

Price, Tobacco Control Policies and Youth Smoking

Frank J. Chaloupka
University of Illinois at Chicago
National Bureau of Economic Research
fjc@uic.edu
<http://www.uic.edu/~fjc>

Michael Grossman
City University of New York
National Bureau of Economic Research

Rosalie Pacula
University of San Diego, UIC
National Bureau of Economic Research

Henry Wechsler
Harvard University, School of Public Health

Henry Saffer
Kean University of New Jersey
National Bureau of Economic Research

John Tauras
UIC, University of Michigan

**Funded by the Robert Wood Johnson Foundation and
the Centers for Disease Control and Prevention**

Cigarette Prices and Adult Smoking

- **Overall Cigarette Demand Responsive to Changes in Cigarette Taxes and Prices:**
 - **Price Elasticity of Demand:** the percentage change in consumption resulting from a one percent increase in price
 - **Estimated Price Elasticity of Cigarette Demand:**

Short Run:	-0.3 to -0.5
Prevalence:	-0.1 to -0.2
Long Run:	-0.7 to -0.8
 - **10 percent increase in price reduces duration of smoking by 10 percent**
- **Estimates imply that large cigarette excise tax increases would lead to significant reductions in overall cigarette demand and would lead to sizable increases in cigarette tax revenues**

Youth Smoking and Cigarette Prices

- **Economic theory suggests that youth will be more responsive to changes in price than adults:**
 - **Proportion of disposable income youth spends on cigarettes likely to exceed corresponding portion of adult's income**
 - **Peer influences much more important for young smokers than for adult smokers**
 - **Young smokers less addicted than adult smokers**
 - **Young people tend to discount the future more heavily than adults**

Past Research on Youth/Young Adults

- **Lewit and Coate (1982); Lewit, Coate and Grossman (1981); and Grossman et al. (1983):**
 - **samples of youth (12-17) and young adults (18-25)**
 - **Youth elasticities:**
 - **prevalence: -1.20**
 - **consumption: -0.25**
 - **total: -1.44**
 - **Young adults:**
 - **prevalence: -0.74**
 - **consumption: -0.15**
 - **overall: -0.89**
- **Wasserman et al. (1991)**
 - **youth, ages 12-17**
 - **no significant effects of price on youth smoking; not statistically different from adult demand**
- **Chaloupka (1991)**
 - **young adults, ages 17-24**
 - **no significant effects of price on young adult demand; very myopic behavior**

DATA

- **1992, 1993, 1994 Monitoring the Future Surveys of 8th, 10th, and 12th grade students**
 - **110,717 students, mostly ages 12-18 years**
 - **cigarette smoking:**
 - **indicator for smoking in past 30 days**
 - **average daily cigarette consumption for smokers**
 - **smokeless tobacco use:**
 - **indicator for smokeless tobacco use**
 - **frequency of past month use**
 - **wide variety of socioeconomic and demographic information**
- **Longitudinal data from MTF**
 - **Panels formed from 1976-1993 high school senior surveys**
 - **Followups through 1995**
 - **up to 8 observations on some individuals**
 - **nearly 200,000 observations/almost 50,000 persons**
 - **mostly ages 18-32 years**
- **1993 Harvard College Alcohol Survey**
 - **16,000+ students in 140 4-year colleges and universities**
 - **cigarette smoking:**
 - **indicator of smoking in past 30 days**
 - **average daily cigarette consumption by smokers**
 - **wide variety of socioeconomic and demographic data**
 - **some information on school characteristics**

DATA

- **Tobacco Prices and Taxes**
 - **Tobacco Institute**
 - **state-level weighted average price per pack of 20 cigarettes**
 - **state cigarette and smokeless tobacco tax rates**
 - **American Chamber of Commerce Researchers' Association**
 - **city-level price per carton for Winston king-sized**
- **Tobacco Control Policies**
 - **Coalition on Smoking OR Health**
 - **variety of state tobacco related policies**
 - **NCI/ANR**
 - **local tobacco control policies**

DATA

- **Downey and Gardiner (1996) - 1994 only**
 - **State implementation of Synar amendment**
 - **indicator of preemption**
 - **indicator of statewide vs. local activity**
 - **indicator of stings vs. observation**
 - **indicators of vending machine policy/enforcement**
 - **over the counter compliance rates**
 - **vending machine compliance rates**

ESTIMATION

- **Cragg's Two-Part Model:**
 - **Probit estimates of smoking/smokeless tobacco use prevalence equations**
 - **Least squares estimates of conditional cigarette demand and frequency of smokeless tobacco use**
- **Ordered probit estimates for categorical measures of use**
- **Multiple model specifications**
 - **multicollinearity vs. omitted variables bias**
- **Full vs. Restricted Samples to account for potential cross-border shopping**
- **Subsamples defined by race and gender**
- **Longitudinal analysis:**
 - **individual, state, and year fixed effects models**

RESULTS

- **Cigarette Prices:**
 - **Negative and significant effects in nearly all equations for youth and young adult samples**
 - **Estimated price elasticities of demand:**
 - **Youth:**
 - **Smoking prevalence: -0.675**
 - **Conditional demand: -0.638**
 - **Total: -1.313**
 - **Young Adults (college students):**
 - **Smoking prevalence: -0.53**
 - **Conditional demand: -0.58**
 - **Total: -1.11**
 - **Longitudinal sample:**
 - **Smoking prevalence: -0.122**
 - **Conditional demand: -0.661**
 - **Total: -0.783**
 - **Some evidence of border crossing in response to interstate price differentials**
 - **Significant differences by race and gender**
 - **Young males smokeless tobacco demand also responsive to price of smokeless tobacco products**

ESTIMATES

- **Simulated effects of proposed price increases on youth smoking prevalence and on premature smoking-related mortality for current 0-17 cohort:**
 - **CDC estimated that over 16 million youth in the 0-17 cohort in 1995 would become regular smokers and that 32% would die prematurely from smoking related illnesses (over 5.3 million)**
 - **Alternative price increases:**
 - **63 cent industry initiated price increase (original settlement agreement)**
 - **12 percent reduction in overall demand**
 - **20 percent reduction in youth smoking prevalence**
 - **1.1m fewer premature deaths in 0-17 cohort**
 - **\$650m decline in federal revenues**
 - **McCain - \$1.10 over five years**
 - **20 percent reduction in overall demand**
 - **about 1/3 reduction in youth prevalence**
 - **1.7m fewer premature deaths**
 - **\$19.5b increase in federal revenues**
 - **Kennedy, Conrad, Harkin and others - \$1.50 over 2-3 years**
 - **30 percent reduction in overall demand**
 - **about 50 percent reduction in youth prevalence**
 - **2.5m fewer premature deaths**
 - **\$22.5b increase in federal revenues**
 - **IOM, public health groups - \$2.00 immediately**
 - **40 percent reduction in overall demand**
 - **about 2/3 reduction in youth prevalence**
 - **3.6m fewer premature deaths**
 - **\$25b increase in federal revenues**

RESULTS:

- **Smoking Restrictions:**
 - **Strong limits on smoking in public places/private worksites significantly reduce the probability of youth and young adult smoking**
 - **Daily cigarette consumption by youth smokers reduced by restrictions on smoking in schools**
 - **Daily cigarette consumption by college students also reduced by restrictions on smoking in other public places (i.e. shopping malls...)**
 - **For youth, estimate that strong comprehensive restrictions would lead to about a 3-4 percent reduction in youth smoking prevalence**

RESULTS

- **Limits on Youth Access to Tobacco:**
 - **generally insignificant effects of:**
 - **minimum legal purchase ages**
 - **signage requirements**
 - **restrictions on vending machine sales**
 - **limits on distribution of free samples**
 - **tobacco licensing requirements**
 - **some weak evidence that comprehensive approach to limiting youth access (combination of policies above) reduces youth smoking**
 - **likely due to weak enforcement**
- **Enforcement of Limits on Youth Access:**
 - **Some evidence that comprehensive statewide approach that's aggressively enforced and that achieves high compliance rates significantly reduces youth smoking prevalence**
 - **Estimate that an ideal implementation of Synar amendment could reduce youth smoking prevalence by about 18 percent**
 - **based on very early data; more recent/better data needed for more careful analysis**

RESULTS

- **Other Tobacco Related Policies:**
 - **Cigarette Tax Earmarking:**
 - **Strong negative and significant impact on both smoking prevalence and cigarette consumption by smokers**
 - **Smoker protection legislation:**
 - **little impact on youth smoking prevalence**
 - **positive effect on cigarette consumption by young smokers**
 - **Preemption:**
 - **significant, positive impact on both measures of youth smoking**
- **Tobacco Control and Other Substance Use**
 - **Consistent evidence of complementary relationship between cigarette smoking and marijuana use; higher cigarette prices reduce both cigarette smoking and marijuana use**

SUMMARY

- **Youth and young adult smoking very sensitive to price**
 - **Large price increases single most effective policy in reducing youth smoking**
 - **Consistent with new qualitative evidence from CDC's network of prevention research centers**
- **Other tobacco control policies significantly reduce youth smoking, although magnitude of effects is relatively small**
- **Plans for further research**