

YOUTH SMOKING UPTAKE PROGRESS: PRICE AND PUBLIC POLICY EFFECTS

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INTRODUCTION

The increases in smoking prevalence among U.S. youth during the 1990's [CDC, 1995, 1996, 1997, 1998] attracted significant attention among public health officials. This unfavorable trend and the growing evidence on the addictive nature of cigarette smoking [USDHHS, 1988] made youth the primary focus for numerous tobacco control programs.

Several nationally representative surveys indicate that the age by which adolescents become regular smokers has markedly decreased over the past 50 years [Johnson et al., 1999]. Smoking initiation usually occurs during the high school ages and the cigarette uptake process is mostly completed before the age of 21. Because youth typically underestimate the health consequences of smoking and the risk of nicotine addiction [USDHHS, 1994; Johnson et al., 2001; Kessler, 1995], there exists an externality calling for a government intervention. Since a smoker in the early stages of the uptake process may be less addicted to cigarettes, he may be more responsive to smoking prevention programs. Therefore, these programs may be the most effective in reducing long run smoking prevalence when targeted at young experimenters.

Smoking prevention campaigns, however, had so far limited success in keeping adolescents from smoking initiation [Pierce et al., 1998, Ch. 5]. Their impacts are often not clear and economic evaluations have produced conflicting results. One of the reasons is that most studies examine current smoking, usually defined as having a cigarette in the last 30 days. This measure cannot capture complex smoking behavior, particularly at its developing stage, and it is not a good predictor of who will enter adulthood as an addicted smoker [Pierce, 1995].

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The application of social cognitive theory helps to explain the process of smoking uptake. It stipulates that future performance of the behavior, in our case smoking initiation, is affected by cognitions about the behavior [Ajzen and Fishbein, 1980]. Specifically, determination to smoke in the future increases the probability of future smoking [Bandura, 1986]. The empirical results support the theory: an intention to smoke was found to be positively related to the switch from experimenting to regular smoking, as well as from non-smoking to experimenting [Chassin et al., 1984]. This implies that a person who thinks s/he will smoke in the future is in the higher stage of the smoking uptake process compared to a person who do not have that intention. Research also showed that it is mainly the lack of intention to smoke that predicts future non-smoking status. Those who are uncertain about their future smoking behavior have a probability of future smoking equal to those with positive smoking intentions [McNeill et al., 1989].

According to the self-efficacy theory, future behavior is determined by a person's expectation about that behavior [Bandura, 1998]. Applied to smoking, this theory links beliefs about the ability to refuse a cigarette offered by a friend to lower probability of future smoking. This belief, together with future smoking intentions, was identified as the only two cognitions significantly predicting progress on the smoking uptake continuum [Sussman et al., 1987]. In addition, past smoking behavior has impact on both of these cognitions [Choi et al., 2001]. This suggests that the combination of future smoking intentions, the ability to refuse a cigarette under social pressure, and past smoking experience can determine the stages of the smoking uptake process.

There are several stages of the smoking uptake and it may take an adolescent several years to convert from a never smoker to an established smoker [USDHHS, 1994]. The three major transitions are the one from never smoker to puffer, the one from puffer to experimental smoker, and the one from experimental to established smoker. There are no uniform definitions of a puffer or an experimental smoker. An established smoker is usually defined as a person who has consumed over 100 cigarettes in his/her lifetime. Such an individual meets many of the criteria specified by the American Psychiatric Association for addiction and is therefore assumed to be addicted to nicotine [Pierce et al., 1998, Ch. 3].

Economic studies typically fail to distinguish between different stages of smoking uptake because they assume that the only difference between established smokers and experimenters is the quantity of consumed cigarettes. However, it can be expected that price and other public policies will have varying effects on individuals at different stages of smoking uptake. To obtain sensible feedback on the effectiveness of a preventive intervention, it is necessary to assess their impact on youth stratified by stages of smoking uptake.

This paper addresses the gaps in knowledge about the impact of tobacco control policies on youth smoking uptake by examining the differential effects of cigarette prices, clean indoor air laws, youth access laws, and other socio-economic factors on smoking uptake among U.S. high school students.

PREVIOUS RESEARCH

Even though most cross-sectional studies of teen smoking participation find price to negatively affect both smoking prevalence and smoking intensity, results with respect to smoking onset are still conflicting. The literature analyzing the process of smoking initiation (and also smoking cessation) is rather scattered due to a scarcity of high quality data (preferably longitudinal, nationally representative data), much of which became available only in the last decade.

Chaloupka and Grossman [1996] employed two-part methods to examine cigarette smoking among high school students participating in the 1992 - 1994 Monitoring the Future surveys. A smoker in this study was determined by smoking a cigarette in a month preceding the survey, and characterized by the number of cigarettes consumed during that period. Smoking by younger persons was found very responsive to cigarette prices with an overall price elasticity of demand -1.313 . The study further concluded that only strong smoking restrictions could reduce smoking prevalence, but limits on youth access to tobacco did not have an effect on cigarette demand.

Gruber [2000] estimated a state fixed effect model with a time trend employing data from both the Monitoring the Future surveys (1991 - 1997) and the Youth Risk Behavior Surveys (1991 - 1997). He defined a smoker in a way similar to that of Chaloupka and Grossman [1996] and found that older teens (17 - 18 years old) are relatively more responsive to price (price elasticity of smoking prevalence -0.67) than younger teens (13 - 16 years old), whom he found not to be price sensitive at all. However, the author did not address the issue of smoking uptake or social versus commercial sources of cigarettes for these different age groups. The study did not find smoking restrictions to significantly affect youth cigarette demand, but youth access restrictions were associated with a reduced quantity of cigarettes smoked by smokers.

The definition of a smoker in both of these studies failed to recognize the stages of the smoking uptake process. Douglas and Hariharan [1994] addressed this issue using retrospective data from the 1978 and 1979 Smoking Supplements to the National Health Interview Survey. Using a split population duration model under the rational addiction framework, the study found that cigarette prices are not a significant determinant of youth smoking initiation. Nevertheless, this study was not without limitations. The authors admitted that the results might be biased towards zero because of errors-in-variables problem inherent both in the cigarette price data (matching problem) and in the retrospective data on smoking initiation.

DeCicca et al., [2002] used the 1988 National Education Longitudinal Surveys to estimate ordered probability models and discrete time hazard models of smoking onset. They found insignificant effects of state taxes on the smoking onset of high school students. However, taxes were measured only in three different time points within a state reducing their variation. The same model estimated without state fixed effects found a negative and significant effect of price on smoking initiation. The results of this study apply only to regular smokers, not to experimenters or occasional smokers.

Choi et al. [2001] studied the implication of the social cognitive and the self-efficacy theories for smoking onset using two longitudinal datasets (Teenage Attitudes and Practices Survey and California Tobacco Survey). The study classified never smokers

in two basic categories, “susceptible never smokers” with high-risk cognition, and “committed never smokers” with low-risk cognition. Further, it identified various levels of smoking experience: puffers (experimented with cigarette, but did not smoke a whole cigarette), experimenters (already smoked a cigarette, but did not smoke 100 cigarettes), and established smokers (smoked at least 100 cigarettes in life). The level of risk was determined according to the intention to smoke in the future and the ability to refuse a cigarette offered by a friend. Only those who were certain about their ability to refuse a cigarette from a friend and did not intend to smoke in the future were classified as low-risk individuals. The authors confirmed that high-risk cognition individuals had a higher probability of becoming established smokers than low-risk cognition individuals. In addition, they showed that past smoking experience modifies the behavior of individuals with high-risk cognitions: high-risk cognitions increased the probability of future smoking within each level of previous smoking experience over low-risk cognitions. The probability of becoming future established smoker ranged from 5.6% for low-risk cognition never smokers to 83% for high-risk cognition current established smokers.

Emery et al. [2001] is among the few economic studies that recognized different stages of the youth smoking experience. The authors used a two-part model to study the price responsiveness among teens in different stages of smoking uptake using the 1993 Teenage Attitudes and Practices Survey (TAPS). The study concluded that cigarette prices do not have a significant effect on smoking experimentation, but both current and established smokers were price responsive (total price elasticity was -1.70 and -2.24, respectively). The authors suggested that the non-responsiveness of experimenters to cigarette prices is caused by an access to non-commercial cigarette sources.

To summarize, the issue of whether price can affect smoking uptake or smoking initiation is not fully resolved in the economic literature. This study contributes to the ongoing debate on this issue. It also examines whether those at the final stages of smoking uptake are more price responsive than those at the beginning stage. It contributes to the existing literature by providing the first estimates of the effects of various public policies on adolescents in different stages of smoking uptake.

DATA AND METHODS

The cross-sectional data on individuals attending 202 US high schools in 1996 were collected for the project “The Study of Smoking and Tobacco Use Among Young People” funded by the Robert Wood Johnson Foundation. Half of the schools were randomly selected with probability proportional to the counties’ population and to the number of students enrolled in grades 9 through 12. Three supplementary schools’ samples were drawn from areas heavily populated by African-Americans, by Hispanics, and from high poverty areas. All students enrolled in the randomly selected classes in these schools constituted the respondents’ sample¹.

The conceptual framework based on the cognition and the self-efficacy theories, and further developed in Choi et al. [2001], was applied to classify respondents into five distinct categories of the smoking uptake progress. The uptake categories were defined according to the answer to two sets of questions, which identify precursors to future smoking behavior.

The first question set described the respondent's actual smoking behavior: Have you ever smoked a cigarette?; Have you ever tried or experimented with cigarette smoking even a few puffs?; Have you smoked at least 100 cigarettes in your life?; On how many days in the last 30 did you smoke?

The second set of questions addressed only those who did not smoke a cigarette in the last 30 days before the survey to study their level of cognition risk. It identified intentions and expectations with respect to smoking, thus assessing the probability of future smoking: If one of your best friends were to offer you a cigarette, would you smoke it?; At any time during the next year do you think you will smoke a cigarette?

A respondent falls into the first stage of smoking uptake if he/she: never smoked a whole cigarette, never experimented with smoking, definitely will not smoke next year and definitely would not smoke a cigarette offered by a friend. This is a low risk cognition non-smoker.

The second stage of smoking uptake was assigned to those who: never smoked a whole cigarette, never experimented with smoking, but were not certain about their smoking status next year or about their ability to refuse a cigarette offered by a friend; or never smoked a whole cigarette, experimented with smoking, definitely will not smoke next year, and definitely would not smoke a cigarette offered by a friend. These respondents are high-risk cognition non-smokers or low-risk cognition puffers.

The third stage of smoking uptake was defined as: never smoked a whole cigarette, experimented with smoking, but is not certain about his/her smoking status next year or about his/her ability to refuse a cigarette offered by a friend; or smoked a whole cigarette, has not smoked 100 cigarettes, has not smoked in last 30 days, definitely will not smoke next year, and definitely would not smoke a cigarette offered by a friend. These respondents are high-risk cognition puffers or low-risk cognition experimenters.

The fourth stage of smoking uptake included those who: smoked a whole cigarette, have not smoked 100 cigarettes, have not smoked in last 30 days, but were not certain about their smoking status next year or about their ability to refuse a cigarette offered by a friend; or smoked in last 30 days, and have not smoked 100 cigarettes in their life. These respondents are high-risk cognition experimenters or low-risk cognition established smokers.

Respondents who smoked at least 100 cigarettes are considered addicted/established smokers and belong to the fifth stage of smoking uptake. Students who would belong to this category but did not smoke last month, did not have intentions to smoke next year and were not susceptible to a cigarette offer by a friend were dropped from the sample.

Some assumptions were made with respect to those individuals who did not answer all relevant questions, in order to retain the highest possible number of observations. It was possible to classify 16,558 out of 17,287 survey participants to one of the uptake stage categories. About one quarter of the students are in the first stage of smoking uptake, but over forty percent of them belong to the two highest uptake stages. Disregarding the youngest age group (13 years old), which represents only 0.5% of the sample, the risk of smoking uptake increases with age.

Numerous variables describing socio-economic status were created from the survey. They represent the respondent's age, racial/ethnic background, religiosity, house-

hold arrangement (living with parents, with others or alone), income, labor force participation, urban status, parents' marital status, parental education, and parents' working status.

To evaluate the differential effect of price and other tobacco control policies on escalating uptake stages, the survey data were merged with a measure of state cigarette prices [Tobacco Institute, 1997] and a set of public policy indicators. The cigarette price is the weighted state average of a single pack, carton, and vending machine prices, including state excise taxes. It is a comprehensive price measure, but it does not represent youth or local specific price. Therefore, another price measure was constructed from the survey based on the question: "How much does a pack of cigarettes cost in your area?" However, the answer may reflect the smoking status of a respondent, creating a potentially endogenous price variable. Replacing the direct answer by its average for each high school partly alleviates the problem. Ross and Chaloupka [2003] provide detailed justification for selecting these two price measures.

Tobacco control policy variables were matched to the survey based on each respondent's school location. Even though these policies may capture local sentiment towards smoking, they can be important determinants of youth smoking uptake. Their presence in the model will also reduce a possible price coefficient bias if state average prices are correlated with state anti-smoking sentiment. Smoking restrictions are represented by a Clean Indoor Air (CIA) index capturing the existence of local or state smoking restrictions in private workplaces, restaurants, shopping areas, and in other places. Youth access laws are controlled for by the level of compliance with these laws because the literature suggests the importance of effective enforcement [DiFranza et al., 1992]. The compliance rate is defined as a percentage of the unsuccessful purchasing attempts in a situation when law prohibits the sale.

The study further controls for the existence of state preemption laws that prevent local authorities from adopting more stringent local tobacco ordinances than the state law, for cross-border shopping incentives (captured by the price difference between the state of residence and a lower price in a neighboring state if it can be reached within 25 miles or less), and for the level of sentiment towards tobacco by including dichotomous indicators representing the six top tobacco producing states (Kentucky, North Carolina, Tennessee, South Carolina, Georgia, and Virginia), one state with a positive (Nevada), and one state with a negative (Idaho) attitude towards smoking.

The impact of independent variables on youth smoking uptake was assessed by applying the generalized ordered logit model. This method relaxes the assumption of the standard ordinal regression analysis that the explanatory variables have equal effects across the stages of smoking uptake. Therefore, the results consists of four sets of coefficients, each set being a result of a cumulative binary logit model specified for the five consecutive categories of smoking uptake. The assumptions of the generalized ordered logit with respect to differential effects of explanatory variables across the stages of smoking uptake were tested by the pair-wise Wald tests. The resulting chi-square statistics were significant at conventional levels, suggesting that the use of the generalized version of the ordered logit model is appropriate in this case. The model was estimated using the STATA statistical software [Fu, 1998]. All standard errors were adjusted for clustering at the school level by using Huber/White estimator, which corrects for within-cluster dependence.

RESULTS

Results for the primary variables of interest are summarized in Table 1. The first part of the table presents coefficients from the model using the state average price; the second part of the table shows coefficients based on the model using the average price perceived by students. All results are statistically significant according to a 5% or a 10% two-tailed test criterion, with the exception of the odds ratios for the Clean Indoor Air laws index.

TABLE 1
Effect Of Variables Of Interest On Smoking Uptake

Variable of interest	Be in stage 2, 3, 4 or 5	Be in stage 3, 4 or 5	Be in stage 4 or 5	Be in stage stage 5
MODEL WITH STATE AVERAGE PRICE				
State average price	-0.383** (0.143)	-0.387** (0.137)	-0.400** (0.138)	-0.478** (0.183)
Compliance Rate	-0.878** (0.262)	-0.821** (0.266)	-0.913** (0.248)	-1.118** (0.298)
100% CIA laws	-0.001 (0.041)	-0.012 (0.039)	0.008 (0.040)	-0.041 (0.053)
Preemption	0.208** (0.080)	0.228** (0.074)	0.225** (0.070)	0.278** (0.097)
Cross-Border Prices	0.005* (0.003)	0.005* (0.003)	0.005** (0.002)	0.006** (0.002)
MODEL WITH AVERAGE PERCEIVED PRICE				
Av. perceived price	-0.336** (0.106)	-0.354** (0.100)	-0.367** (0.107)	-0.457** (0.162)
Compliance Rate	-0.880** (0.257)	-0.821** (0.263)	-0.925** (0.250)	-1.147** (0.312)
100% CIA laws	-0.006 (0.040)	-0.017 (0.038)	0.003 (0.038)	-0.045 (0.050)
Preemption	0.172** (0.078)	0.194** (0.071)	0.189** (0.066)	0.243** (0.096)
Cross-Border Prices	0.009** (0.004)	0.008** (0.004)	0.009** (0.003)	0.009** (0.004)

Notes: Coefficients are corrected for within-cluster dependence. The numbers in parentheses represent robust standard errors. Results in the form of odd ratios can be provided upon request.

* Result is significantly different from 1.0 (P<0.10) based on two-tailed test

** Result is significantly different from 1.0 (P<0.05) based on two-tailed test

Higher cigarette prices reduce the probability of being in a higher stage of smoking uptake, independent of the price measure employed in the model². The magnitude of impact is quite similar for both price measures, with the average state price having a slightly larger effect. The price effect is more pronounced in later stages of smoking uptake. This suggests that the further students are in their smoking uptake progress the more they are sensitive to cigarette prices.

The compliance with youth access laws reduced the probability of being in a higher stage of smoking uptake. Because the impact is larger for those who are in later stages, it confirms the hypothesis that social sources of cigarettes are more important in earlier stages of smoking uptake. When consumption reaches a certain limit, a consumer moves to higher uptake stages and retail sources become much more im-

portant. Therefore, adolescents who are closer to completion of their smoking uptake are primarily affected by retailers' compliance with youth access laws.

Even though the effect of smoking restrictions (measured by the CIA index) on uptake progress is mostly negative, the results are not statistically significant. The significance slightly improved when the index included only 100% restrictions, but it still does not reach the conventional level. Because the performance of the other variables of interest was not substantially altered when the two different CIA indices were used, we present only results based on the model using the 100% CIA in Table 1. The results from the other model are available upon request.

Preemption of local tobacco regulations by state law and the "smuggling" incentives are associated with greater probability of being in higher stages of the smoking uptake. However, preempting local anti-tobacco laws does not exhibit a clear pattern when moving across uptake stages, and cross-border incentives have very little differential impact.

Controlling for the state sentiment towards tobacco consumption did not substantially affect the results. Despite being from a tobacco growing state, high school students from Tennessee and Virginia are less likely to move to a higher stage of smoking uptake. The same results were obtained for respondents living in Idaho. Living in Nevada significantly increases the probability of being in a higher uptake stage, and living in Georgia significantly increases the probability of being in the last stage of the smoking uptake (see Table 2).

A few of the socio-demographic variables exhibit statistically significant and consistent effects on progress between uptake stages. Being Black, Asian, or regularly attending religious services is associated with lower uptake stages. Having divorced or separated parents or a deceased father will increase the probability of being in a higher stage of smoking uptake. Higher income and more working hours also increase this probability. Some socio-demographic variables are significant only for the switch to the highest uptake categories that may be associated with a nicotine addiction. Higher age and living alone increase the probability of completing smoking uptake; participating even infrequently in religious services and/or being Hispanic decrease this probability. The complete results for all socio-demographic variables are presented in Table 2. Because the results with respect to the socio-economic and demographic status did not differ with the price measure used in the model, only results based on the state average price model are shown.

DISCUSSION

The study found that cigarette prices were negatively related to being further on the smoking uptake continuum. The analysis further suggests that higher prices have an increasing impact on youth who are further along in the smoking uptake process. These differential effects of price can be expected because experimental smokers and regular smokers often get cigarettes from different sources. At early stages of smoking uptake, cigarettes may be obtained from friends or from other social sources, and are rarely paid for. These consumers may not respond as strongly to the price incen-

tives as those in the subsequent stages of smoking uptake, when their cigarette consumption is beyond the point of everyday borrowing. As the progress to higher uptake stages will be associated with a larger share of a person's budget to be spent on tobacco, economic theory predicts higher price sensitivity. Our results confirm this prediction. Yet, they are based on the assumption that price is an exogenous determinant of smoking uptake. If the level of smoking uptake affects cigarette prices (e.g., through social norms having an impact on the strength of tobacco control measures such as the level of cigarette taxes), the estimated price effect is biased upwards.

Compliance with youth access laws significantly reduces the progress to higher uptake stages having the largest impact on those being further on the uptake continuum (i.e., more addicted). This is an important result, because there is very little consensus among tobacco control researchers regarding the efficacy of youth access restrictions. The difficulty of measuring the existence of these laws and their active enforcement is often cited as an obstacle. This study assesses the compliance with the laws, which reflects both law existence and its active enforcement. Nevertheless, the negative impact of youth access laws have to be interpreted with caution for two reasons. First, all tobacco control policies are potentially endogenous. If anti-tobacco social norms cause respondents to be in lower stages of smoking uptake and at the same time increase compliance of local vendors with youth access laws, the policy effects will be overstated. The potential bias is partially controlled for by including other tobacco control policies and a set of dummy variables for tobacco growing states. Second, there were differences in sampling methods and inspection protocols between states when they evaluated their compliance rates, which can introduce an error in measuring the variable. This error may bias the coefficients in a direction opposite to endogeneity bias.

The presence of smoking restrictions is associated with being at a lower stage of smoking uptake, but the effect is not statistically significant. This result contrasts those of Wakefield et al. [2000], which analyzed the same data and found the negative effect of these policies to be significant. There are several reasons why the our results are different. First, we measure the Clean Indoor Air laws differently using a more commonly applied five-point index while the previous study used a three-point index. Second, unlike the model of Wakefield et al., this model controls for cigarette prices and other tobacco related policies. If cigarette prices and Clean Indoor Air policies are positively correlated, then the effect of CIA policies in Wakefield et al. is overestimated. In addition, it is possible that the effect of CIA laws in both studies is underestimated, because they are not measured with enough precision. This is particularly true for policies at local levels, the existence of which is poorly recorded. However, both studies found the largest effect of Clean Indoor Air laws in the highest stages of smoking uptake.

The analysis suffers from several limitations. First, we used cross-sectional data to address a dynamic process of smoking uptake. Longitudinal data tracking youth for an extended period would better suit this analysis and document the transition of respondents stratified by their initial uptake stage. Second, there is no information on the duration of various policies, and it is possible that their effect is changing over time.

TABLE 2
EFFECT OF SOCIO-ECONOMIC VARIABLES ON SMOKING UPTAKE

Socio-economic Variable	Be in stage 2, 3, 4 or 5	Be in stage 3, 4 or 5	Be in stage 4 or 5	Be in stage 5
Age	-0.015 (0.020)	0.007 (0.019)	-0.002 (0.019)	0.100** (0.024)
Male	-0.003 (0.064)	0.011 (0.062)	0.027 (0.071)	0.008 (0.102)
Hispanic	0.127* (0.070)	0.075 (0.066)	-0.098 (0.062)	-0.729** (0.085)
Asian	-0.421** (0.096)	-0.513** (0.085)	-0.520** (0.095)	-0.745** (0.123)
Other Race	-0.029 (0.081)	0.005 (0.076)	-0.073 (0.076)	-0.362** (0.104)
Live with Others	0.234** (0.099)	0.082 (0.084)	0.012 (0.078)	0.043 (0.105)
Live Alone	-0.030 (0.253)	0.160 (0.227)	0.492** (0.209)	0.872** (0.242)
Infrequent Religious Services	0.066 (0.054)	-0.001 (0.052)	-0.016 (0.049)	-0.148** (0.054)
Infrequent Religious Services	0.066 (0.054)	-0.001 (0.052)	-0.016 (0.049)	-0.148** (0.054)
Frequent Religious Services	-0.369** (0.057)	-0.383** (0.052)	-0.365** (0.056)	-0.655** (0.061)
Parents Never Married	0.233** (0.090)	0.238** (0.078)	0.086 (0.075)	0.234** (0.111)
Parents Separated	0.354** (0.074)	0.295** (0.069)	0.192** (0.073)	0.249** (0.088)
Parents Divorced	0.384** (0.051)	0.340** (0.045)	0.252** (0.046)	0.444** (0.052)
Both Parents Deceased	0.128 (0.310)	-0.027 (0.291)	0.107 (0.285)	-0.146 (0.434)
Father Deceased	0.292** (0.100)	0.310** (0.091)	0.196* (0.104)	0.401** (0.126)
Mother Deceased	0.299 (0.189)	0.209 (0.177)	0.203 (0.167)	0.376** (0.183)
Father Completed High School	-0.062 (0.069)	-0.024 (0.061)	-0.071 (0.062)	-0.020 (0.080)
Father Has Some College	-0.127* (0.077)	-0.114* (0.064)	-0.099 (0.069)	-0.120 (0.084)
Father Completed College	-0.069 (0.079)	-0.076 (0.070)	-0.057 (0.072)	-0.101 (0.092)
Father More than College	-0.115 (0.097)	-0.102 (0.094)	-0.019 (0.084)	-0.086 (0.098)
Mother Completed High School	-0.068 (0.070)	-0.025 (0.063)	0.055 (0.065)	0.170** (0.080)
Mother Has Some College	-0.029 (0.082)	-0.033 (0.073)	0.014 (0.079)	0.145 (0.094)
Mother Completed College	-0.066 (0.080)	-0.039 (0.074)	0.032 (0.075)	0.219** (0.096)
Mother More than College	0.008 (0.106)	-0.008 (0.092)	0.061 (0.094)	0.216** (0.110)
Father not Working	-0.018 (0.067)	0.058 (0.061)	0.037 (0.056)	0.148** (0.074)

TABLE 2 — Continued
EFFECT OF SOCIO-ECONOMIC VARIABLES ON SMOKING UPTAKE

Socio-economic Variable	Be in stage 2, 3, 4 or 5	Be in stage 3, 4 or 5	Be in stage 4 or 5	Be in stage 5
Mother not Working	-0.072 (0.048)	-0.071 (0.046)	-0.072 (0.047)	-0.082 (0.059)
Average Hours Worked per Week	0.015** (0.002)	0.016** (0.002)	0.012** *(0.002)	0.017** (0.002)
Pocket Money per Week	0.002** (0.0004)	0.002** (0.0004)	0.002** (0.0004)	0.003** (0.0004)
Live in City	-0.004 (0.065)	0.025 (0.060)	-0.044 (0.059)	0.002 (0.073)
Live in Suburbs	-0.002 (0.075)	-0.041 (0.064)	-0.014 (0.062)	0.008 (0.076)
Kentucky	0.096 (0.123)	0.110 (0.256)	0.118 (0.261)	0.223 (0.361)
North Carolina	-0.155 (0.242)	-0.066 (0.277)	-0.101 (0.204)	-0.143 (0.261)
Tennessee	-0.200* (0.108)	-0.178* (0.098)	-0.481** (0.088)	-0.329** (0.120)
South Carolina	0.159 (0.205)	0.131 (0.162)	0.188 (0.169)	-0.157 (0.186)
Georgia	-0.391 (0.375)	-0.041 (0.257)	0.051 (0.137)	0.344** (0.129)
Virginia	-0.413** (0.140)	-0.421** (0.209)	-0.560** (0.111)	-0.404 (0.254)
Idaho	-1.455** (0.079)	-1.431** (0.069)	-1.326** (0.064)	-1.031** (0.077)
Nevada	0.157** (0.072)	0.378** (0.069)	0.638** (0.066)	0.522** (0.086)

Notes: Coefficients are corrected for within-cluster dependence. The numbers in parentheses represent robust standard errors. Results in the form of odd ratios can be provided upon request.

* Result is significantly different from 1.0 (P<0.10) based on two-tailed test

** Result is significantly different from 1.0 (P<0.05) based on two-tailed test

Despite its limitations, the study is another piece of evidence that cigarette prices and some tobacco control policies are effective tools for controlling smoking behavior among youth. The majority of current established smokers started their smoking habit during high school. One in two of these smokers will eventually die of a smoking-attributable disease [Peto et al., 1994]. Preventing teens from reaching the highest stage of smoking uptake can be crucial in curbing smoking prevalence in the whole population and saving lives.

NOTES

1. See Wakefield, M. et al., [2000] or Ross, H. and Chaloupka, F.J. for more detailed description of the survey.
2. Model using state cigarette tax instead of average price confirmed negative and statistically significant effect of this price measure on progress to higher states of smoking uptake.

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