

**The Effect of Cigarette Taxes on Youth Smoking Participation: Evidence from
TABS**

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July 2010

JEL classification: I180; H710

Key words: cigarette tax; tobacco control; smoking; youth substance use

Abstract

In volume 27, issue 2 of this journal, Christopher Carpenter and Philip J. Cook (C&C) used data from the Youth Risk Behavior Surveys to estimate the effect of state cigarette taxes on youth smoking. They found that, controlling for state fixed effects, recent increases in state cigarette taxes were associated with reductions in smoking participation and frequent smoking. Drawing on data from the Teenage Attitudes and Behavior Study (TABS), a heretofore underutilized source of data, we reexamine the relationship between state cigarette taxes and youth smoking. Our findings suggest a negative relationship between cigarette taxes and smoking among older TABS respondents.

1. Introduction

Using data on high school students from the 1991-2005 national Youth Risk Behavior Surveys (YRBS), Carpenter and Cook (2008) found that, controlling for state fixed effects, a one-dollar increase in state cigarette taxes was associated with a 9-20 percent decrease in youth smoking participation and a 18-30 percent reduction in frequent smoking (defined as having smoked on at least 20 of the past 30 days). These estimates are in contrast with those of earlier studies by DeCicca et al. (2002, 2005) that indicated youth smoking was unresponsive to changes in cigarette excise taxes.¹

In this comment we examine the relationship between state cigarette taxes and youth smoking in the Teenage Attitudes and Behavior Study (TABS), a heretofore underutilized source of data. From 1999 to 2007, Research International conducted telephone interviews of adolescents ages 11 through 17. The interviews were designed to produce nationally representative data that could be used by policymakers and researchers interested in underage tobacco use and its correlates. They were administered to approximately 20,000 respondents per year, or approximately 1,667 per month. Because cigarette tax increases were larger in the 2000s than during the mid-to-late 1990s, we are able to observe and exploit larger within-state changes in cigarette taxes over time than have most previous studies.

Using the TABS data on 11- through 17-year-olds and controlling for state fixed effects, a one-dollar increase in state cigarette taxes is associated with relatively small, imprecisely estimated, reductions in smoking participation. However, our estimates of the relationship between cigarette taxes and frequent/heavy smoking are much closer in

¹ See also DeCicca et al. (2008) who found evidence that higher cigarette taxes may induce young smokers to quit by early adulthood.

magnitude to those found by Carpenter and Cook (hereafter C&C). We conclude that TABS may be a useful source of information on smoking trends and behavior for the years 1999 through 2007, a period when many states instituted large increases in cigarette excise taxes.

2. Data, Empirical Model, and Measures

As noted above, our data source is the Teenage Attitudes and Behavior Study (TABS). TABS was conducted by Research International, a market research company, at the behest of the Youth Smoking Prevention Department of Phillips-Morris USA. The TABS interviews were administered by phone. Lists of potential phone numbers were generated every month based on all active area codes and prefixes within one of 15 regions across the contiguous United States. Telephone numbers from each list were selected via random digit dialing, and every month from February 1999 through December 2007 information on approximately 1,667 respondents, ages 11 through 17, was collected.² The TABS survey was designed to produce nationally representative data that could be used by policymakers and researchers interested in understanding and curbing underage tobacco use.³

We begin by estimating a standard linear probability model (LPM) of the form:

² There was an attempt to remove all business and cell phone numbers from these lists. In addition, so as not to interview the same respondent twice within a single twelve-month period, phone numbers on the lists were compared with those of respondents who had completed the TABS survey. Interviews were conducted every day of the week throughout the year except during major holidays such as Thanksgiving and Christmas and the period immediately surrounding the “Great American Smoke Out.”

³ For more information on the TABS study design and methodology see *Teenage Attitudes and Behavior Study (TABS): 2007 Results*, available at: <http://www2.pmusa.com/en/yssp/tabs/about/faqs.asp?navId=a3>

$$(1) \text{ Smoke}_{ist} = \beta_0 + \beta_1' X_{ist} + \beta_2' Z_{st} + \beta_3 \text{Cigarette Tax}_{st} + v_s + w_t + \varepsilon_{ist},$$

where Smoke_{ist} is equal to one if individual i smoked (for instance, at least once during the past 30 days, or 20 of the past 30 days). The vector X_{ist} includes indicators for race, ethnicity, gender, grade, and age, and the vector Z_{st} includes controls for the unemployment rate in state s at time t , as well as indicators for clean air indoor laws in venues frequented by students.⁴ Finally, v_s is a vector of state fixed effects, w_t is a vector of year fixed effects, and the variable $\text{Cigarette Tax}_{st}$ is equal to the excise tax on a pack of cigarettes in 2005 dollars.⁵ These are the independent variables used by C&C in their preferred specification.

Table 1 presents means of our outcome variables and selected independent variables for the full sample of 11- through 17-year-olds and by age group. In addition, Table 1 presents means from the national YRBS reproduced from C&C (p. 292).

Nine percent of the TABS respondents reported smoking at least once during the 30 days prior to being interviewed, and 3.2 percent smoked at least 20 of the past 30 days. These figures are much lower than what C&C found in the national YRBS. However, it should be kept in mind that smoking participation among American youth has declined since the 1990s and the TABS data do not cover the years 1991-1998. In addition, the TABS respondents were, on average, 2.2 years younger than the YRBS respondents examined by C&C (whose mean age was 16.1). Restricting the TABS

⁴ Information on clean air indoor laws was provided by C&C and was originally coded by the Robert Wood Johnson's ImpacTeen program. It is available at: <http://www.impactteen.org/tobaccodata.htm>.

⁵ Information on state cigarette taxes was obtained from *The Tax Burden on Tobacco: Historical Compilation*, available from Orzechowski and Walker (2008).

sample to 16- and 17- year-olds produces participation and frequent smoking estimates are much closer to those found by C&C in the national YRBS.

Two and a half percent of TABS respondents were daily smokers, defined as having smoked every day for the past 30 days. Approximately two percent of TABS respondents reported smoking an average of a half a pack per day or more (defined as consuming at least 300 cigarettes in the last 30 days). These outcomes were not examined by C&C, but allow us to test the hypothesis that recent increases in cigarette taxes impacted the likelihood of what might be termed heavy smoking.

3. Results

Table 2 presents estimates of β_3 using data from TABS. In the full sample, a one-dollar increase in the per-pack state cigarette tax is associated with a (statistically insignificant) 4.4 percent (0.004/0.090) decrease in the probability of having smoked at least once in the past 30 days, and a 15.6 percent (0.005/0.032) decrease in the probability of having smoked 20 of the past 30 days. These estimates are a bit smaller in absolute magnitude than those found by C&C. A one-dollar increase in the cigarette tax is also associated with a 20.0 percent (0.005/0.025) decrease in the probability of having smoked every day, and a 22 percent (0.004/0.018) decrease in the probability of having smoked at least a half pack per day.

When the sample is split by age, we find evidence that the estimated relationship between cigarette taxes and smoking is strongest among 16- and 17-year-olds. Specifically, a one-dollar increase in the cigarette tax is associated with a (statistically insignificant) 5.8 percent (0.011/0.189) decrease in the probability that older respondents

smoked at least once in the past 30 days, a 14.0 percent (0.012/0.086) decrease in the probability that they smoked at least 20 of the past 30 days, a 19.4 percent (0.013/0.067) decrease in the probability that they smoked every day, and a 21.1 percent (0.012/0.057) decrease in the probability that they smoked at least a half a pack per day. The estimated marginal probabilities are quite a bit smaller for younger TABS respondents and statistically significant in only one out of 8 regressions.

In Table 3 we explore the sensitivity of these estimates to controlling for anti-smoking sentiment at the state level. The anti-smoking sentiment control was created by DeCicca et al. (2008) using the Tobacco Use Supplements of the Current Population Survey (CPS).⁶ Even controlling for anti-smoking sentiment, the estimated marginal probabilities are of comparable magnitude to those reported in Table 2 (although the estimated effect of taxes on frequent smoking is no longer statistically significant at conventional levels). This pattern of results suggests that anti-smoking sentiment is not driving the negative relationship between state cigarette taxes and smoking among older TABS respondents.

Conclusion

In this comment we examine the relationship between state cigarette taxes and youth smoking in TABS. These data cover the years 1999 through 2007, a period during which many states instituted large increases in cigarette excise taxes. Controlling for state fixed effects, the estimated effect of cigarette taxes on smoking participation,

⁶ The anti-smoking sentiment variable was provided to us by DeCicca et al. (2008). CPS respondents were asked about their views on the promotion and advertising of tobacco products, policies that restrict smoking on public or private property, and whether they permit smoking in their homes. DeCicca et al. (2008) used the answers to these questions to produce a measure of anti-smoking sentiment at the state level.

although negative, is small and not statistically significant. However, there is stronger evidence that cigarette tax increases affected frequent/heavy smoking. Older teens (those who were either 16 or 17 years of age when interviewed) appear to have been the most responsive.

Specifically, we find that, among 16- and 17-year-olds, a one-dollar increase in cigarette taxes is associated with a 12.8 to 14.0 percent decrease in frequent smoking. Although smaller than the semi-elasticities found by C&C, our estimates suggest that older teens were, at least on the intensive margin, responsive to changes in cigarette excise taxes during the period 1999 through 2007. We conclude that TABS, although overlooked by previous researchers, may be a useful source of information on smoking trends and behavior for the years 1999 through 2007.

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Table 1. Means from TABS and the National YRBS

	<i>TABS</i> (1999-2007)				<i>YRBS</i> (1991-2005)
	Full Sample	Ages 11-13	Ages 14-15	Ages 16-17	
Participation (smoked ≥ 1 past 30 days)	.090	.025	.100	.189	0.29
Frequent Smoker (smoked ≥ 20 past 30 days)	.032	.004	.028	.086	0.13
Smoked Every Day	.025	.003	.021	.067	---
Smoked ½ pack per Day	.018	.0014	.015	.057	---
State Cigarette Tax (2005 \$s)	.709	.709	.709	.709	0.52
Black	.122	.123	.123	.121	0.13
Hispanic	.166	.175	.163	.156	0.13
Other Race	.067	.071	.064	.067	0.07
Grade 9	.162	.027	.458	.035	0.26
Grade 10	.146	.0042	.296	.215	0.25
Grade 11	.125	.0026	.033	.456	0.24
Grade 12	.072	.0009	.004	.282	0.24
Age	13.925	12.057	14.492	16.462	16.1
n	172,841	76,564	53,284	42,993	101,633

Table 2. The Effect of Cigarette Taxes on Youth Smoking: Evidence from the Teenage Attitudes and Behavior Study (TABS).

	<i>Participation</i>	<i>Frequent Smoking</i>	<i>Smoked Every Day</i>	<i>Smoked ½ Pack Per Day</i>
Full Sample n = 172,841	-.004 (.003)	-.005** (.002)	-.005*** (.002)	-.004** (.001)
Ages 11-13 n = 76,564	.001 (.003)	.0004 (.001)	.0001 (.001)	.001 (.001)
Ages 14-15 n = 53,284	-.006 (.006)	-.006 (.004)	-.007** (.003)	-.003 (.003)
Ages 16-17 n = 42,993	-.011 (.008)	-.012** (.006)	-.013*** (.005)	-.012** (.005)

*significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent.

Note: Marginal probabilities from separate linear probability models are reported. The standard errors, in parentheses, are corrected for clustering at the state-level. Controls include grade, age, race, ethnicity, sex, the state unemployment rate, indicators for clean indoor air laws, state effects, and year effects.

Table 3. The Effect of Cigarette Taxes on Youth Smoking: Controlling for State Anti-Smoking Sentiment

	<i>Participation</i>	<i>Frequent Smoking</i>	<i>Smoked Every Day</i>	<i>Smoked ½ Pack Per Day</i>
Full Sample n = 172,841	-.003 (.0028)	-.004** (.002)	-.005*** (.002)	-.003** (.001)
Ages 11-13 n = 76,564	.002 (.003)	.001 (.001)	-.0001 (.001)	.090 (.009)
Ages 14-15 n = 53,284	-.005 (.006)	-.005 (.006)	-.008** (.003)	-.003 (.003)
Ages 16-17 n = 42,993	-.008 (.009)	-.011 (.007)	-.012** (.005)	-.010** (.005)

*significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent.

Note: Marginal probabilities from separate linear probability models are reported. The standard errors, in parentheses, are corrected for clustering at the state-level. Controls include grade, age, race, ethnicity, sex, the state unemployment rate, indicators for clean indoor air laws, state effects, year effects, and state anti-smoking sentiment.