Appendix

Table A1. Independent variables selected for the split population model and averages according to year of implementation

Variable name	Definition	GYTS 2004	GYTS 2009	GYTS 2015	GYTS 2020	Total sample
Initiation	Dummy that indicates if a respondent has ever tried smoking	0.31	0.52	0.031	0.18	0.33
Cigarette price[3]	Real price per pack (inflation-adjusted) (in ALL)	99.09	110.26	172.51	232.81	157.67
Gender	Dummy that indicates when a respondent is female (in %)	0.53	0.52	0.51	0.51	0.52
Family smoking habits						
One Parent smokes	Dummy that indicates of the respondent's parents (either of both) smoke	0.51	0.45	0.45	0.43	0.46
Both parents smoke	Dummy that indicates that both parents smoke	0.04	0.03	0.05	0.05	0.04
A family member smokes in home premises	Dummy that indicates when a family member smokes in home premises (mother, father, brother, sister)	0.50	0.45	0.45	0.42	0.45
Peers smoking habits						
Most Close Friends smoke	Dummy that indicates if at least half of respondent's closest friends' smoke tobacco	0.04	0.09	0.09	0.06	0.07
Most Students in my grade smoke	Dummy that indicates if at least half of the students in the respondent's grade smoke tobacco	0.10	0.18	0.17	0.11	0.14
Tobacco control policies						
Business penalty fee for smoking	Dummy that takes value 1 after the year 2013, when the policy was implemented	0	0	1	1	0.30
Individual penalty fee for smokers	Dummy that takes value 1 after the year 2014, when the policy was implemented	0	0	1	1	0.24
Number of individuals observed	Number	4,682	4,771	4,672	5,388	19,513

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[3] The price values included in the table are the average prices for the years in which GYTS were collected. Price values for all the period from 1994 to 2020 were included in the analyses.

Number of person-period observations	Number	28,602	29,789	31,361	34,897	124,653

Source: Authors own elaboration

Table A2. Robustness check: Family and peers smoking behavior

Hazard of smoking initiation	Baseline (Model 1)	Model 3	Model 4	Model 5
Price of cigarettes	0.997***	0.997***	0.997***	0.997***
	(0.001)	(0.001)	(0.001)	(0.001)
Female	0.499***	0.519***	0.519***	0.531***
	(0.018)	(0.018)	(0.018)	(0.017)
Policy_2013	0.709***	0.711***	0.717***	0.704***
	(0.064)	(0.064)	(0.064)	(0.063)
Policy_2014	0.826**	0.819**	0.826**	0.830**
	(0.069)	(0.067)	(0.068)	(0.069)
Most of the peers smoke	1.894***	1.917***	1.881***	
	(0.075)	(0.076)	(0.075)	
Most of close friends smoke				2.502***
				(0.114)
A family member smokes in home premises	1.654***			
	(0.056)			
At least one parent smokes		1.235***		
		(0.039)		
Both parents smoke			1.409***	
			(0.097)	
Cure probability	0.111***	0.0813***	0.0938***	0.0278***
Observations	119754	121589	121589	120124

Standard errors are shown in parentheses. We control for duration depencency in all specifications

$* p < 0.10, ** p < 0.05, *** p < 0.01$