



## Smoking initiation among youth: The role of cigarette excise taxes and prices by race/ethnicity and gender

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### ABSTRACT

Existing evidence for the role of cigarette excise taxes and prices as significant determinants of youth smoking initiation is mixed. A few studies have considered the possibility that the impact of cigarette taxes and prices might differ by gender or race/ethnicity. In this paper, we address the role of cigarette taxes and prices on youth smoking initiation using the National Longitudinal Survey of Youth 1997 cohort and discrete-time survival methods. We present results overall and by gender, race/ethnicity, and gender by race/ethnicity. We examine initiation over the age range during which youth are most at risk of initiation and over a period in which substantial changes have occurred in tax and price. The result for cigarette excise taxes is small and mixed across alternative specifications, with the effect strongest for black youth. Cigarette prices are more consistently a significant determinant of youth smoking initiation, especially for black youth.

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### 1. Introduction

Adolescent smoking is of particular interest from both a research and a policy perspective because smoking initiation and early smoking habits are known to have important implications for lifetime smoking. More than 90% of adult smokers started smoking as teens or younger. Few people in their 20s or older choose to start smoking (USDHHS, 1994; Glynn et al., 1993; IOM, 1994). The earlier in life a youth tries a cigarette, the more likely he or she is to become a regular smoker or daily smoker, translating into a greater incidence of negative health effects (IOM, 1994; Lewit et al., 1981). Less than half (46%) of youth who initiate smoking in the 11th grade become regular adult smokers, whereas 67% of youth who initiate smoking in the 6th grade become regular smokers (IOM, 1994). Gruber and Zinman (2001) find that there is an important intertemporal correlation in the decision to smoke. They estimate that between 25% and 50% of the increase in youth smoking seen in the 1990s will persist into adulthood, which will result in an estimated long-run cost to the United States of at least 1.6 million life-years lost.

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Throughout most of the 1990s, youth smoking rates increased despite attempts to reduce them. Nationally, from 1988 to 1996, the incidence of first use of cigarettes increased by 30% and the incidence of daily use increased by 50% among youth aged 12–17. From the late 1990s to approximately 2004, youth smoking rates declined, although recent evidence suggests that this decline has slowed or stopped (Johnston et al., 2005). Despite the declines, a significant number of adolescents continue to experiment with cigarette smoking, and significant numbers of youth continue to smoke on a regular basis. According to the 2007 Monitoring the Future (MTF) survey, 7.2% of 10th grade students and 12.3% of 12th grade students were daily smokers. Also, 2.7% of 10th grade students and 5.7% of 12th grade students smoked half a pack or more of cigarettes per day (Johnston et al., 2008).

Smoking rates differ by gender and race/ethnicity. Youth Risk Behavior Survey (YRBS) data from 2009 show gender differences for smoking initiation: male students (11.8%) were significantly more likely than female students (9.4%) to have smoked a whole cigarette before age 13. This gender difference held for each racial/ethnic group as well. Similarly, Hispanic and white students were more likely than black students to have smoked a whole cigarette before age 13 (12.6%, 10.3%, and 9.1%, respectively) (CDC, 2010). In terms of any current cigarette use (past 30 days), male students (19.8%) were more likely to report use than female students (19.1%), although the difference was not statistically significant. This difference was true for each racial/ethnic group as well, although the difference was only significant for black students. The prevalence of any cur-

rent use was higher among white students (22.5%) than Hispanics (18.0%) and blacks (9.5%). Hispanic students (51.0%) had higher rates of ever having tried a cigarette compared with white (46.1%) and black (43.5%) students. White students (9.5%) had higher rates of frequent smoking than Hispanic (4.2%) and black (2.1%) students. Males (8%) had higher frequent smoking rates than females (6.4%), although this difference is not significant. Within the racial/ethnic subgroups, Hispanic and black males smoked frequently at higher rates than females, but this was not true for white students (CDC, 2010). In terms of quitting, females (54.2%) were more likely than males (48.0%) to report ever having tried to quit. White students (49.9%) were more likely than Hispanic (53.3%) and black (45.2%) students to report ever having tried to quit (CDC, 2010).

From 1991 through 1997, the prevalence of current cigarette smoking increased 80% among black high school students, 34% among Hispanic high school students, and 28% among white high school students. For blacks and Hispanics (blacks especially), this reverses the trend over the period from 1978 through 1995. From 1997 through 2007, the prevalence of current cigarette smoking declined among all high school students, with the greatest decline among female Hispanic students (54.8%) and the lowest among white male students (39.9%). While current cigarette consumption prevalence for black male students declined by 47.2% between 1997 and 2007, this rate declined by only 8.6% from 2001 through 2007. In addition, the smoking prevalence rate among black male students actually increased by 18.4% in 2003 and 6.4% in 2007 (versus the previous report 2 years prior). The fact that the decline in current cigarette consumption rates among black male students slowed, and actually reversed in two reporting years, is a disturbing recent development that warrants attention (CDC, 2008b).

A number of studies have found that cigarette excise taxes and prices have an effect on the prevalence and intensity of smoking among youth (Carpenter and Cook, 2008; Taurus et al., 2005). A number of studies have considered that price responsiveness might vary by characteristics of the youth. For example, Gruber and Zinman (2001) found that older teens are sensitive to price whereas younger teens are not. Emery et al. (2001) found that price was not an important factor in predicting the probability that a respondent was an experimental smoker but was a significant predictor of established smoking. Liang and Chaloupka (2002) found that higher cigarette prices have an increasing effect as an adolescent's level of cigarette consumption increases. These studies are consistent with evidence that adolescents experimenting with smoking do not always buy their own cigarettes but rather obtain them from social sources such as friends (e.g., Emery et al., 1999). If youth are not purchasing their own cigarettes when experimenting with smoking (initiating), then cigarette price may not be a salient factor.

However, not all studies have shown that cigarette taxes or prices affect adolescents who smoke more often or more intensely. Harris and Chan (1999) found that cigarette price varies inversely with age and that among 15- to 17-year-olds the effect of price on smoking some days (i.e., for experimenters) was significantly higher than the effect on smoking every day.

In recent years, researchers have begun to assess the effect of taxes and prices on smoking initiation with mixed results. Douglas and Hariharan (1994) and Douglas (1998) used survival methods to investigate smoking initiation and found no significant price effect. Forster and Jones (2001) and Nicolas (2002) also used survival methods and found a significant effect of tax and price on smoking initiation; however, the magnitude of these effects is relatively small. A recent series of studies by DeCicca et al. (2002, 2008, 2009), using data from the National Education Longitudinal Survey(s) (NELS), has called into the question evidence for the impact of tax and price on youth smoking. DeCicca et al. used a number of

different methods and introduced a measure of state antismoking sentiment as a control for factors likely to affect taxes and youth smoking initiation. DeCicca et al.'s empirical methods included a discrete-time hazard model to focus on smoking initiation, and they found no significant impact of the cigarette excise tax on smoking initiation. In the 2002 study, they controlled for state unobserved heterogeneity using state fixed effects, which eliminated any effect of state excise tax on smoking initiation. In later studies (2008, 2009), they included a measure of state antismoking sentiment to better control for state factors associated with smoking sentiment in each state. In these later studies, DeCicca et al. appear to have defined initiation as going from a nonsmoker in 1992 to a smoker in 2000 using the 2000 tax rate in each state as the policy variable of interest. Once again, they did not find evidence that the tax had an effect on youth smoking.

The impact of price and tobacco control policies also appears to differ by gender and race/ethnicity (see Chaloupka and Pacula, 1999). Chaloupka and Pacula find that significant differences in price responsiveness and sensitivity to tobacco control policies exist by both gender and race/ethnicity. They found that men are much more price responsive than women – the participation elasticity for men being nearly twice as large as that for women – and the smoking rates of young black men are more responsive to price than young white men. Gruber and Zinman (2001) also found that among older teens, blacks were more responsive to price/tax than whites. DeCicca et al. (2000) used data from NELS to examine racial/ethnic differences in the onset of smoking and found some support that higher cigarette prices will reduce smoking among Hispanic and black youth but not among white youth. Cawley et al. (2004) used the NLSY97 to examine the factors, including cigarette prices, on smoking initiation among youth and in particular focused on gender differences. They found that males were more price sensitive than females.

## 2. Methods

### 2.1. Data

The primary data set for this analysis is the National Longitudinal Survey of Youth 1997 cohort (NLSY97). NLSY97 is a nationally representative cross-sectional sample of 8984 adolescents aged 12–17 at baseline (NLSY, 2003). NLSY97 is designed to track a youth's transition from school (adolescence) to the labor market (adulthood) through annual surveys starting in 1997. Survey respondents were between 22 and 26 years old in the ninth wave of the survey, the last round of data used in this analysis. The survey sample includes multiple respondents from the same household in cases where multiple youth per household met age restrictions at baseline. Data from rounds 1 through 9 (1997–2006) of the NLSY97 were used in the analyses.

### 2.2. Measures

#### 2.2.1. Defining event indicator for initiation to smoking from never smoking

The outcome of interest is an event indicator that indicates whether initiation has taken place. Initiation is defined as a transition from being a never smoker to an ever smoker. At the baseline survey, all respondents were asked, "Have you ever smoked a cigarette?" and, if yes, "How old were you when you smoked your first cigarette?" Responses to these questions were used to determine that initiation had taken place and the age at which initiation had taken place for those who initiated at or before baseline. Once a respondent had valid responses to these questions, we used the

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