Demand for Cigarettes by Teenagers and Young Adults and Their Smoking Transitions

By

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Abstract

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Adviser: Professor Michael Grossman

This paper provides the first comprehensive analysis of the effects of cigarette prices, cigarette excise taxes, smoke-free air laws, youth access laws, state spending on comprehensive tobacco control programs, socio-economic factors, and demographic characteristics on measures of demand for smoking, especially light and intermittent smoking by teenagers and young adults in a long panel. I employ the panel to estimate demand for cigarette smoking by young people and the determinants of transitions from light or intermittent smoking to heavy or regular smoking in the following years. Finally, I estimate transitions in the opposite direction: from regular or heavy smoking to light or intermittent smoking and to quitting. My findings indicate that the cigarette price and the price change significantly reduce the smoking prevalence, the conditional cigarette consumption, and the probabilities of some progressive smoking transitions, as well as increase the probabilities of regressive smoking transitions. The price elasticities implied for demand for cigarettes and smoking transitions are consistent with the previous literature. In addition, most smoke-free-air laws, youth access laws, state spending on comprehensive tobacco control programs are effective in preventing progressive smoking transitions or promoting regressive transitions.

Cigarette smoking is the leading cause of premature death in the United States and is directly responsible for nearly one-third of all cancer deaths. Knowledge of the effects of tobacco policies in reducing smoking will have very important public health implications. The findings

from my study provide invaluable information to policy makers in decreasing the tremendous burden of tobacco related disease.

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Introduction

Cigarette smoking is the single most preventable cause of death and disability in the United States. It is responsible for an estimated 443,000 deaths or nearly 1 of every 5 deaths each year in the United States. In particular, cigarette smoking causes coronary heart disease, acute myeloid leukemia, as well as cancers of lung, kidney, pancreas, bladder, larynx, pharynx, cervix, stomach, esophagus, oral cavity, and uterus. In addition, cigarette smoking increases the risks of stroke, infertility, preterm delivery, stillbirth, low birth weight and Sudden infant death syndrome. Despite the deleterious health consequences of cigarette smoking, an estimated 46.0 million adults in the US were current smokers in 2008, representing 20.6 percent of the total United States adult population (CDC 2008). Among these adult smokers, considerable evidences indicate that most of them initiate and develop their smoking behavior when they are adolescents or young adults. Research also shows that more than a third of all children who ever try smoking a cigarette become regular, daily smokers before leaving high school (CDC 1998). It is very critical to understand how teenagers and young adults make decisions on demand for cigarettes and the dynamics of their smoking trajectories. This study contributes to the literature on youth smoking in two aspects. First, few prior studies have examined the dynamics or development of smoking by teenagers and young adults in a long panel. A close examination of transitions into and out of different levels of smoking is highly demanded. In this paper, I estimate the determinants of transitions of smoking in teenage to early adulthood, when most people experiment with smoking and develop their smoking patterns. Second, it is necessary to revisit the study on demand for smoking in a period when a historically high price of cigarettes driven by more aggressive cigarette taxes and Master Settlement Agreement (MSA) has been observed.

Moreover, many newly developed policy interventions have emerged, such as bans on smoking in certain locations and various comprehensive tobacco control programs. In this analysis, I use recent data during year 1997 to 2007 to estimate the effects of determinants on measures of demand for smoking in various frameworks. The results in this paper yield important information for policy makers who are concerned about the tremendous burden related to tobacco use.

This paper proceeds as follows: Section 1 provides a brief history of smoking prevention and background of the literature on demand for smoking and smoking transitions. Section 2 describes the panel and defines the transition matrices. Section 3 estimates the effects of determinants on demand for smoking in three frameworks (conventional, myopic and rational addiction models). Section 4 estimates the transitions of smoking and their determinants in discrete hazard model.

1. A Brief History of Smoking Prevention

Efforts to reduce cigarette smoking prevalence in the United States began in the mid 1960s following the release of the first Surgeon General's report which casually linked cigarette smoking to lung cancer and a host of other diseases. Since then, many tobacco control strategies have been adopted, including spread dissemination of information and consumer education on the risks of smoking, and various public policy interventions. Beginning in the 1990's a new era of tobacco control emerged. This Period has been characterized by an unprecedented number of states increasing cigarette excise taxes and implementing stronger control restrictions, like bans on smoking in private worksite and other public places, stronger youth restrictions and created many comprehensive tobacco control programs. Since January 1, 1998, 43 states and the District of Columbia have increased their excise taxes on cigarettes at least once. As of October 1, 2007 state excised tax rate on cigarettes ranged from $2.58 per pack in New Jersey to $0.07 per pack in South Carolina. The average price of a pack of cigarettes in the United States increased from $2.06 per pack in November of 1997 to $4.26 per pack by November of 2006(Figure 1). The Master Settlement Agreement (MSA) was settled in 1998 when the tobacco industry agreed to pay the states $206 billion over a 25 years period. In addition, the four states that were not part of the MSA (Mississippi, Florida, Texas, and Minnesota) separately settle their lawsuits with tobacco industry. Currently, all 50 states and the District of Columbia have smoke-free air laws restricting smoking in certain indoor locations. The number of states implementing complete bans on smoking, the most restrictive provisions, has increased dramatically over the past decade. For example, the number of states to ban smoking in all private worksites has increased from 1 in 1995 to 17 in 2007; the number of states to ban smoking in restaurants has increased

from 1 in 1995 to 22 in 2007; and the number of states to ban smoking in bars has increased from 1 in 1998 to 16 in 2005. Throughout the 1990's and early 2000's, many states also enacted laws that penalize minors for tobacco related offenses. For example, the number of states that prohibited minors from possessing tobacco products increased from 8 in 1990 to 36 in 2005. Similarly, the number of states that prohibited the use of tobacco products by minors increased from 8 in1990 to 19 in 2005. Finally, the number of states that prohibit minors from purchasing cigarettes increased from 14 in 1990 to 41 by the year 2003.

1.1 Literature Review on Smoking Behavior among Teenagers and Young Adults

In investigating cigarette demand by youth, there is a broad literature. Most papers find a price elasticity of cigarette consumption of -0.3 to -0.5, which indicates a 10-percent increase in price would reduce the cigarette consumption by 4 percentage points on average. In addition, some studies find that various control policies are also effective (Gruber and Zinman 2001). In a recent research, Carpenter and Cook (2008) find that state tobacco tax increases reduce smoking participation and frequent smoking by youths in post- MSA period. They estimate a teen tax elasticity of smoking participation of -0.05, corresponding to a price elasticity of -0.25. However, this study is limited to youths at school and excludes high school dropouts who may be more or less responsive to cigarette tax or price.

In regards to smoking initiation, Douglas and Hariharan (1994) and Douglas (1998) find that cigarette prices are uncorrelated with the decision to start smoking. However, these results should be interpreted with caution given that duration analysis is applied to cross-sectional data and retrospective information on smoking initiation. Incorrect recall by participants on smoking initiation, along with errors from matching price with the past residence will influence the results. In another study using retrospective data, Forster and Jones (2003) find that higher taxes

will prolong the amount of time before an eventual smoker actually initiates, although the magnitude of the impact is small.

Four recent studies have found cigarette prices to be inversely related to adolescent smoking initiation. Nonnemaker and Farelly (2011) examined the effects of cigarette excise taxes and prices using recent NLSY97 data and found that cigarette price is a significant determinant of youth smoking initiation especially for black youth. Employing longitudinal data on 8th and 10th graders, Tauras, O'Malley, and Johnston (2001) examined the impact of cigarette prices on three alternative measures of smoking initiation: Any initiation (initiation based on smoking at least 1 cigarette in the previous thirty days), daily initiation (initiation based on smoking at least 1 cigarette per day); and heavy daily initiation (initiation based on smoking 10 or more cigarettes per day). They found that a 10-percent increase in cigarette price decreased the probability of any, daily, and heavy daily smoking initiation by 2.7 percent, 8.1 percent, and 9.6 percent, respectively. Cawley, Markowitz, and Tauras (2004) employed NLSY97 data and found adolescent male smoking initiation to be very responsive to changes in cigarette prices, but found generally insignificant price effects for young females. The average male price elasticity of any initiation (defined the same as Tauras et al. 2001) was estimated to be –0.86. Confirming the results of Tauras et al. (2001), both subsequent studies found cigarette prices to have a larger impact on stricter measures of smoking initiation.

DeCicca, Kenkel et al. (2002), however, fail to find negative price effects in a study of smoking initiation by teenagers. This result emerges only after they include dichotomous variables for each state of the U.S. in a panel that spans a very short four-year time period. It is plausible that there is not enough price variation in the data to estimate a demand function once state dummies are included as regressors in a sample that spans a very short period of time.

Moreover, using current smoking rather than initiation as an outcome and a somewhat different specification, Gilleskie and Strumpf (2005) obtain negative price effects in the same data set used by DeCicca, Kenkel, and Mathios.

In regards to smoking cessation, Douglas (1998) applies Becker and Murphy's (1988) rational addiction model to the decision to quit smoking. That model predicts that the quit probability should be positively related to the current, past, and future price. The latter effect occurs because an increase in future price lowers future consumption. In turn, the marginal benefit of current consumption falls, and current consumption falls perhaps to zero. Similarly, an increase in past price lowers past consumption, which lowers the marginal benefit of current consumption. Despite high correlations among the current price, the price next year (future price), and the price last year (past price), Douglas finds positive and significant future price coefficients in his quit equations. This indicates that smokers in his sample are forward looking. The current and past price coefficients are not significant, but Douglas includes the number of cigarettes smoked per day at a peak period in his hazard equations. Clearly, past price may operate through this variable, suggesting that it should be omitted from the equations.

Tauras and Chaloupka (2001) were the first to model smoking cessation decisions in a longitudinal data set (Monitoring the Future). They employed a semi-parametric Cox regression to assess the probability that smokers would make a transition from smoking to nonsmoking. They concluded that the likelihood of making a smoking cessation attempt among both men and women increased significantly as cigarette prices rise. The estimated price elasticity of smoking cessation ranged from 0.34 and 0.71 for women and between 0.27 and 0.92 for men implying that a 10-percent increase in price raises the probability of making a cessation attempt by up to 10 percent. Expanding on the original study, Tauras (2004a) used the longitudinal component of

the Monitoring the Future surveys and employed a stratified Cox regression to model multiple quit attempts among young adults. His findings confirm the positive relationship between cigarette prices and smoking cessation. His findings suggest that a 10-percent increase in the price of cigarettes increases successful cessation by young adults by approximately 3.5 percent. Chatterji et al. (2010) investigate the effects of state tobacco control program expenditures on young adults smoking behavior and they find that a higher level of state spending on tobacco control programs is associated with a significant increase in the probability that a daily smoker report at least one attempt to quit smoking and reductions in the prevalence of daily smoking among college students. However, there findings limit to college students who are exposure to the tobacco control programming for a short term.

While numerous econometric studies have examined the determinants of current smoking, less than a handful of econometric studies have looked into the determinants of light and intermittent smoking. Tauras (2004a) was the first study to examine the impact of prices and policies on intermittent smokers. He extracted data from the 1991, 1993, and 1994 National Health Interview Surveys to estimate the impact of cigarette prices and smoke-free air laws on some-day smoking among adults in the United States. He found that, conditional on being a current smoker, increasing the price of cigarettes will increase the probability of being a someday-smoker and consequently will decrease the probability of being an every-day smoker. In particular, he found that a 10 percent increase in the price of cigarettes will increase the probability of intermittent smoking among current smokers by 8.6 percent. He also found some-day smokers to be more price-responsive with respect to average number of cigarettes smoked per month than are every-day smokers. Finally, Tauras found that more restrictive private

worksite laws significantly increase the prevalence of some-day smoking among current smokers and decrease average monthly smoking among some-day smokers.

Two recent studies have examined the effects of cigarette prices on various levels of smoking intensity using cross-sectional data. Liang and Chaloupka (2002) used the 1992, 1993, and 1994 surveys from the Monitoring the Future project and found higher cigarette prices to be inversely related to cigarette consumption at all levels of smoking intensity. While higher cigarette prices were found to have a negative and statistically significant impact on light smokers, higher cigarette prices were found to have the largest impact on the heaviest smoking levels. These results were confirmed by Ross, Chaloupka, and Wakefield (2001), who employed a cross-sectional survey from The Study of Smoking and Tobacco Use among Young People project.

Tauras (2005) employed nationally representative longitudinal data on young adults from the Monitoring the Future Surveys to examine the effects of prices and smoke-free air laws on smoking progression. The estimates from this study clearly indicated that higher cigarette prices decrease the probability that young adults would transition from a non-daily smoking level to a daily-smoking level between waves of data. In particular, the study found that a 10-percent increase in the price of cigarettes would decrease the probability of progressing from non-daily to daily smoking by 6.5 percent. Smoke-free air laws were found not to play a significant role in deterring the non-daily to daily transition among young adults.

While much has been learned about the impact of prices and policies on cigarette demand, there is still much more to learn, particularly as it relates to intermittent and light smoking. Intermittent and light smoking currently is the most prevalent smoking status among teenagers and young adults. The existing studies on light and intermittent smoking use data that

predates the dramatic changes in cigarette prices, tobacco control policies, and the prevalence of light and intermittent smoking among current smokers that have occurred over the past decade. Moreover, none of the previous studies have allowed for the possibility that state and individual sentiments toward tobacco drive both the enactment of stronger tobacco control policies and the movement toward intermittent and light smoking. Prior studies fail to examine the influence of prices and policies on the transition into light and intermittent smoking from both nonsmoking and daily-smoking levels. In addition, no prior study has examined the effects of state spending on comprehensive tobacco control programs, or youth access laws on light and intermittent smoking. Finally, no previous study has looked at the impact of tobacco policies on smoking cessation decisions among light and intermittent smokers. In this paper, I reexamine the demand for cigarettes by teenagers and young adults in the past decade when most young smokers were light and intermittent smokers and dramatic changes in price and policies were going on. In addition, I estimate the smoking transitions in a long panel that allows many transitions to be observed. This paper provides a comprehensive analysis of the effects of cigarette prices, cigarette excise taxes, smoke-free air laws, youth access laws, socio-economic factors, and demographic characteristics on demand for smoking and transition of smoking by teenagers and young adults.

2 Data and Variable Construction

2.1 Sample Description

For all the empirical models that are estimated in this study, I employ 1997-2007 panels from the National Longitudinal Survey of Youth 1997 (NLSY97). NLSY97 is a nationally representative sample of 8,984 respondents aged 12 to 16 as of December 31, 1996. The first wave of NLSY97 was conducted in 1997, and individuals were followed up over years since then. The time period of this panel (1997-2007) allows me to examine the effects of Post-MSA cigarette excise tax hike and a variety of tobacco control policies on smoking trajectories and demand for cigarettes and by American teens and young adults. The age range of this panel (12-28) covers the period at which many individuals initiate smoking and thereafter transit to heavier tobacco use. Moreover, some of the light or intermittent smokers may transit to heavy or daily smokers while some of them quit. The NLSY97 data allows many different paths of smoking transitions to be observed in a long panel, thus is very crucial to studying smoking transitions among teenagers and young adults and providing a complete picture of smoking trajectories.

Each year, the respondents were asked a series of questions on health related behaviors in NLSY97: such as whether they have ever smoked cigarettes, consumed alcohol, or used illegal drugs as well as whether and how often they have engaged in these activities within the past month of survey. And respondents self-reported answers to the above questions. In NLSY97, current smoking status can be identified in two alternative ways: by the number of days smoked in the past thirty days (frequency) (Figure 3b) and by the average number of cigarettes smoked per day in the past thirty days (intensity) (Figure 3a). Hence, I attained the consumption of cigarettes in the past 30 days as the product of the frequency and intensity just defined. And a

respondent participate smoking if she reports any cigarette consumption in the past 30 days[1]. Moreover, smoking states can be identified based on either frequency or intensity: there are three frequency states: nonsmoking, smoking on some days (intermittent smoking), and daily smoking; there are also three intensity smoking states: nonsmoking, light smoking, and heavy smoking. I will define the aforementioned smoking states in the next paragraph. For each state in the prior wave, two transitions are possible. For example, an intermittent smoker in the previous wave could progress to daily smoking or regress to nonsmoking. Another example is that a non-smoker in the previous wave could progress to light smoking or heavy smoking and could also progress to intermittent smoking or daily smoking. In another word, I attempt to estimate two 3 by 3 transition matrices with twelve transitions to smoking destinations other than the original states. I create variables to identify each of these transitions in different models. In addition, variables for smoking initiation and quitting are also constructed. Smoking initiation is defined as the first record of smoking any cigarette for those who were never smokers in the previous waves (also referred as first-cigarette smoking initiation). Quitting is identified as the cessation in the current wave for those who were smoker in the previous wave. The smoking initiation and quitting can be observed from both the intensity and frequency.

I employ a 15-cigarettes-per-day threshold as the upper cutoff to define light smoking: Those who smoke 15 cigarettes or more per day are defined as heavy smokers. Indeed, a growing number of published papers and government publications have used an upper threshold of 15 cigarettes per day to define light/ heavy smoking. In particular, Farkas, Pierce et al. (1996) found smokers who smoke fewer than 15 cigarettes at baseline were 80 percent more likely to quit

[1] There are 1007 observations with a positive frequency but zero intensity or vice versa during the 11 year interval. I define them as participants and their consumption as the positive value of frequency or intensity.

smoking at follow up (two years later) than individuals who smoked 15 or more cigarettes per day on average at baseline. Moreover, using 16 years of follow up data, Godtfredsen, Holst et al. (2002) found that there were significant reductions in mortality risks for individuals who sustained a light smoking habit (1-14 cigarette per day) and smokers that quit smoking as compared to individuals who sustained a heavy smoking habit (smoking 15 or more cigarettes per day). However, the study found that heavy smokers who reduced their consumption by at least half did not significantly reduce long term mortality from tobacco related diseases when compared to heavy smokers who continued to smoke at heavy rates. These findings were confirmed in a more recent study by Tverdal and Bjartveit (2006) that employed a 15 cigarette per day threshold. In the dimension of smoking frequency, I define daily smoking as smoking more than 25 days in the past 30 days, and intermittent smoking as smoking 25 days or less in the past 30 days. The practical reason for using 25 days as the cutoff is that very few people report to smoke between 25 and 30 days in the data.

During year 1997 to 2007, most respondents in NLSY97 are nonsmokers. However, the participation rate of smoking in the past 30 days has increased from 18% in 1997 to 37% in 2007 (Figure 4a). The average conditional consumption of cigarettes in the past 30 days has steadily risen over years, from about 122 cigarettes in 1997 to about 250 cigarettes in 2007 (Figure 4b). Majority of the smokers in NLSY97 consists of light or intermittent smokers, among those who report smoking any cigarette in the past 30 days, 44% are intermittent smokers and 78% are light smokers. In addition, I observe increasing trends for daily, light and heavy smokers for the first few years. The number of intermittent smokers does not vary much over the survey period. After 2003, the composition of smoking levels in both frequency and intensity remains amazingly

stable (Figures 5a and 5b). In section 4, I will examine how smokers transit among these smoking states.

2.2 Independent Variables from NLSY97

Based on NLSY97, I construct independent variables that are likely to affect cigarette demand and transitions, these controls include: age of the respondents in each survey year, a quadratic for age, gender, race/ ethnicity (Asian, American Indian, Black, Black Hispanic, white Hispanic, other Hispanic, and white as reference group), education level (high school drop-out, high school diploma, enrolled in college, college graduates and enrolled in high school as reference group), marital status (married, separated, divorced, widowed, and single as reference group), household size, family structure (child lives with no parents, child lives with a step parent, child lives with one parent, child lives with adopted parents, and child lives with both parents as reference group), indicator of employed, job status in the past 30 days(hired, fired, and no job turnover in the past 30 days as reference group), youth income (a sum up of earned income and allowance)[2], indicator that equals one if a child has any religion, state fixed effects and survey year fixed effects. For missing values in the controls like marital status and enrollment status, I replace the missing with values that indicate their most possible situation by comparing their status in the past and the following years. For example, if a respondent was married in both year t-1 and year t+1 but with an unknown marital status in year t, I would replace the missing marital status of year t with the value that indicates married status. For the missing values that I cannot refill or impute using the panel features, I generate an indicator for the missing, and replace the missing with the mean of non-missing values of the variable of that year. And the indicators for missing are therefore included as covariates in the regression.

[2] Because all respondents in round 8 were over the age of 18, question about the total allowance received was no longer asked. Thus the youth income after round 8 is earned income only.

The NLSY97 also provides geocode supplement file that contains detailed information on the geographic residence of each NLSY97 respondent. These data allow me to analyze the influences of state level cigarette prices, cigarette taxes and tobacco control policies. Based on the state in which the respondent resides, state level cigarette prices and cigarette excise taxes from The Tax Burden on Tobacco by Orzechowski and Walker (2008) are merged with NLSY 97 data. Municipal taxes of Cook County, New York City County and counties in Virginia State are also merged to the respondents that report living in these counties. [3]To coincide with the date when individuals are surveyed, I employ weighted past 30-day average prices and taxes for a pack of 20 cigarettes in most analysis. [4]To account for changes in the relative prices and taxes of cigarette over time, I deflate the prices and taxes by the National Consumer Price Index published by the Bureau of Labor Statistics (1982-1984=100)[5].

2.3 Tobacco Control Policy Variables

Information on smoke-free air laws, minimum age purchase laws and spending on tobacco control programs is acquired from Impac Teen project. Smoke-free air laws capture the presence and magnitude of each state's law on smoking in private and government worksites, public and private schools, healthcare facilities, recreational facilities, culture facilities child care

[3] I thank Ann Boonn, Frank J. Chaloupka, Danny McGoldrick, Eric Lindblom, and Huang Jidong for the historical record of county level cigarette taxes.

4 To be concrete, I use the prices as of November 1st reported in the Tax Burden on Tobacco. To obtain an estimate of 30-day average price preceding the interview date, state and federal excise taxes as of November 1st each year are subtracted from the November 1st prices and net-of-tax prices are assumed to change linearly over time. Given this assumption, estimates of the net-of-tax price are calculated for each day through a year and the state and federal taxes in effect are added to these estimates. Then a past 30-day average cigarette price is calculated for each interview date. The 30-day average tax is a weighted average of taxes in effect in the past 30 days.

5 The real terms of price/tax and income are obtained by dividing the nominal terms by the consumer price index, which is reported by the U.S. Bureau of Labor Statistics, All Urban Consumers, series ID: CUUR0000SA0,Not seasonally adjusted, Area: U.S. city average, Item: All Items, Base Period: 1982-84=100. From now on, the price refers to real cigarette price.

centers, public transit, restaurants, free-standing bars, and shopping malls. Tobacco control expenditures include state level tobacco control funding per capita and state level other tobacco control funding. I present the coding scheme for each policy variable in the appendix. For most policies, I use a level variable to indicate the levels of the restriction. In addition, I create an indicator for smoking ban in free-standing bar and indicators for each level of laws in worksites and schools. Information on minimum age purchase laws includes the minimum age for cigarette sale (18 or 19 years old) and youth purchase index which indicates the number of youth purchase laws. I create an indicator for each of the minimum age for sale laws and youth purchase indexes. In the analysis of smoking transitions, I do not estimate the effects of the minimum age for cigarette sale, due to that only state New Jersey had changed their minimum age law in post 1997 period, and there is not enough variation to examine the effect of the law, especially for transitions that are estimated using much smaller samples.[6]

[6] To justify the inclusion of the policy variables, I regress each policy variable on state and year fixed effects. The fixed effects usually account for less than 80% of the variation of policy variables other than the minimum age purchase law indicators.

3 Cigarette Demand by Teenager and Young Adults

3.1 Theoretical Background

In this section, I examine the demand for cigarettes by teenager and young adults. The empirical models of cigarette smoking are based on economic theory of demand. In order to derive cigarette demand equations, an individual utility function must first be assumed. This utility function has cigarettes, other goods, and tastes as factors. An individual maximized her utility subject to a budget constraint, which is comprised of the price of cigarettes, income and the prices of all other goods. The constrained maximization yields a derived demand function for cigarettes. This derived demand function shows that cigarette consumption is related to the price of cigarettes, prices of related goods, income, and tastes. In addition, I appeal to addiction model (Becker and Murphy 1988; Becker, Grossman et al. 1991; Becker, Grossman et al. 1994) as the theoretical framework of this paper. In the addiction model, consumptions of the addictive good are linked over time, and the derived demand function under this framework implies current consumption a function of the current price, past and future consumptions. However, the setup of the addiction model introduces difficulties to empirical analysis. For instance, ordinary least square (OLS) does not yield consistent estimates due to the unobserved life cycle utilities. Therefore, two stage least square (TSLS) is required in this context to obtain consistent estimates. The following subsections of section 3 proceed as follows: I estimate the demand equations (the participation equation and the conditional consumption equation) in conventional model that are free of addiction behavior, myopic addiction without forward looking and rational addiction model ((Becker and Murphy 1988; Becker, Grossman et al. 1991; Becker, Grossman et al. 1994).

Furthermore, the tobacco control policies affect cigarette demand through "Full price" of cigarettes. The "Full price" of cigarette can be thought of as the sum of the monetary purchase price of cigarettes and the costs associate with obtaining and consuming cigarettes. Therefore, any policy that increases the monetary price of cigarettes (for example, increased excise taxes), make cigarette more difficult to obtain (for example, minimum legal purchase age restrictions), or raises the inconvenience costs associate with consumption (for example, clean indoor air laws) will increase the "full price" of cigarettes. According to the basic law of economics, as the "full price" of a good raise, the quantity demand of that food will decrease. Thus, I estimate the effects of all tobacco control policies in addition to cigarette prices and taxes in all models.

3.2 Demand Function of Teenagers and Young Adults

3.2.1 Conventional Two-part Models of Cigarette Demand

I estimate cigarette demand equations based on two-part model developed by cragg (1971), in which participation of smoking and conditional consumption of smoking are estimated using separate equations. I prefer this model to Heckman's procedure in this context for the following reasons: First, the sample selection model introduced by Heckman (1979) is good at modeling the potential outcomes, and is widely applied in wage equation estimation when outcomes are only observed for people who work above the reservation wage and potential wage is a modeling issue. However, potential smoking is not a concern in modeling smoking. And two-part model is more robust to violations of the Normality assumption. Moreover, based on the collinearity test, two-part model is strongly preferred to sample selection model in the case of cigarette smoking (Madden 2008). To estimate the two-part model, the linear probability model is used to estimate the participation equation in the first step, and OLS is used to estimate the cigarette consumption given participation in the second step.

Throughout this paper, I include state fixed effects to control for the potential endogeneity of state cigarette prices or taxes and state tobacco control policies. There is a broad literature discussing the unobserved state sentiment toward tobacco that may affect smoking behaviors, cigarette prices or taxes, and tobacco control policies in general, which may yield biased estimates of the interest effects. To control for this unobserved state smoking sentiment and other relevant state level time-invariant unobservable effects, I include state fixed effects in all the models that are estimated in this paper with few exceptions. In addition, through the entire study period, the state and year fixed effects only account for 80 percent of the variation in cigarette price, which leaves enough variation to study price effects on cigarette demand and smoking transitions. The second strategy is to allow the sentiment to vary over time and states. Therefore, I estimate specifications that substitute state fixed effects with a measure of anti-smoking sentiment (SASS) developed by Decicca et al. (2008). They used the responses to the smoking attitude questions in TUS-CPS data and created this measure of state anti-smoking sentiment that varies over state and year. The results of the alternative specifications with the SASS measure are reported in the appendix tables.

Given the panel nature of NLSY97, the disturbance terms of a given person in different years are likely to be serially correlated. The disturbance terms of different persons within the same state are also likely to be correlated. To account for these correlations, I cluster the standard errors at the state level to allow for the correlations of the disturbance terms between whoever resides in the same state.

3.2.1.1 Results

I present descriptive statistics of the NLSY97 data in Table 1. This table shows that one third of the youth and young adults are smokers over the survey period (Figure 4a). And the

number of conditional consumption of cigarette in the past 30 days is 223 (Figure 4b), which is around 11 packs of cigarettes (each pack contains 20 cigarettes). Real cigarette price is in 1980 dollars, and at an average of $1.89. The average age of the respondents is 20 years. 89 percent of the respondents are white. The education level is evenly distributed: 17 percent of the respondents are college graduates, 20 percents are enrolled in college, 20 percents are high school graduates, 32 percents are enrolled in high school, and 11 percents are high school dropouts.

Columns 2 and 4 in Table 2 contain the estimates from the two demand equations. Cigarette price (From now on, cigarette price or tax refers to real terms) has negative and statistically significant impacts on both cigarette consumption equation and smoking participation equation. I estimate a price elasticity of demand of -0.3, which falls in the narrow range of -0.3 to -0.5 that most studies report. This elasticity suggests a 10-percent increase in the cigarette price decreased the cigarette consumption by 3 percent. The estimated participation elasticity is -0.24, suggests that a 10-percent increase in the cigarette price will decrease the probability of smoking by 2.4 percent. DeCicca et al. (2002) summarized a “consensus” estimate of price elasticity of youth smoking participation at -0.7 from various previous studies. My estimate of youth smoking participation elasticity is smaller, but is very close to the estimate of -0.27 reported by Sloan and Trogdon (2004).

In the previous model, I assume that unobserved individual heterogeneity does not exist and OLS estimates are consistent. However, it is fair to consider that there is unobserved individual heterogeneity in a longitudinal data. Moreover, Becker and Murphy (1988) point out a key source of unobserved heterogeneity in addiction behavior such as smoking: namely, present oriented individuals are potentially more addicted to harmful goods than future oriented

individuals because an increase in past consumption leads to a smaller rise in the full price of the good when the future is more heavily discounted. Orphanides and Zervos (1995) expand the sources of heterogeneity by noting that consumption of an addictive good is not equally harmful to everyone and because subjective beliefs about this harm differ among individuals. It also arises because cigarette smoking by teenagers and young adults is subject to peer effects (Lewit, Coate et al. 1981; Powell, Tauras et al. 2005), and the magnitude of these effects can vary among individuals.

To control for the potential heterogeneity, I use within transformation to eliminate the unobserved individual effect. This approach provides equivalent results to the regression with individual dummies as regressors. The consistent estimates from the fixed effect model are very important to examine the robustness of the estimates from conventional model in this analysis. Since Hausman test prefers fixed effect model to random effect model in both the cigarette participation equation and the consumption equation, the individual fixed effects need to be controlled to obtain consistent estimates.

Columns 2 and 5 in Table2 contain the estimates from the cigarette demand equation and the participation equation after accounting for the individual fixed effects and state fixed effects. Real cigarette price has a negative and statistically significant impact on cigarette consumption. The estimate of the price elasticity of demand is -0.15. This elasticity suggests that a 10-percent increase in the real cigarette price decreased the cigarette consumption by 1.5 percent, which is slightly smaller than that of the conventional OLS model. The estimated participation elasticity is -0.04, and not statistically significant from zero. While in Columns 3 and 6, I model both equations in an alternative approach, namely, including the individual fixed effects but excluding the state fixed effects in the specification. This approach is based on an assumption of no movers

over years. The estimated price elasticity of demand and the estimated price elasticity of participation are at -0.15 and -0.07 respectively, and both of them are significant. The price-responsiveness in conditional consumption demand is robust among the alternative specifications.

3.3 Addictive Two-part Models of Cigarette Demand

3.3.1 Models of Myopic and Rational Addiction

Following Becker, Grossman et al. (1994), I assume that consumers maximize a lifetime utility function given by:

$$V = \sum_{t=1}^{\infty} \beta^{t-1} U(Y_t, C_t, C_{t-1}, e_t) \qquad (1)$$

Here Y_t is consumption of a composite good in period t, C_t is the consumption of an addictive good (cigarette in our case) in period t, C_{t-1} is the cigarette consumption in period t-1, e_t reflects the effects of unmeasured life cycle variables on utility, and β is the time discount factor [β=1/(1+r), where r is the rate of time preference for the present]. Equation 1 yields an equation of current consumption of cigarettes:

$$C_t = \theta C_{t-1} + \beta\theta C_{t+1} + \theta_1 P_t + \theta_2 e_t \quad (2)$$

Thus, I estimate a full equation with all relevant factors:

$$C_{it} = \delta_0 + \delta_1 C_{it-1} + \delta_2 C_{it+1} + \delta_3 P_{st} + \delta_4 X_{it} + MAL_{st} + Teen_{it} + \delta_5 MAL_{st} \times Teen_{it} +$$

$$SALW_{st} + Em_{it} + \delta_6 SALW_{st} \times Em_{it} + SALS_{st} + En_{it} + \delta_7 SALS_{st} \times En_{it} + \varepsilon_{it}$$

$$i = 1, \ldots, N;\ MAL_{st}\ (Youth\ Access\ laws)$$

$$P_{st}\ (Price, general\ \ Smoke - free\ air\ laws, tobacco\ control\ fudings)$$

$$SALW_{st}\ (Smoke - free\ air\ laws\ in\ worksites)$$

$$SALS_{st}(Smoke - free\ air\ laws\ in\ School)$$

Equation 2 is the basis of the empirical analysis in this rational addiction model. In all the regressions, other than price, policy and socioeconomic variables, I also include an indicator of teenager and its interactions with all youth access laws, an indicator for current employed and its interaction with all smoke-free air laws in worksite, and an indicator for school enrollment and its interactions with all smoke-free air laws in school. Note that OLS estimation of the equation might lead to biased estimates of the parameters of interest. First, the unobserved variables in each period are likely to be serially correlated. Even if these variables are not serially correlated, consumptions at all periods are affected by e_t through the optimizing behavior. However, Equation 2 also suggests that current consumption is independent of past and future prices when past and future consumption are held constant; any effect of past or future prices on current consumption must come through their effects on past or future consumption. Therefore, Equation 2 can be estimated by TSLS with past and future prices as instrumental variables for past and future consumptions. Other past and future smoking control policies or socioeconomic variables can also serve as instruments.

In addition, I estimate an alternative model by excluding the socioeconomic variables from instruments. This is different from the strategy that Beck et al. (1994) adopted since they also pointed out in their paper that the measurement errors in future variables may lead to a downward bias in the estimates of future consumptions. Furthermore, the future socioeconomic variables may not be exogenous because that the unmeasured life cycle variable (e_t) in Equation 2 may correlate to future socioeconomic variables. For example, a rise of the current cigarette consumption may lower future earnings and reduce the possibility of marriage in the future. This feedback effect violates the strict exogeneity assumption on socioeconomic variables and lead to inconsistency in all estimates. Nevertheless, Grossman et al. (1998) discussed the possibility to

use actual future socioeconomic variables as instruments when more than one socioeconomic variable are employed and there could be offsetting forces that eliminate the correlation between the predicted consumption and unmeasured life cycle variable. Thus, they show results from using different sets of instruments: price and policy variables with and without socio-economic variables. Therefore in this paper, I estimate the rational addition model using TSLS by the following sets of instruments: past and future prices only, past and future prices with past and future policy variables, and past and future price, policy and socioeconomic variables. The instruments that are used in estimating the myopic model are only the past forms of the aforementioned instrumental variables.

Moreover, the statistical significance of the coefficient of future consumption can be taken as a test between rational the model of addiction and the myopic model (backward looking). Myopic behavior implies that the coefficients on future consumption should not be significant from zero in TSLS framework. While the rational model implies that it should be significant with same sign as the coefficient on lagged consumption. In addition, the ratio of the coefficient of future consumption to the coefficient of past consumption yields an estimate of discount rate according to the equation 2.

The estimates from Equation 2 can be used to derive short-run and long-run demand elasticities for cigarettes. Short-run elasticity is attained by holding past consumption constant and must be smaller than the long-run one. In another word, rational and myopic models of the addiction behavior predict larger long-run price effects the greater is the degree of addiction.

3.3.2 Results

Tables 3 and 4 test the myopic addiction model and the rational addiction model of cigarette smoking in the two-part model. As I just discussed in section 3.3.1, I use TSLS to

estimate both equations. In the myopic model, the past participation and the past consumption are treated as endogenous. In the rational addiction model, the past and future participations are treated as endogenous in the participation equations; the past and future consumptions are treated as endogenous in the consumption equations. The first, second and third columns of each table contain the estimates from TSLS regressions; and the fourth columns contain the estimates from OLS regressions, which serve as comparisons to the results from TSLS in the first and third columns. The current cigarette price and smoking control policies are included in the structural models in all models that are estimated in this section. Current socioeconomic variables are also included in the structural model (Columns 1, 3 and 4) except for the second column of each table. In the first column of tables pertaining to the myopic model, the past price is employed as the only instrument for the past consumption and the past participation in the myopic model, which would provide estimates of just identified TSLS. Similarly, in the first column pertaining to the rational addiction model, one lead and one lag of the price are taken as the only two instruments when there are two potential endogenous variables. In the second columns, the instruments are exclusive of socioeconomic variables. While in the third columns, the instruments are inclusive of socioeconomic variables. The price and policy variables are taken as instruments all the time.

In these tables, the difference of the specification and instrument sets between columns 2 and 3 appeals to the different assumptions on exogenetiy of the socioeconomic variables. The underlying assumption involves a trade-off between omitted variable bias and reduction in endogeneity incurred by these omitted variables. The omitted bias is bigger in the models shown in the second columns, since the casual effects of current socioeconomic variables on current consumption is substantial. Nevertheless, these socioeconomic variables are more likely to

correlate with the past and future cigarette consumption and violate the strict exogeneity assumption required for consistency. Thus the potential endogenity is less in this specification as a reward.

The tables also contain statistics resulting from the regression-based test with the hypothesis that the instrumented variables in 2SLS are exogenous. This regression-based test of endogeneity is robust to clustering and heteroskedasticity, and is identical to the Wu-Hausman test when variance covariance matrix is not adjusted. In the first step, the residuals from first stage regression are obtained. In the second step, the first stage residuals are included as additional regressors and the model is fitted via OLS. If the residuals are jointly significant in the second step regression, it suggests that the endogenous regressors in the model are indeed endogenous. I report the first stage F-statistics pertaining to the excluded instruments in the table as well. In columns 2 and 3 of each table, the number of instruments exceeds the number of instrumented variables. I therefore present the score test of over-identification in these two columns. The statistics in these two columns indicate that instruments are significant as a set in the first stage and over-identification restrictions are valid. In column 3 of both Tables 3 and 4, the socioeconomic variables that are included in the instrument set are past or future incomes, and past or future household sizes. If other socioeconomic variables, such as education status and marital status, are included in the instrument sets, the over-identification test rejects the validity of these instruments.

Table 3 shows the estimates from the myopic model. In this model, the future participation and the future consumption are excluded in the corresponding structural demand equations. Most policies have no significant effects on the consumption of cigarettes or the smoking participation. There are a few exceptions: smoke-free air laws in cultural facilities and

smoke-free air laws in free-standing bars significantly decrease the probability of smoking participation. Panel A contains the estimates of Participation equation. The Column1 in this panel shows the results from just identified TSLS model with past price as the only instrument, the F-ratio of the first stage is very low and do not reject the hypothesis that the instrument has zero effect on past participation, suggesting that the instrument is very weak and the results in this column could be severely biased. The estimated effects of past participation on current participation are positive and significant in both OLS and TSLS regressions reported in columns 2 and 3. According to Regression–based test of endogeneity, the consistency of OLS estimator is not rejected in most models. The over-identification tests do no reject the over-identification restrictions at 5% level in Columns 2 and 3 of each table. F-ratios in the first stage show that the instruments have significant effects on instrumented variables in both Columns 2 and 3. The estimated price effect is negative and significant in these columns as well. The estimated average price elasticity of participation from myopic model on is -0.1 corresponding with a long-run elasticity of -0.4.

Panel B contains results from models estimating conditional consumption equation. In all models, the effects of past consumption on current consumption are positive and significant, and the cigarette effects are negative and significant. F-ratios in first stage and over-identification tests do not reject that the instruments are valid. The average short-run elasticity of cigarette consumption is -0.2 with its long-run counterpart of -0.45.

I estimate the rational addiction model and show the results in Table 4. The first column employs one lag and one lead of cigarette price as instruments for just-identified TSLS regressions. Again, the results in the first column are not informative since the instruments are weak especially for the future consumption and participation. The specifications in Columns 2

and 3 correspond with the choices in covariates in the myopic model. In these two columns, F-ratios in first stage and over-identification tests do not reject that the instruments are valid.

In the rational addiction model, most policy variables are not very effective in reducing the prevalence of smoking or consumption of smoking. As what I show in Panel A of Table 4, the minimum age for sale law at 18 year old and smoke-free air laws in school that restrict smoking to separately ventilated areas (Level 2) are the only two policies that significantly reduce the participation probability. The estimates from consumption equation are presented in Panel B of Table 4, smoke-free air laws in worksite that Restrict smoking to separately ventilated areas (Level 2) and smoke-free air laws in public transit significantly decrease the number of cigarettes consumption.

The results shown in table 4 confirm rational addiction model. The future and past participations significantly raise current participation. The average short-run price elasticity of participation is -0.06, and the average long run elasticity is about -0.3. The future and past consumptions have positive and significant effects on current consumption. Cigarette price significantly decreases the number of cigarette consumption. On average, the short run price elasticity of consumption is -0.12, and the long run elasticity is -0.35. The estimated participation elasticities are larger in rational addiction model than those in myopic model. The consumption elasticities in rational addiction model are smaller in short run and larger in long run than those in myopic model.

As I discussed before, the ratio of the coefficient of future consumption to the coefficient of past consumption from the model of rational addiction provides an estimate of the discount factor. Using the estimates from Columns 2 and 4 in Table 4, I estimate the discount factors for participation equation and consumption equation respectively. For the participation equation, the

estimates imply negative discount factors throughout different models; for consumption equation, the estimated discount factors are 1.24, 1.35 and 1.02, corresponding to interest rates of 24%, 35% and 2%.

3.4 Conclusion

Using NLSY97 geocode data, I estimate the demand function for cigarettes by teenagers and young adults in the conventional model and models of addiction. Since my sample mainly consists of light and intermittent smokers in the past decade, this analysis yields estimates of price elasticitis for this particular group. My findings suggest that smoking is an addictive behavior for young population. The results from rational addiction approach show that future consumption or future participation is significant in structural demand functions. This evidence indicates that cigarette smoking may be rational for youths. After evaluating smoke-free air laws, youth access laws, and state spending on comprehensive tobacco control programs, I find that, youth access laws significantly reduce both participation and cigarette consumption. Smoke-free air laws in work-site and tobacco control funding significantly reduce smoking participation. My findings also confirm that price is most effective among all interventions: the price effects are very robust in all equations and models.

4 Smoking Transitions by Teenager and Young Adults

4.1 Introduction

In this section, I describe the dynamics of smoking and employ discrete time hazard model to estimate the determinants of each smoking transition discussed in this paper. The advantage of a panel data such as NLSY97 is that longitudinal survey tracks individual smoking status over time, allows me to match prices and policies to the respondents precisely, and provides a complete picture of smoking transitions.

In NLSY97, I identify the smoking transitions by smoking frequency and intensity. The smoking frequency and intensity are attained by asking respondents how many days they smoked and how many cigarettes they smoked per day in the past 30 days. Accordingly, smoking more than 25 days in the past 30 days is used to define everyday smoking. Smoking 15 cigarettes or more per day in the past 30 days is used to define heavy smoking. The transitions that are estimated include smoking initiation, quitting, restarting after quitting, transitions from nonsmoking to light or heavy smoking, transition from light smoking into heavy smoking or quitting, transition from heavy smoking into non-heavy smoking, transition from nonsmoking to intermittent smoking or daily smoking, transition from intermittent smoking into everyday smoking or quitting, and transition from every day smoking to intermittent smoking or quitting. In general, transitions can be either progressive or regressive. The progressive smoking includes initiation, restarting, and smoking transitions to a heavier or more frequent level. The regressive smoking includes quitting, and smoking transitions to a lighter or less frequent level.

For transitions to multiple destinations, I use competing risk model to estimate them simultaneously. For each transition, respondents can be in risk pool for multiple times as long as

they are at risk of making that particular transition. This model is essentially the simultaneous estimation of binary logistic equations that allows for all possible comparisons among outcome categories. For example, this model allows an individual who is currently an intermittent smoker to be simultaneously at risk of remaining an intermittent smoker, progressing into daily smoker and regressing into cessation. Reduction in smoking may also occur slowly through an intermediate level of smoking while others may move directly from heavy smoking to nonsmoking (quitting). After making the transition, the respondents dropped out of risk pool, unless they make an opposite transition later and return to the risk pool of the estimated transition afterwards. I further assume that the effects of determinants on a particular transition are same for multiple spells or repeated events of that transition.

In this paragraph, I provide a thorough description of each transition. A respondent can be a non-smoker, light smoker, or heavy smoker at the baseline period. In an alternative dimension based on the smoking frequency, a respondent can be a nonsmoker, intermittent smoker or daily (everyday) smoker at the baseline period. One can certainly define a transition based on both dimensions, for example, the transition from a heavy and daily smoker to a light and intermittent smoker. However, given most of my observations are nonsmokers, there are not enough power to evaluate the determinants of such transitions. Therefore, I only estimate and discuss the transitions in either smoking frequency or smoking intensity. For regressive smoking transitions, smokers at baseline are at risk of quitting; correspondingly, heavy smokers are at risk of transiting into light smoking and nonsmoking; and daily smokers are at risk of transiting into intermittent smoking and nonsmoking. For progressive transitions, never smokers are at risk of smoking initiation. Quitters or ex-smokers are at risk of restarting. And nonsmokers in total are at risk of transiting into light, heavy, intermittent and daily smoking. On the other hand,

intermittent smokers are at both risk of making regressive transition into non smokers and progressive transition into daily smokers. Light smokers are at risk of making regressive transition into nonsmoker and progressive transition into heavy smokers. Respondents that do not change smoking status and remain at risk pool are right-censored observations that stay in the sample throughout the period.

Table 5 contains the sample transition frequencies. The most common progressive transitions in two consecutive years are transition from nonsmoking to light smoking (5.31%) and transition from nonsmoking to intermittent smoking (4.50%). The regressive transitions of light smoking and intermittent smoking (transition from light smoking to nonsmoking and transitions from intermittent smoking to nonsmoking) are more common than progressive transitions of them (transition from light smoking to heavy smoking and transition from intermittent smoking to daily smoking).

In addition, Table 5b explicitly presents two transition matrices of smoking frequency and smoking intensity respectively. The upper panel shows the transition matrix of smoking intensity in the form of $\begin{bmatrix} \Pr(Y_t = 0|Y_{t-1} = 0) & \Pr(Y_t = 1|Y_{t-1} = 0) & \Pr(Y_t = 2|Y_{t-1} = 0) \\ Pr(Y_t = 0|Y_{t-1} = 1) & \Pr(Y_t = 1|Y_{t-1} = 1) & \Pr(Y_t = 2|Y_{t-1} = 1) \\ \Pr(Y_t = 0|Y_{t-1} = 2) & \Pr(Y_t = 1|Y_{t-1} = 2) & \Pr(Y_t = 2|Y_{T-1} = 2) \end{bmatrix}$, with 0, 1 and 2 representing nonsmoking, light smoking and heavy smoking respectively. While the lower panel presents the transition matrix based on smoking frequency.

The determinants that I estimate for smoking transitions are same with those I estimate for demand for smoking. State and year fixed effects are included in all transition models. In addition, I include the cigarette consumption at baseline in the regressions for transitions from any smoking (quitting, transitions from light smoking or intermittent smoking to any destination, and transitions from heavy smoking or daily smoking to any destination). I estimate transitions

between two smoking states in a binary logistic model (such as smoking initiation, quitting, restarting and the transition from heavy smoking to non-heavy smoking) and transitions from one state to multiple destinations in a competing risk model (such as transitions from light smoking/intermittent smoking to other states). The general binary logistic model to estimate smoking initiation, cessation and restarting can be described as follows:

$$Pr(transition_{it}) = \Lambda(\delta_0 + \delta_1 P_{st} + \delta_2 X_{it} + MAL_{st} + Teen_{it} + \delta_3 MAL_{st} \times Teen_{it} + SALW_{st} + Em_{it} + \delta_4 SALW_{st} \times Em_{it} + SALS_{st} + En_{it} + \delta_5 SALS_{st} \times En_{it}) \quad (3)^{7}$$

$$i = 1, \ldots., N;\ MAL_{st}\ (Youth\ Access\ laws)$$

$$P_{st}\ (Price, general\ \ Smoke - free\ air\ laws, tobacco\ control\ fudings)$$

$$SALW_{st}\ (Smoke - free\ air\ laws\ in\ worksites)$$

$$SALS_{st}(Smoke - free\ air\ laws\ in\ School)$$

In all the regressions, Other than price, policy and socioeconomic variables, I also include an indicator of teenager and its interactions with all youth access laws, an indicator for current employed and its interaction with all smoke-free air laws in worksite, and an indicator for school enrollment and its interactions with all smoke-free air laws in school. I also present the Kaplan-Meier survival estimates of smoking initiation, cessation and restarting in Figures 6-8.

A simplified form of the competing risk model in the discrete time context can be estimated in multinomial logit model after the data is transformed.[8]

$$\Pr\big(Y_t = j | Y_{t-1,..1} = 0\big) = \frac{e^{X_{it}\beta_j}}{\sum_{j=0}^{2} e^{X_{it}\beta_j}}, j = 0, 1, 2, \sum_{j=0}^{2} \Pr(Y_t = j) = 1 \qquad (4)$$

[7] In Initiation, t=1998,…, the year of failure; t=1998,…,2007 for censored respondents. In cessation and restarting t is analysis time, t= fist year at risk pool,… ,the year of failure or 2007 for right censored sample.

[8] The sample consists of people who are at risk pool and who make the transitions. Individuals drop out of sample once they make the transition, thus the t in this model is the analysis time that are described in footnote 7.

This equation is used to estimate transitions to multiple destinations. The independent variables are same with those described in Equation 3. As indicated in footnote 8, t=0 is the baseline period when individuals enter the risk pool, which is not necessarily to be the same for each spell.

In addition, I estimate smoking transitions in many alternative specifications with different price variables (either annually average cigarette price or tax preceding the interview month or 30-day average cigarette price or tax preceding the interview date) and state anti-smoking sentiment measurements (either state fixed effects or SASS). The price effects estimated in these various specifications are shown in appendix tables and discussed in the corresponding sections.

4.2 Progressive Smoking Transitions

In this section, I estimate progressive smoking transitions such as smoking initiation, smoking restarting after quitting, and transitions from non-smoking to multiple states. For smoking initiation, the sample consists of respondents who never smoked and respondents who never smoked but are observed to initiate smoking in the survey period. Therefore, the baseline period of smoking initiation is year 1997, when NLSY97 survey was first conducted. For smoking restarting, the sample consists of quitters and quitters who pick up smoking again in the survey period. Thus, the earliest survey year to observe the restarting of a quitter in this data is year 1999. In general, both never smokers and ex-smokers are nonsmokers and the determinants of smoking transitions are estimated using a sample with pooled never smokers and ex-smokers at the baseline period. The Wald test suggests that the effect of price on smoking initiation of never smokers is significantly different from that on restarting of ex-smokers.

4.2.1 Smoking Initiation

In this section, I estimate the smoking initiation of first cigarette in a binary logistic model followed by robustness check using different definitions of smoking initiation. The sample that is at risk of first cigarette smoking initiation consists of 5096 respondents who were never-smokers in 1997 (Figure 7). The Kaplan-Meier estimate suggests that more than half of the respondents initiate smoking in 10 years (Figure 5). The dependent variable in this model is a binary indicator of smoking (0 for nonsmoking and 1 for smoking initiation). If a respondent reports to smoke any cigarette for the first time during year 1998-2007, the respondent realizes first cigarette smoking initiation and drops out of risk pool ever after. To be concrete, I model the smoking initiation as a logistic function of relevant factors, smoking related policies and one of the following sets of price variables: the current price only; the price change only; the past, current and future prices. The price is measured as the average annual price preceding the interview month. Grossman (2005) shows that smoking initiation depends on changes in price between periods instead of the current price only. Hence, with the current price held constant, initiation should be positively related to the past price. If one allows for rational addiction in decision making on smoking initiation, the future price becomes a relevant determinant of the interest transition. In particular, a reduction in the future price raises future consumption, the marginal benefit of current consumption rises, and individuals are more likely to start smoking in the current period. This model suggests a negative effect of future price on smoking initiation. I describe the reduced form equation for smoking initiation under rational addiction assumption in Equation 4:

$$I_t = \alpha_1 p_{t-1} + \alpha_2 p_t + \alpha_3 p_{t+1} \quad (4)$$

As I described, I_t is a binary indicator for smoking initiation. I define smoking initiation as the behavior that nonsmokers report their first cigarette consumption in any wave during 1998-2007.

Please note that NLSY97 is a panel data that allows the smoking initiation to be observed. Compared with studies relying on cross-sectional data and retrospective questions on smoking initiation, this study avoids the measurement error in matching the price and other time variant covariates, and leads to more precise estimators.

Table 6 shows the estimates of smoking initiation from various approaches.[9] Column 1 offers a benchmark model with current price, policy and socio-economic variables as regressors. Column 2 replaces the price with the changes of price between two consecutive periods. Column 3 presents the estimates from Equation 4 with the past, current and future prices as alternative price variables.

The results indicate that three Possession-Use-Purchase laws, smoke-free air laws at culture facilities and free-standing bars significantly reduce the probability of smoking initiation. On average, the enforcement of these smoke-free air laws in various locations decease the probability of smoking initiation by 1-2 percentage points. In addition, the state tobacco control funding per capita and other state tobacco control funding also reduce the probability of smoking initiation significantly. A dollar rise in tobacco control funding per capita decreases the probability of smoking initiation by 0.1 percentage point, and one million dollars' rise in other tobacco control funding decreases the probability of smoking initiation by 0.4 percentage point. However, none of the price variables are associated with the smoking initiation.

From Table 6B to Table 6F, I further investigate the smoking initiation of various definitions. Table 6B presents the results in estimating intermittent smoking initiation (the initiation of smoking more than 14 days in the past 30 days). The estimates indicate that annual

9 By definition, Smoking initiation/restarting can be observed from intensity, frequency and consumption of smoking. The estimates from different definitions of smoking initiation/restarting are similar.

price and most policies do not have effects on reducing intermittent smoking initiation. Smoke-free air laws at worksite of Level 1 and 2 significantly reduce the probability of intermittent smoking initiation by 1-4 percentage points. The smoke-free air law at healthcare facilities also has reduction effect on intermittent smoking initiation. However, these effects in most specifications are only marginal significant. Table 6C shows the estimates pertaining to everyday smoking initiation, which indicate that neither the price nor policies has any effect on everyday smoking initiation. Table 6D to Table 6F present estimates of smoking initiation defined by different numbers of cigarettes smoking per day. Table 6D contains results for the smoking initiation of five or more cigarettes per day. The results indicate that the annual price has a marginal significant effect on reducing the smoking imitation. The smoke-free air laws at recreational facilities and free standing bars significantly decrease the initiation of five or more cigarettes by 3 and 7 percentage points separately. Smoke-free air law at worksite of level 2 decreases the probability of smoking initiation of the employees by a small magnitude. Table 6E show the estimates of smoking initiation of ten or more cigarettes per day and find no significant effects of the price or policies. Table 6F contains results for smoking initiation of 15 cigarettes or more per day. They suggest that smoke-free air laws at worksites of all levels significantly decrease the initiation in this context. In addition, smoke-free air laws at recreational facilities, restaurants and free-standing bars all decrease this smoking initiation significantly. The tobacco control funding per capita and other tobacco control funding program also have reduction effects on the smoking initiation. The alternative specifications for each smoking initiation are presented in the appendix tables. The results from the specification that is exclusive of state fixed effects and inclusive of SASS indicate that the annual price significantly reduce the smoking initiation of 15 cigarette or more per day.

My finding is consistent with many other studies of smoking initiation that use longitudinal data and generally find no association between the initiation probability and cigarette price or tax (Douglas and Hariharan 1994; Douglas 1998; DeCicca, Kenkel et al. 2002). However, these findings are inconsistent with some literatures (Nonnemaker and Farrelly 2011; Cawley, Markkowitz, et al. 2004) that investigate the price effect on smoking initiation using the same data. However, some differences in estimating procedures distinguish my paper from other literature on smoking initiation using NLSY97 data. First, I take account for state and year fixed effects when estimating the effects of price and other interventions on smoking initiation, whereas some previous literatures did not (Cawley, Markowitsze, Tauras 2004). Second, unlike other papers that utilize a retrospective question on age of smoking initiation in NLSY97 and extend the baseline period to years that predate 1997 (Nonnemaker and Farrelly 2011), I select a sample of respondents that were never-smokers in year 1997 and assume that they are only at risk pool since year 1998. By doing so, the measurement error related to matching the price and policy to an uncertain residence before 1997 is avoided. I acknowledge that this leads to a shorter period with less price and policy variation to detect the price effect on smoking initiation, especially given that most smokers initiate in a very short time span. To be more concrete, in the period that is used in the analysis to estimate the first cigarette smoking initiation, the year and state fixed effects account for 86% of the price variation, which may be a concern for the examination. However, this analysis would yield a more precise estimator of smoking initiation for late initiators who were never-smokers in 1997. In addition, I include a much richer set of policy variables such as youth access laws, smoke-free air laws and state spending on comprehensive tobacco control programs and provide results from various definitions of smoking initiation, which consistently suggest that the price is not associated with smoking

initiation when state fixed effects and a rich set of policy variables described in equation 3 are controlled. The robustness check also indicates that, if a rich set of policy variables is included the price effect is sensitive to the inclusion of state fixed effects, and vice versa. The magnitude of the price effect on smoking initiation that is estimated with either the set of policy covariates or the state fixed effects is very similar to the one that is reported in other literatures that employ the same dataset. Thus, I would conclude that the cigarette price has negative effect on smoking initiation, however, this effect is only marginal significant and sensitive to the inclusion of state fixed effects and the set of policy variables. The estimated coefficient of the price on smoking initiation is very close to the one that is reported by Nonnemaker and Farrelly (2011), and imply a price elasticity of -0.22 without state effects and of -0.05 with state fixed effects. These elastic ties are quite consistent with those in the previous literatures.

4.2.2 Smoking Restarting after Quitting

To investigate the restarting behavior after quitting, I select a sample that consists of people who are smokers at t-1, quit at baseline period t and are at risk of restarting at time t+1 (Figure 9). The Kaplan-Meier estimate suggests that more than 30 percent quitters start smoking again in one year and 75 percent restart smoking in 8 years after the quitting (Figure 7). Similarly, I examine the determinants of restarting by estimating the effects of relevant factors, policy interventions and one of the following sets of price variables: the current price only; price change only; price change, past and future prices (the prices are 30-day average prices preceding the interview dates). The dependent variable is an indicator for restarting (0 for quitter and 1 for smokers who were quitter in the previous wave). I present the results of different approaches in Table 7.

The table suggests that none of the prices are associated with smoking restarting. The Possession-Use-Purchase Law of Level 1 significantly decreases the probability of smoking restarting by 8 percentage points. Among the smoke-free-air laws, the one at Free-standing bar significantly decreases the probability of restarting by about 6 percentage points. The alternative specifications that are reported in appendix table 6 indicate that when price variables are averaged annually, with the current price held constant, the average price of the past year significantly decreases the probability of smoking restarting. In addition, the price change (measured by the difference between 30 day average prices preceding the interview dates of two consecutive years) decreases the probability of the smoking restarting. The evidence shows that smoking restarting is associated with the price change instead of the current price only.

4.2.3 Smoking Transitions from Non-smoking to Other Destinations

Table 8A and Table 8B present the results from competing risk model which estimates the transitions from nonsmoking to other smoking status defined by smoking frequency and intensity. In this analysis, I allow for multiple spells of transitions, thus the sample consists of never smokers and quitters at the baseline period. Table 8A shows the results for transitions from non-smoking to either intermittent or daily smoking, while Table 8B shows the results for transitions from non-smoking to either light or heavy smoking. All price variables that are measured by 30-day average price preceding the interview date and most policies do not have effect on reducing transitions from non-smoking to other states. Smoke-free air laws at worksite and culture facilities decrease the probability of the transition into intermittent smoking. The smoke-free air law at free-standing bars and tobacco control funding per capita significantly decrease the probabilities of transitions into intermittent smoking and light smoking. The results from competing risk models also suggest that, the price and policy effects mainly pertains to

preventing nonsmokers from transiting into intermittent or light smoking, and that the effects on aggressive progressive transitions such as direct transitions into daily or heavy smoking are either too small to be estimated or insignificant.

I further report the results from alternative specifications that employ different price and state anti-smoking sentiment variables. The estimates from the specification that do not control for state fixed effects and the specification that control for SASS suggest that the price change measured by 30-day averages preceding the interview dates significantly decreases the probability of transiting into intermittent smoking by 1 percentage point. However, the price change does not reduce the probability of transitions into other states including transitions into light, heavy and daily smoking. In other specifications that estimate the effects of the annual price preceding the interview month, the results show that the price change and the current price significantly reduce the probabilities of transitions into intermittent smoking and light smoking by 1-2 percentage points. The results are robust to specifications that control for state fixed effects and SASS respectively, yet neither price has any effect on transitions from nonsmoking to heavy or daily smoking status.

4.3 Regressive Smoking Transitions

In this section, I estimate and discuss regressive smoking transitions including smoking cessations and smoking transitions from heavy smoking and daily smoking. Since all people at risk pool are smokers in regressive transitions, the consumption at baseline is taken as a determinant in all analyses. As expected, the consumption at baseline significantly decreases the probability of making a regressive transition. This suggests that the more people smoke cigarettes, the harder for them to cut down their cigarette use in both frequency and intensity. The magnitude of this effect, however, is very small. In addition, I add a fourth specification to

examine the determinants of regressive smoking transitions, in which the past price is excluded to avoid the correlation between the past price and the baseline consumption that may confound the estimated effects of both.

4.3.1 Smoking Cessation

To model the quitting probability at time t, I assume the function of quitting in a form of rational addiction model as follows:

$$q_t = \theta_1(p_t - p_{t-1}) + \theta_2 c_{t-1} + \theta_3 p_{t+1} \quad (5)$$

In which q_t is a binary indicator for quitting (0 for smoking and 1 for quitting). Quitting is observed by comparing total consumption in two consecutive periods. [10] The Kaplan-Meier estimate suggests that roughly 35 percent smokers quit in one year and 75 percents quit smoking in 10 years after they are observed to be a smoker (Figure 6). In another word, for those people who quit smoking in the current wave t, their current cigarette consumption is zero and their total cigarette consumption in the previous wave t-1 is positive. This specification nests a myopic model and a non-addictive model. With price held constant, the effects of past consumption and future price on quitting are positive. Other factors such as tobacco control policies, demographic and socioeconomic characteristics of survey respondents also enter into the equation.

There is an alternative model that let the quitting probability at time t be a positive function of the change in price between consecutive periods ($p_t - p_{t-1}$). Colman, Grossman, and Joyce (2003) and Grossman (2005) show that this alternative approach is not entirely correct because the quit probability can be positive even if the current price equals the past price. This is because the quit probability is the complement of the conditional probability of continuing to smoke in period t given that a person smoked in period t-1. The latter probability is the ratio of

[10] Quitting can be identified using frequency, intensity, and total consumption of cigarette smoking. The results are similar among different definitions of quitting.

the probability of smoking in period t or the smoking participation in that period at the aggregate level to the smoking participation rate in period t-1. An increase in p_t and p_{t-1} by the same amount will have no impact on q_t only if the price elasticities of smoking participation in the two periods are same. Thus, the rational model of addiction is more nested in modeling smoking cessations.

Table 8 contains the estimates of marginal effects from different quitting equations (Figure 8).In this analysis, I include all smokers who are at risk pool of quitting over the period, thus it is possible for each individual to enter the risk pool for multiple times. Columns 1-3 show results from estimating alternative models with three different sets of price variables: the current price only; the price change only; the price change, the past price and the future price.

The estimated effect of the current price on quitting is positive and significant. So is the effect of the price change. Results from column 3 suggest that holding the price change constant, a dollar increase in the past price would increase the probability of quitting in the current period by 3 percentage points. However, the future price has no effect on cessation. The estimates in Table 8 yield an average price elasticity of cessation of 0.33. The magnitude of this elasticity close to the one that John Tauras estimated using longitudinal data from the Monitoring the Future Surveys. He used a Cox regression and found an average price elasticity of cessation at 0.35.(Tauras 2004) Table 8 also shows that Smoke-free air laws in worksites that restrict smoking to separately ventilated areas (level 2) significantly increase the quitting probability of employees by 3 percentage points in all specifications. In addition, smoke-free air law at shopping malls significantly increases the quitting probability by 8-10 percentage points in the specifications without the past and the future prices. The effects of prices on quitting are very robust to alternative measurements of price variables and anti-smoking sentiments.

4.3.2 Transitions from Heavy Smoking to light Smoking/ Nonsmoking

Due to the limitation of the sample size, I estimate the transition from heavy smoking to other statuses (light smoking/nonsmoking) using binary logistic model (0 for heavy smokers and 1 for the others). The sample consists of heavy smokers who smoke more than 15 cigarettes per day at the baseline. After including all observations that are at risk pool or make transitions, the sample consists of 6269 person-years. I estimate the transition in three alternative models and present these results in Table 9.

Column 1 of Table 9 suggests that the current price significantly increases the probability of the transition to a non-heavy smoking status. A dollar increase in the cigarette price significantly increases the probability of transiting out of heavy smoking by 11 percent pointes, which implies a price elasticity of 0.699. In Column 2, I replace the current price with the price change in the regression. The results indicate that the effect of the price change is not significant. Based on one-tailed test, the results from Column 3 also suggest that, with the future price held constant, increases in the price change and the past price significantly increase the probability of the transition. The magnitudes of the coefficients are about 7 percentage points for each. One to three Possession-Use-Purchase laws significantly increases the probability of the regressive transition from heavy smoking of youth by 5-11 percentage points. The robustness check suggests that if price variables are measured as average annual prices that precede the interview month, the price effects are only significant in one-tailed test, yet the magnitudes of the coefficients are similar.

In order to estimate a competing risk model of transition from heavy smoking, I use an alternative definition of heavy smoking with 10 or more cigarettes per day as the cutoff. The results are reported in Appendix Table 7B and indicate that the price significantly increases the

probability of transition from heavy smoking to light smoking. The price effect on transition from heavy smoking to non-smoking is not significant.

4.3.3 Transitions from Daily Smoking to Intermittent Smoking/ Nonsmoking

For transitions from daily smoking to multiple destinations, I use the competing risk model to estimate them simultaneously and examine the effects of the determinants on two alternative transitions from daily smoking (the transition to intermittent smoking and the transition to nonsmoking). This exercise answers how a determinant would affect the transition from daily smoking compared with staying daily smoking, in a sharp way to nonsmoking (i.e cold turkey) or in a gradual way to intermittent smoking.

The dependent variable in the regressions is a category variable that identifies daily smoking by 0, intermittent smoking by 1 and nonsmoking by 2. To apply the discrete time hazard competing risk model, I use multinomial logistic regression to estimate the transitions after dropping those who made transitions and are thereafter not at risk pool. The sample consists of 15577 person-years, all of whom are daily smokers at baseline. I present the results regarding to three models with alternative price variables in table 10. Columns 1, 3 and 5 show the estimates of the transition from daily smoking to intermittent smoking, whereas Columns 2, 4 and 6 show the estimates of the transition from daily smoking to nonsmoking. In general, none of the estimated policy variables are associated with the transition from daily smoking to nonsmoking, which suggests that none of these policy interventions can promote a sharp regressive transition from daily smoking to nonsmoking. Moreover, the consumption at baseline has a negligible negative effect on the smoking transition from daily smoking to nonsmoking, which may indicate that the baseline consumption does not have effect on quitting smoking abruptly. In all approaches, the cigarette price or the price change significantly raise the

probability of the transition into intermittent smoking and the transition into nonsmoking, which suggests that the price is very effective in pushing daily smokers out of their smoking status to either intermittent smoking or non-smoking. The estimates in columns 1 and 3 suggest that a dollar increase in the cigarette price or the price change raise the probability of the transition into intermittent smoking by 2 percentage points on average. In the approach where the past price, the price change and the future price are taken as covariates (shown in Columns 5 and 6), I estimate a positive and significant effect of the past price on the transition to intermittent smoking of 3 percentage points and a positive and significant effect of the price change of 4 percentage points. For abrupt transition from daily smoking to nonsmoking, the price effects are of 5-6 percentage points, which are bigger in the magnitude but only marginally significant. Among the policy interventions, smoke-free-air law at worksite that restricts smoking to DSAs (Level1) increases the probability of transiting to intermittent smoking by 1.5 percentage points for those who are employed. Moreover, if the future price is included in the specification, smoke-free air law at public transit raises the probability of transition into intermittent smoking. The price effects are robust to the alternative specifications that are exclusive of state fixed effects and inclusive of SASS. However, the transitions are not sensitive to the annually average price variables.

4.4 Regressive and Progressive Transitions from Light Smoking and Intermittent Smoking

4.4.1 Transitions from Light Smoking to Heavy Smoking/ Nonsmoking

As in section 4.3.3, I employ the competing risk model to examine the smoking transitions from light smoking to two possible other destinations: heavy smoking and nonsmoking. Table 11 presents the results from three alternative models with different price variables. All the models suggest that the price has no significant effects on the transition from

light smoking to heavy smoking, but significantly increase the probability of the transition into nonsmoking by 3 percentage points on average. In Columns 5 and 6, the price change, the past and future prices are relevant price variables in the model. The current and past prices significantly increase the probability of the transition into nonsmoking, and the future price has no effect on either transitions. The price effects are robust to the alternative specifications that are exclusive of state fixed effects and inclusive of SASS. However, the transitions are not sensitive to the annually average price variables. The consumption at baseline significantly increases the probability of the transition to heavy smoking by 0.03 percentage point and decreases the probability of the transition into nonsmoking by 0.1 percentage point. Corresponding to the alternative definition of light/heavy smoking with 10 or more cigarettes as the threshold in the previous section, the price effects on transitions from light smoking are re-estimated and reported in Appendix Table 10B and the price effect on quitting remain significant.

Smoke-free-air law at worksite that restricts smoking to DSAS (Level 1) has a significant effect in raising the probability of the regressive transition into nonsmoking by 3 percentage points for those who are employed, and decreases the probability of progressive transition from light smoking to heavy smoking by 4 percentage points. All Possession-Use-Purchase laws significantly decrease the probability of the transition into heavy smoking, yet have not effects on the regressive smoking transition from light smoking. Smoke-free air law in shopping malls significantly increases the probability of the regressive transition and has no effect on theprogressive transition. In contrast, smoke-free-air laws in health care facilities, recreational facilities and free-standing bar significantly decrease the probability of the progressive transition only. The magnitudes of the coefficients are about 0.7, 0.8 and 2 percentage points respectively.

In addition, a dollar increase in tobacco control funding per capita decreases the probability of the progressive transition by 0.2 percentage point.

4.4.2 Transitions from Intermittent Smoking to Daily Smoking/ Nonsmoking

I estimate transitions from intermittent smoking in three models with different price variables using the competing risk model. The estimated marginal effects are shown in Table 12. In general, the consumption at baseline increases the probability of the progressive transition from intermittent smoking to daily smoking and decreases the probability of the regressive transition from intermittent smoking to nonsmoking by 0.1 percentage point respectively. In the first two columns I present the results from estimating the effects of the current price and other factors on transitions, which indicates that the current price increases the probability of the regressive transition by 4 percentage points but has no effect on the progressive transition. In columns 3 and 4, I replace the current price with the price change. The price change significantly increases the probability of the regressive transition by 4 percentage points and decreases the probability of the progressive transition by 4 percentage points. I further estimate the effects of the past and future prices and the price change, and show the results in columns 5 and 6. The price change raises the probability of the transition into nonsmoking by 6 percentage points. And when the past and future prices are held constant, the effect of the price change on the transition from intermittent smoking to daily smoking is paltry. Most price effects are robust to the alternative specifications, and if the current price is measured by annual average, it significantly increases the probability of the regressive transition and decrease the probability of the progressive transition.

Unlike transitions from light smoking, the transitions from intermittent smoking are not associated with most policy interventions in the right direction. The smoke-free air law at public

transit only increases the probability of the regressive transition from intermittent smoking in the specification that includes price change as the only price variable.

4.5 Conclusion:

In section 4, I discuss the trajectories of smoking among teenagers and young adults and estimate the determinants of each transition. I present the results through Table 6-12. These results indicate that the current cigarette price significantly increases the probability of all regressive transitions and imply price elasticities that are quite consistent with previous literatures[11]. In addition, the cigarette price significantly decreases the probability of the progressive transitions such as transition from intermittent smoking into daily smoking. I also find evidence indicating that the cigarette price reduces the probabilities of smoking restarting and smoking transitions from nonsmoking to other states in a marginal significant level. However, the price does not have effect on smoking initiation of various definitions due to the inclusion of state fixed effects. In an alternative model where the price change replaces the current price, I am able to estimate significant and positive effects of the price change on most regressive transitions. In addition, the price change significantly decreases the probability of the progressive transition from intermittent smoking to daily smoking. I also find evidence showing that smoking restarting is associated with the price change instead of the current price only. In a third model with additional past and future prices in the equation, I estimate significant and positive effects of the past price on quitting and most regressive transitions. The futures price has no effect on any smoking transition. The effects of the current price and price change are very robust to alternative specifications.

[11] The price effect on smoking transition from daily to nonsmoking is trivial in magnitude but nevertheless significant.

To sum up the effects of policy variables on various smoking transitions, I present youth access laws, smoke-free air laws, and state spending on tobacco control programs that have significant effects on the corresponding transition in the column head in Table 13. In general, smoke-free air laws in worksite significantly increase the probability of regressive transitions such as quitting, the transition from daily smoking to intermittent smoking, and the transition from light smoking to nonsmoking, and decreases the probability of progressive transitions such as the transition from light smoking to heavy smoking and the transition from nonsmoking to intermittent smoking. The smoke-free air law at free-standing bars is very effective in reducing the progressive transitions including smoking initiation, smoking restarting, transitions from nonsmoking to intermittent smoking or light smoking and the transition from light smoking to heavy smoking. The law at culture facilities also reduces the probability of progressive smoking transitions such as initiation, light to heavy transition and daily to intermittent transitions. However, these laws do not have effects on prompting regressive transitions. In contrast, smoke-free air law at shopping malls significantly increases the probability of progressive transitions like quitting and the transition from light smoking to non-smoking, and the law at public transit significantly raises the probability of the transition from daily smoking into intermittent smoking. But neither of these laws reduces the probability of progressive transitions. This analysis also shows that tobacco control funding per capita significantly reduces the probability of progressive smoking transitions including initiation, light to heavy smoking and nonsmoking to either light or intermittent smoking but do not have effect in pushing regressive transitions. In the specifications with alternative definitions of smoking initiation, I find that that smoke-free air laws at worksites of all levels, smoke-free air laws at recreational facilities, restaurants and free-standing bars, tobacco control funding per capita and other tobacco control funding program

reduce heavy smoking initiation. I note that the smoke-free air laws at schools are associated with higher probability of progressive smoking transitions and lower probability of regressive smoking transitions, which tempers my confidence in findings on smoke-free air laws. However, this may be due to that I do not distinguish the smoke-free air laws between public and private schools. Despite this limitation, this analysis informs the policy makers that youth access laws, most smoke-free air laws, and state spending on comprehensive tobacco control programs are effective in either preventing progressive smoking transitions or prompting regressive transitions. Moreover, different policies function in various stages of smoking trajectories and development, which suggests that a comprehensive package of smoking related policies are highly demanded for reducing the prevalence of cigarette use and the consumption of cigarettes.

Table 1 Descriptive Statistics [a]

Description of Variables in the Data Set			
Variable	**Description**	**Mean**	**S.D.**
Smoking Participation	Smoking any cigarette in the past 30 days	0.33	0.47
Consumption of cigarettes	Consumption of cigarettes given smoking	223	264
Smoking Frequency	#of days that a respondent has smoked in the past 30days given smoking	20.47	11.72
Smoking Intensity	#of cigarettes per day that a respondent has smoked in the past 30days given smoking	8.56	8.64
real cigarette price	Average real price of cigarette: 30 days average preceding interview 1997-2007 (1980 dollars)	1.89	0.48
real cigarette tax	Average real tax of cigarette : 30 days average preceding interview 1997-2007 (1980 dollars)	0.54	0.32
Demographic and Socioeconomic Variables			
Age	Age at interview	19.69	3.56
Male	Gender	0.5	0.5
Household Size	# of people in the household	3.83	1.73
Employment status	Employed in the past 30 days, indicator	0.56	0.5
Hired	Hired in the past 30 days, indicator	0.07	0.26
Fired	Fired in the past 30 days, indicator	0.09	0.29
Total income	Income from employment and allowance (1980 hundred dollars)	32.6	57.1
No parents	Living without parents in the household, indicator	0.48	0.5
Step parent	Living with step parents in the household, indicator	0.07	0.26
One parent	Living with one parent in the household, indicator	0.17	0.38
adopt parent	Living with adopted parent in the household, indicator	0.01	0.08
Native	Race, indicator	0.01	0.1
Asian	Race, indicator	0.02	0.14
Hispanic Black	Race, indicator	0.004	0.06
Hispanic White	Race, indicator	0.08	0.28
Black	Race, indicator	0.27	0.44
Other Hispanic	Race, indicator	0.13	0.33
Other race	Race, indicator	0.86	0.35
Religion	Indicator for Having religious	0.86	0.35
Married	Marital status, indicator	0.09	0.29
Separated	Marital status, indicator	0.004	0.06
Divorced	marital status, indicator	0.01	0.09
High school dropout	Enrollment status, indicator	0.11	0.31
Enroll in College	Enrollment status, indicator	0.2	0.4

Table 1_Continued

High school degree	Highest grade completed, indicator	0.2	0.4
college graduates	Highest grade completed, indicator	0.17	0.37
Minimum Age Purchase Laws			
#Youth purchase Index:1	One Youth purchase law exist in the state of resident, indicator	0.06	0.23
#Youth purchase Index:2	Two Youth purchase laws exist in the state of resident, indicator	0.13	0.33
#Youth purchase Index:3	Three Youth purchase laws exist in the state of resident, indicator	0.06	0.24
minimum age for sale:18 yrs old	Age<18 and living in a state with minimum age for sale at 18 yr old, indicator	0.29	0.45
minimum age for sale:19 yrs old	Age<19 and living in a state with minimum age for sale at 19 yr old, indicator	0.01	0.11
Smoke-free Air Laws			
SFA laws in worksites: Level1	Employed and the state level smoke-free air laws are in level 1, indicator	0.29	0.45
SFA laws in worksites: Level2	Employed and the state level smoke-free air laws are in level 2, indicator	0.08	0.27
SFA laws in worksites:Level3	Employed and state level smoke-free air laws are in level 3, indicator	0.09	0.28
SFA laws in schools: Level 1	Enrolled and state level smoke-free air laws in school are at level 1, indicator	0.14	0.34
SFA laws in schools: Level 2	Enrolled and state level smoke-free air laws in school are at level 2, indicator	0.08	0.28
SFA laws in schools: Level 3	Enrolled and state level smoke-free air laws in school are at level 3, indicator	0.18	0.38
SFA laws in schools: Level 4	Enrolled and state level smoke-free air laws in school are at level 4, indicator	0.02	0.14
SFA laws in schools: Level 5	Enrolled and state level smoke-free air laws in school are at level 5, indicator	0.05	0.21
SFA laws in public transit	level of smoke-free air laws in public transit (Level: 0-5)	1.85	1.54
SFA laws in healthcare facilities	level of smoke-free air laws in health care facilities (Level: 0-4)	1.61	1.28
SFA laws in recreational facilities	level of smoke-free air laws in recreational facilities (Level: 0-5)	1.67	1.7
SFA laws in cultural facilities	level of smoke-free air laws in cultural facilities (Level: 0-5)	2.25	1.47
SFA laws in child care centers	level of smoke-free air laws in child care centers (Level: 0-5)	2.28	1.77
SFA laws in restaurants	level of smoke-free air laws in restaurants (Level: 0-4)	1.13	1.29
SFA laws in shopping malls	level of smoke-free air laws in shopping malls (Level: 0-4)	0.94	1.51
SFA laws in free-standing bars	The state has smoke-free air laws in free-standing bars, indicator	0.37	0.48
Tobacco control Programs			
Tobacco control Funding per capita	The state level tobacco control funding per capita	2.18	2.61
Other tobacco control funding	The state level other tobacco control funding	1.75	0.99

[a]: the coding scheme of smoke-free air laws is in appendix. SFA-Smoke-free air Laws.

Table2-Esitiamtes of Non-addictive Equations

Dependent Variable	**Consumption equation**			**Participation equation**		
Independent Variable	(1)	(2)	(3)	(4)	(5)	(6)
Price	-33.09***	-17.43*	-15.69**	-0.039***	-0.011*	-0.009+
	(8.481)	(9.109)	(7.411)	(0.013)	(0.006)	(0.006)
Youth Access Laws						
Possession-Use	1.882	-5.858	11.83	-0.004	-0.021	-0.011
-Purchase Law:1	(19.27)	(15.74)	(12.42)	(0.024)	(0.022)	(0.016)
Possession-Use	-14.88	-18.00**	-14.42**	-0.021	-0.008	-0.002
-Purchase Law:2	(11.23)	(8.460)	(7.015)	(0.019)	(0.016)	(0.011)
Possession-Use	14.51	6.606	7.825	-0.009	-0.013	-0.012
-Purchase Law:3	(15.98)	(12.89)	(10.92)	(0.020)	(0.020)	(0.013)
PUP Law:1*	1.69	1.116	-1.815	-0.003	-0.015	-0.018
Youth	(10.28)	(15.18)	(15.28)	(0.021)	(0.016)	(0.015)
PUP Law:2*	4.629	4.026	-1.300	0.001	-0.005	-0.009
Youth	(9.439)	(14.79)	(14.50)	(0.014)	(0.014)	(0.013)
PUP Law:3*	8.05	-13.00	-14.28	-0.008	-0.027*	-0.032**
Youth	(11.27)	(19.02)	(18.72)	(0.017)	(0.014)	(0.013)
Smoke-free Air Laws						
School Level1	16.07	23.35	-5.844	0.039*	0.064***	0.022
	(19.51)	(21.42)	(15.80)	(0.022)	(0.016)	(0.013)
School Level2	-12.86	17.91	-3.948	0.007	0.052***	0.024
	(15.23)	(18.74)	(16.13)	(0.027)	(0.019)	(0.015)
School Level3	6.466	16.08	-10.80	0.035	0.055***	0.023
	(16.01)	(20.50)	(15.62)	(0.023)	(0.016)	(0.014)
School Level4	21.91	-8.672	-39.57*	0.037	--	0.042*
	(23.09)	(36.24)	(22.98)	(0.033)	--	(0.023)
School Level5	10.50	26.34	8.929	0.039*	0.057***	0.042***
	(17.13)	(15.05)	(16.89)	(0.020)	(0.013)	(0.014)
School Level1	3.374	21.6	23.21	0.008	-0.010	-0.007
*enrolled	(17.05)	(15.21)	(15.25)	(0.013)	(0.009)	(0.010)
School Level2	43.92***	31.61**	33.78**	0.039*	-0.0005	0.001

Table 2_Continued

*enrolled	(15.42)	(12.81)	(12.76)	(0.020)	(0.008)	(0.009)
School Level3	-10.05	13.34	15.00	-0.018	-0.015*	-0.013
*enrolled	(12.44)	(12.47)	(12.85)	(0.012)	(0.008)	(0.009)
School Level4	24.35**	30.95***	33.89***	0.019**	-0.006	-0.005
*enrolled	(9.709)	(10.57)	(10.48)	(0.008)	(0.008)	(0.008)
School Level5	32.74*	27.6	30.91*	-0.003	-0.016	-0.015
*enrolled	(18.89)	(17.02)	(17.20)	(0.013)	(0.010)	(0.011)
Worksite Level1	10.45	12.18	16.58	-0.029	-0.027**	-0.005
	(14.64)	(16.70)	(11.16)	(0.019)	(0.012)	(0.008)
Worksite Level2	29.62	26.91	28.99**	-0.074***	-0.039**	-0.027**
	(20.25)	(19.22)	(12.26)	(0.025)	(0.018)	(0.013)
Worksite Level3	18.65	14.12	12.24	-0.052***	-0.029**	-0.029
	(17.71)	(12.60)	(10.66)	(0.014)	(0.012)	(0.017)
Worksite Level1	7.07	4.822	3.321	-0.002	0.002	0.001
*employed	(9.546)	(6.406)	(6.510)	(0.010)	(0.006)	(0.006)
Worksite Level2	-15.62*	-0.321	-2.463	-0.012	-0.017**	-0.017**
*employed	(9.155)	(5.480)	(5.455)	(0.010)	(0.007)	(0.006)
Worksite Level3	-7.359	14.47*	12.56	-0.004	0.003	0.003
*employed	(16.62)	(8.038)	(8.091)	(0.013)	(0.010)	(0.011)
Public Transit	-1.457	1.827	-0.413	0.007**	0.009**	0.004
	(2.542)	(4.012)	(2.485)	(0.003)	(0.004)	(0.002)
Healthcare facilities	-7.722	-4.762	-2.95	0.017*	0.010	0.005
	(6.656)	(6.990)	(4.736)	(0.009)	(0.008)	(0.004)
Recreational facilities	2.686	-4.898	2.144	0.005	-0.006	0.004
	(5.398)	(6.089)	(4.452)	(0.006)	(0.005)	(0.004)
Culture facilities	2.018	2.15	3.122	-0.009	-0.002	-0.006
	(4.364)	(8.431)	(5.423)	(0.007)	(0.006)	(0.005)
Child care centers	2.036	10.87**	1.564	0.006	0.010	-0.000
	(4.494)	(4.889)	(2.248)	(0.008)	(0.008)	(0.004)
Free standing Bars	-4.345	-4.659	1.448	-0.012	-0.017	-0.009
	(7.839)	(7.619)	(5.511)	(0.014)	(0.010)	(0.006)
Restaurants	-3.145	-7.748	-5.705	-0.007	-0.007	0.002

Table 2_Continued

	(5.542)	(7.642)	(5.062)	(0.009)	(0.006)	(0.004)
Shopping Malls	4.744	3.153	-0.0517	-0.002	-0.001	-0.001
	(4.940)	(5.602)	(5.362)	(0.006)	(0.006)	(0.005)
Control Programs						
Tobacco control Funding	-1.224	-0.986	-0.799	-0.003**	-0.002*	-0.001
per capita	(0.806)	(1.256)	(1.150)	(0.001)	(0.001)	(0.001)
Other tobacco control funding	-2.547	-1.512	0.002	-0.004	-0.005	-0.002
	(3.964)	(4.393)	(3.776)	(0.004)	(0.003)	(0.003)
price elasticity	-0.290***	-0.152*	-0.137**	-0.237***	-0.062*	-0.050+
	(0.074)	(0.079)	(0.064)	(0.070)	(0.036)	(0.034)
Individual Fixed effects	No	Yes	Yes	No	Yes	Yes
State Fixed effects	Yes	Yes	No	Yes	Yes	No
Observations	28438	28438	28438	82639	86239	86239
R-squared	0.156	0.075	0.075	0.112	0.055	0.054

Robust standard errors in parentheses. All regressions are controlled for age, age squared, year fixed effects, state fixed effects, household structure, youth income, race, gender, marital status, employment status, and education level. Standard errors are clustered by states. *$0.05 < p \leq 0.1$, **$0.01 < p \leq 0.05$, ***$p \leq 0.01$.

Table3 Estimates of Myopic Model

Panel A Estimates of Myopic Model-Participation Equation

Independent variable	2SLS (1)	(2)	(3)	OLS (4)
Past Participation	-2.318	0.738***	0.771***	0.630***
	(6.750)	(0.137)	(0.101)	(0.010)
price (Pt)	-0.009	-0.018***	-0.016***	-0.016**
	(0.061)	(0.006)	(0.006)	(0.007)
Minimum Age Laws				
Possession-Use	-0.088	0.032*	0.042***	0.019
-Purchase Law:1	(0.245)	(0.019)	(0.015)	(0.016)
Possession-Use	-0.028	0.020**	0.019**	0.010
-Purchase Law:2	(0.099)	(0.009)	(0.009)	(0.009)
Possession-Use	-0.068	0.014	0.015	0.002
-Purchase Law:3	(0.161)	(0.011)	(0.010)	(0.009)
Smoke-free Air Laws				
School Level1	0.016	-0.041	0.008	0.004
*enrolled	(0.054)	(0.027)	(0.008)	(0.007)
School Level2	0.149	-0.036*	0.006	0.005
*enrolled	(0.352)	(0.020)	(0.009)	(0.009)
School Level3	-0.049	-0.050*	-0.004	-0.008
*enrolled	(0.106)	(0.028)	(0.009)	(0.008)
School Level4	0.094	-0.039*	0.001	0.002
*enrolled	(0.214)	(0.021)	(0.008)	(0.006)
School Level5	0.030	-0.047*	-0.004	-0.006
*enrolled	(0.089)	(0.025)	(0.008)	(0.007)
Worksite Level1	-0.007	-0.006	-0.010	-0.010
*employed	(0.030)	(0.006)	(0.007)	(0.006)
Worksite Level2	-0.021	-0.002	-0.008	-0.008*
*employed	(0.043)	(0.004)	(0.005)	(0.005)
Worksite Level3	-0.018	0.011	0.010	0.002
*employed	(0.063)	(0.010)	(0.009)	(0.008)
Public transit	-0.003	0.005**	0.005**	0.006**
	(0.025)	(0.003)	(0.003)	(0.002)
Healthcare	0.061	0.011	0.012	0.013**
facilities	(0.113)	(0.007)	(0.007)	(0.007)
Recreational	0.029	0.006	0.006	0.003
facilities	(0.061)	(0.004)	(0.004)	(0.004)
Culture	0.014	-0.014***	-0.014***	-0.016***
facilities	(0.076)	(0.004)	(0.003)	(0.003)
Child care	-0.028	0.002	0.001	0.004
centers	(0.079)	(0.004)	(0.004)	(0.004)
Restaurants	-0.037	0.004	0.004	-0.001
	(0.092)	(0.006)	(0.006)	(0.006)
Shopping Malls	-0.019	-0.005	-0.004	0.001
	(0.053)	(0.005)	(0.004)	(0.004)
Free-standing bar	-0.022	-0.032***	-0.030***	-0.029**
	(0.040)	(0.010)	(0.010)	(0.011)
Control Programs				

Table3_ Panel A Continued

Tobacco control	-0.006	-0.0003	-0.0003	-0.001
Funding/Captita	(0.010)	(0.001)	(0.001)	(0.001)
Other tobacco	-0.002	0.001	0.0005	-0.002
control funding	(0.012)	(0.003)	(0.003)	(0.003)
Observations	73707	65394	65394	73707
R-squared	0.12	0.35		0.44
Price Elasticity				
Long run	-0.017	-0.394*	-0.41*	-0.245**
	(0.125)	(0.220)	(0.248)	(0.108)
Short run	-0.053	-0.10***	-0.094***	-0.091**
	(0.349)	(0.033)	(0.032)	(0.041)
Regression-based test of Endogeneity	2.03	0.36	1.42	--
F-ratio, IV for past Participation	0.19	3.52	4.53	--
Score χ2	--	25.10	13.05	--

Robust standard errors in parentheses. Standard errors are clustered by states, *$0.05 < p \leq 0.1$, **$0.01 < p \leq 0.05$, ***$p \leq 0.01$. For regression-based test of endogeneity, critical values of F(1,50) are 4.03 at 5% and 7.17 at 1%. For test of instruments, critical values of F(29,50) are 1.69 at 5% and 2.11 at 1% for model in column2; critical values of F(12,50) are 1.95 at 5% and 2.56 at 1% for model in colmu3. For test of over identifying restrictions, critical values of chi square (28) are 41.34 at 5% and 48.28 at 1% for model in column2; critical values of chi square (11) are 19.68 at 5% and 24.72 at 1% in column3.

Table 3 Panel B Estimates of Myopic Model- Conditional Consumption Equation

		2SLS		OLS
Independent variable	**(1)**	**(2)**	**(3)**	**(4)**
Past Consumption (Ct-1)	0.816*** (0.303)	0.549*** (0.164)	0.754*** (0.058)	0.545*** (0.013)
Real cigarette price (Pt)	-16.01* (8.849)	-23.25*** (8.214)	-17.12*** (5.686)	-20.87*** (6.167)
Minimum Age Laws				
PUP Law:1 *youth	19.74 (12.99)	-2.008 (16.17)	17.81** (8.52)	11.26 (8.57)
Possession-Use -Purchase Law:2	0.0148 (7.671)	-2.351 (7.852)	-0.375 (7.771)	-1.694 (8.003)
Possession-Use -Purchase Law:3	7.914 (9.702)	5.687 (9.155)	7.107 (8.599)	4.372 (8.842)
Smoke-free Air Laws				
School Level1	-6.795 (9.65)	-69.33*** (21.94)	-5.86 (9.64)	-2.691 (10.62)
School Level2	5.011 (18.48)	-42.73*** (12.47)	8.561 (10.46)	20.59* (10.66)
School Level3	-5.195 (8.85)	-70.94*** (22.45)	-4.981 (8.95)	-4.258 (9.29)
School Level4	-7.655 (15.03)	-55.66*** (12.63)	-4.643 (8.27)	5.566 (7.53)
School Level5	1.002 (13.82)	-50.73*** (17.12)	3.57 (10.85)	12.27 (12.16)
Worksite Level1	2.06 (10.24)	-7.873 (5.09)	2.814 (9.40)	5.371 (8.88)
Worksite Level2	-4.532 (8.334)	-18.95*** (5.162)	-4.937 (7.699)	-6.306 (7.705)
Worksite Level3	6.942 (10.66)	-11.61 (10.04)	6.035 (10.01)	2.961 (10.18)
Public transit	-1.976 (3.354)	-2.336 (3.233)	-2.054 (3.204)	-2.315 (2.978)
Healthcare facilities	-1.418 (6.514)	-3.437 (6.016)	-1.777 (6.066)	-2.993 (6.143)
Recreational facilities	-2.834 (5.551)	-0.033 (4.528)	-2.162 (4.089)	0.114 (4.063)
Culture facilities	4.685 (4.725)	2.995 (4.287)	4.575 (4.522)	4.205 (4.057)
Child care centers	5.864 (5.393)	4.666 (5.360)	5.383 (4.700)	3.751 (4.998)
Restaurants	-7.071 (9.042)	-4.962 (9.901)	-6.636 (8.777)	-5.163 (9.473)
Shopping Malls	-0.792 (4.740)	-0.562 (5.029)	-0.88 (4.686)	-1.178 (4.762)
Free-standing bar	-0.656 (5.752)	-0.809 (5.731)	-0.591 (5.730)	-0.37 (5.740)

Table 3 Panel B Continued

Control Programs				
Tobacco control	0.25	-0.153	0.131	-0.272
Funding per capita	(0.786)	(0.665)	(0.567)	(0.563)
Other tobacco	3.304	1.204	2.791	1.054
control funding	(2.926)	(3.216)	(2.875)	(3.205)
Observations	25271	25271	25271	25271
R-squared	0.321	0.37	0.343	0.376
Price Elasticity				
Long run	-0.758	-0.449***	-0.607***	-0.400***
	(0.942)	(0.149)	(0.216)	(0.119)
Short run	-0.140*	-0.203***	-0.149***	-0.182***
	(0.077)	(0.07)	(0.050)	(0.054)
Regression-based test of Endogeneity	0.90	0.004	15.61	--
F-ratio, IV for past consumption	9.09	4.05	57.88	--
Score χ2	--	10.06	47.00	--

Robust standard errors in parentheses. Standard errors are clustered by states, *$0.05 < p \leq 0.1$, **$0.01 < p \leq 0.05$, ***$p \leq 0.01$For regression-based test of endogeneity, critical values of F(1,50) are 4.03 at 5% and 7.17 at 1%. For test of instruments, critical values of F(15,50) are 1.87 at 5% and 2.42 at 1% for model in column2; critical values of F(35,50) are 1.66 at 5% and 2.05 at 1% for model in colmu3. For test of over identifying restrictions, critical values of chi square (14) are 23.69 at 5% and 29.14 at 1% for model in column2; critical values of chi square (34) are 48.60 at 5% and 56.06 at 1% in column3.

Table4- Estimates of Rational Addiction Model
Panel A participation equation

	2SLS			OLS
Independent variable	**(1)**	**(2)**	**(3)**	**(4)**
Future Participation	-0.752	0.399***	0.599***	0.429***
	(1.798)	(0.123)	(0.104)	(0.005)
Past Participation	0.201	0.199*	0.296***	0.380***
	(0.956)	(0.109)	(0.107)	(0.004)
Real cigarette price	-0.003	-0.010*	-0.011**	-0.009*
	(0.036)	(0.006)	(0.005)	(0.005)
Minimum Age Laws				
PUP Law:1	0.032	-0.02	-0.012	-0.002
*youth	(0.093)	(0.018)	(0.013)	(0.011)
PUP Law:2	0.012	0.005	0.002	0.006
*youth	(0.029)	(0.010)	(0.008)	(0.007)
PUP Law:3	0.0005	-0.012	-0.015*	-0.009
*youth	(0.040)	(0.010)	(0.008)	(0.007)
Smoke-free Air Laws				
School Level1	0.027	-0.074***	-0.005	-0.001
*enrolled	(0.052)	(0.025)	(0.007)	(0.005)
School Level2	0.093	-0.061***	-0.015**	-0.004
*enrolled	(0.155)	(0.018)	(0.008)	(0.006)
School Level3	-0.005	-0.082***	-0.009	-0.007
*enrolled	(0.028)	(0.026)	(0.006)	(0.006)
School Level4	0.061	-0.057***	-0.004	9.42E-05
*enrolled	(0.091)	(0.019)	(0.006)	(0.004)
School Level5	0.038	-0.069***	-0.010	-0.005
*enrolled	(0.071)	(0.020)	(0.006)	(0.004)
Worksite Level1	-0.021	-0.006	0.003	-0.002
*employed	(0.041)	(0.005)	(0.005)	(0.005)
Worksite Level2	-0.011	-0.003	0.001	-0.0004
*employed	(0.022)	(0.005)	(0.004)	(0.004)
Worksite Level3	0.002	0.006	0.014	0.011
*employed	(0.028)	(0.010)	(0.009)	(0.009)
Public transit	0.016	0.011***	0.010***	0.012***
	(0.013)	(0.004)	(0.003)	(0.003)
Healthcare	0.032	0.010	0.005	0.006
facilities	(0.042)	(0.008)	(0.006)	(0.006)
Recreational	0.015	-0.004	-0.008*	-0.007*
facilities	(0.033)	(0.005)	(0.005)	(0.004)
Culture facilities	-0.014	-0.006	-0.004	-0.005
	(0.019)	(0.006)	(0.005)	(0.004)
Child care centers	-0.008	0.005	0.008	0.006
	(0.030)	(0.006)	(0.005)	(0.005)
Restaurants	-0.008	-0.004	-0.003	-0.001
	(0.023)	(0.006)	(0.005)	(0.005)
Shopping Malls	-0.012	0.001	0.005	0.003
	(0.024)	(0.008)	(0.007)	(0.007)
Free-standing bar	-0.053	-0.014	-0.008	-0.016

Table 4 Panel A Continued

	(0.063)	(0.016)	(0.015)	(0.016)
Control Programs				
Tobacco control	-0.003	-0.001	-0.0003	-0.0003
Funding per capita	(0.004)	(0.001)	(0.001)	(0.001)
Other tobacco	-0.0005	-0.002	-0.002	-0.002
control funding	(0.008)	(0.003)	(0.003)	(0.003)
Observations	61711	61711	61711	63066
R-squared	--	0.517	0.517	0.555
Price Elasticity				
Long run	-0.005	-0.148	-0.612	-0.277*
	(0.051)	(0.106)	(0.528)	(0.139)
Short run	-0.018	-0.060*	-0.06**	-0.053**
	(0.021)	(0.035)	(0.028)	(0.028)
Regression-based test of Endogeneity	1.91	1.72	1.36	--
F-ratio, IV for past participation	1.01	5.19	8.27	--
F-ratio, IV for Future participation	0.40	6.84	36.97	--
Score χ2	--	23.68	36.96	--

Robust standard errors in parentheses. Standard errors are clustered by states, *$0.05 < p \leq 0.1$, **$0.01 < p \leq 0.05$, ***$p \leq 0.01$. For regression-based test of endogeneity, critical values of F(2,50) are 3.18 at 5% and 5.06 at 1%. For test of instruments, critical values of F(30,50) are 1.69 at 5% and 2.10 at 1% for model in column2; critical values of F(32,50) are 1.67 at 5% and 2.08 at 1% for model in colmu3. For test of over identifying restrictions, critical values of chi square (28) are 41.34 at 5% and 48.28 at 1% for model in column2; critical values of chi square (30) are 43.77 at 5% and 50.89 at 1% in column3.

Table 4 Panel B Conditional Consumption Equation

	2SLS			OLS
Independent variable	**(1)**	**(2)**	**(3)**	**(4)**
Past Consumption	1.71	0.387**	0.304**	0.366***
	(1.366)	(0.164)	(0.120)	(0.008)
Future Consumption	-0.706	0.313*	0.225*	0.356***
	(0.973)	(0.161)	(0.115)	(0.009)
Real cigarette price	-25.81	-10.81	-16.33**	-12.33*
	(20.08)	(10.29)	(8.212)	(6.758)
Minimum Age Laws				
PUP Law:1	77.83	-8.08	2.087	-1.416
*youth	(70.49)	(16.19)	(8.114)	(8.298)
PUP Law:2	23.3	-3.739	-3.622	-4.384
*youth	(26.11)	(7.599)	(7.060)	(7.892)
PUP Law:3	38.74	-5.504	-5.495	-6.783
*youth	(38.73)	(8.815)	(7.409)	(7.761)
Smoke-free Air Laws				
School Level1	-10.94	-47.80**	2.531	0.007
*enrolled	(17.91)	(18.72)	(10.45)	(8.513)
School Level2	-7.828	-34.03***	23.44**	11.76
*enrolled	(42.23)	(12.12)	(11.51)	(9.001)
School Level3	-1.066	-54.33***	-3.618	-5.371
*enrolled	(20.42)	(18.66)	(8.122)	(7.948)
School Level4	-27.39	-33.29**	14.58*	8.682
*enrolled	(40.48)	(13.65)	(8.156)	(7.210)
School Level5	14.25	-39.67***	14.9	4.459
	(30.15)	(15.37)	(12.09)	(10.20)
Worksite Level1	-8.856	-3.248	-0.717	-1.961
*employed	(21.09)	(4.465)	(8.677)	(6.903)
Worksite Level2	1.444	-11.65*	-13.81*	-12.86
*employed	(21.15)	(6.057)	(7.766)	(7.778)
Worksite Level3	18.79	4.681	9.255	9.845
*employed	(24.46)	(11.48)	(10.76)	(9.796)
Public transit	1.438	-19.36	-6.157**	-7.412***
	(10.94)	(16.34)	(2.739)	(2.519)
Healthcare facilities	4.582	-4.569	0.927	-0.107
	(22.01)	(7.181)	(6.730)	(5.620)
Recreational facilities	-22.13	6.825	8.191	6.699
	(28.86)	(6.291)	(5.421)	(4.137)
Culture facilities	19.39	1.663	-2.192	-1.812
	(22.30)	(6.352)	(5.487)	(3.938)
Child care centers	21.18	-2.098	4.02	6.334
	(18.51)	(12.53)	(5.486)	(5.155)
Restaurants	2.354	-11.51	-6.638	-7.265
	(15.62)	(20.30)	(5.231)	(4.598)
Shopping Malls	-16.16	6.351	-3.131	-1.741
	(20.10)	(14.73)	(6.767)	(5.612)
Free-standing bar	-40.41	26.23**	-4.517	-5.858
	(38.54)	(10.89)	(15.28)	(16.87)

Table 4 Panel B Continued

Control Programs				
Tobacco control	1.058	0.042	-0.437	-0.24
Funding per capita	(2.108)	(0.624)	(0.684)	(0.558)
Other tobacco	12.36	0.505	0.527	1.586
control funding	(12.78)	(2.677)	(3.188)	(2.863)
Observations	20716	18465	20716	21296
R-squared	--	0.454	0.441	0.464
Price Elasticity				
Long run	--	-0.317	-0.304**	-0.390**
	--	(0.251)	(0.135)	(0.214)
Short run	-0.227	-0.096	-0.144**	-0.108*
	(0.177)	(0.091)	(0.072)	(0.059)
Regression-based test of Endogeneity	2.32	0.05	1.46	--
F-ratio, IV for past consumption	2.60	5.36	17.14	--
F-ratio, IV for Future consumption	3.81	7.16	15.54	--
Score χ2	--	20.15	30.55	--

Robust standard errors in parentheses. Standard errors are clustered by states, *$0.05 < p \leq 0.1$, **$0.01 < p \leq 0.05$, ***$p \leq 0.01$. For regression-based test of endogeneity, critical values of F(2,50) are 3.18 at 5% and 5.06 at 1%. For test of instruments, critical values of F(30,50) are 1.69 at 5% and 2.10 at 1% for model in column2; critical values of F(35,50) are 1.66 at 5% and 2.08=5 at 1% for model in colmu3. For test of over identifying restrictions, critical values of chi square (28) are 41.34 at 5% and 48.28 at 1% for model in column2; critical values of chi square (33) are 47.40 at 5% and 54.78 at 1% in column3.

Table5-Summary of Smoking States in Two Consecutive Periods

Baseline State t	Destination state t+1				
percentage	None	light	heavy	Total	N
None	59.26	5.31	0.56	65.14	55054
Light	7.24	17.62	1.77	26.63	22570
Heavy	0.72	2.36	5.15	8.23	6959
Total	67.22	25.29	7.48	100	84520

Note: allow for repeat transitions

Baseline State t	Destination state t+1				
Percentage	none	intermittent	daily	Total	N
None	57.97	4.50	1.69	64.16	54321
intermittent	5.66	7.81	2.14	15.61	13222
Daily	2.48	3.01	14.73	20.22	17127
Total	66.11	15.32	18.56	100	84670

Note: allow for repeat transitions

Table5B- Transition Matrix of Smoking Intensity (number and percentage)

Baseline State t	Destination state t+1			
percentage	None	light	heavy	Total
none	50087	4492	475	55054
	90.98%	8.16%	0.86%	100%
light	6118	14890	1499	22570
	27.18%	66.16%	6.66%	100%
heavy	609	1997	4353	6959
	8.75%	28.70%	62.55%	100%

Transition Matrix of Smoking Frequency

Baseline State t	Destination state t+1			
Percentage	none	intermittent	daily	Total
None	49085	3806	1430	54321
	90.36%	7.01%	2.63%	100%
intermittent	4795	6616	1811	13222
	36.27%	50.04%	13.70%	100%
Daily	2104	2550	12473	17127
	12.28%	14.89%	72.83%	100%

Table6- Estimates of First Cigarette Smoking Initiation (Progressive Transition)

Dependent variable	**Initiation**		
Independent variable	**(1)**	**(2)**	**(3)**
Annual price (Pt)	-0.002	--	-0.008
	(0.009)	--	(0.011)
Annual Price	--	0.004	--
change(Pt-Pt-1)	--	(0.009)	--
Annual Past	--	--	-0.006
Price (Pt-1)	--	--	(0.014)
Annual Future	--	--	0.007
Price (Pt+1)	--	--	(0.010)
Minimum Age Laws			
Possession-Use	0.025**	0.025**	0.027*
-Purchase Law:1	(0.012)	(0.012)	(0.016)
Possession-Use	0.007	0.008	0.006
-Purchase Law:2	(0.008)	(0.007)	(0.009)
Possession-Use	0.004	0.004	0.004
-Purchase Law:3	(0.008)	(0.008)	(0.009)
PUP Law:1	0.002	0.001	0.002
*youth	(0.010)	(0.010)	(0.011)
PUP Law:2	-0.001	-0.001	-0.001
*youth	(0.006)	(0.006)	(0.006)
PUP Law: 3	-0.012**	-0.012**	-0.013**
*youth	(0.006)	(0.005)	(0.006)
Smoke-free Air Laws			
School Level1	0.054***	0.054***	0.069***
	(0.012)	(0.012)	(0.015)
School Level2	0.050***	0.050***	0.074***
	(0.016)	(0.016)	(0.018)
School Level3	0.054***	0.054***	0.069***
	(0.015)	(0.014)	(0.016)
School Level4	0.030	0.029	0.049
	(0.028)	(0.029)	(0.035)
School Level5	0.040***	0.040***	0.056***
	(0.012)	(0.012)	(0.014)
School Level1	-0.002	-0.002	-0.0001
*enrolled	(0.007)	(0.007)	(0.008)
School Level2	-0.009	-0.009	-0.009
*enrolled	(0.007)	(0.007)	(0.007)
School Level3	-0.004	-0.004	-0.002
*enrolled	(0.007)	(0.007)	(0.008)
School Level4	-0.008	-0.007	-0.009
*enrolled	(0.006)	(0.006)	(0.006)
School Level5	-0.008	-0.008	-0.007
*enrolled	(0.007)	(0.007)	(0.008)
Worksite Level1	-0.011	-0.011	-0.026*
	(0.013)	(0.013)	(0.014)
Worksite Level2	-0.024	-0.025	-0.049***
	(0.015)	(0.016)	(0.018)
Worksite Level3	-0.011	-0.011	-0.030*
	(0.011)	(0.011)	(0.017)
Worksite Level1	0.00004	-0.0001	-0.0002
*employed	(0.006)	(0.006)	(0.006)
Worksite Level2	0.012**	0.012**	0.012**
*employed	(0.005)	(0.005)	(0.006)
Worksite Level3	0.006	0.006	0.010
*employed	(0.008)	(0.008)	(0.009)
Public transit	0.005	0.005	0.016***
	(0.004)	(0.004)	(0.004)
Healthcare facilities	0.008	0.008	0.014**
	(0.006)	(0.006)	(0.005)

Table 6 Continued

Recreational facilities	-0.002	-0.002	0.0002
	(0.004)	(0.004)	(0.005)
Culture facilities	-0.011***	-0.011***	-0.016***
	(0.004)	(0.004)	(0.004)
Child care centers	0.004	0.004	0.002
	(0.005)	(0.005)	(0.006)
Restaurants	-0.007	-0.007	-0.001
	(0.006)	(0.006)	(0.006)
Shopping Malls	0.005	0.006	-0.001
	(0.005)	(0.005)	(0.006)
Free-standing bar	-0.014*	-0.013*	-0.017**
	(0.008)	(0.007)	(0.008)
Control Programs			
Tobacco control Funding per capita	-0.001**	-0.001**	-0.002**
	(0.001)	(0.001)	(0.001)
Other tobacco control funding	-0.004*	-0.005**	-0.004*
	(0.002)	(0.002)	(0.003)
Observations	35427	35427	32787

Marginal Effects in the table. Standard errors clustered by states in parentheses, *$0.05 < p \leq 0.1$, **$0.01 < p \leq 0.05$, ***$p \leq 0.01$.

Table6B- Estimates of Intermittent Smoking Initiation (Progressive Transition)

Dependent variable	**Initiation**		
Independent variable	**(1)**	**(2)**	**(3)**
Annual price (Pt)	-0.004	--	-0.008
	(0.004)	--	(0.006)
Annual Price	--	-0.001	--
change(Pt-Pt-1)	--	(0.001)	--
Annual Past	--	--	-0.003
Price (Pt-1)	--	--	(0.003)
Annual Future	--	--	0.003
Price (Pt+1)	--	--	(0.002)
Minimum Age Laws			
Possession-Use	0.0002	0.001	0.0002
-Purchase Law:1	(0.002)	(0.002)	(0.003)
Possession-Use	-0.001	0.0003	-0.0003
-Purchase Law:2	(0.003)	(0.001)	(0.001)
Possession-Use	-0.002	-0.002	-0.003
-Purchase Law:3	(0.002)	(0.002)	(0.002)
PUP Law:1	0.002	0.002	0.003
*youth	(0.002)	(0.002)	(0.003)
PUP Law:2	0.001	0.001	0.002
*youth	(0.001)	(0.001)	(0.002)
PUP Law: 3	0.0004	-0.0001	0.001
*youth	(0.001)	(0.001)	(0.001)
Smoke-free Air Laws			
School Level1	0.002	0.002	0.004
	(0.002)	(0.002)	(0.005)
School Level2	0.0002	-0.0002	0.002
	(0.002)	(0.002)	(0.005)
School Level3	0.002	0.003	0.005
	(0.002)	(0.003)	(0.005)
School Level4	-0.007	-0.008	--
	(0.006)	(0.007)	--
School Level5	0.003	0.003	0.005
	(0.003)	(0.002)	(0.005)
School Level1	0.002+	0.002*	0.003**
*enrolled	(0.001)	(0.001)	(0.001)
School Level2	0.001	0.001	0.001
*enrolled	(0.001)	(0.001)	(0.001)
School Level3	0.001	0.001	0.002
*enrolled	(0.001)	(0.001)	(0.001)
School Level4	0.002	0.002	0.003*
*enrolled	(0.001)	(0.002)	(0.002)
School Level5	0.001	0.001	0.001
*enrolled	(0.001)	(0.001)	(0.001)
Worksite Level1	0.002	0.001	0.001
	(0.002)	(0.002)	(0.004)
Worksite Level2	0.001	0.002	-0.002
	(0.003)	(0.003)	(0.007)
Worksite Level3	-0.001	-0.000	-0.003
	(0.002)	(0.002)	(0.005)
Worksite Level1	-0.001	-0.001	-0.002*
*employed	(0.001)	(0.001)	(0.001)
Worksite Level2	-0.003*	-0.003*	-0.004**
*employed	(0.002)	(0.002)	(0.002)
Worksite Level3	0.001	0.001	0.002
*employed	(0.001)	(0.001)	(0.002)
Public transit	0.001	0.001	0.002
	(0.001)	(0.001)	(0.001)
Healthcare facilities	0.001	0.001	0.002
	(0.001)	(0.001)	(0.002)
Recreational	-0.003**	-0.003	-0.004
facilities	(0.002)	(0.002)	(0.003)

Table 6B Continued

Culture facilities	0.002	0.002	0.001
	(0.001)	(0.001)	(0.001)
Child care centers	0.0003	0.0001	0.0004
	(0.001)	(0.001)	(0.001)
Restaurants	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)
Shopping Malls	0.0004	0.0003	0.001
	(0.001)	(0.001)	(0.002)
Free-standing bar	-0.002	-0.002	-0.002
	(0.002)	(0.002)	(0.003)
Control Programs			
Tobacco control Funding per capita	-0.0001	-0.0001	-0.0002
	(0.0001)	(0.0001)	(0.0002)
Other tobacco control funding	0.0001	-0.0001	0.0001
	(0.0003)	(0.0003)	(0.0005)
Observations	57801	57801	53121

Marginal Effects in the table. Standard errors clustered by states in parentheses, *$0.05 < p \leq 0.1$, **$0.01 < p \leq 0.05$, ***$p \leq 0.01$.

Table6C- Estimates of Daily Smoking Initiation (Progressive Transition)

Dependent variable	**Initiation**		
Independent variable	**(1)**	**(2)**	**(3)**
Annual price (Pt)	-0.003	--	-0.006
	(0.003)	--	(0.005)
Annual Price	--	-0.001	--
change(Pt-Pt-1)	--	(0.001)	--
Annual Past	--	--	-0.0004
Price (Pt-1)	--	--	(0.002)
Annual Future	--	--	0.002
Price (Pt+1)	--	--	(0.002)
Minimum Age Laws			
Possession-Use	0.002	0.002	0.003
-Purchase Law:1	(0.002)	(0.002)	(0.002)
Possession-Use	-0.0003	0.001	0.002*
-Purchase Law:2	(0.0005)	(0.001)	(0.001)
Possession-Use	-0.001	0.0004	0.001
-Purchase Law:3	(0.001)	(0.001)	(0.001)
PUP Law:1	0.001	0.0004	0.001
*youth	(0.001)	(0.001)	(0.001)
PUP Law:2	-0.0003	-0.001	-0.001
*youth	(0.0005)	(0.001)	(0.001)
PUP Law: 3	-0.001	-0.001	-0.001
*youth	(0.001)	(0.001)	(0.002)
Smoke-free Air Laws			
School Level1	0.005	0.005	0.007
	(0.004)	(0.004)	(0.005)
School Level2	0.003	0.003	0.003
	(0.003)	(0.003)	(0.005)
School Level3	0.004	0.004	0.005
	(0.003)	(0.003)	(0.005)
School Level4	--	-0.002	-0.004
	--	(0.003)	(0.005)
School Level5	0.003	0.003	0.005
	(0.003)	(0.003)	(0.004)
School Level1	0.001	0.001	0.001
*enrolled	(0.001)	(0.001)	(0.001)
School Level2	0.000	0.00005	0.000
*enrolled	(0.001)	(0.001)	(0.001)
School Level3	0.0002	0.0003	-0.001
*enrolled	(0.001)	(0.001)	(0.001)
School Level4	-0.0003	-0.0001	-0.001
*enrolled	(0.001)	(0.001)	(0.001)
School Level5	0.001	0.001	0.002
*enrolled	(0.001)	(0.001)	(0.002)
Worksite Level1	-0.001	-0.001	-0.0004
	(0.002)	(0.002)	(0.004)
Worksite Level2	-0.001	-0.001	-0.0001
	(0.003)	(0.002)	(0.004)
Worksite Level3	-0.002	-0.002	-0.002
	(0.003)	(0.002)	(0.004)
Worksite Level1	0.0002	0.0001	0.0004
*employed	(0.001)	(0.001)	(0.001)
Worksite Level2	-0.001	-0.001	-0.001
*employed	(0.001)	(0.001)	(0.001)
Worksite Level3	0.002	0.001	0.003
*employed	(0.002)	(0.002)	(0.003)
Public transit	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)
Healthcare facilities	0.001	0.001	0.002
	(0.001)	(0.001)	(0.002)
Recreational	-0.002	-0.002	-0.003
facilities	(0.001)	(0.001)	(0.002)

Table 6C Continued

Culture facilities	0.0004	0.001	0.001
	(0.001)	(0.001)	(0.001)
Child care centers	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)
Restaurants	-0.001	-0.002	-0.002
	(0.001)	(0.001)	(0.002)
Shopping Malls	0.001	0.001	0.001
	(0.001)	(0.001)	(0.002)
Free-standing bar	-0.002	-0.002	-0.003
	(0.002)	(0.002)	(0.002)
Control Programs			
Tobacco control Funding per capita	-0.00002	-0.00002	-0.0001
	(0.0001)	(0.0001)	(0.0001)
Other tobacco control funding	0.0001	-0.000	0.0002
	(0.002)	(0.0002)	(0.0004)
Observations	62120	62120	56930

Marginal Effects in the table. Standard errors clustered by states in parentheses, *$0.05 < p \leq 0.1$, **$0.01 < p \leq 0.05$, ***$p \leq 0.01$.

Table6D- Estimates of Five Cigarettes per Day Smoking Initiation (Progressive Transition)

Dependent variable	**Initiation**		
Independent variable	**(1)**	**(2)**	**(3)**
Annual price (Pt)	-0.005+	--	-0.006
	(0.004)	--	(0.006)
Annual Price	--	-0.001	--
change(Pt-Pt-1)	--	(0.002)	--
Annual Past	--	--	-0.001
Price (Pt-1)	--	--	(0.003)
Annual Future	--	--	-0.001
Price (Pt+1)	--	--	(0.003)
Minimum Age Laws			
Possession-Use	0.003	0.004	0.003
-Purchase Law:1	(0.003)	(0.003)	(0.004)
Possession-Use	0.001	0.002	0.001
-Purchase Law:2	(0.002)	(0.002)	(0.002)
Possession-Use	-0.00003	-0.000	0.0002
-Purchase Law:3	(0.002)	(0.002)	(0.003)
PUP Law:1	0.001	0.0002	0.001
*youth	(0.002)	(0.002)	(0.003)
PUP Law:2	-0.002	-0.002	-0.002
*youth	(0.002)	(0.002)	(0.002)
PUP Law: 3	-0.001	-0.002	-0.001
*youth	(0.003)	(0.003)	(0.003)
Smoke-free Air Laws			
School Level1	0.002	0.002	-0.005
	(0.003)	(0.003)	(0.006)
School Level2	-0.002	-0.002	-0.013*
	(0.004)	(0.004)	(0.008)
School Level3	-0.001	-0.001	-0.011*
	(0.004)	(0.004)	(0.007)
School Level4	--	-0.012	-0.025**
	--	(0.008)	(0.012)
School Level5	0.0003	0.0003	-0.007
	(0.003)	(0.003)	(0.006)
School Level1	0.003*	0.003*	0.005**
*enrolled	(0.002)	(0.002)	(0.002)
School Level2	0.003*	0.003*	0.004**
*enrolled	(0.001)	(0.001)	(0.002)
School Level3	0.002	0.002	0.002
*enrolled	(0.002)	(0.002)	(0.002)
School Level4	-0.0001	0.0003	0.0003
*enrolled	(0.001)	(0.001)	(0.001)
School Level5	-0.002	-0.002	-0.002
*enrolled	(0.002)	(0.002)	(0.003)
Worksite Level1	0.002	0.002	0.011
	(0.004)	(0.004)	(0.007)
Worksite Level2	0.002	0.002	0.014
	(0.006)	(0.006)	(0.009)
Worksite Level3	-0.002	-0.001	0.004
	(0.004)	(0.004)	(0.004)
Worksite Level1	-0.001	-0.001	-0.001
*employed	(0.002)	(0.002)	(0.002)
Worksite Level2	-0.003*	-0.003**	-0.005**
*employed	(0.002)	(0.002)	(0.002)
Worksite Level3	-0.0001	-0.0003	0.0003
*employed	(0.003)	(0.003)	(0.003)
Public transit	0.0003	0.0002	-0.001
	(0.001)	(0.001)	(0.001)
Healthcare facilities	0.0002	-0.0003	-0.002
	(0.003)	(0.003)	(0.003)
Recreational	-0.003*	-0.003*	-0.004**
facilities	(0.002)	(0.002)	(0.002)

Table 6D Continued

Culture facilities	0.002*	0.003**	0.004**
	(0.001)	(0.001)	(0.002)
Child care centers	0.002	0.002	0.004
	(0.002)	(0.002)	(0.003)
Restaurants	-0.002	-0.002	-0.002
	(0.001)	(0.002)	(0.002)
Shopping Malls	0.002	0.002	0.003
	(0.002)	(0.002)	(0.003)
Free-standing bar	-0.007*	-0.006*	-0.007
	(0.004)	(0.003)	(0.004)
Control Programs			
Tobacco control Funding per capita	-0.00005	-0.00005	-0.0001
	(0.0002)	(0.0002)	(0.0002)
Other tobacco control funding	-0.0001	-0.0004	-0.0002
	(0.0001)	(0.001)	(0.001)
Observations	62106	62106	56944

Marginal Effects in the table. Standard errors clustered by states in parentheses, *$0.05 < p \leq 0.1$, **$0.01 < p \leq 0.05$, ***$p \leq 0.01$.

Table6E- Estimates of Ten Cigarettes per Day Smoking Initiation (Progressive Transition)

Dependent variable	**Initiation**		
Independent variable	**(1)**	**(2)**	**(3)**
Annual price (Pt)	-0.002	--	-0.006
	(0.003)	--	(0.005)
Annual Price	--	0.001	--
change(Pt-Pt-1)	--	(0.002)	--
Annual Past	--	--	-0.003
Price (Pt-1)	--	--	(0.003)
Annual Future	--	--	0.006
Price (Pt+1)	--	--	(0.004)
Minimum Age Laws			
Possession-Use	-0.003	-0.003	-0.004
-Purchase Law:1	(0.003)	(0.003)	(0.003)
Possession-Use	-0.0004	0.0003	-0.0001
-Purchase Law:2	(0.002)	(0.001)	(0.002)
Possession-Use	-0.001	-0.001	0.001
-Purchase Law:3	(0.002)	(0.002)	(0.003)
PUP Law:1	0.003	0.003	0.004
*youth	(0.002)	(0.002)	(0.003)
PUP Law:2	0.001	0.001	0.001
*youth	(0.002)	(0.002)	(0.002)
PUP Law: 3	-0.002	-0.002	-0.002
*youth	(0.002)	(0.002)	(0.003)
Smoke-free Air Laws			
School Level1	0.005	0.005	0.007
	(0.005)	(0.005)	(0.007)
School Level2	0.002	0.001	0.003
	(0.002)	(0.004)	(0.007)
School Level3	0.0002	0.006	0.007
	(0.002)	(0.004)	(0.007)
School Level4	-0.004	0.002	--
	(0.002)	(0.006)	--
School Level5	0.001	0.005	0.006
	(0.002)	(0.004)	(0.006)
School Level1	0.001	0.001	0.001
*enrolled	(0.002)	(0.002)	(0.003)
School Level2	0.002	0.002	0.002
*enrolled	(0.002)	(0.002)	(0.003)
School Level3	0.0002	0.0003	0.001
*enrolled	(0.002)	(0.002)	(0.002)
School Level4	-0.004	-0.003	-0.004*
*enrolled	(0.002)	(0.002)	(0.003)
School Level5	0.001	0.001	0.001
*enrolled	(0.002)	(0.002)	(0.002)
Worksite Level1	-0.002	-0.003	-0.002
	(0.004)	(0.004)	(0.006)
Worksite Level2	-0.0001	-0.0002	-0.004
	(0.005)	(0.005)	(0.008)
Worksite Level3	-0.004	-0.004	-0.007
	(0.005)	(0.005)	(0.007)
Worksite Level1	-0.001	-0.001	-0.002
*employed	(0.001)	(0.001)	(0.002)
Worksite Level2	-0.002	-0.002	-0.002
*employed	(0.001)	(0.001)	(0.002)
Worksite Level3	-0.001	-0.001	-0.001
*employed	(0.002)	(0.002)	(0.003)
Public transit	-0.001	-0.001	0.001
	(0.001)	(0.001)	(0.001)
Healthcare facilities	0.001	0.001	0.001
	(0.002)	(0.002)	(0.002)
Recreational	-0.001	-0.001	-0.002
facilities	(0.001)	(0.001)	(0.002)

Table 6E Continued

Culture facilities	0.002	0.002	0.001
	(0.002)	(0.002)	(0.002)
Child care centers	-0.0001	-0.0002	-0.0003
	(0.001)	(0.001)	(0.002)
Restaurants	-0.0003	-0.001	0.002
	(0.001)	(0.001)	(0.002)
Shopping Malls	-0.0001	-0.001	-0.0003
	(0.001)	(0.001)	(0.002)
Free-standing bar	-0.002	-0.002	-0.005*
	(0.002)	(0.002)	(0.003)
Control Programs			
Tobacco control Funding per capita	-0.00004	-0.00004	-0.0001
	(0.0001)	(0.0001)	(0.0002)
Other tobacco control funding	0.0003	0.0001	0.0003
	(0.0003)	(0.001)	(0.001)
Observations	68172	68172	62219

Marginal Effects in the table. Standard errors clustered by states in parentheses, *$0.05 < p \leq 0.1$, **$0.01 < p \leq 0.05$, ***$p \leq 0.01$.

Table6F- Estimates of Fifteen Cigarettes per Day Smoking Initiation (Progressive Transition)

Dependent variable	**Initiation**		
Independent variable	**(1)**	**(2)**	**(3)**
Annual price (Pt)	-0.002	--	-0.016*
	(0.002)	--	(0.009)
Annual Price	--	-0.004	--
change(Pt-Pt-1)	--	(0.006)	--
Annual Past	--	--	0.003
Price (Pt-1)	--	--	(0.008)
Annual Future	--	--	0.006
Price (Pt+1)	--	--	(0.004)
Minimum Age Laws			
Possession-Use	-0.005	0.002	0.001
-Purchase Law:1	(0.003)	(0.008)	(0.010)
Possession-Use	-0.002	0.004	0.005
-Purchase Law:2	(0.001)	(0.003)	(0.004)
Possession-Use	0.001	-0.002	-0.003
-Purchase Law:3	(0.002)	(0.004)	(0.005)
PUP Law:1	0.003	0.006	0.009
*youth	(0.002)	(0.005)	(0.007)
PUP Law:2	0.002	0.002	0.004
*youth	(0.002)	(0.003)	(0.004)
PUP Law: 3	0.001	-0.001**	-0.0001
*youth	(0.002)	(0.003)	(0.004)
Smoke-free Air Laws			
School Level1	0.013**	0.004	0.010
	(0.006)	(0.007)	(0.011)
School Level2	0.008*	0.002	0.010
	(0.005)	(0.010)	(0.014)
School Level3	0.011**	0.008	0.015
	(0.005)	(0.008)	(0.011)
School Level4	0.011*	-0.019	-0.019
	(0.006)	(0.019)	(0.024)
School Level5	0.009**	-0.002	0.014
	(0.004)	(0.003)	(0.012)
School Level1	-0.001	0.006**	0.009**
*enrolled	(0.001)	(0.003)	(0.004)
School Level2	-0.003	0.004	0.005
*enrolled	(0.002)	(0.003)	(0.004)
School Level3	-0.0005	0.004	0.006
*enrolled	(0.001)	(0.003)	(0.004)
School Level4	0.001	0.009***	0.012***
*enrolled	(0.001)	(0.003)	(0.003)
School Level5	0.001	-0.002	-0.002
*enrolled	(0.001)	(0.003)	(0.004)
Worksite Level1	-0.007*	-0.001	-0.004
	(0.004)	(0.008)	(0.012)
Worksite Level2	-0.012*	-0.003	-0.006
	(0.006)	(0.010)	(0.010)
Worksite Level3	-0.009*	-0.003	-0.002
	(0.005)	(0.007)	(0.008)
Worksite Level1	-0.0001	-0.003	-0.004
*employed	(0.001)	(0.003)	(0.004)
Worksite Level2	-0.000	-0.006***	-0.008**
*employed	(0.002)	(0.002)	(0.003)
Worksite Level3	0.001	-0.001	-0.002
*employed	(0.002)	(0.003)	(0.005)
Public transit	0.0004	0.003	0.008***
	(0.001)	(0.002)	(0.002)
Healthcare facilities	0.0003	-0.0004	0.002
	(0.002)	(0.003)	(0.004)
Recreational	-0.001	-0.010**	-0.011**
facilities	(0.001)	(0.004)	(0.004)

Table 6F Continued

Culture facilities	-0.0002	0.003	0.002
	(0.001)	(0.003)	(0.003)
Child care centers	0.002	0.005	0.005
	(0.001)	(0.003)	(0.003)
Restaurants	0.0002	-0.006**	-0.003
	(0.001)	(0.003)	(0.003)
Shopping Malls	0.001	0.006**	0.003
	(0.001)	(0.003)	(0.004)
Free-standing bar	-0.005***	-0.008	-0.011
	(0.002)	(0.007)	(0.010)
Control Programs			
Tobacco control Funding per capita	-0.0002	-0.001	-0.001**
	(0.0002)	(0.0003)	(0.0004)
Other tobacco control funding	-0.00003	-0.002**	-0.002*
	(0.003)	(0.001)	(0.001)
Observations	73244	73244	66587

Marginal Effects in the table. Standard errors clustered by states in parentheses, *$0.05 < p \leq 0.1$, **$0.01 < p \leq 0.05$, ***$p \leq 0.01$.

Table7- Estimates of Smoking Restarting (Progressive Transition)

Dependent variable	**Restart**		
Independent variable	**(1)**	**(2)**	**(3)**
Price (Pt)	-0.021	--	-0.027
	(0.021)	--	(0.030)
Price change	--	-0.027	--
(Pt-Pt-1)	--	(0.025)	--
Past Price	--	--	0.003
(Pt-1)	--	--	(0.037)
Future Price	--	--	0.005
(Pt+1)	--	--	(0.026)
Minimum Age Laws			
Possession-Use	-0.041	-0.038	-0.122**
-Purchase Law:1	(0.073)	(0.072)	(0.061)
Possession-Use	-0.057	-0.052	-0.056
-Purchase Law:2	(0.051)	(0.047)	(0.054)
Possession-Use	0.006	-0.001	-0.025
-Purchase Law:3	(0.056)	(0.049)	(0.060)
PUP Law:1	0.025	0.023	0.051
*youth	(0.063)	(0.063)	(0.068)
PUP Law:2	0.054	0.052	0.069
*youth	(0.047)	(0.047)	(0.052)
PUP Law: 3	0.001	-0.001	0.009
*youth	(0.048)	(0.049)	(0.053)
Smoke-free Air Laws			
School Level1	0.061	0.060	0.048
	(0.052)	(0.052)	(0.080)
School Level2	0.082	0.078	0.110
	(0.062)	(0.063)	(0.085)
School Level3	0.046	0.047	0.089
	(0.060)	(0.059)	(0.081)
School Level4	0.100	0.089	--
	(0.101)	(0.100)	--
School Level5	0.055	0.055	0.117
	(0.060)	(0.060)	(0.083)
School Level1	0.045	0.045	0.054*
*enrolled	(0.030)	(0.030)	(0.031)
School Level2	0.008	0.007	0.009
*enrolled	(0.026)	(0.026)	(0.031)
School Level3	0.014	0.014	0.016
*enrolled	(0.024)	(0.024)	(0.027)
School Level4	-0.027	-0.027	-0.043*
*enrolled	(0.021)	(0.021)	(0.023)
School Level5	-0.050*	-0.050*	-0.052
*enrolled	(0.030)	(0.030)	(0.034)
Worksite Level1	0.019	0.017	0.026
	(0.067)	(0.067)	(0.075)
Worksite Level2	-0.167	-0.164	-0.102
	(0.109)	(0.108)	(0.129)
Worksite Level3	-0.079	-0.076	-0.045
	(0.081)	(0.082)	(0.086)
Worksite Level1	-0.022	-0.024	-0.035
*employed	(0.023)	(0.023)	(0.027)
Worksite Level2	0.008	0.008	-0.003
*employed	(0.018)	(0.018)	(0.021)
Worksite Level3	0.004	0.004	0.022
*employed	(0.030)	(0.030)	(0.033)
Public Transit	0.011	0.010	0.012
	(0.015)	(0.016)	(0.021)
Healthcare	0.014	0.014	-0.002
facilities	(0.029)	(0.029)	(0.032)
Recreational	0.005	0.005	-0.006
Facilities	(0.015)	(0.015)	(0.016)

Table 7 Continued

Culture facilities	-0.020	-0.018	0.005
	(0.020)	(0.021)	(0.017)
Child care centers	0.003	-0.0003	-0.001
	(0.019)	(0.018)	(0.025)
Restaurants	0.026	0.025	0.054***
	(0.018)	(0.018)	(0.019)
Shopping Malls	-0.005	-0.007	-0.035
	(0.014)	(0.014)	(0.022)
Free-standing bar	-0.055**	-0.049**	-0.110***
	(0.022)	(0.020)	(0.043)
Control Programs			
Tobacco control	0.002	0.002	0.002
Funding/capita	(0.003)	(0.003)	(0.003)
Other tobacco	0.010	0.009	0.014
control funding	(0.011)	(0.011)	(0.012)
Observations	11159	11159	9399

Marginal Effects in the table. Standard errors clustered by states in parentheses, *$0.05 < p \leq 0.1$, **$0.01 < p \leq 0.05$, ***$p \leq 0.01$,+ p<0.1 in one tailed test.

Table 7B- Estimates of Smoking Transition from Nonsmoking (Progressive Transition)

Dependent variable	Competing Risk Model							
Independent variable	**(1) Intermittent**	**(2) Daily**	**(3) Intermittent**	**(4) Daily**	**(5) Intermittent**	**(6) Daily**	**(7) Intermittent**	**(8) Daily**
Price (Pt)	0.006	-0.001	--	--	--	--	0.007	-0.002
	(0.004)	(0.001)	--	--	--	--	(0.005)	(0.002)
Price change(Pt-Pt-1)			-0.008+	0.0003	0.002	-0.001	--	--
			(0.005)	(0.001)	(0.006)	(0.002)	--	--
Past Price (Pt-1)	--	--	--	--	0.014**	-0.003	--	--
	--	--	--	--	(0.006)	(0.003)	--	--
Future Price (Pt+1)	--	--	--	--	0.002	0.001	0.004	0.001
	--	--	--	--	(0.006)	(0.002)	(0.007)	(0.001)
Minimum Age Laws								
Possession-Use	0.004	0.0001	0.002	0.0002	0.004	-0.001	0.004	-0.001
-Purchase Law:1	(0.015)	(0.001)	(0.014)	(0.001)	(0.016)	(0.002)	(0.016)	(0.002)
Possession-Use	0.0001	-0.0002	-0.002	-0.0001	0.005	0.0001	0.004	0.0002
-Purchase Law:2	(0.010)	(0.001)	(0.010)	(0.001)	(0.011)	(0.001)	(0.011)	(0.001)
Possession-Use	-0.007	0.001	-0.007	0.001	-0.012	0.001	-0.011	0.001
-Purchase Law:3	(0.013)	(0.001)	(0.012)	(0.001)	(0.012)	(0.001)	(0.013)	(0.001)
PUP Law:1	0.002	0.002	0.004	0.002	0.005	0.004	0.005	0.004
*youth	(0.010)	(0.002)	(0.010)	(0.002)	(0.011)	(0.003)	(0.011)	(0.003)
PUP Law:2	-0.003	0.001	-0.001	0.001	-0.002	0.002	-0.002	0.002
*youth	(0.006)	(0.001)	(0.005)	(0.001)	(0.006)	(0.002)	(0.006)	(0.002)
PUP Law:3	-0.007	-0.0003	-0.005	-0.0004	-0.007	0.0001	-0.007	0.0001
*youth	(0.006)	(0.001)	(0.005)	(0.001)	(0.006)	(0.001)	(0.006)	(0.001)
Smoke-free Air Laws								
School Level1	0.026*	0.001	0.026*	0.001	0.028*	0.003	0.029*	0.003
	(0.014)	(0.002)	(0.014)	(0.002)	(0.017)	(0.004)	(0.017)	(0.004)
School Level2	0.026*	-0.0002	0.027*	-0.0003	0.037**	0.002	0.038**	0.002
	(0.015)	(0.002)	(0.015)	(0.002)	(0.018)	(0.003)	(0.018)	(0.003)
School Level3	0.020	0.001	0.020	0.001	0.029	0.005	0.028	0.005
	(0.015)	(0.002)	(0.015)	(0.002)	(0.018)	(0.004)	(0.018)	(0.004)

Table 7B Continued

School Level4	--	--	0.010	-0.001	0.007	-0.002	0.010	-0.002
	--	--	(0.022)	(0.003)	(0.025)	(0.003)	(0.024)	(0.003)
School Level5	0.018	0.002	0.019	0.002	0.025	0.005	0.025	0.005
	(0.014)	(0.002)	(0.014)	(0.002)	(0.016)	(0.004)	(0.016)	(0.004)
School Level1	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
*enrolled	(0.009)	(0.001)	(0.009)	(0.001)	(0.010)	(0.001)	(0.010)	(0.001)
School Level2	-0.008	0.0004	-0.008	0.0004	-0.008	0.0005	-0.008	0.001
*enrolled	(0.006)	(0.001)	(0.006)	(0.001)	(0.006)	(0.001)	(0.006)	(0.001)
School Level3	0.010	-0.001	0.010	-0.0004	0.011	-0.0003	0.011	-0.0003
*enrolled	(0.007)	(0.001)	(0.007)	(0.001)	(0.007)	(0.001)	(0.007)	(0.001)
School Level4	0.001	-0.001	-0.001	-0.001	0.0005	-0.002	0.0004	-0.002
*enrolled	(0.003)	(0.001)	(0.003)	(0.001)	(0.004)	(0.001)	(0.004)	(0.001)
School Level5	-0.004	-0.001	-0.005	-0.001	-0.004	-0.001	-0.004	-0.001
*enrolled	(0.006)	(0.001)	(0.006)	(0.001)	(0.007)	(0.001)	(0.007)	(0.001)
Worksite Level1	-0.005	0.001	-0.001	0.001	-0.011	0.001	-0.011	0.001
	(0.012)	(0.001)	(0.012)	(0.001)	(0.015)	(0.002)	(0.015)	(0.002)
Worksite Level2	-0.042**	0.002	-0.039**	0.001	-0.051**	0.002	-0.055**	0.002
	(0.019)	(0.002)	(0.020)	(0.002)	(0.024)	(0.003)	(0.023)	(0.003)
Worksite Level3	-0.012	-0.001	-0.013	-0.001	-0.014	-0.002	-0.015	-0.002
	(0.015)	(0.002)	(0.016)	(0.002)	(0.019)	(0.002)	(0.018)	(0.002)
Worksite Level1	-0.005	-0.0004	-0.004	-0.0005	-0.006	-0.001	-0.006	-0.001
*employed	(0.005)	(0.001)	(0.005)	(0.001)	(0.005)	(0.001)	(0.005)	(0.001)
Worksite Level2	0.009***	-0.001	0.009**	-0.001	0.007*	-0.001	0.007*	-0.001
*employed	(0.003)	(0.001)	(0.003)	(0.001)	(0.004)	(0.001)	(0.004)	(0.001)
Worksite Level3	-0.002	-0.0003	-0.002	-0.0004	0.001	0.0001	0.001	0.0001
*employed	(0.009)	(0.001)	(0.009)	(0.001)	(0.009)	(0.002)	(0.009)	(0.002)
Public transit	0.004	0.0001	0.004	0.0001	0.008**	0.0003	0.008**	0.0003
	(0.003)	(0.0003)	(0.003)	(0.0003)	(0.003)	(0.0005)	(0.003)	(0.0005)
Healthcare facilities	0.002	0.001	0.002	0.001	0.006	0.001	0.006	0.001
	(0.007)	(0.001)	(0.007)	(0.001)	(0.008)	(0.001)	(0.008)	(0.001)
Recreational facilities	0.002	-0.001	0.002	-0.001	0.002	-0.002	0.002	-0.002
	(0.002)	(0.001)	(0.002)	(0.001)	(0.004)	(0.001)	(0.003)	(0.001)

Table 7B Continued

Culture facilities	-0.010***	0.0003	-0.011***	0.0003	-0.007*	0.001	-0.008**	0.001
	(0.003)	(0.001)	(0.003)	(0.001)	(0.004)	(0.001)	(0.004)	(0.001)
Child care centers	0.004	0.001	0.005**	0.001	0.002	0.002	0.002	0.002
	(0.003)	(0.001)	(0.002)	(0.001)	(0.004)	(0.001)	(0.004)	(0.001)
Restaurants	0.001	-0.001	0.001	-0.001	0.002	-0.001	0.002	-0.001
	(0.005)	(0.001)	(0.005)	(0.001)	(0.005)	(0.001)	(0.005)	(0.001)
Shopping Malls	0.005	-0.0001	0.004	-0.0001	-0.003	0.00002	-0.002	-0.0001
	(0.004)	(0.001)	(0.004)	(0.001)	(0.005)	(0.001)	(0.005)	(0.001)
Free-standing bar	-0.015***	-0.002	-0.017***	-0.002	-0.025***	-0.003	-0.026***	-0.003
	(0.004)	(0.001)	(0.004)	(0.001)	(0.008)	(0.002)	(0.008)	(0.002)
Control Programs								
Tobacco control Funding per capita	-0.001**	-0.0001	-0.001*	-0.0001	-0.001	-0.0001	-0.001	-0.0001
	(0.001)	(0.0001)	(0.001)	(0.001)	(0.001)	(0.0001)	(0.001)	(0.0001)
Other tobacco control funding	-0.002	-0.00001	-0.002	-0.00003	-0.001	0.00004	-0.001	-0.00003
	(0.002)	(0.0003)	(0.002)	(0.0003)	(0.002)	(0.00004)	(0.002)	(0.0004)
Observations	55786	55786	55786	55786	50637	50637	50637	50637
Log Likelihood								

Marginal Effects in the table. Standard errors clustered by states in parentheses, *$0.05 < p \leq 0.1$, **$0.01 < p \leq 0.05$, ***$p \leq 0.01$

Table 7C- Estimates of Smoking Transition from Nonsmoking (Progressive Transition) Competing Risk Model

Independent variable	**(1)**	**(3)**	**(5)**	**(7)**
	Light	**Light**	**Light**	**Light**
Price (Pt)	0.002	--	--	0.003
	(0.004)	--	--	(0.006)
Price change	--	-0.004	0.001	--
(Pt-Pt-1)	--	(0.006)	(0.008)	--
Past Price (Pt-1)	--	--	0.006	--
	--	--	(0.007)	--
Future Price	--	--	0.002	0.002
(Pt+1)	--	--	(0.007)	(0.007)
Minimum Age Laws				
PUP Law:1	-0.001	-0.002	-0.002	-0.002
	(0.016)	(0.016)	(0.017)	(0.017)
PUP Law:2	-0.005	-0.006	-0.0002	-0.001
	(0.012)	(0.012)	(0.013)	(0.013)
PUP Law:3	-0.009	-0.009	-0.018	-0.018
	(0.014)	(0.014)	(0.014)	(0.014)
PUP Law:1	0.010	0.011	0.015	0.015
*youth	(0.014)	(0.014)	(0.015)	(0.016)
PUP Law:2	0.0002	0.001	0.004	0.004
*youth	(0.007)	(0.007)	(0.009)	(0.009)
PUP Law:3	-0.007	-0.007	-0.006	-0.006
*youth	(0.007)	(0.007)	(0.008)	(0.008)
Smoke-free Air Laws				
School Level1	0.025*	0.025*	0.038**	0.038**
	(0.014)	(0.014)	(0.016)	(0.016)
School Level2	0.022	0.022	0.047***	0.048***
	(0.016)	(0.016)	(0.018)	(0.017)
School Level3	0.023	0.023	0.048***	0.047***
	(0.016)	(0.016)	(0.016)	(0.016)
School Level4	0.001	0.003	0.004	0.006
	(0.024)	(0.025)	(0.026)	(0.026)
School Level5	0.023	0.024*	0.039**	0.039***
	(0.014)	(0.014)	(0.015)	(0.015)
School Level1	0.005	0.005	0.007	0.007
*enrolled	(0.008)	(0.008)	(0.008)	(0.008)
School Level2	0.003	0.003	0.003	0.003
*enrolled	(0.005)	(0.006)	(0.006)	(0.006)
School Level3	0.010	0.009	0.011	0.011
*enrolled	(0.007)	(0.007)	(0.007)	(0.007)
School Level4	0.004	0.003	0.002	0.002
*enrolled	(0.005)	(0.005)	(0.005)	(0.005)
School Level5	-0.010	-0.010	-0.008	-0.007
*enrolled	(0.006)	(0.006)	(0.007)	(0.007)
Worksite Level1	0.006	0.006	-0.009	-0.009
	(0.014)	(0.014)	(0.016)	(0.016)
Worksite Level2	-0.028	-0.027	-0.037	-0.039
	(0.023)	(0.023)	(0.025)	(0.025)
Worksite Level3	-0.012	-0.012	-0.018	-0.018
	(0.017)	(0.017)	(0.018)	(0.018)
Worksite Level1	-0.005	-0.005	-0.008	-0.008
*employed	(0.004)	(0.004)	(0.005)	(0.005)
Worksite Level2	0.002	0.002	-0.0001	0.0001
*employed	(0.004)	(0.004)	(0.004)	(0.004)
Worksite Level3	-0.001	-0.001	0.006	0.006
*employed	(0.009)	(0.009)	(0.009)	(0.009)
Public transit	0.006*	0.006*	0.011***	0.011***
	(0.003)	(0.003)	(0.004)	(0.003)
Healthcare	0.007	0.007	0.012	0.012
facilities	(0.007)	(0.007)	(0.008)	(0.008)
Recreational	0.001	0.001	-0.001	-0.001
Facilities	(0.003)	(0.003)	(0.004)	(0.004)
Culture facilities	-0.009***	-0.009***	-0.007*	-0.008*

Table 7C_ Continued

	(0.003)	(0.004)	(0.004)	(0.004)
Child care	0.003	0.003	0.005	0.003
centers	(0.004)	(0.004)	(0.006)	(0.005)
Restaurants	0.002	0.002	-0.009*	0.005
	(0.005)	(0.005)	(0.005)	(0.006)
Shopping Malls	0.0003	-0.0001	-0.010*	-0.009*
	(0.004)	(0.004)	(0.005)	(0.005)
Free-standing	-0.022***	-0.023***	-0.036***	-0.037***
bar	(0.004)	(0.004)	(0.009)	(0.009)
Control Programs				
Tobacco control	-0.001**	-0.001**	-0.002*	-0.002**
Funding/capita	(0.001)	(0.001)	(0.001)	(0.001)
Other tobacco	-0.002	-0.002	-0.001	-0.001
control funding	(0.002)	(0.002)	(0.002)	(0.002)
Observations	55649	55649	51459	51459
Log Likelihood				

Marginal Effects in the table. Standard errors clustered by states in parentheses, *$0.05 < p \leq 0.1$, **$0.01 < p \leq 0.05$, ***$p \leq 0.01$. The effects of the determinants on smoking transition from nonsmoking to heavy smoking are negligible and not reported in the table.

Table8- Estimates of Smoking Cessation (Regressive transition)

Dependent variable	**Quitting**			
Independent variable	**(1)**	**(2)**	**(3)**	**(4)**
Price (Pt)	0.031***	--	--	0.039***
	(0.007)	--	--	(0.011)
Price change	--	0.023***	0.043***	--
(Pt-Pt-1)	--	(0.009)	(0.012)	--
Past Price	--	--	0.034**	--
(Pt-1)	--	--	(0.014)	--
Future Price	--	--	-0.011	-0.012
(Pt+1)	--	--	(0.011)	(0.011)
Consumption	-0.0002***	-0.0002***	-0.0002***	-0.0002***
at baseline	(0.000)	(0.000)	(0.000)	(0.000)
Smoke-free Air Laws				
PUP Law:1	-0.015	-0.020	-0.008	-0.008
	(0.023)	(0.025)	(0.028)	(0.028)
PUP Law:2	-0.004	-0.011	-0.001	-0.0003
	(0.012)	(0.012)	(0.013)	(0.013)
PUP Law:3	0.006	0.006	0.004	0.004
	(0.015)	(0.015)	(0.013)	(0.013)
PUP Law:1	0.001	0.005	0.002	0.002
*youth	(0.015)	(0.015)	(0.016)	(0.016)
PUP Law:2	0.009	0.012	0.013	0.013
*youth	(0.011)	(0.011)	(0.012)	(0.012)
PUP Law:3	0.006	0.010	0.009	0.009
*youth	(0.012)	(0.012)	(0.012)	(0.012)
Smoke-free Air Laws				
School L1	-0.015	-0.016	-0.003	-0.003
	(0.017)	(0.017)	(0.017)	(0.017)
School L2	-0.032	-0.026	-0.018	-0.019
	(0.023)	(0.021)	(0.024)	(0.024)
School L3	-0.027	-0.029*	-0.005	-0.005
	(0.017)	(0.017)	(0.018)	(0.017)
School L4	-0.014	0.005	-0.0004	-0.002
	(0.024)	(0.023)	(0.031)	(0.030)
School L5	-0.033	-0.030*	-0.019	-0.020
	(0.017)	(0.017)	(0.018)	(0.018)
School L1	-0.020	-0.019	-0.020	-0.020
*enrolled	(0.012)	(0.012)	(0.013)	(0.013)
School L2	-0.006	-0.004	-0.014	-0.014
*enrolled	(0.012)	(0.012)	(0.012)	(0.012)
School L3	0.003	0.002	0.002	0.002
*enrolled	(0.015)	(0.015)	(0.016)	(0.018)
School L4	-0.048***	-0.053***	-0.050***	-0.051***
*enrolled	(0.010)	(0.010)	(0.011)	(0.011)
School L5	-0.016	-0.018	-0.016	-0.016
*enrolled	(0.012)	(0.012)	(0.014)	(0.014)
Worksite L1	0.013	0.014	0.003	0.002
	(0.014)	(0.013)	(0.018)	(0.018)
Worksite L2	0.002	0.002	0.018	0.020
	(0.026)	(0.024)	(0.027)	(0.026)
Worksite L3	0.013	0.009	0.013	0.014
	(0.015)	(0.014)	(0.014)	(0.014)
Worksite L1	0.013	0.015	0.010	0.010
*employed	(0.015)	(0.012)	(0.012)	(0.012)
Worksite L2	0.028***	0.028***	0.023**	0.023**
*employed	(0.011)	(0.011)	(0.011)	(0.011)
Worksite L3	-0.019	-0.019	-0.017	-0.017
*employed	(0.014)	(0.014)	(0.014)	(0.014)
Public transit	0.003	0.003	-0.006	-0.006
	(0.004)	(0.004)	(0.005)	(0.005)
Healthcare	-0.013	-0.013	-0.002	-0.002
facilities	(0.009)	(0.009)	(0.010)	(0.010)
Recreational	-0.005	-0.005	-0.005	-0.005

Table 8_ Continued

facilities	(0.005)	(0.004)	(0.005)	(0.005)
Culture	0.003	0.0001	0.001	0.001
facilities	(0.005)	(0.005)	(0.006)	(0.006)
Child care	0.0005	0.004	0.002	0.002
centers	(0.006)	(0.006)	(0.009)	(0.009)
Restaurants	0.005	0.007	-0.004	-0.005
	(0.007)	(0.007)	(0.009)	(0.009)
Shopping	0.010	0.011*	0.008	0.008
Malls	(0.007)	(0.006)	(0.009)	(0.009)
Free-standing	0.021	0.013	0.028	0.028
bar	(0.016)	(0.012)	(0.030)	(0.031)
Tobacco Control Programs				
Funding	-0.001	-0.001	-0.001	-0.001
/capita	(0.001)	(0.001)	(0.001)	(0.001)
Other	-0.00001	0.002	-0.001	-0.001
funding	(0.005)	(0.005)	(0.006)	(0.006)
Observations	27162	27162	23975	23975

Marginal Effects in the table. Standard errors clustered by states in parentheses, *$0.05 < p \leq 0.1$, **$0.01 < p \leq 0.05$, ***$p \leq 0.01$.

Table9- Estimates of Smoking Transition from Heavy Smoking (Regressive Transition)

Dependent variable	**Nonsmoking/light smoking**			
Independent variable	**(1)**	**(2)**	**(3)**	**(4)**
Price (Pt)	0.108***	--	--	0.074+
	(0.033)	--	--	(0.045)
Price change	--	0.030	0.076+	--
(Pt-Pt-1)	--	(0.026)	(0.050)	--
Past Price	--	--	0.071+	--
(Pt-1)	--	--	(0.045)	--
Future Price	--	--	0.033	0.032
(Pt+1)	--	--	(0.030)	(0.030)
Consumption	-0.0001**	-0.0001**	-0.0001*	-0.0001*
At baseline	(0.000)	(0.000)	(0.000)	(0.000)
Minimum Age Laws				
PUP	-0.008	-0.033	-0.032	-0.032
Law:1	(0.071)	(0.074)	(0.054)	(0.055)
PUP	0.073*	0.047	0.085**	0.085**
Law:2	(0.043)	(0.041)	(0.041)	(0.041)
PUP	0.066	0.064	0.091**	0.091**
Law:3	(0.052)	(0.051)	(0.044)	(0.044)
PUP Law:1	0.111*	0.131**	0.130*	0.130*
*youth	(0.066)	(0.067)	(0.069)	(0.069)
PUP Law:2	0.043	0.059	0.045	0.046
*youth	(0.052)	(0.052)	(0.054)	(0.054)
PUP Law:3	-0.028	-0.012	-0.025	-0.025
*youth	(0.082)	(0.084)	(0.082)	(0.082)
Smoke-free Air Laws				
School Level1	-0.034	-0.037	-0.108**	-0.108**
	(0.033)	(0.037)	(0.054)	(0.054)
School Level2	-0.167	-0.140**	-0.216***	-0.217***
	(0.056)	(0.059)	(0.065)	(0.065)
School Level3	-0.014	-0.021	-0.098	-0.098
	(0.044)	(0.049)	(0.066)	(0.066)
School Level4	0.231	0.280***	--	--
	(0.107)	(0.108)	--	--
School Level5	-0.022	-0.022	-0.101	-0.101
	(0.049)	(0.054)	(0.069)	(0.069)
School Level1	0.065	0.062	0.075	0.075
*enrolled	(0.057)	(0.057)	(0.059)	(0.059)
School Level2	0.095*	0.095*	0.096*	0.096*
*enrolled	(0.051)	(0.052)	(0.054)	(0.054)
School Level3	0.096*	0.089	0.094	0.094
*enrolled	(0.055)	(0.055)	(0.058)	(0.058)
School Level4	0.064	0.055	0.078*	0.078*
*enrolled	(0.039)	(0.039)	(0.041)	(0.041)
School Level5	0.052	0.042	0.033	0.033
*enrolled	(0.055)	(0.056)	(0.054)	(0.054)
Worksite 1	-0.029	-0.021	0.039	0.038
Level	(0.046)	(0.048)	(0.072)	(0.072)
Worksite	-0.050	-0.048	-0.049	-0.048
Level2	(0.058)	(0.063)	(0.078)	(0.077)
Worksite	-0.086**	-0.094**	-0.064	-0.064
Level3	(0.037)	(0.037)	(0.056)	(0.056)
Worksite L1	-0.004	-0.002	-0.0004	-0.0004
*employed	(0.021)	(0.021)	(0.021)	(0.021)
Worksite L2	0.051**	0.047**	0.041	0.041
*employed	(0.021)	(0.020)	(0.027)	(0.027)
Worksite L3	0.017	0.017	0.021	0.021
*employed	(0.034)	(0.034)	(0.040)	(0.040)
Public transit	0.006	0.010	0.021	0.021
	(0.013)	(0.014)	(0.017)	(0.017)
Healthcare	0.039	0.029	0.010	0.010
Facilities	(0.042)	(0.043)	(0.056)	(0.056)

Table 9_Continued

Recreational facilities	-0.004 (0.021)	-0.004 (0.023)	-0.004 (0.037)	-0.004 (0.037)
Culture facilities	-0.002 (0.022)	-0.007 (0.024)	-0.011 (0.033)	0.010 (0.032)
Child care centers	-0.036* (0.019)	-0.025 (0.021)	-0.042 (0.027)	-0.042 (0.027)
Restaurants	-0.030 (0.028)	-0.016 (0.028)	0.001 (0.039)	0.001 (0.039)
Shopping Malls	0.028 (0.028)	0.026 (0.030)	0.045 (0.040)	0.044 (0.039)
Free-standing bar	0.027 (0.029)	0.009 (0.031)	0.021 (0.047)	0.022 (0.047)
Control Programs				
Control Funding/capita	-0.002 (0.004)	-0.003 (0.004)	-0.002 (0.005)	-0.002 (0.004)
Other tobacco control funding	-0.014 (0.011)	-0.005 (0.010)	-0.015 (0.013)	-0.016 (0.013)
Observations	6269	6269	5428	5428

Marginal Effects in the table. Standard errors clustered by states in parentheses, *$0.05 < p \leq 0.1$, **$0.01 < p \leq 0.05$, ***$p \leq 0.01$.

Table10- Estimates of Smoking transition from Daily smoking (Regressive Transition)

Dependent variable	**Competing Risk Model**							
Independent variable	**(1) Intermittent**	**(2) None**	**(3) Intermittent**	**(4) None**	**(5) Intermittent**	**(6) None**	**(7) Intermittent**	**(8) None**
Price (Pt)	0.020*	0.005+	--	--	--	--	0.034**	0.006+
	(0.012)	(0.003)	--	--	--	--	(0.014)	(0.004)
Price change(Pt-Pt-1)			0.022*	0.002	0.039***	0.006+	--	--
			(0.011)	(0.002)	(0.015)	(0.004)	--	--
Past Price (Pt-1)	--	--	--	--	0.029*	0.007+	--	--
	--	--	--	--	(0.017)	(0.005)	--	--
Future Price (Pt+1)	--	--	--	--	-0.008	-0.002	-0.010	-0.002
	--	--	--	--	(0.012)	(0.006)	(0.012)	(0.002)
Consumption At baseline	-0.0001***	-0.000	-0.0001***	-0.000	-0.0001***	-0.000	-0.0001***	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Minimum Age Laws								
PUP Law:1	0.017	0.002	0.012	0.001	-0.006	0.003	-0.006	0.003
*youth	(0.020)	(0.004)	(0.021)	(0.004)	(0.021)	(0.006)	(0.021)	(0.006)
PUP Law:2	0.021	0.0004	0.016	-0.001	0.004	0.002	0.004	0.002
*youth	(0.013)	(0.002)	(0.012)	(0.002)	(0.013)	(0.003)	(0.013)	(0.003)
PUP Law:3	0.015	0.001	0.015	0.001	0.004	0.002	0.004	0.002
*youth	(0.015)	(0.003)	(0.015)	(0.003)	(0.015)	(0.004)	(0.015)	(0.004)
Possession-Use	-0.038*	0.0002	-0.036*	0.001	-0.036	-0.000	-0.036*	0.000
-Purchase Law:1	(0.020)	(0.002)	(0.021)	(0.002)	(0.022)	(0.002)	(0.022)	(0.002)
Possession-Use	-0.025	0.001	-0.024	0.002	-0.024	0.001	-0.024	0.001
-Purchase Law:2	(0.016)	(0.002)	(0.015)	(0.002)	(0.018)	(0.003)	(0.018)	(0.002)
Possession-Use	-0.007	0.001	-0.005	0.001	-0.001	0.001	-0.002	0.001
-Purchase Law:3	(0.023)	(0.002)	(0.023)	(0.003)	(0.026)	(0.003)	(0.026)	(0.003)
Smoke-free Air Laws								
School Level1	0.010	0.0003	0.010	0.00003	0.041**	0.001	0.042**	0.001
	(0.022)	(0.005)	(0.022)	(0.005)	(0.019)	(0.006)	(0.019)	(0.006)
School Level2	0.009	-0.003	0.013	-0.002	0.033	-0.003	0.033	-0.003
	(0.026)	(0.005)	(0.026)	(0.005)	(0.024)	(0.007)	(0.024)	(0.007)
School Level3	0.025	-0.001	0.024	-0.001	0.051**	0.001	0.052***	0.001

Table10_Continued

	(0.022)	(0.004)	(0.022)	(0.004)	(0.020)	(0.006)	(0.020)	(0.006)
School Level4	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--
School Level5	0.033	-0.0001	0.034	0.0002	0.030*	0.002	0.030*	0.002
	(0.025)	(0.004)	(0.025)	(0.004)	(0.021)	(0.006)	(0.021)	(0.006)
School Level1	-0.031**	0.003	-0.031**	0.003	-0.030*	0.003	-0.030*	0.003
*enrolled	(0.013)	(0.002)	(0.013)	(0.002)	(0.015)	(0.003)	(0.015)	(0.003)
School Level2	-0.034**	0.002	-0.034**	0.002	-0.031*	0.002	-0.031*	0.002
*enrolled	(0.015)	(0.002)	(0.015)	(0.002)	(0.017)	(0.002)	(0.017)	(0.002)
School Level3	-0.021*	0.003	-0.022*	0.003	-0.020	0.004	-0.020	0.004
*enrolled	(0.012)	(0.002)	(0.012)	(0.002)	(0.014)	(0.003)	(0.014)	(0.003)
School Level4	-0.017*	0.0003	-0.020**	-0.001	-0.016	0.001	-0.016	0.001
*enrolled	(0.010)	(0.001)	(0.010)	(0.001)	(0.011)	(0.001)	(0.011)	(0.001)
School Level5	-0.015	0.003	-0.016	0.003	-0.016	0.002	-0.016	0.002
*enrolled	(0.012)	(0.003)	(0.012)	(0.002)	(0.014)	(0.003)	(0.015)	(0.003)
Worksite Level1	0.001	0.001	0.004	0.002	-0.006	-0.0004	-0.007	-0.0003
	(0.012)	(0.003)	(0.012)_	(0.003)	(0.019)	(0.005)	(0.019)	(0.005)
Worksite Level2	-0.007	0.004	-0.008	0.004	-0.035	0.006	-0.034	0.006
	(0.031)	(0.005)	(0.031)	(0.005)	(0.033)	(0.009)	(0.033)	(0.009)
Worksite Level3	-0.011	0.001	-0.013	0.001	-0.032**	0.001	-0.032**	0.0004
	(0.013)	(0.003)	(0.013)	(0.003)	(0.015)	(0.006)	(0.015)	(0.006)
Worksite Level1	0.015*	0.003	0.015*	0.003	0.014	0.003	0.014	0.003
*employed	(0.009)	(0.002)	(0.009)	(0.002)	(0.010)	(0.003)	(0.010)	(0.003)
Worksite Level2	0.009	0.003	0.008	0.003	0.009	0.003	0.009	0.003
*employed	(0.006)	(0.003)	(0.006)	(0.003)	(0.008)	(0.003)	(0.008)	(0.003)
Worksite Level3	0.004	0.001	0.004	0.001	0.003	0.001	0.003	0.001
*employed	(0.010)	(0.002)	(0.009)	(0.002)	(0.010)	(0.003)	(0.010)	(0.001)
Public transit	0.001	-0.001	0.002	-0.001	0.013***	-0.001	0.012***	-0.001
	(0.005)	(0.001)	(0.005)	(0.001)	(0.003)	(0.001)	(0.003)	(0.000)
Healthcare facilities	0.001	-0.003	0.0003	-0.003	0.009	-0.002	0.009	-0.002
	(0.014)	(0.002)	(0.014)	(0.002)	(0.015)	(0.002)	(0.015)	(0.002)
Recreational facilities	-0.00003	-0.0003	-0.0001	-0.0002	-0.011	-0.001	-0.011	-0.001

Table10_Continued

	(0.006)	(0.001)	(0.006)	(0.001)	(0.007)	(0.001)	(0.007)	(0.001)
Culture facilities	-0.012*	0.001	-0.014**	0.0004	-0.013***	0.002	-0.012***	0.002
	(0.007)	(0.001)	(0.007)	(0.001)	(0.005)	(0.002)	(0.005)	(0.002)
Child care centers	0.007	0.0003	0.010	0.001	0.009	0.0003	0.009	0.0003
	(0.008)	(0.001)	(0.008)	(0.001)	(0.007)	(0.002)	(0.007)	(0.002)
Restaurants	0.008	0.001	0.010	0.001	0.011	0.0005	0.011	0.001
	(0.010)	(0.001)	(0.010)	(0.001)	(0.011)	(0.002)	(0.011)	(0.002)
Shopping Malls	-0.002	0.001	-0.0001	0.001	0.0004	0.0004	-0.0003	0.0004
	(0.011)	(0.001)	(0.011)	(0.001)	(0.012)	(0.002)	(0.012)	(0.002)
Free-standing bar	-0.023*	0.002	-0.028*	0.001	-0.007	0.003	-0.006	0.003
	(0.013)	(0.002)	(0.015)	(0.001)	(0.014)	(0.004)	(0.013)	(0.004)
Control Programs								
Tobacco control Funding per capita	-0.001	0.0001	-0.001	0.0001	-0.001	0.0001	-0.001	0.0001
	(0.001)	(0.0002)	(0.001)	(0.0002)	(0.001)	(0.0002)	(0.001)	(0.0002)
Other tobacco control funding	-0.009**	-0.00003	-0.008*	0.0003	-0.009*	-0.0002	-0.009*	-0.0001
	(0.004)	(0.001)	(0.004)	(0.001)	(0.005)	(0.001)	(0.005)	(0.001)
Observations	15577	15577	15577	15577	13592	13592	13592	13592
Log Likelihood								

Marginal Effects in the table. Standard errors clustered by states in parentheses, *$0.05 < p \leq 0.1$, **$0.01 < p \leq 0.05$, ***$p \leq 0.01$

Table11- Estimates of Smoking Transition from Light Smoking (Regressive and Progressive Transition)

Dependent variable	**Competing Risk Model**							
Independent variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
	None	**Heavy**	**None**	**Heavy**	**None**	**Heavy**	**None**	**Heavy**
Price (Pt)	0.025**	-0.0002	--	--	--	--	0.031**	-0.001
	(0.010)	(0.006)	--	--	--	--	(0.015)	(0.009)
Price change	--	--	0.024**	0.001	0.036**	-0.0003	--	--
(Pt-Pt-1)	--	--	(0.011)	(0.007)	(0.017)	(0.010)	--	--
Past Price	--	--	--	--	0.025+	-0.003	--	--
(Pt-1)	--	--	--	--	(0.018)	(0.009)	--	--
Future Price	--	--	--	--	-0.009	0.005	-0.010	0.004
(Pt+1)	--	--	--	--	(0.013)	(0.006)	(0.013)	(0.006)
Consumption at	-0.001***	0.0003***	-0.001***	0.0003***	-0.001***	0.0003***	-0.001***	0.0003***
baseline	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Minimum Age Laws								
Possession-Use	-0.016	-0.030**	-0.019	-0.030**	-0.013	-0.033***	-0.013	-0.033***
-Purchase Law:1	(0.025)	(0.013)	(0.025)	(0.013)	(0.024)	(0.012)	(0.024)	(0.012)
Possession-Use	-0.006	-0.027***	-0.012	-0.027***	-0.004	-0.025**	-0.004	-0.025**
-Purchase Law:2	(0.016)	(0.010)	(0.016)	(0.009)	(0.016)	(0.011)	(0.016)	(0.011)
Possession-Use	0.020	-0.018*	0.020	-0.018**	0.020	-0.019**	0.019	-0.019**
-Purchase Law:3	(0.018)	(0.009)	(0.018)	(0.009)	(0.015)	(0.009)	(0.015)	(0.009)
PUP Law:1	0.001	0.015	0.003	0.015	0.001	0.014	0.001	0.014
*youth	(0.018)	(0.012)	(0.019)	(0.012)	(0.020)	(0.011)	(0.020)	(0.011)
PUP Law:2	0.007	0.009	0.009	0.009	0.011	0.008	0.011	0.008
*youth	(0.015)	(0.009)	(0.015)	(0.009)	(0.016)	(0.008)	(0.016)	(0.008)
PUP Law:3	0.016	0.009	0.019	0.009	0.020	0.007	0.020	0.007
*youth	(0.017)	(0.009)	(0.018)	(0.009)	(0.017)	(0.008)	(0.017)	(0.008)
Smoke-free Air Laws								
School Level1	-0.047**	0.055***	-0.046**	0.055***	-0.034	0.046**	-0.034	0.046**
	(0.023)	(0.013)	(0.022)	(0.013)	(0.022)	(0.020)	(0.021)	(0.020)
School Level2	-0.053**	0.039***	-0.048*	0.039***	-0.036	0.033*	-0.037	0.033*

Table11_Continued

	(0.027)	(0.014)	(0.025)	(0.014)	(0.026)	(0.018)	(0.026)	(0.018)
School Level3	-0.064***	0.048***	-0.065***	0.048***	-0.044*	0.044**	-0.044*	0.044**
	(0.025)	(0.013)	(0.024)	(0.013)	(0.026)	(0.017)	(0.026)	(0.017)
School Level4	-0.022	0.014	-0.008	0.014	0.028	0.014	--	--
	(0.041)	(0.020)	(0.040)	(0.020)	(0.046)	(0.028)	--	--
School Level5	-0.066***	0.019	-0.063***	0.019	-0.054**	0.012	-0.055**	0.012
	(0.012)	(0.013)	(0.022)	(0.013)	(0.024)	(0.018)	(0.024)	(0.018)
School Level1	-0.018	-0.005	-0.017	-0.005	-0.020	-0.003	-0.019	-0.003
*enrolled	(0.017)	(0.010)	(0.017)	(0.010)	(0.018)	(0.009)	(0.018)	(0.010)
School Level2	0.002	0.007	0.003	0.007	-0.010	0.005	-0.010	0.005
*enrolled	(0.016)	(0.014)	(0.016)	(0.014)	(0.017)	(0.013)	(0.017)	(0.013)
School Level3	0.007	0.004	0.006	0.004	0.005	0.006	0.005	0.006
*enrolled	(0.022)	(0.010)	(0.022)	(0.010)	(0.023)	(0.009)	(0.023)	(0.009)
School Level4	-0.033**	0.030***	-0.037**	0.030***	-0.035**	0.028***	-0.035**	0.028***
*enrolled	(0.017)	(0.008)	(0.016)	(0.008)	(0.017)	(0.008)	(0.017)	(0.008)
School Level5	-0.010	0.023**	-0.011	0.023**	-0.011	0.021*	-0.011	0.021*
*enrolled	(0.018)	(0.012)	(0.018)	(0.011)	(0.020)	(0.011)	(0.020)	(0.011)
Worksite Level1	0.024	-0.011	0.026	-0.011	0.004	-0.010	0.003	-0.010
	(0.025)	(.010)	(0.024)	(0.010)	(0.024)	(0.013)	(0.024)	(0.013)
Worksite Level2	0.008	-0.038**	0.007	-0.038**	0.017	-0.025	0.020	-0.024
	(0.042)	(0.016)	(0.041)	(0.016)	(0.038)	(0.018)	(0.037)	(0.019)
Worksite Level3	0.014	-0.013	0.010	-0.013	0.010	-0.006	0.012	-0.006
	(0.028)	(0.009)	(0.028)	(0.009)	(0.022)	(0.010)	(0.022)	(0.010)
Worksite Level1	0.017	0.0003	0.018	0.0002	0.015	0.002	0.015	0.002
*employed	(0.014)	(0.009)	(0.014)	(0.009)	(0.014)	(0.008)	(0.014)	(0.008)
Worksite Level2	0.025*	-0.001	0.025*	-0.001	0.018	0.002	0.018	0.002
*employed	(0.013)	(0.009)	(0.013)	(0.009)	(0.012)	(0.008)	(0.012)	(0.008)
Worksite Level3	-0.024	-0.001	-0.024	-0.001	-0.026	-0.0001	-0.026	-0.0001
*employed	(0.016)	(0.011)	(0.016)	(0.011)	(0.018)	(0.011)	(0.018)	(0.011)
Public transit	-0.0004	0.005**	-0.0002	0.005**	-0.014**	0.006	-0.014**	0.006
	(0.012)	(0.002)	(0.006)	(0.002)	(0.007)	(0.004)	(0.007)	(0.004)
Healthcare	-0.015	0.001	-0.016	0.001	-0.003	-0.001	-0.003	-0.001

Table11_Continued

facilities	(0.012)	(0.006)	(0.012)	(0.007)	(0.011)	(0.008)	(0.011)	(0.008)
Recreational	-0.001	-0.007*	-0.001	-0.007*	0.005	-0.006	0.005	-0.006
facilities	(0.006)	(0.004)	(0.006)	(0.004)	(0.008)	(0.006)	(0.009)	(0.006)
Culture facilities	0.002	-0.008**	-0.0004	-0.008**	-0.004	-0.006	-0.003	-0.006
	(0.008)	(0.004)	(0.007)	(0.004)	(0.009)	(0.006)	(0.009)	(0.006)
Child care centers	0.001	0.010*	0.004	0.010*	0.004	0.007	0.004	0.007
	(0.008)	(0.005)	(0.008)	(0.005)	(0.010)	(0.007)	(0.010)	(0.007)
Restaurants	0.003	0.001	0.005	0.001	-0.012	0.005	-0.012	0.005
	(0.009)	(0.005)	(0.009)	(0.005)	(0.009)	(0.006)	(0.009)	(0.006)
Shopping Malls	0.016*	0.007	0.017**	0.007	0.016*	0.002	0.015	0.002
	(0.009)	(0.005)	(0.009)	(0.005)	(0.009)	(0.007)	(0.009)	(0.007)
Free-standing bar	0.021	-0.022*	0.015	-0.022*	0.021	-0.021*	0.021	-0.021
	(0.020)	(0.012)	(0.015)	(0.012)	(0.029)	(0.014)	(0.029)	(0.013)
Control Programs								
Tobacco control	-0.001	-0.002*	-0.001	-0.002*	-0.001	-0.002*	-0.001	-0.002*
Funding per capita	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Other tobacco	-0.001	-0.003	0.0002	-0.003	-0.002	-0.001	-0.003	-0.001
control funding	(0.006)	(0.002)	(0.006)	(0.002)	(0.007)	(0.002)	(0.007)	(0.002)
Observations	21231	21231	21231	21231	18849	18849	18849	18849

Marginal Effects in the table. Standard errors clustered by states in parentheses, *$0.05 < p \leq 0.1$, **$0.01 < p \leq 0.05$, ***$p \leq 0.01$

Table12- Estimates of Smoking Transition from Intermittent Smoking (Regressive and Progressive Transition)

Dependent variable	**Competing Risk Model**							
Independent variable	**(1) None**	**(2) Daily**	**(3) None**	**(4) Daily**	**(5) None**	**(6) Daily**	**(7) None**	**(8) Daily**
Price (Pt)	0.036***	-0.016	--	--	--	--	0.042*	
	(0.012)	(0.017)	--	--	--	--	(0.022)	
Price change	--	--	0.043***	-0.035*	0.055**	-0**	--	--
(Pt-Pt-1)	--	--	(0.016)	(0.020)	(0.025)	0.000	--	--
Past Price	--	--	--	--	0.026	0	--	--
(Pt-1)	--	--	--	--	(0.026)	0.000	--	--
Future Price	--	--	--	--	-0.012	0	-0.015	0
(Pt+1)	--	--	--	--	(0.025)	0.000	(0.024)	0.000
Consumption at baseline	-0.001***	0.001***	-0.001***	0.001***	-0.001***	0*	-0.0001***	0*
	(0.001)	(0.00001)	(0.000)	(0.000)	(0.000)	0.000	(0.000)	0.000
Minimum Age Laws								
Possession-Use	-0.038	0.060	-0.041	0.059	0.004	0	0.004	0
-Purchase Law:1	(0.037)	(0.043)	(0.038)	(0.042)	(0.052)	0.000	(0.052)	0.000
Possession-Use	0.004	0.021	-0.004	0.024	0.025	0	0.026	0
-Purchase Law:2	(0.020)	(0.041)	(0.021)	(0.040)	(0.038)	0.000	(0.038)	0.000
Possession-Use	0.008	0.036	0.008	0.036	0.023	0	0.021	0
-Purchase Law:3	(0.030)	(0.034)	(0.030)	(0.034)	(0.042)	0.000	(0.042)	0.000
Possession-Use	-0.010	-0.006	-0.007	-0.006	-0.015	0	-0.015	0
-Purchase Law:1*youth	(0.027)	(0.030)	(0.028)	(0.029)	(0.029)	0.000	(0.029)	0.000
Possession-Use	-0.012	-0.030	-0.010	-0.029	-0.021	0	-0.019	0
-Purchase Law:2*youth	(0.019)	(0.028)	(0.019)	(0.027)	(0.019)	0.000	(0.019)	0.000
Possession-Use	0.003	-0.005	0.007	-0.006	0.010	0	0.010	0
-Purchase Law:3*youth	(0.019)	(0.028)	(0.020)	(0.028)	(0.016)	0.000	(0.016)	0.000
Smoke-free Air Laws								
School Level1	-0.059	0.111*	-0.057	0.109*	0.021	0	0.019	0
	(0.043)	(0.059)	(0.043)	(0.058)	(0.077)	0.000	(0.076)	0.000
School Level2	-0.091**	0.073	-0.083*	0.067	-0.029	0	-0.033	0
	(0.045)	(0.078)	(0.044)	(0.077)	(0.083)	0.000	(0.082)	0.000
School Level3	-0.084*	0.073	-0.084*	0.072	-0.015	0	-0.015	0

Table 12_Continued

	(0.049)	(0.066)	(0.048)	(0.065)	(0.081)	0.000	(0.079)	0.000
School Level4	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--
School Level5	-0.096**	0.036	-0.091**	0.033	-0.065	0	-0.068	0
	(0.039)	(0.058)	(0.039)	(0.057)	(0.074)	0.000	(0.073)	0.000
School Level1*enrolled	-0.021	0.018	-0.020	0.017	-0.021	0	-0.022	0
	(0.033)	(0.017)	(0.033)	(0.017)	(0.039)	0.000	(0.038)	0.000
School Level2*enrolled	-0.004	0.015	-0.003	0.016	-0.004	0	-0.004	0
	(0.031)	(0.022)	(0.031)	(0.021)	(0.037)	0.000	(0.036)	0.000
School Level3*enrolled	-0.002	0.013	-0.002	0.012	0.005	0	0.005	0
	(0.036)	(0.021)	(0.036)	(0.021)	(0.042)	0.000	(0.042)	0.000
School Level4*enrolled	-0.016	0.012	-0.021	0.012	-0.033	0	-0.034	0
	(0.035)	(0.018)	(0.035)	(0.018)	(0.039)	0.000	(0.039)	0.000
School Level5*enrolled	-0.011	0.026	-0.013	0.026	0.010	0	0.010	0
	(0.037)	(0.027)	(0.037)	(0.027)	(0.049)	0.000	(0.048)	0.000
Worksite Level1	-0.007	-0.023	-0.006	-0.023	-0.045	0	-0.044	0
	(0.035)	(0.063)	(0.034)	(0.063)	(0.066)	0.000	(0.064)	0.000
Worksite Level2	-0.059	0.040	-0.065	0.045	-0.066	0	-0.056	0
	(0.055)	(0.100)	(0.053)	(0.099)	(0.095)	0.000	(0.092)	0.000
Worksite Level3	0.015	-0.030	0.009	-0.021	-0.006	0	-0.001	0
	(0.045)	(0.077)	(0.045)	(0.014)	(0.076)	0.000	(0.074)	0.000
Worksite Level1	0.011	0.022	0.014	0.021	0.015	0	0.014	0
*employed	(0.018)	(0.014)	(0.019)	(0.014)	(0.020)	0.000	(0.020)	0.000
Worksite Level2	0.030**	-0.007	0.031**	-0.007	0.025*	0	0.025*	0
*employed	(0.014)	(0.016)	(0.014)	(0.016)	(0.013)	0.000	(0.013)	0.000
Worksite Level3	-0.044*	0.030	-0.043*	0.030	-0.031	0	-0.031	0
*employed	(0.025)	(0.028)	(0.025)	(0.028)	(0.029)	0.000	(0.029)	0.000
Public transit	0.015	0.006	0.016*	0.006	-0.007	0	-0.009	0
	(0.010)	(0.017)	(0.009)	(0.017)	(0.016)	0.000	(0.016)	0.000
Healthcare facilities	-0.005	0.039	-0.005	0.038	0.015	0	0.015	0
	(0.022)	(0.030)	(0.022)	(0.030)	(0.025)	0.000	(0.025)	0.000
Recreational facilities	0.011	-0.010	0.011	-0.010	0.013	0	0.013	0

Table 12_Continued

	(0.012)	(0.013)	(0.012)	(0.014)	(0.017)	0.000	(0.016)	0.000
Culture facilities	-0.007	-0.017	-0.012	-0.014	-0.026	0	-0.023	0
	(0.014)	(0.017)	(0.014)	(0.017)	(0.017)	0.000	(0.017)	0.000
Child care centers	-0.014	0.032**	-0.010	0.031**	0.007	0	0.007	0
	(0.013)	(0.015)	(0.013)	(0.015)	(0.020)	0.000	(0.020)	0.000
Restaurants	-0.014	-0.026	-0.012	-0.026	-0.054***	0	-0.055***	0
	(0.014)	(0.027)	(0.013)	(0.026)	(0.019)	0.000	(0.019)	0.000
Shopping Malls	0.017	-0.008	0.019	-0.010	0.034	0	0.032	0
	(0.014)	(0.022)	(0.012)	(0.022)	(0.021)	0.000	(0.021)	0.000
Free-standing bar	0.039	-0.033	0.029	-0.030	0.033	0	0.033	0
	(0.033)	(0.028)	(0.026)	(0.025)	(0.043)	0.000	(0.044)	0.000
Control Programs								
Tobacco control	-0.001	0.001	-0.002	0.001	-0.001	0	-0.001	0
Funding per capita	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)	0.000	(0.002)	0.000
Other tobacco	-0.004	-0.001	-0.001	-0.002	-0.007	0	-0.008	0
control funding	(0.008)	(0.007)	(0.007)	(0.006)	(0.010)	0.000	(0.010)	0.000
Observations	12887	12887	12887	12887	11596	11596	11596	11596

Marginal Effects in the table. Standard errors clustered by states in parentheses, *$0.05 < p \leq 0.1$, **$0.01 < p \leq 0.05$, ***$p \leq 0.01$

Table 13 A Summary of the Effects of Preventions on Smoking Transitions

Intervention	Initiation	Restart	Quit	Heavy → Non-heavy	Daily → Inter	Daily → None	Light → Heavy	Light → None	Inter → Daily	Inter → None	None → Inter	None → Light
Real cigarette price (Pt)			+	+	+	+		+		+		
Price change (Pt-Pt-1)			+	+	+	+		+	–	+		
Past Price (Pt-1)			+	+	+	+		+				
Minimum Age Laws (MAL)												
PUP	-	-		+			–					
Smoke-free Air Laws												
School												
Worksite			+		+		–	+			–	
Public transit					+							
Recreational facilities							–					
Culture facilities	-						–				–	
Child care centers									+			
Restaurants												
Shopping Malls			+					+				
Free-standing bar	–	–					–				–	–
Tobacco control Funding per capita	–						–				–	–
Other tobacco control funding	–											

+ indicates that the intervention significantly increase the smoking transition in the column head; - sign indicates that the intervention significantly decreased the probability of the smoking transition in the column head.

Figure 1

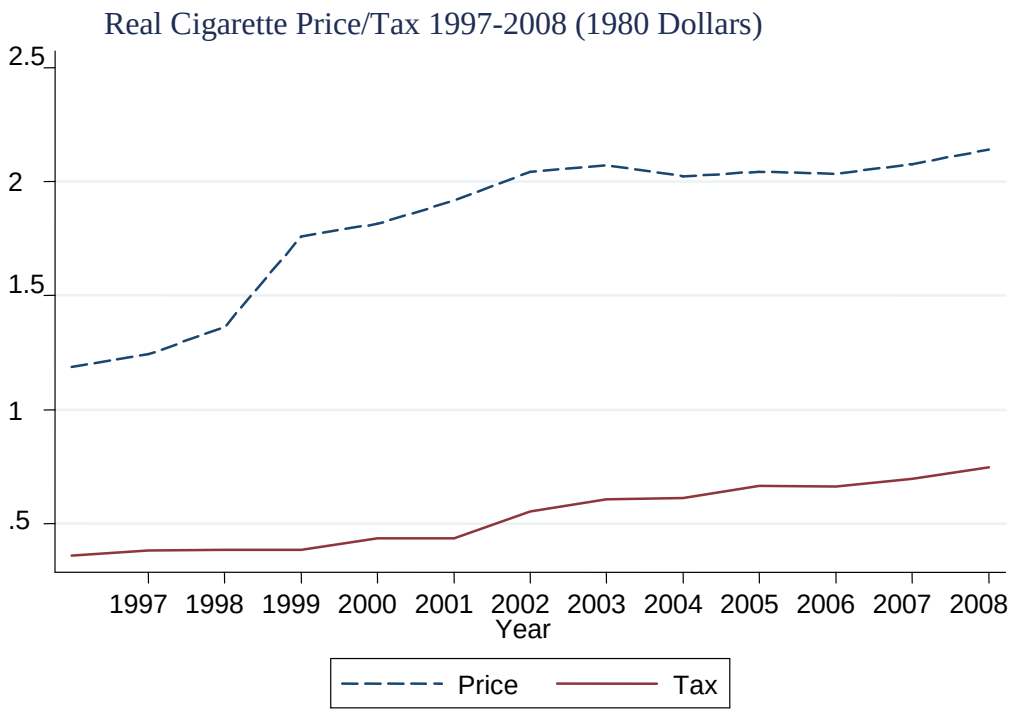


Figure 2

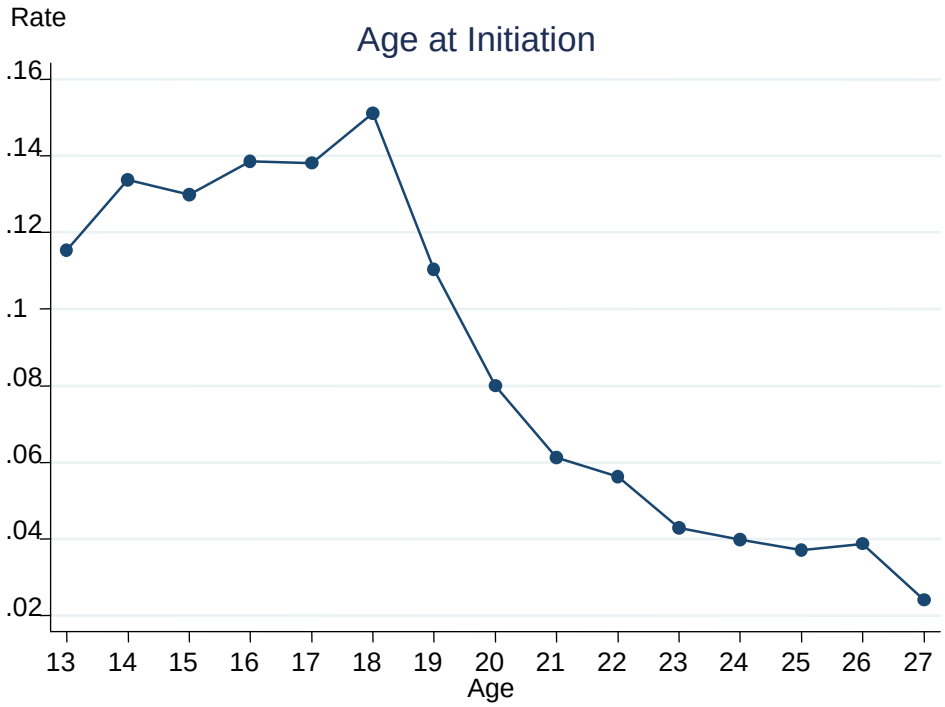


Figure 3a

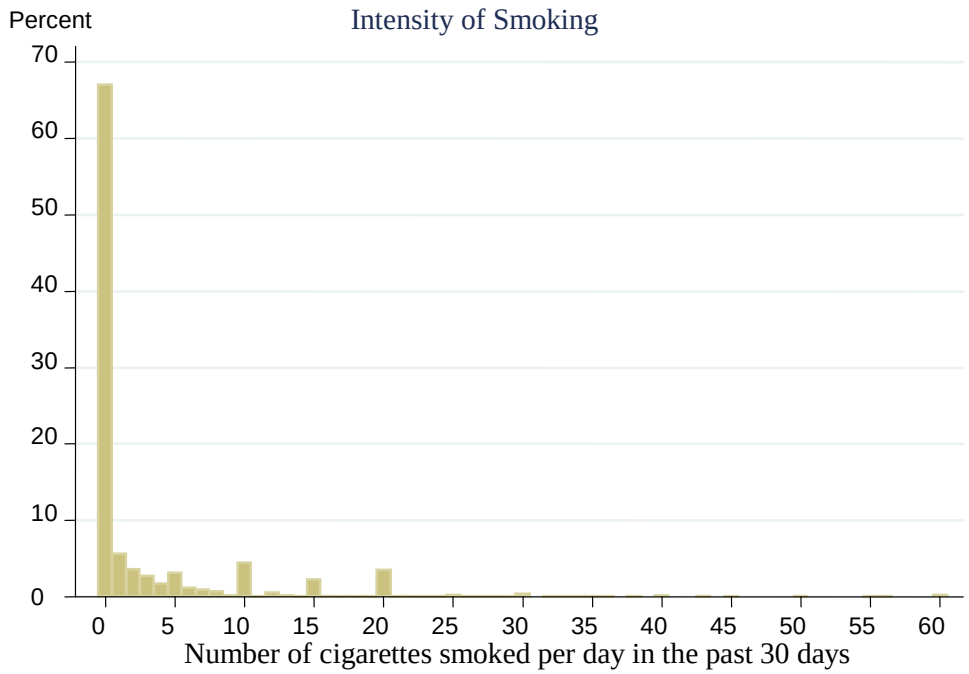


Figure 3b

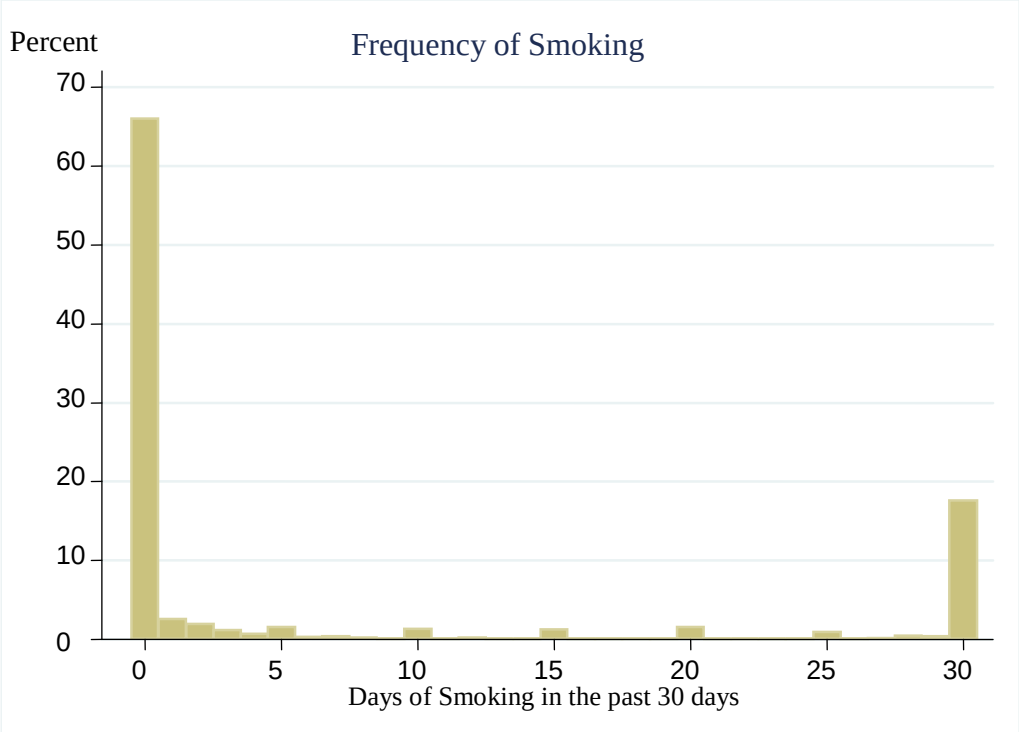


Figure 4a

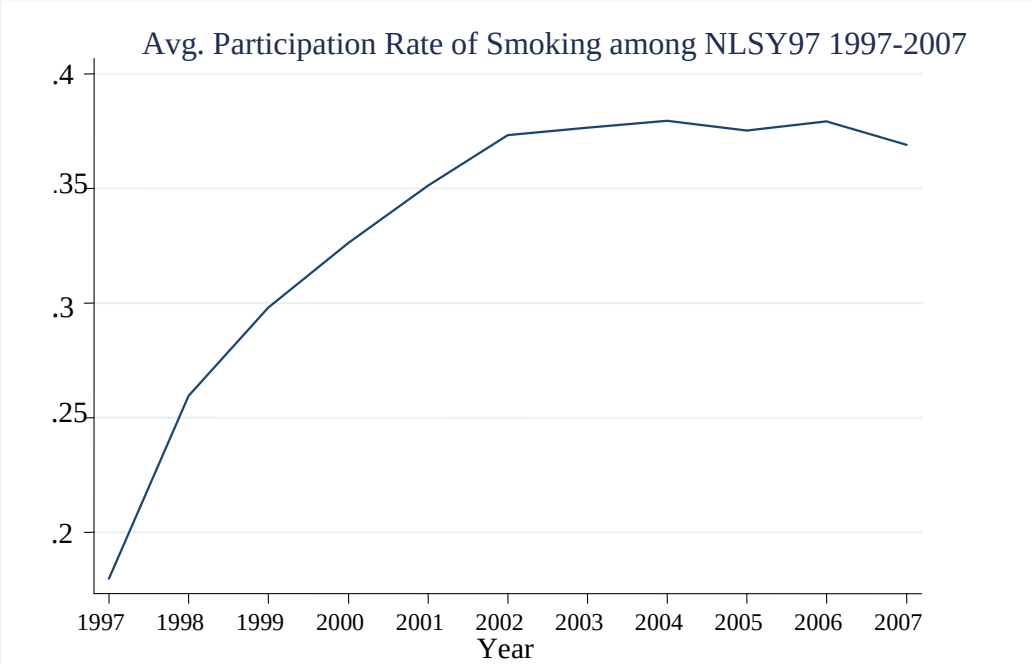


Figure 4b

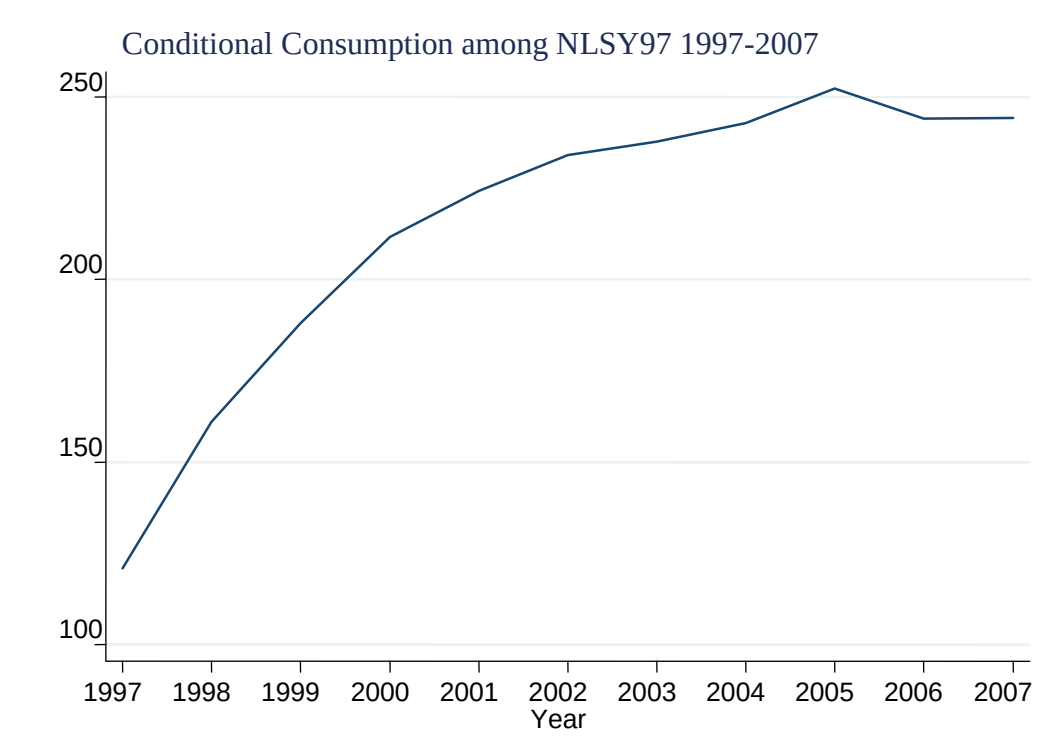


Figure 5a

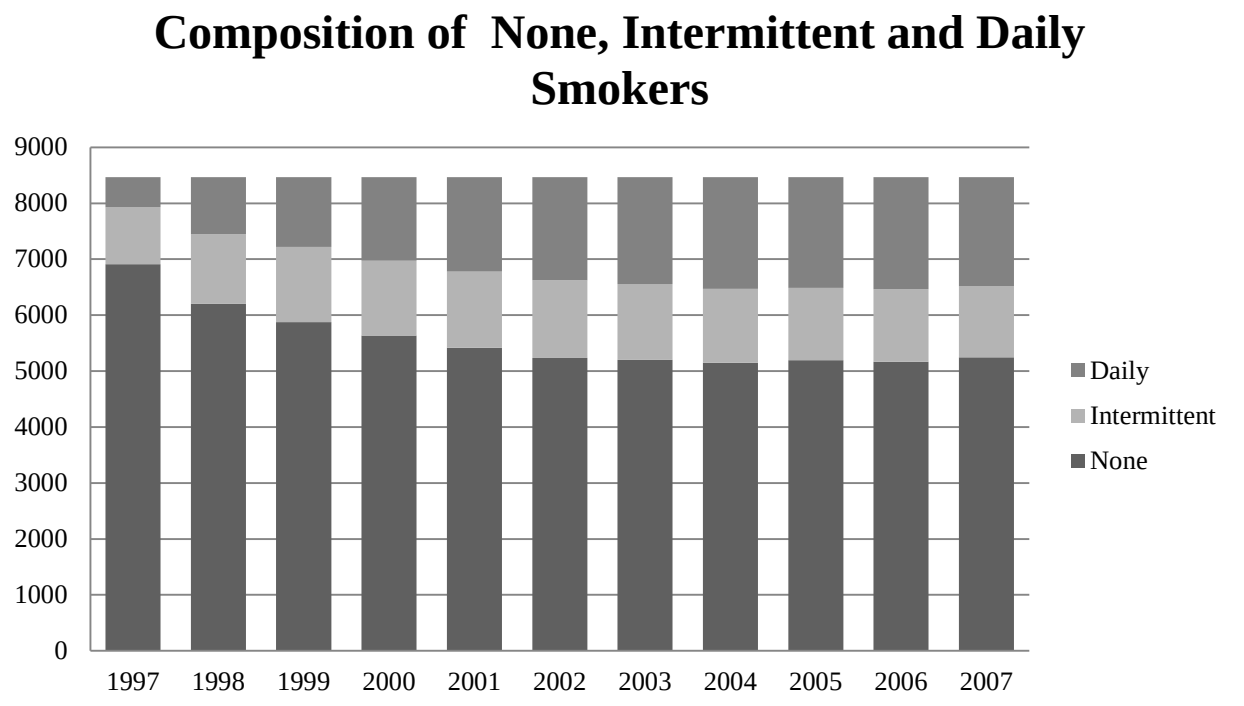


Figure 5b

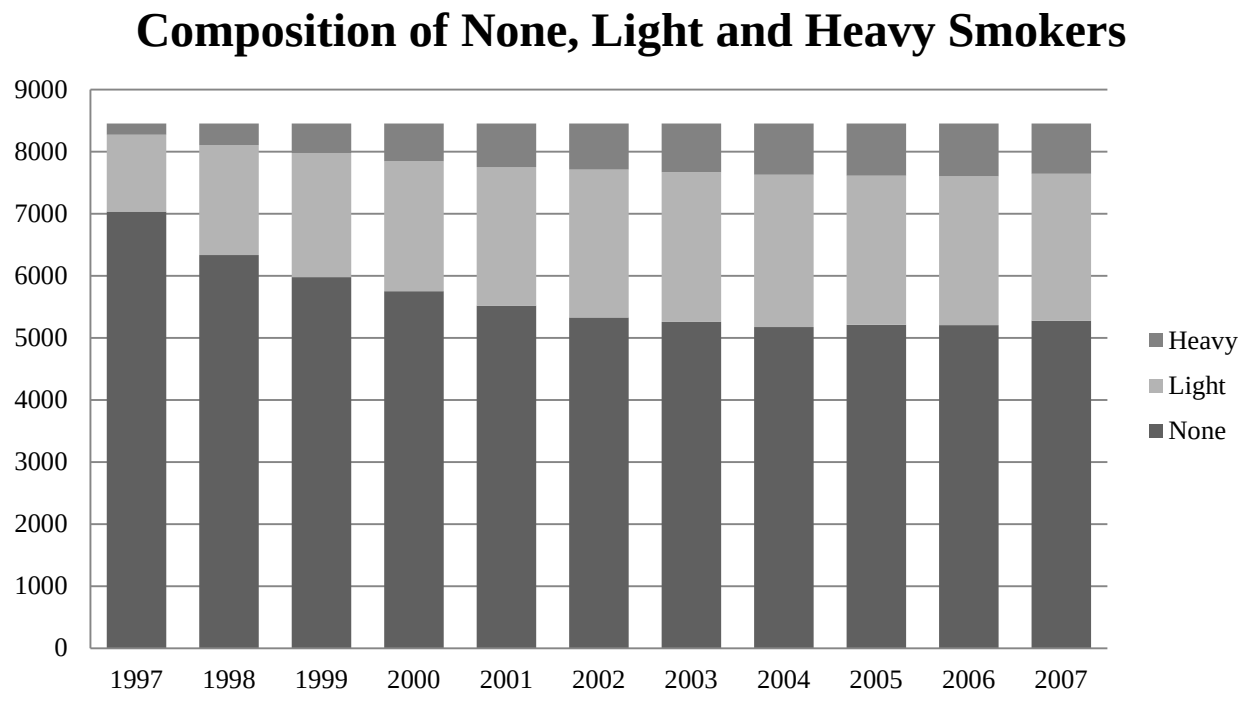


Figure 6

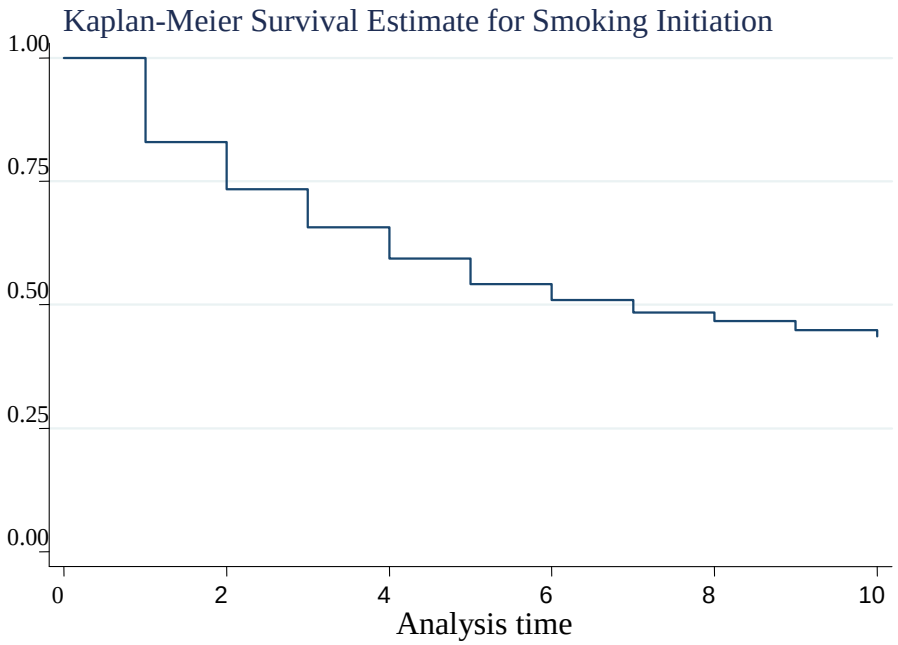


Figure 7

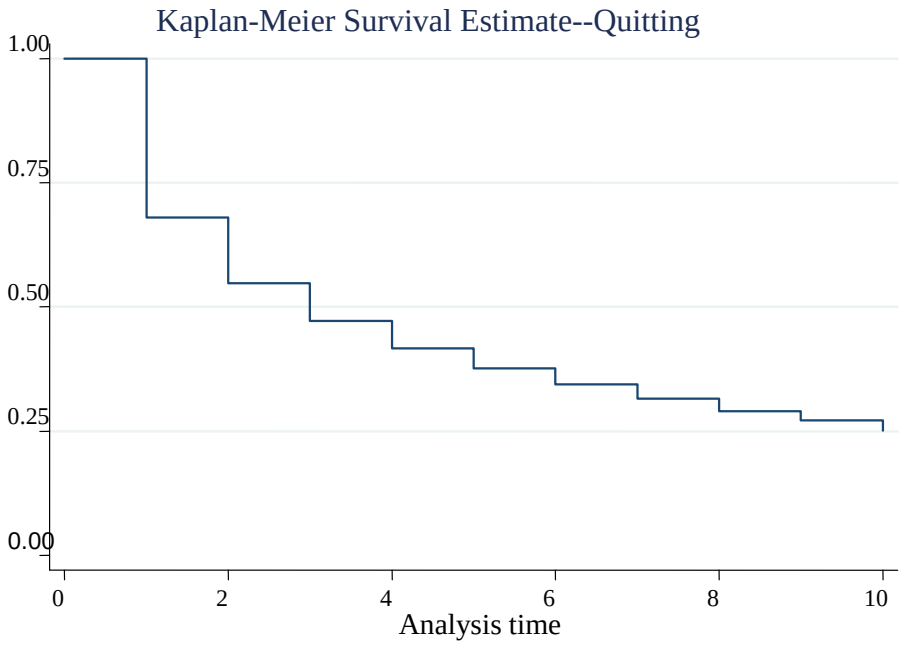
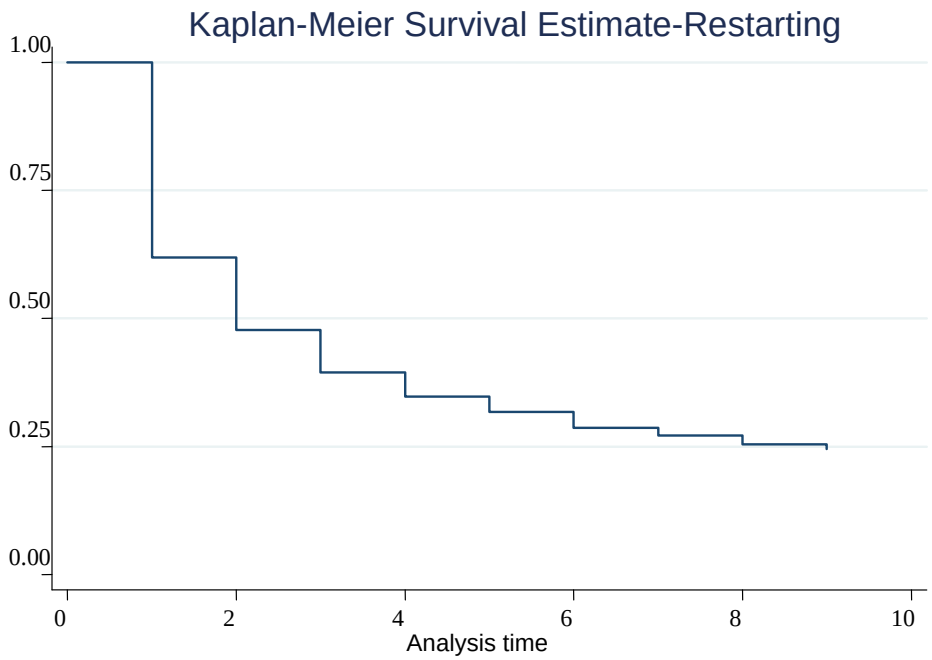


Figure 8



Appendix: Youth Access laws and Smoke-free air law coding scheme:

- STM: Minimum age for sale: The minimum age in years required by state law to purchase tobacco products (possible values: 0 = no minimum age; 16, 17, 18, or 19 years old).
- Possession-Use-Purchase Index: Sum of ‗Minors' possession, use, and purchase prohibited' variables. This index represents the number of possession, use, and/or purchase laws (PUP laws) present for a given state and year (possible values: 0 = no PUP laws; 1 = 1 PUP law present; 2 = 2 PUP laws present; 3 = all 3 PUP laws present).
- **School Coding Scheme**
  - 0 No provision/not meet a restriction
  - 1 Restrict smoking to designated areas
  - 2 Restrict smoking to separately ventilated areas or a ban when children are present with exemptions
  - 3 Ban when children are present (school buildings)

- 4 Ban at all times when children are present (buildings and grounds)
- 5 Ban at all times (buildings and grounds)

- **Location Restriction Decisions in worksites (bars/public transit/restaurants/ shopping malls/health care facilities)**
  - 0 No provision/not meet a restriction
  - 1 Restrict smoking to designated smoking areas (DSAs) or require separate ventilation with exemptions for locations of a certain size (e.g. restaurants with a seating capacity of less than 50)
  - 2 Restrict smoking to separately ventilated areas or a ban with exemptions for certain locations where only a restriction applies
  - 3 Ban at all times
- **Childcare Center Coding Scheme**
  - 0 No provision/not meet a restriction
  - 1 Restrict smoking to designated areas
  - 2 Restrict smoking to separately ventilated areas or a ban when children are present with exemptions
  - 3 Ban when children are present (commercial daycare)
  - 4 Ban at all times when children are present (explicitly including home-based)
  - 5 Ban at all times (explicitly including home-based)
- **Recreational Facilities Coding Scheme***:*
  - 0 No restriction
  - 1 Restricts smoking to DSAs in gyms or arenas
  - 2 Restricts smoking to DSAs in both gyms and arenas
  - 3 Restricts smoking to DSAs in all recreational facilities
  - 4 Bans smoking in gyms or arenas and restricts to DSA(s) in other recreational area(s)
  - 5 Bans smoking at all recreational locations
- **Cultural Facilities Coding Scheme:**
  - 0 No restriction
  - 1 Restricts smoking to DSAs in fewer than 3 cultural areas
  - 2 Restricts smoking to DSAs in 3-5 cultural areas

- 3 Restricts smoking to DSAs in more than 5 cultural areas
- 4 Restricts smoking to DSAs in all cultural facilities
- 5 Bans smoking at all cultural locations

Appendix Table1- Non-addictive Models Exclusive of Policy Variables

Dependent variable	**consumption equation**			**Participation equation**		
Independent variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Cigarette Price (Pt)	-27.37***	-14.01*	-13.12*	-0.031**	-0.008	-0.003
	(9.119)	(8.211)	(6.711)	(0.011)	(0.009)	(0.007)
price elasticity	-0.239***	-0.123*	-0.115*	-0.180**	-0.047	-0.015
	(0.080)	(0.072)	(0.059)	(0.064)	(0.051)	(0.039)
Individual Fixed effects	No	Yes	Yes	No	Yes	Yes
State Fixed effects	Yes	Yes	No	Yes	Yes	No
Observations	28438	28438	28438	86239	86239	86239

Note: Regressions also control for policy variables, socioeconomic variables and demographic variables. +sign indicates significance in one-tailed test.

Appendix Table1B- Non-addictive Models Inclusive of SASS

Dependent variable	**consumption equation**			**Participation equation**		
Independent variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Cigarette Price (Pt)	-34.25***	-16.87*	-14.83*	-0.017+	-0.010+	-0.007+
	(9.151)	(9.491)	(7.700)	(0.012)	(0.006)	(0.006)
price elasticity	-0.300***	-0.148*	-0.130*	-0.100+	-0.055+	-0.064+
	(0.080)	(0.083)	(0.067)	(0.069)	(0.037)	(0.066)
Individual Fixed effects	No	Yes	Yes	No	Yes	Yes
State Fixed effects	Yes	Yes	No	Yes	Yes	No
Observations	28438	28438	28438	86239	86239	86239

Note: Regressions also control for policy variables, socioeconomic variables and demographic variables. +sign indicates significance in one-tailed test.

Appendix Table1C- Estimates of Pooled Sample (Fixed-Effects Model)

Dependent variable	**Consumption (nonsmokers smoke 0 cigarettes)**			
Independent variable	**(1)**	**(2)**	**(3)**	**(4)**
Cigarette Price (Pt)	-8.674**	-7.668**	-8.433**	-7.463**
	(3.950)	(3.450)	(4.158)	(3.613)
price elasticity	-0.224**	-0.198**	-0.217**	-0.191**
	(0.102)	(0.089)	(0.107)	(0.093)
State Fixed effects	Yes	No	Yes	No
SASS	No	Yes	Yes	Yes
Observations	86239	86239	86239	82639

Note: Regressions also control for policy variables, socioeconomic variables and demographic variables. +sign indicates significance in one-tailed test.

Appendix Table1D- Rational Models _ Pooled Sample

Dependent variable	**consumption equation (nonsmokers smoke 0 cigarettes)**							
Independent variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Past Consumption	0.403***	2.732	0.263*	0.414***	0.403***	0.731	0.281*	0.427***
	(0.008)	(3.829)	(0.148)	(0.131)	(0.008)	(1.688)	(0.147)	(0.134)
Future Consumption	0.399**	-1.946	0.353*	0.407***	0.399***	0.240	0.349*	0.391**
	(0.007)	(3.675)	(0.148)	(0.157)	(0.007)	(1.053)	(0.183)	(0.154)
Cigarette Price (Pt)	-4.467**	-24.03	-6.233+	-4.346+	-4.136*	-4.819	-5.782+	-4.152+
	(2.082)	(31.76)	(3.859)	(2.664)	(2.149)	(6.672)	(3.873)	(2.661)
price elasticity	-0.115**	-0.148*	-0.160+	-0.112+	-0.106*	-0.124	-0.149+	-0.107+
	(0.054)	(0.083)	(0.099)	(0.069)	(0.055)	(0.172)	(0.100)	(0.068)
SASS	No	No	No	No	Yes	Yes	Yes	Yes
IV	No	P-1/P+1	Exog	Ex/En	No	P-1/P+1	Exog	Ex/En
Observations	63066	63066	63066	63066	63066	63066	63066	63066

Appendix Table2- Non-addictive Models (Cigarette Tax effect and its elasticity)

Dependent variable	**consumption equation**			**Participation equation**		
Independent variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Cigarette Tax (Tt)	-46.68***	-27.97**	-25.89***	-0.032*	-0.007	-0.018
	(12.216)	(11.39)	(8.536)	(0.018)	(0.008)	(0.015)
tax elasticity	-0.118***	-0.071**	-0.066***	-0.052*	-0.012	-0.030
	(0.031)	(0.029)	(0.022)	(0.029)	(0.013)	(0.025)
Individual Fixed effects	No	Yes	Yes	No	Yes	Yes
State Fixed effects	Yes	Yes	No	Yes	Yes	No
Observations	28438	28438	28438	82639	86239	86239

Note: Regressions also control for policy variables, socioeconomic variables and demographic variables. +sign indicates significance in one-tailed test.

Appendix Table3- The Effects of Tax on Smoking Transitions

Dependent variable	**Initiation**	**Restarting**	**Quit**	**Heavy to none-heavy**		
Cigarette Tax (Tt)	0.004	-0.022	0.027***	0.099***		
	(0.007)	(0.021)	(0.009)	(0.039)		
Dependent variable	**Daily to Intermittent**	**Daily to None**	**Intermittent To None**	**Intermittent To Daily**	**Light to None**	**Light to Heavy**
Cigarette Tax (Tt)	0.019+	0.005+	-0.019	0.022	0.0002	0.020*
	(0.014)	(0.003)	(0.020)	(0.018)	(0.006)	(0.011)

Note: Regressions also control for policy variables, socioeconomic variables and demographic variables, consumption of cigarettes at baseline for smokers, state fixed effects and year fixed effects as column1 of each table for smoking transitions. +sign indicates significance in one-tailed test.

Appendix Table4- First Cigarette Smoking Initiation (Robustness Check)

Dependent variable						
Independent variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Annual Price	-0.008	--	-0.006	-0.010+	--	-0.008
	(0.007)	--	(0.013)	(0.007)	--	(0.012)
Annual Price	--	0.0004	--	--	0.0006	--
Change	--	(0.009)	--	--	(0.009)	--
Annual Future	--	--	-0.006	--	--	-0.0004
Price	--	--	(0.011)	--	--	(0.009)
Annual Past Price	--	--	-0.001	--	--	-0.008
	--	--	(0.009)	--	--	(0.012)
State Fixed effects	No	No	No	No	No	No
SASS	No	No	No	Yes	Yes	Yes
Price	0.001	--	0.004	-0.0002	--	0.003
	(0.005)	--	(0.007)	(0.005)	--	(0.007)
Price Change	--	0.006	--	--	0.006	--
	--	(0.005)	--	--	(0.005)	--
Future Price	--	--	0.003	--	--	0.003
	--	--	(0.006)	--	--	(0.006)
Past Price	--	--	-0.011*	--	--	-0.013*
	--	--	(0.006)	--	--	(0.007)
State Fixed effects	No	No	No	No	No	No
SASS	No	No	No	Yes	Yes	Yes
Annual Price	-0.009+					
	(0.006)					
State Fixed effects	No					
Policies	Yes					
Observations	35486	35486	32838	35486	35486	32838

Note: Regressions also control for year fixed effects, policy variables, socioeconomic variables and demographic variables. +sign indicates significance in one-tailed test.

Appendix Table5- Intermittent Cigarette Smoking Initiation (Robustness Check)

Dependent variable						
Independent variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Annual Price	-0.002	--	-0.005	-0.003	--	-0.005
	(0.002)	--	(0.004)	(0.002)	--	(0.005)
Annual Price	--	-0.001	--	--	-0.001	--
Change	--	(0.001)	--	--	(0.001)	--
Annual Future	--	--	0.003	--	--	0.002
Price	--	--	(0.003)	--	--	(0.003)
Annual Past Price	--	--	-0.001	--	--	-0.002
	--	--	(0.002)	--	--	(0.003)
State Fixed effects	No	No	No	No	No	No
SASS	No	No	No	Yes	Yes	Yes
Price	-0.001	--	-0.001	-0.001	--	-0.001
	(0.001)	--	(0.002)	(0.001)	--	(0.002)
Price Change	--	0.001	--	--	0.001	--
	--	(0.001)	--	--	(0.001)	--
Future Price	--	--	0.002	--	--	0.002
	--	--	(0.002)	--	--	(0.002)
Past Price	--	--	-0.003	--	--	-0.003
	--	--	(0.003)	--	--	(0.003)
State Fixed effects	No	No	No	No	No	No
SASS	No	No	No	Yes	Yes	Yes
Observations	57839	57839	53154	57839	57839	53154

Note: Regressions also control for year fixed effects, policy variables, socioeconomic variables and demographic variables. +sign indicates significance in one-tailed test.

Appendix Table5B- Daily Cigarette Smoking Initiation (Robustness Check)

Dependent variable						
Independent variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Annual Price	-0.001	--	-0.004	-0.001	--	-0.004
	(0.001)	--	(0.004)	(0.002)	--	(0.004)
Annual Price	--	-0.001	--	--	-0.001	--
Change	--	(0.001)	--	--	(0.001)	--
Annual Future	--	--	0.002	--	--	0.002
Price	--	--	(0.002)	--	--	(0.002)
Annual Past Price	--	--	0.0004	--	--	-0.00002
	--	--	(0.002)	--	--	(0.008)
State Fixed effects	No	No	No	No	No	No
SASS	No	No	No	Yes	Yes	Yes
Price	-0.0004	--	-0.0004	-0.001	--	-0.0005
	(0.001)	--	(0.002)	(0.002)	--	(0.002)
Price Change	--	0.0003	--	--	0.0003	--
	--	(0.001)	--	--	(0.001)	--
Future Price	--	--	0.001	--	--	0.001
	--	--	(0.001)	--	--	(0.001)
Past Price	--	--	-0.001	--	--	-0.002
	--	--	(0.002)	--	--	(0.002)
State Fixed effects	No	No	No	No	No	No
SASS	No	No	No	Yes	Yes	Yes
Observations	62211	62211	57010	62211	62211	57010

Note: Regressions also control for year fixed effects, policy variables, socioeconomic variables and demographic variables. +sign indicates significance in one-tailed test.

Appendix Table5C- Five Cigarettes per Day Smoking Initiation (Robustness Check)

Dependent variable						
Independent variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Annual Price	-0.001	--	-0.002	-0.002	--	-0.003
	(0.003)	--	(0.005)	(0.003)	--	(0.005)
Annual Price	--	-0.001	--	--	-0.001	--
Change	--	(0.002)	--	--	(0.002)	--
Annual Future	--	--	0.001	--	--	0.001
Price	--	--	(0.003)	--	--	(0.003)
Annual Past Price	--	--	0.0004	--	--	-0.0004
	--	--	(0.003)	--	--	(0.003)
State Fixed effects	No	No	No	No	No	No
SASS	No	No	No	Yes	Yes	Yes
Price	-0.00002	--	0.004	-0.0002	--	0.004
	(0.002)	--	(0.003)	(0.002)	--	(0.003)
Price Change	--	0.003	--	--	0.003*	--
	--	(0.002)	--	--	(0.002)	--
Future Price	--	--	-0.00004	--	--	0.00003
	--	--	(0.002)	--	--	(0.003)
Past Price	--	--	-0.005*	--	--	-0.006*
	--	--	(0.003)	--	--	(0.003)
State Fixed effects	No	No	No	No	No	No
SASS	No	No	No	Yes	Yes	Yes
Observations	62144	62144	56977	62144	62144	56977

Note: Regressions also control for year fixed effects, policy variables, socioeconomic variables and demographic variables. +sign indicates significance in one-tailed test.

Appendix Table5D- Ten Cigarettes per Day Smoking Initiation (Robustness Check)

Dependent variable						
Independent variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Annual Price	-0.002	--	-0.006	-0.002	--	-0.006
	(0.002)	--	(0.005)	(0.002)	--	(0.005)
Annual Price	--	0.001	--	--	0.001	--
Change	--	(0.002)	--	--	(0.002)	--
Annual Future	--	--	0.005	--	--	0.005
Price	--	--	(0.004)	--	--	(0.004)
Annual Past Price	--	--	-0.003	--	--	-0.003
	--	--	(0.003)	--	--	(0.003)
State Fixed effects	No	No	No	No	No	No
SASS	No	No	No	Yes	Yes	Yes
Price	-0.001	--	-0.003	-0.001	--	-0.003
	(0.001)	--	(0.003)	(0.001)	--	(0.003)
Price Change	--	-0.0001	--	--	-0.0001	--
	--	(0.002)	--	--	(0.002)	--
Future Price	--	--	0.003	--	--	0.003
	--	--	(0.003)	--	--	(0.003)
Past Price	--	--	-0.002	--	--	-0.002
	--	--	(0.003)	--	--	(0.003)
State Fixed effects	No	No	No	No	No	No
SASS	No	No	No	Yes	Yes	Yes
Observations	68172	68172	62219	68172	68172	62219

Note: Regressions also control for year fixed effects, policy variables, socioeconomic variables and demographic variables. +sign indicates significance in one-tailed test.

Appendix Table5E- Fifteen Cigarettes per Day Smoking Initiation (Robustness Check)

Dependent variable						
Independent variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Annual Price	-0.004+	--	-0.012*	-0.005+	--	-0.013*
	(0.003)	--	(0.007)	(0.003)	--	(0.007)
Annual Price	--	-0.003	--	--	-0.003	--
Change	--	(0.006)	--	--	(0.006)	--
Annual Future	--	--	0.006	--	--	0.006
Price	--	--	(0.004)	--	--	(0.004)
Annual Past Price	--	--	0.001	--	--	0.001
	--	--	(0.009)	--	--	(0.008)
State Fixed effects	No	No	No	No	No	No
SASS	No	No	No	Yes	Yes	Yes
Observations	35272	35272	32198	35272	35272	32198
Price	-0.002	--	0.004	-0.0003	--	-0.0004
	(0.002)	--	(0.007)	(0.002)	--	(0.004)
Price Change	--	0.004	--	--	0.004	--
	--	(0.004)	--	--	(0.004)	--
Future Price	--	--	0.005	--	--	0.005
	--	--	(0.003)	--	--	(0.003)
Past Price	--	--	-0.008	--	--	-0.008
	--	--	(0.006)	--	--	(0.006)
State Fixed effects	No	No	No	No	No	No
SASS	No	No	No	Yes	Yes	Yes
Observations	35272	35272	32198	35272	35272	32198

Note: Regressions also control for year fixed effects, policy variables, socioeconomic variables and demographic variables. +sign indicates significance in one-tailed test.

Appendix Table6- Smoking Restarting (Robustness Check)

Dependent variable						
Independent variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Annual Price	-0.028	--	0.014	0.025	--	0.045
	(0.029)	--	(0.042)	(0.019)	--	(0.044)
Annual Price	--	0.025	--	--	0.022	--
Change	--	(0.032)	--	--	(0.030)	--
Annual Future	--	--	-0.002	--	--	-0.006
Price	--	--	(0.041)	--	--	(0.038)
Annual Past Price	--	--	-0.075*	--	--	-0.053
	--	--	(0.038)	--	--	(0.035)
State Fixed effects	Yes	Yes	Yes	No	No	No
SASS	No	No	No	Yes	Yes	Yes
Observation	11159	11159	9399	11170	11170	9408
Price	0.004	--	-0.018	0.004	--	-0.018
	(0.016)	--	(0.031)	(0.015)	--	(0.031)
Price Change	--	-0.037+	--	--	-0.037+	--
	--	(0.024)	--	--	(0.024)	--
Future Price	--	--	-0.011	--	--	-0.011
	--	--	(0.025)	--	--	(0.025)
Past Price	--	--	0.025	--	--	0.025
	--	--	(0.036)	--	--	(0.037)
State Fixed effects	No	No	No	No	No	No
SASS	No	No	No	Yes	Yes	Yes
Observations	11170	11170	9408	11170	11170	9408

Note: Regressions also control for year fixed effects, policy variables, socioeconomic variables and demographic variables. +sign indicates significance in one-tailed test.

Appendix Table7- Transition from Heavy Smoking (Robustness Check)

Dependent variable						
Independent variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Annual Price	0.090+	--	--	0.034+	--	--
	(0.057)	--	--	(0.026)	--	--
Annual Price	--	-0.018	0.026	--	-0.022	-0.015
Change	--	(0.037)	(0.062)	--	(0.036)	(0.050)
Annual Future	--	--	0.035	--	--	0.026
Price	--	--	(0.042)	--	--	(0.037)
Annual Past Price	--	--	0.067	--	--	0.035
	--	--	(0.062)	--	--	(0.042)
State Fixed effects	Yes	Yes	Yes	No	No	No
SASS	No	No	No	Yes	Yes	Yes
Observation	6269	6269	5428	6280	6280	5436
Price	0.066*	--	--	0.058***	--	--
	(0.019)	--	--	(0.019)	--	--
Price Change	--	0.028	0.052	--	0.031	0.052
	--	(0.025)	(0.044)	--	(0.025)	(0.044)
Future Price	--	--	0.019	--	--	0.019
	--	--	(0.029)	--	--	(0.029)
Past Price			0.051+			0.050+
			(0.035)			(0.035)
State Fixed effects	No	No	No	No	No	No
SASS	No	No	No	Yes	Yes	Yes
Observations	6280	6280	5436	6280	6280	5436

Note: Regressions also control for policy variables, socioeconomic variables and demographic variables, consumption of cigarettes at baseline for smokers, year fixed effects. +sign indicates significance in one-tailed test.

Appendix Table1 7B- Smoking Transition from Heavy Smoking _Ten Cigarettes Cut Off (Robustness check)

Dependent variable	**Competing Risk Model**							
Independent variable	**(1) Light**	**(2) None**	**(3) Light**	**(4) None**	**(5) Light**	**(6) None**	**(7) Light**	**(8) None**
Annual Price	0.026+	0.002	--	--	0.013	0.001	--	--
	(0.019)	(0.003)	--	--	(0.014)	(0.001)	--	--
Annual Price change	--	--	0.006	-0.001	--	--	0.008	-0.001
	--	--	(0.015)	(0.001)	--	--	(0.017)	(0.001)
State Fixed effects	Yes	Yes	Yes	Yes	No	No	No	No
SASS	No	No	No	No	Yes	Yes	Yes	Yes
Price	0.024**	0.002	--	--	0.020**	-0.001	--	--
	(0.010)	(0.003)	--	--	(0.009)	(0.002)	--	--
Price change	--	--	0.003	0.001	--	--	0.006	0.001
	--	--	(0.011)	(0.001)	--	--	(0.012)	(0.002)
State Fixed effects	Yes	Yes	Yes	Yes	No	No	No	No
SASS	No	No	No	No	Yes	Yes	Yes	Yes
Observations	10785	10785	10785	10785	10785	10875	10875	10875

Note: Regressions also control for policy variables, socioeconomic variables and demographic variables, consumption of cigarettes at baseline for smokers, year fixed effects. +sign indicates significance in one-tailed test.

Appendix Table8- Smoking Cessation (Robustness Check)

Dependent variable						
Independent variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Annual Price	0.028**	--	--	0.0004	--	--
	(0.012)	--	--	(0.010)	--	--
Annual Price	--	0.005	0.050***	--	0.003	0.031*
Change	--	(0.012)	(0.015)	--	(0.012)	(0.016)
Annual Future	--	--	-0.025*	--	--	-0.025
Price	--	--	(0.014)	--	--	(0.015)
Annual Past Price	--	--	0.056***	--	--	0.029*
	--	--	(0.019)	--	--	(0.017)
State Fixed effects	Yes	Yes	Yes	No	No	No
SASS	No	No	No	Yes	Yes	Yes
Price	0.013**	--	--	0.014***	--	--
	(0.006)	--	--	(0.005)	--	--
Price Change	--	0.024***	0.036***	--	0.024***	0.037***
	--	(0.008)	(0.013)	--	(0.008)	(0.013)
Future Price	--	--	-0.011	--	--	-0.011
	--	--	(0.012)	--	--	(0.012)
Past Price			0.020+			0.022*
			(0.014)			(0.13)
State Fixed effects	No	No	No	No	No	No
SASS	No	No	No	Yes	Yes	Yes
Observations	27162	27162	5436	27162	27162	23975

Note: Regressions also control for policy variables, socioeconomic variables and demographic variables, consumption of cigarettes at baseline for smokers, year fixed effects. +sign indicates significance in one-tailed test.

Appendix Table1 9- Smoking Transition from Intermittent Smoking (Robustness check)

Dependent variable	**Competing Risk Model**							
Independent variable	**(1) None**	**(2) Daily**	**(3) None**	**(4) Daily**	**(5) None**	**(6) Daily**	**(7) None**	**(8) Daily**
Annual Price	0.047+	-0.040+	--	--	-0.012	-0.018	--	--
	(0.033)	(0.026)	--	--	(0.023)	(0.018)	--	--
Annual Price change	--	--			--	--		-
			0.036+	-0.053*			0.028	0.046+
	--	--	(0.027)	(0.028)	--	--	(0.026)	(0.026)
State Fixed effects	Yes	Yes	Yes	Yes	No	No	No	No
SASS	No	No	No	No	Yes	Yes	Yes	Yes
Price	-0.001	-0.010	--	--	0.001	-0.010	--	--
	(0.014)	(0.012)	--	--	(0.013)	(0.012)	--	--
Price change	--	--					0.042***	-
			0.042***	-0.034*	--	--		0.034*
	--	--	(0.015)	(0.020)	--	--	(0.015)	(0.020)
State Fixed effects	No	No	No	No	No	No	No	No
SASS	No	No	No	No	Yes	Yes	Yes	Yes
Observations	12887	12887	12887	12887	12887	12887	12887	12887

Note: Regressions also control for policy variables, socioeconomic variables and demographic variables, consumption of cigarettes at baseline for smokers, year fixed effects. +sign indicates significance in one-tailed test.

Appendix Table1 10- Smoking Transition from Light Smoking (Robustness check)

Dependent variable	**Competing Risk Model**							
Independent variable	**(1) None**	**(2) Heavy**	**(3) None**	**(4) Heavy**	**(5) None**	**(6) Heavy**	**(7) None**	**(8) Heavy**
Annual Price	0.009	0.003	--	--	-0.011	0.0001	--	--
	(0.025)	(0.009)	--	--	(0.015)	(0.007)	--	--
Annual Price change	--	--	-0.002	0.002	--	--	-0.002	0.002
	--	--	(0.018)	(0.008)	--	--	(0.017)	(0.008)
State Fixed effects	Yes	Yes	Yes	Yes	No	No	No	No
SASS	No	No	No	No	Yes	Yes	Yes	Yes
Price	0.006	-0.002	--	--	0.009	-0.001	--	--
	(0.008)	(0.005)	--	--	(0.007)	(0.005)	--	--
Price change	--	--	0.026**	-0.001	--	--	0.026**	-0.002
	--	--	(0.010)	(0.007)	--	--	(0.010)	(0.007)
State Fixed effects	No	No	No	No	No	No	No	No
SASS	No	No	No	No	Yes	Yes	Yes	Yes
Observations	21231	21231	21231	21231	12887	21231	21231	21231

Note: Regressions also control for policy variables, socioeconomic variables and demographic variables, consumption of cigarettes at baseline for smokers, year fixed effects. +sign indicates significance in one-tailed test.

Appendix Table1 10B- Smoking Transition from Light Smoking _Ten Cigarettes Cutoff (Robustness check)

Dependent variable	**Competing Risk Model**							
Independent variable	**(1) None**	**(2) Heavy**	**(3) None**	**(4) Heavy**	**(5) None**	**(6) Heavy**	**(7) None**	**(8) Heavy**
Annual Price	0.024	0.010	--	--	-0.010	0.004	--	--
	(0.032)	(0.013)	--	--	(0.019)	(0.009)	--	--
Annual Price change	--	--	0.015	0.005	--	--	0.012	0.005
	--	--	(0.023)	(0.014)	--	--	(0.020)	(0.014)
State Fixed effects	Yes	Yes	Yes	Yes	No	No	No	No
SASS	No	No	No	No	Yes	Yes	Yes	Yes
Price	0.034***	0.009	--	--	0.010	0.002	--	--
	(0.010)	(0.009)	--	--	(0.009)	(0.006)	--	--
Price change	--	--	0.037***	-0.002	--	--	0.036***	-0.002
	--	--	(0.011)	(0.011)	--	--	(0.011)	(0.011)
State Fixed effects	Yes	Yes	Yes	Yes	No	No	No	No
SASS	No	No	No	No	Yes	Yes	Yes	Yes
Observations	16776	16776	16776	16776	16676	16676	16676	16676

Note: Regressions also control for policy variables, socioeconomic variables and demographic variables, consumption of cigarettes at baseline for smokers, year fixed effects. +sign indicates significance in one-tailed test.

Appendix Table1 11- Smoking Transition from Non-Smoking (Robustness check)

Dependent variable	**Competing Risk Model**							
Independent variable	**(1) Inter**	**(2) Daily**	**(3) Inter**	**(4) Daily**	**(5) Inter**	**(6) Daily**	**(7) Inter**	**(8) Daily**
Annual Price	-0.003	-0.002	--	--	-0.009+	-0.001	--	--
	(0.008)	(0.002)	--	--	(0.006)	(0.001)	--	--
Annual Price change	--	--	-0.013+	0.0004	--	--	-0.016*	0.0004
	--	--	(0.008)	(0.001)	--	--	(0.009)	(0.001)
State Fixed effects	Yes	Yes	Yes	Yes	No	No	No	No
SASS	No	No	No	No	Yes	Yes	Yes	Yes
Price	0.002	-0.0003	--	--	0.001	-0.0003	--	--
	(0.005)	(0.001)	--	--	(0.005)	(0.001)	--	--
Price change	--	--	-0.011**	0.003	--	--	-0.011**	0.0003
	--	--	(0.005)	(0.001)	--	--	(0.005)	(0.001)
State Fixed effects	No	No	No	No	No	No	No	No
SASS	No	No	No	No	Yes	Yes	Yes	Yes
Observations	55786	55786	55786	55786	55786	55786	55786	55786

Note: Regressions also control for policy variables, socioeconomic variables and demographic variables, consumption of cigarettes at baseline for smokers, year fixed effects. +sign indicates significance in one-tailed test.

Appendix Table1 12- Smoking Transition from Non-Smoking (Robustness check)

Dependent variable	**Competing Risk Model**							
Independent variable	**(1) Light**	**(2) Heavy**	**(3) Light**	**(4) Heavy**	**(5) Light**	**(6) Heavy**	**(7) Light**	**(8) Heavy**
Annual Price	-0.012+	--	--	--	-0.011+	--	--	--
	(0.009)	--	--	--	(0.007)	--	--	--
Annual Price change	--	--	-0.010+	--	--	--	-0.011+	--
	--	--	(0.008)	--	--	--	(0.008)	--
State Fixed effects	Yes	Yes	Yes	Yes	No	No	No	No
SASS	No	No	No	No	Yes	Yes	Yes	Yes
Price	0.001	--	--	--	-0.0002	--	--	--
	(0.005)	--	--	--	(0.004)	--	--	--
Price change	--	--	-0.007	---	--	--	-0.007	--
	--	--	(0.006)	--	--	--	(0.006)	--
State Fixed effects	No	No	No	No	No	No	No	No
SASS	No	No	No	No	Yes	Yes	Yes	Yes
Observations	56649	56649	56649	56649	56649	56649	56649	56649

Note: Regressions also control for policy variables, socioeconomic variables and demographic variables, consumption of cigarettes at baseline for smokers, year fixed effects. +sign indicates significance in one-tailed test.

Appendix Table13- Smoking Transition from Daily Smoking (Robustness check)

Dependent variable	**Competing Risk Model**							
Independent variable	**(1) None**	**(2) Inter**	**(3) None**	**(4) Inter**	**(5) None**	**(6) Inter**	**(7) None**	**(8) Inter**
Annual Price	0.003	-0.004	--	--	0.001	0.006	--	--
	(0.003)	(0.014)	--	--	(0.001)	(0.009)	--	--
Annual Price change	--	--	-0.001	0.019	--	--	-0.0003	0.021+
	--	--	(0.002)	(0.018)	--	--	(0.002)	(0.017)
State Fixed effects	Yes	Yes	Yes	Yes	No	No	No	No
SASS	No	No	No	No	Yes	Yes	Yes	Yes
Price	0.003+	0.023***	--	--	0.003+	0.019**	--	--
	(0.002)	(0.009)	--	--	(0.002)	(0.008)	--	--
Price change	--	--	0.002	0.022**	--	--	0.002	0.023**
	--	--	(0.002)	(0.011)	--	--	(0.002)	(0.011)
State Fixed effects	No	No	No	No	No	No	No	No
SASS	No	No	No	No	Yes	Yes	Yes	Yes
Observations	15577	15577	15577	15577	15577	15577	15577	15577

Note: Regressions also control for policy variables, socioeconomic variables and demographic variables, consumption of cigarettes at baseline for smokers, year fixed effects. +sign indicates significance in one-tailed test.

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