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How Do 100% Smoke-Free Bans Affect Smoking Behavior?

Elizabeth K. Vermann
Macalester College, e.k.vermann@gmail.com

HOW DO 100% SMOKE-FREE BANS IN WORKPLACES, BARS, AND RESTAURANTS AFFECT SMOKING BEHAVIOR?

ELIZABETH KATARINA VERMANN
ADVISOR: SARAH WEST

Abstract. Since 2001, the pervasiveness of 100% smoke-free bans has increased dramatically, while the smoking rate among American adults has decreased modestly. This study examines the effect of these bans in workplaces, bars, and restaurants on changes in smoking behavior (initiation, prevalence, continuation, consumption, and cessation) using individual-level smoking data from the Behavioral Risk Factor Surveillance Survey. Generally, this paper finds that, relative to increases in cigarette taxes, bans are less successful in changing smokers' behavior. Nonetheless, results indicate that of the three types of bans, those in restaurants are correlated with the largest likelihood of behavioral change.

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I. Introduction

Each year in the United States, 20% of deaths can be attributed either directly or indirectly to smoking. In fact, those who smoke are estimated to die 14 years earlier than those who do not (Adhikari et al., 2008). As information about the health consequences of smoking emerged in the 1960s, governments at all levels began regulating cigarettes through higher taxes, advertising bans, and warning labels. The most recent trend in regulating cigarette demand is the rise in 100% smoke-free bans in public and private spaces such as bars and restaurants. These bans are intended to not only encourage cessation, stop initiation, change public sentiment concerning smoking, and raise the opportunity cost of smoking, much like a higher tax rate would, but to decrease nonsmokers' exposure to second hand smoke. Since the early 2000s, these bans have spread at a dramatic rate, growing from 32 local laws in 2001 to 308 by the end of 2009. At this rate, the Centers for Disease Control and Prevention (CDC) estimate that smoke-free indoor air laws will cover the entire U.S. (CDC, 2011).

Though 100% smoke-free bar and restaurant bans are fairly new, economists have studied how less severe bans in public places and workplaces have influenced smoking initiation and prevalence. Early literature – which controls for bans in examinations of tax policy and youth smoking – estimates the effects of bans on cigarette demand using indices that either take into account ban stringency (e.g. Czart et al., 2001; Sung et al., 1994; Wasserman, 1991), probability of encountering a ban (Yurekli & Zhang, 2000), or a method that combines these two factors (Chaloupka, 1992). These analyses indicate that bans have robust, significant, and negative effects on smoking. For example, according to Yurekli and Zhang (2000), clean indoor-air laws reduced cigarette consumption by 4.5%.

The assumptions surrounding the construction of these indices, however, could have skewed results in one of two ways. Studies that weight their indices based on the stringency of policies assume the same marginal effects for all types of bans (DeCicca, Kenkel, & Mathios, 2008; Ross & Chaloupka, 2004). Additionally, these studies assume compliance with and enforcement of partial legal restrictions. Yet, in an examination of state clean indoor air laws and smoking-related outcomes among the US workers facing these laws on a regular basis, Bitler, Carpenter, & Zavodny (2011) find that only bartenders reported increased presence of bans at their workplace (bars). As such, they were the only workers in the study to report statistically significant changes in their smoking habits. On the other hand, studies with indices weighted based on the likelihood of encountering each specific type of ban assume that all bans are created equal. Yet, it has been shown that individuals who face comprehensive bans – bans that cover indoor and outdoor areas – are less likely to use tobacco, but those with indoor-only bans do not exhibit significant changes in their tobacco consumption (Knudsen, Boyd, & Studts, 2010; Raptou, Mattas, & Katrakilidis, 2009; Ross & Chaloupka, 2004).

Another branch of smoking ban literature focuses on the introduction of bans in the workplace. With the exception of Chaloupka and Saffer (1992), these studies estimate larger changes in smoking demand than studies that use indices (e.g. Brownson, Hopkins, & Wakefield, 2002; Farrelly, Evans, & Sfekas, 1999; Irvine & Nguyen, 2009). To illustrate, Farrelly, Evans, and Sfekas (1999) find that 100% smoke-free workplace bans reduced smoking prevalence – the percentage of people who smoke – by 6% and average cigarette consumption by 14% among a cross-section of workers in the 1993 Current Population Survey. Experimental studies, such as the difference-in-differences analysis of the effects of the implementation of

full workplace smoking bans in Ontario, Canada highlighted in Carpenter (2007 and 2009), find overall decreases in smoking and environmental tobacco smoke exposure among blue-collar workers who had not encountered such policies in their workplaces prior to the laws. The effects of the workplace bans are also estimated to have positive spillovers, implying that restrictions on an individual's smoking habits are likely to have a social multiplier, causing smoking reductions among people who do not face bans at their workplaces (Cutler & Glaeser, 2007). Nonetheless, many of the studies that examine the effects of workplace bans do not control for the presence of other bans or for other aspects of tobacco control (e.g. Irvine & Ngyuen, 2009; Evans, Farrelly, & Sfekas, 1999). In excluding tax rates and other venue-specific restrictions, these studies may falsely attribute the effects of other policies to work bans, overestimating the effect of such bans on smoking.

In examining the effects of 100% smoke-free bans in workplaces, bars and restaurants, this paper addresses the limitations of previous literature in three ways. First, because all of the bans examined here have the same level of stringency and I explicitly control for bans in workplaces, restaurants, and bars. That way, this study overcomes the limitations of the assumed ban homogeneity in the ban index literature. At the same time, this study takes into account other aspects of tobacco control policy, such as taxes and state-level funding. That way, this paper can assess the role smoking restrictions play within the myriad of tobacco control policies. Finally, to my knowledge, the majority of the existing literature examining smoking bans in the U.S. analyzes data collected prior to 2001. Since 2001, however, the number of 100% smoke-free laws in all workplaces, restaurants, and bars increased dramatically from 32 local laws to 375 by the end of 2009 (Americans for Nonsmokers' Rights, 2010).

In analyzing data from the CDC's Behavioral Risk Factor Surveillance Survey, this study finds that county-level bans have statistically significant effects on smoking behavior. These effects are largest for smoke-free bans in restaurants. Despite their statistical significance, the results indicate that these non-price tobacco controls may not have an economically significant impact on smoking behavior relative to price controls.

In section II of this paper, I exposit my theoretical approach. In Section III, I describe the data and present summary statistics. Section IV explains the estimation strategy and examines my empirical results. Finally, in Section V, I conclude by discussing the policy implications of my findings and by considering further approaches to studying this topic.

II. Theory

To assess the effect of smoking bans on cigarette consumption, this paper uses a utility-maximizing framework. This framework assumes smokers are rational and, thus, respond to changes in prices (Becker & Murphy, 1988) as they maximize their intraday utility (Irvine & Nguyen, 2009). Further, I assume that intraday utility (U) is a separate function of the utility from cigarettes ($f(c)$) and the utility from all other goods ($g(g)$) following:

$$U = [f(c), g(g)]\,. \tag{1}$$

This utility function is consistent with two-state budgeting: an individual first decides how much income to allocate to cigarettes and other goods, then, within those categories, how

much to spend on individual goods (Deaton & Muellbaur, 1980).[1] As a result, utility can be maximized for cigarette consumption alone, ignoring g.

When the government imposes a smoking ban, the real price of smoking changes. Rather than make decisions on how much to smoke based on p_1, a smoker must determine his or her optimal level of cigarette consumption by considering the opportunity cost of smoking in the presence of a ban (Irvine & Nguyen, 2009). For this reason, even if the nominal price does not change, the real price of smoking may increase due to foregone wages and convenience costs. To illustrate, if a smoker faces a workplace ban, part of the smoking decision will also be based on the time cost of leaving his or her workspace to smoke. In this case, a smoker would face an implicit loss in wages due to the time spent away from working. If a smoker faces a ban in a restaurant or bar, part of the smoking decision will be based on the awkwardness of excusing oneself from a social situation. In this situation, an individual faces an additional convenience cost of smoking. I assume that perceived social norms about smoking would also influence how an individual smoker internalizes the implicit costs of smoking in an area with a ban. Hence, large-scale changes in public perception of smoking – one of the goals of a smoking ban – would influence an individual's decision to smoke (Singleton, 2008; DeCicca et al., 2008; Kim & Shanahan, 2003).

To take into account the additional costs a smoker faces, the price of smoking in the presence of a ban (p_b) is greater than the price of smoking in the absence of one (p_u):

$$\begin{aligned} p_b &> p_u \\ p_u &= p_1. \end{aligned} \tag{2}$$

[1]Clearly the allocation of spending on cigarettes and spending on other goods could be affected by a ban. The predictions of this theory for empirical testing, however, are not affected by this assumption.

Hence, a smoker's budget constraint for cigarettes (I_c) when a ban is in effect takes into account these prices, following:

$$I_c = p_u c_u + p_b c_b, \tag{3}$$

where c_u represents the consumption of cigarettes in an area without a ban and c_b represents the consumption of cigarettes in an area with a ban. This equation implies that cigarettes are no longer homogenous goods. Instead, individuals must allocate c_u and c_b to maximize their total utility by maximizing their utility of smoking (U_c),

$$U_c = \left[\mu_1 c_u^{\rho} + \mu_2 c_b^{\rho}\right]^{\frac{1}{\rho}}, \tag{4}$$

where μ_1, μ_2, and ρ are parameters. Equation (4) represents a nonlinear trade-off between the number of cigarettes consumed in areas with and without bans. This utility function exhibits constant elasticity of substitution (Varian, 1993). Maximization of the utility of smoking subject to the budget constraint for smoking (Equation 3) occurs when the marginal rate of smoking substitution equals the ratio of the prices of smoking:

$$\frac{MU_{c_u}}{MU_{c_b}} = \frac{\mu_1}{\mu_2}\left(\frac{c_u}{c+b}\right)^{\rho-1} = \frac{p_u}{p_b}. \tag{5}$$

Because cigarettes are addictive, this model is conditioned upon an individual's level of addiction (Irvine & Nguyen, 2009; Harris & Chan 1998), indicated by the magnitude of ρ. This parameter dictates the substitutability of cigarettes in areas with and without bans (Figure 1). For a light smoker, $\rho = 1$, giving his or her utility curve the form:

$$U_c = \mu_1 c_u + \mu_2 c_b. \tag{6}$$

In this case, banned and unbanned cigarettes are perfect substitutes. Consequently, as the price of banned cigarettes increases, the smoker will consume all of his or her cigarettes in areas without bans, implying that there will be no change in the individuals total number of cigarettes consumed because

$$\frac{MU_{c_u}}{MU_{c_b}} = \frac{\mu_1}{\mu_2} = \frac{p_u}{p_b}. \tag{7}$$

For a heavy smoker, $\rho \to -\infty$, making unbanned and banned cigarettes perfect complements. Hence, Equation (5) becomes:

$$\frac{MU_{c_u}}{MU_{c_b}} = \frac{\mu_1}{\mu_2}\left(\frac{c_u}{c+b}\right)^{-\infty} = \frac{p_u}{p_b}. \tag{8}$$

This situation indicates that there is no substitution between cigarettes in banned and unbanned areas. Therefore, heavy users will see a dramatic decrease in the total number of cigarettes consumed.

Though this result seems counter-intuitive because heavier users would be more willing to pay the higher price for smoking during banned times, literature indicates that heavier smokers are more likely to compensate for fewer cigarettes by increasing their average intake of nicotine per cigarette (Irvine & Nguyen, 2009; Adda & Cornaglia, 2006). For example, Benowitz et al. (1986) find that heavy smokers (who smoke an average of 37 cigarettes per day) that are limited to smoking only 5 cigarettes per day tripled their average intake of nicotine per cigarette. Following this finding, Benowitz (2001) finds that heavy smokers will decrease their cigarette consumption to the minimum amount necessary to maintain their addiction (generally, around 10 cigarettes).

For other smokers, banned and unbanned cigarettes can be viewed as imperfect substitutes. Depending on one's level of addiction, a smoker would want to keep a certain level

of nicotine in their system during the day in order to avoid daily withdrawal symptoms (Benowitz, 2001). For these smokers, $-\infty < \rho < 1$, so that their utility maximization decision is characterized by Equation (5). Therefore, the changes in the consumption habits of those with lower levels of addiction will more closely resemble individuals who consider banned and unbanned cigarettes perfect substitutes, while the changes in the consumption habits of those with higher levels of addiction will more closely resemble individuals who consider banned and unbanned cigarettes perfect complements. Thus, rescheduling one's smoking routine is easier for light smokers than it is for heavy smokers, who require a higher and more constant stream of nicotine throughout the day to avoid withdrawal. As such, light smokers they will have little or no change in the number of cigarettes consumed each day, while heavy smokers will have a more substantial change in the number of cigarettes consumed.

III. Data Description and Summary Statistics

To estimate the effects of clean indoor air laws in bars and restaurants on smoking behavior, it would be ideal to have panel data on individuals, their smoking habits (e.g. how many cigarettes and how often), their level of addiction, the factors that influence the individual's smoking decision (e.g. smoking setting, number of friends who smoke), and how often individuals encounter smoking bans. Such data would allow one to more accurately track exposure to bans and identify subsequent changes in behavior. Unfortunately, only cross-sectional data on individual smoking consumption exist so one cannot observe an individual's response to smoking bans over time.

To circumvent this problem, this paper uses repeated cross-sectional smoking information from the Behavioral Risk Factor Surveillance Survey (BRFSS),[2] while controlling for time and region fixed effects. [3] These data are merged with information on local, county, and state smoking bans from the Americans for Nonsmoker's Rights lobby,[4] cigarette prices from the Tax Burden on Tobacco,[5] tobacco control data from ImpacTeen.org[6] and alcohol price data from the ACCRA cost of living index.[7]

Data Organization.

Smoking and Addiction. The BRFSS provides individual level health data for adults 18 years or older. This survey, conducted by the Centers for Disease Control and Prevention (CDC) via monthly phone interviews, is one of the main sources of data on smoking trends in the U.S.. The sample used in this study contains 964,925 individuals between the ages 18 and 50 interviewed between January 1st , 2001 and December 31st, 2009. Geographic coverage spans 2,367 counties in 49 states[8] and Washington D.C..

To classify an individual's smoking behavior, I use the responses to the survey's core tobacco use questions. Specifically, the survey determines if an individual has ever smoked by asking whether he or she had smoked 100 cigarettes (5 packs) over his or her lifetime. Based on the results of this question, I create a dummy variable – *initiation* – to track the number

[2]Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 1990-2009.

[3]I define regions using the Census Regions found at US Census Bureau http://www.census.gov/popest/geographic/codes02.html

[4]Americans for Nonsmoker Rights (2010). Chronological table of U.S. population protected by 100% smoke-free state or local laws [data file]. Retrieved on 2 Oct 2010 from: http://www.no--smoke.org/pdf/EffectivePopulationList.pdf.

[5]Orzechowski & Walker (2008) The tax burden on tobacco [data file]. Vol 44. Arlington, VA. Retrieved from http://apps.nccd.cdc.gov/statesystem/TrendReport/TrendReports.aspx

[6]ImpacTeen (2010) Tobacco control policy and prevalence data: 1991-2008 [data file]. Retrieved from http://www.impacteen.org/tobaccodata.htm.

[7]The Council for Community and Economic Research (2010) Accra cost of living index [data file].

[8]The data exclude Alaska.

of respondents who have smoked. To determine an individual's current smoking status, the survey asks all of those who claimed that had smoked 100 cigarettes in their lifetime if they are current smokers. Based on the responses of these individuals, I create a dummy variable for smoking *prevalence* – the number of smokers in the entire survey population – and a dummy variable for *continuation* – the number of current smokers among those who had those who had smoked 100 cigarettes over their lifetime. After determining an individual's current smoking status, the survey asks current smokers how often they smoke (daily or occasionally) and whether they have attempted to quit in the past year. Hence, I create a ranked variable from 0 to 2 to indicate smoking frequency where 0 indicates never and 2 indicates daily smoking. I also create a dummy variable (*cessation*) for attempting to quit.

Because this theoretical model implies that the effects of a smoking ban are conditional on a smoker's level of addition, I use a variety of demographic controles to proxy for ρ. Specifically, I use the demographic information in the BRFSS to control for age, gender, employment status, class of worker, income, marital status, and the presence of children as literature has shown individuals of different demographics have different responses to smoking policies (Dedobbeleer et al., 2004; Hersch, 2000; Dodgen, 2005; Cheng & Kenkel, 2010). Additionally, I control for the consumption of alcoholic beverages – another addictive substance – in order to have an idea of both the likelihood of an individual encountering a smoking ban in a bar and as a proxy for an individual's propensity for addiction.[9] To categorize the drinking behaviors, the BRFSS asks whether each individual had consumed an alcoholic beverage within the last month, and, if so, how many drinks, and finally, how

[9]According to the National Institute on Alcohol Abuse and Alcoholism (2007), between 80% and 95% of alcoholics smoke cigarettes (National Institute on Alcohol Abuse and Alcoholism, 2007). Furthermore, economic literature on alcohol and tobacco consumption, indicates that alcohol and tobacco are correlated (DiFranza, 1990; Bask & Melkersson, 2004; Decker, 2000; Picone, Sloan, & Trogdon, 2004).

often he or she drinks. Using this information, I create a dummy variable denoting whether the individual consumes any alcohol.

Smoking Bans and Other Tobacco Policy Variables. The Americans for Nonsmokers' Rights lobby provides data on the dates when 100% smoke-free workplace, bar, and restaurant ban legislation were enacted. I merge these data with the individual data from the BRFSS using county codes and interview dates. Using these data, I create dummy variables indicating the presence of any ban in a county without a statewide ban and a dummy variable indicating the presence a statewide ban.

Figures 2, 3, and 4 illustrate the trends in smoking behavior among the respondents vis-à-vis trends in ban presence. In all three of these figures, one can see a dramatic rise in the percentage of respondents living in an area with a ban, but a fairly constant level of initiation, prevalence, and cessation rates, as well as minimal fluctuations in the prevalence of daily, occasional, and quitting smokers. In fact, the proportion of respondents facing a ban rose from 10% in 2001 to 75% in 2009 (see Table 4). These descriptive results may indicate that these bans have a minimal impact on the smoking behaviors examined.

To control for price, this paper uses data on the annual average statewide price per pack of cigarettes from The Tax Burden on Tobacco. This nominal price includes any tax paid. I adjust these nominal prices in two ways. First, to account for state-by-state variation in price levels, I divide each by each state's average annual cost of living using the ACCRA cost of living index. Next, I divide by the consumer price index using 2009 as the base year to get the real cost per pack.

To control for the level of anti-smoking sentiment in each state, I use the state's average annual tobacco control spending per capita provided by ImpacTeen. This variable

was chosen as a proxy because a number of studies (e.g. Siegel & Biener, 2000; Liu & Tan, 2009; Hamilton, Biener, & Brenan, 2008; Marlow, 2007) find that the intensity of state education and media campaigns (and other forms of tobacco control) is positively correlated with the level of disapproval of smoking. Since ImpacTeen only provides data up to 2007, the 2008 and 2009 tobacco control spending data come from a combination of data from the CDC and from Tobacco Free Kids.[10] Specifically, Tobacco Free Kids provides the annual state and federal tobacco control spending. To get the per capita state spending, I subtract the total federal spending from those data using information from the CDC and divide by the U.S. Census Bureau's population estimates for each state.[11] Once all of the tobacco control data are compiled, I adjust them using the ACCRA cost of living composite index and the CPI to get the adjusted real annual per capita state tobacco control spending.

Finally, I add a control for alcohol price to further take into account the probability of going to a bar and to control for the relationship between alcohol and tobacco consumption. To control for alcohol price I aggregate the ACCRA cost of living data on beer prices for each state over each quarter to get annual state alcohol prices. I then adjust them to get the real price using the CPI. I choose to proxy for alcohol prices with beer prices both because I assume one is more likely to consume beer over wine in a bar and because the data for wine and liquor prices were unavailable after 2004.

Summary Statistics.

[10]Tobacco Free Kids. History of State Tobacco Control Spending. Retrieved from: www.tobaccofreekids.org/research/factsheets/pdf/0209.pdf

[11]CDC. State Tobacco Activities Tracking and Evaluation System. Retrieved from http://apps.nccd.cdc.gov/statesystem/DetailedReport/DetailedReports.aspx

Tables 1 and 2 present the summary statistics for the demographics of all respondents, respondents not facing bans, and respondents facing bans, respectively. The composition of the sample is 60% women, 74% white respondents, 77% employed, 38% are single, 62% have children, and 59% drink. Overall, respondents ranged in age from 18 to 49 years old, with a mean age of 37. This age distribution was heavily skewed towards individuals over 30 years old, who represent nearly 75% of the entire sample. My data also appear to oversample highly educated individuals, as nearly 40% are college graduates (Table 2).

From these data one can see that the individual demographics (Table 1) are largely consistent regardless of the presence of a ban. There are differences in socioeconomic characteristics between individuals living in areas with and without bans. Generally, those facing bans are more likely to have a college degree and earn over $75,000 per year. Further, they are also more likely to live in the New England, the Mountain division and the Pacific division, while those living in counties without bans are more likely to live in the South. These differences in socioeconomic status and region could reflect differences in smoking culture and attitudes.

Tables 3 and 4 describes the differences in smoking behavior and tobacco control policies for respondents in the sample. Overall, 42% of respondents have smoked, 24% are current smokers, and 18% are former smokers. Of the current smokers (56% of those who have ever smoked), 42% smoke daily and 57% attempted to quit within the last year. Between 32% and 42% of all individuals in the sample live in an area with a smoking ban. Of all types of bans, they are most likely to encounter a statewide smoking ban in restaurants and the least likely to encounter a countywide bar ban. Across areas that have enacted smoking bans, there is very little difference in smoking behavior. With the exception of current,

daily smokers, who are 7% more likely to live in an area without a ban and former smokers who are 7% more likely to live in an area with a ban, there is at most a 5% difference in smoking behaviors across individuals living in areas with and without bans. In comparing the adjusted state level tobacco price data a pack of cigarettes in an area with a ban costs an average of $0.25 (5.8%) more than in an area without a ban. The minimum value for cigarette price ($3.00), however, occurs in an area with a ban, while the maximum value ($7.21) occurs in both an area with a ban and an area without one. The price ranges are also similar, falling between $3.21 and $7.21 in areas without bans and between $3.00 to $7.21 in areas with bans.

Interestingly, states without bans on average spend $0.11 (4.1%) more per capita on tobacco control than do those with bans. There is, however, no difference in spending range for states with and without bans: both types of states spend between $0 and $16.32 per capita on tobacco control. Issues in alcohol price difference are also important to note because, on average, price of alcohol is $0.74 (11.0%) lower in areas with bans than in areas with bans. Nonetheless, the spread of the prices in banned and unbanned areas – $7.11 to $9.52 and $7.39 to $10.00, respectively – is similar.

Tables 5, 6, 7, and 8 compare the demographics of respondents who have never smoked, are current daily smokers, are current occasional smokers, and are former smokers. In comparing these groups, one can see that current daily smokers have the lowest levels of educational attainment and income, with 54% of respondents with a high school diploma or less and 37% earning less than $25,000 per year. In contrast, 46% of those who have never smoked have at least a college degree and 53% earn more than $50,000 annually. The typical occasional smoker group is the youngest, most likely to be non-white, and most likely to drink

of all the groups examined (Table 5). A typical former smoker is more likely to be white, older, have a child, and have a higher level of income than the other groups (Tables 7 and 8). In comparing individuals who have and have not attempted to quit smoking in the past year (Table 7 and 8), those who have not attempted to quit are more likely to be white, are nearly 2 years older on average, and more likely to have a higher level of education than those who have attempted to quit. Overall, with the exception of socioeconomic characteristics, there are not large discrepancies in demographics across the different categories of smoker

IV. Analysis

The effects of 100% smoke-free bans in workplaces, bars, and restaurants on smoking behavior were estimated following:

$$S_{it} = \alpha + \beta_1 Z_{it} + \beta_2 E_{it} + \beta_3 D_{it} + \beta_4 P_{it} + \beta_5 A_{it} + \beta_6 F_{it-4} + \beta_7 B_{it-1} + \beta_8 E_{it} * B_{it} + \beta_9 D_{it} * B_{it} + \sum_{i \to N}^{i} R_i + \sum_{i \to N}^{i} T_i + \varepsilon_{it},$$

where

- Subscripts i and t represent the respondent and survey year, respectively.
- S represents the smoking behavior examined. Those behaviors are initiation, prevalence, continuation, frequency, and cessation.
- Z represents the vector of demographic controls consisting of age, age squared, sex, race, martial status, child present, income level, and educational attainment.
- E represents a dummy variable for employment.
- D represents a dummy variable for whether the respondent drinks.
- P represents the cigarette price.

- A represents the alcohol price.
- F represents the log of per capita state tobacco control funding. This variable has been lagged one year to take into account both the results of funding for programs enacted in the previous year (assuming individuals will experience those programs at time t) and to avoid possible endogeneity.
- B represents the vector of various county- and state- level bans the respondent may encounter. These variables have been lagged one quarter to avoid possible endogeneity issues,[12] as I assume bans precede changes in an individual's smoking behavior.[13]
- $E*B$ and $D*B$ represent the interaction terms between the indicators of employment and work ban presence, and between drinking and bar ban presence, respectively. These terms control for the probability of a respondent encountering either a work or bar ban. It is important to note that the bans in the interaction terms have not been lagged.
- R and T represent the region and time fixed effects, respectively.

A number of models could be used to estimate this equation using synthetic panel data with a dummy dependent variable.[14] This paper uses a probit because such a model is robust to the presence of time invariant variables (Gallet et al., 2006) and a number of regressors in this model vary across space but not time. All of the regressions of smoking behaviors

[12]The literature on tobacco control debates whether endogeneity is an issue within individual-level data. On one hand, evidence suggests that states adopting 100% smoke-free bans are likely to have lower smoking rates and more tobacco control policies (Dunham & Marlow, 2000; Boyes & Marlow, 1996; Smetters & Gravelle, 2001). On the other hand, Chaloupka (1992) and Wasserman et al. (1991) argue that when using individual-level data to estimate cigarette demand, endogeneity is not a problem because the presence of clean indoor air laws is more closely related to average statewide cigarette consumption. In other words, a single individual's decision to smoke will not factor into a legislator's decision to enact more stringent tobacco control policies, but the decisions a group of individuals will.

[13]This method has been used by Chaloupka (1992) and Picone, Sloan, & Trogdon (2004).

[14]Such models include the linear probability model, logits, and tobits.

were estimated using a binomial probit regression except for the regression involving smoking frequency. To estimate the correlation between smoking bans and smoking frequency, I used an ordered probit.

The main coefficients of interest from these estimates are those on the ban variables (β_7), interaction terms (β_8 and β_9), and cigarette price (β_4). Of these coefficients, β_7 represents the overall influence of a ban on the probability of all respondents exhibiting a certain smoking behavior, while $\beta_7 + \beta_8$ or $\beta_7 + \beta_9$ represent the overall influence of a ban on the smoking behaviors of individuals encountering the ban. Thus, $\beta_7 + \beta_8 + \beta_9$ represent the overall influence of bans on a given smoking behavior if all three types of ans are present. Given these coefficients, I expect β_7 not to equal 0 and β_8, β_9 and β_4, to be less than zero.[15]

Results.

Tables 9 through 20 present the estimated coefficients on smoking bans and tobacco policy controls from the probit regressions of smoking initiation (column I), prevalence (column II), continuation (column III), and cessation (column V), as well as the results from the ordered probit regression on frequency (column IV), while Table 10 presents the estimated coefficient for the demographic control variables from these regressions. The coefficients for the estimates on all dependent variables except smoking frequency have been normalized to measure the marginal effect of each variable on the individual's smoking behavior. As such, one can interpret the coefficients as the change in the probability of the individual's smoking behavior, given his or her demographic characteristics and the set of tobacco control policies he or she faces.

[15]I expect the opposite for the specifications where attempt to quit is the dependent variable because I assume bans would be positively correlated with a smoker's attempt to stop smoking.

Table 9 presents the results for the core regression, in which I explicitly control for each type of county- and state- level ban. The remaining Tables contain various robustness checks.

Bans. Table 9 indicates that the overall effects of smoking bans on smoking initiation, prevalence, continuing to smoke, smoking frequency, and attempting to quit are negligible – especially the effects of county-level bans. To illustrate, county-level bans are correlated with a 0.8% decrease in smoking prevalence and a 1.5% increase in the probability of individuals continuing to smoker, holding demographics constant. For the employed, drinking individuals, county-level bans make them no are no more likely to have ever smoked and make smokers 2.2% less prevalent, more likely to smoker less, and 1.8% more likely to have quit successfully. Implementation of these bans, however, has no statistically significant effect on attempting to quit. State-level bans, on the other hand, are associated with slightly larger overall changes in behavior. Bans at this level are correlated with a 0.5% decrease in the initiation rate, a 0.3% increase in the prevalence rate, a 1.7% increase in smokers continuing to smoke, a 0.8% decrease in the likelihood of smokers attempting to quit, and an increase in smoking frequency. In areas with state-level bans, smokers who are employed and drink are 1.1% less prevalent, 1.6% more likely to have quit successfully, and slightly less likely to smoke everyday. Nonetheless, they are 0.8% less likely to attempt to quit smoking.

Though the magnitudes of the overall effects of county-level bans are higher than those on state-level bans, only county-level restaurant bans (column II) and bar bans (column III) are statistically significant, whereas all three state-level bans are consistently statistically significant. The overall lack of statistical significance on coefficients for individual county-level bans may indicate that county-level bans may be less effective at changing the behaviors

of smokers. In other words, imposing a county-level ban on smokers may not change their behaviors. Such a ban may, instead, encourage them to smoke elsewhere. Thus, the minimal estimated effects of county-level bans may be due to the ability of smokers to avoid such bans by working, drinking, or eating out in a neighboring county without smoking restrictions.[16]

The differential effects of county-level and state-level bans could also indicate problems with endogeneity. Generally, these small overall effects of state-level bans are driven by either the presence of large, positive coefficients on the work and bar ban variables. For example, individuals facing a statewide 100% smoke-free workplace ban are 2.2% more likely to be smokers. The magnitude of this positive coefficient overpowers the magnitude of the negative coefficient on the interaction term, which indicates that workers facing a workplace ban are 1.2% less likely to smoke. The positive coefficients on state-level bans suggest that state-level bans are implemented in areas where there are more smokers, indicating that bans are endogenous: areas with higher numbers of smokers are more likely to impose bans in the first place. Hence, the lack of statistical significance on for the estimated coefficients on the county-level bans indicates that these bans are more likely to be exogenous. Therefore, the interaction terms may indicate the actual overall effect of these bans on the smoking behaviors of individuals who encounter them.

Interestingly, of the three types of bans controlled for in this specification, the estimated coefficients on restaurant bans were the highest, as they were correlated with at least a 0.8% likelihood of behavioral change for a county-level ban and a 1.9% likelihood of change for a state-level ban. This finding is likely because there is no interaction term to control for whether individuals encounter these bans.[17] By excluding such an interaction term, the

[16]In fact, Adams and Cotti (2008) find evidence for smokers traveling across county lines to avoid restrictions in bars.

[17]The results in Tables 14 and 15 examine this possibility.

coefficients on county- and state-level restaurant bans may be overestimated because the specification assumes everyone in an area with a restaurant ban is eating out and encountering the ban. County-level 100% smoke-free bans in workplaces are estimated to have the least effect, as the effects of these bans on smoking behavior are not statistically different from 0. In terms of the behaviors, estimated coefficients on bans on both the county- and state-level are smallest when looking at smoking initiation and cessation.

Price Controls. The estimated coefficients on a 1-percent increase in the price of cigarettes in the core regression (Table 9) fall between 1.5% and 8.6%, have the expected negative signs, and are all statistically significant. For all of the dependent variables except for smoking initiation, the estimates on this price control – which represents the state average price per pack of cigarettes, including the tax – are at least approximately 4 times larger than the estimated total effects of the bans. These findings imply that price controls have a larger negative effect on smokers' behaviors than do non-price controls. To illustrate, the regression results indicate that bans are correlated with a 0.8% decrease in the likelihood of a current smoker attempting to quit. At the same time, an increase in the price of a pack of cigarettes is correlated with a 8.6% increase in the likelihood of an individual attempting to quit.

For the estimated effects on the likelihood of an individual having smoked, the coefficients on bans (-1.5% at the state-level) and cigarette prices (-1.4%) are similar. This finding may indicate that other factors (such as the number of friends who smoke) may outweigh price in the decision to begin smoking. At the same time, this finding could indicate that both prices and bans are equal barriers in stopping people from smoking. A high cost per pack of cigarettes may deter people from beginning to smoke because they simply cannot afford it, while a high presence of smoking bans may discourage individuals from smoking

because these bans make it less acceptable and more difficult to smoke in public places. Consequently, these bans could decrease the appeal of smoking.

Unlike the coefficients on cigarette price, the state tobacco control funding variable consistently lacks statistical significance and has extremely small coefficients. This finding indicates that the marginal effect of a one-dollar increase in state tobacco control funding per capita is not correlated with either a statistically or economically significant change in smoking behavior.

The final price control in the regression is alcohol prices. The coefficients on this control tend to be relatively large in magnitude across all dependent variables except smoking prevalence. Specifically, the estimates indicate that the marginal effect of a 1-percent increase in alcohol prices falls between 1.0% (smoking prevalence) and 6.6% (smoking initiation). Interestingly, the signs on the coefficient for alcohol prices changes depending on the dummy variable estimated. For smoking initiation and prevalence, the coefficients are negative. This result indicates that increases in the alcohol price decrease the number of people who have ever smoked and the number of people who currently smoke in the sample population. Hence, for the sample population, alcohol and cigarettes are substitutes. For the portion of the sample who has smoked before, an increase in the price of alcohol is associated with a 4.1% increase in the likelihood of being a current smoker, an increase in smoking frequency, and a 5.4% decrease in the likelihood of attempting to quit. Therefore, for individuals who do smoke, alcohol and cigarettes are complementary goods.

Demographic Controls. Across all of the regressions and specifications, the coefficients on all of the demographic and price controls are stable and (generally) statistically significant. These coefficients are displayed in table 10 and indicate the changes in the probability of

a respondent exhibiting the examined smoking behavior relative to the reference – a white, married, unemployed, childless male who does not drink, have a high school degree, earn more than $10,000 each year or live in an area with a ban.

When looking at the entire sample population (e.g. the smoking initiation and smoking prevalence variables), a number of trends emerge. Women are less likely to have smoked and to currently smoke than men. Across races, African-Americans and Hispanics are less likely than whites to start smoking, but African Americans tend to have a higher level of smoking prevalence. Across incomes, one can see that individuals in higher income groups are increasingly less likely to have ever smoked and currently smoke. To illustrate, those who make more than $20,000 a year are 2% less likely to smoke, while those making over $75,000 a year are 15% less likely to smoke relative to the reference. These trends are statistically significant. Similarly, individuals with higher levels of educational attainment are increasingly less likely to have smoked and to currently smoke. For example, high school graduates are 9% less likely to smoke relative to non-graduate and college graduates are 32% less likely to smoke relative to a high school dropout. Being single, older and a "drinker" increase the likelihood of an individual having smoked by 2%, 4%, and 14% respectively, while having a child decreases this likelihood by 2%. These same characteristics increase smoking prevalence by 2%, 6%, and 10%, respectively, while having a child also decreases this likelihood by 2%.

In the regressions examining the population of the sample who has smoked, similar trends across income and educational attainment emerge. For example, individuals who earn between $25,000 and $35,000 per year are 3% less likely to be current smokers, while those who earn over $75,000 per year are 21% less likely to be current smokers relative to the

reference. At the same time, wealthier smokers are more likely to smoke less than poorer smokers. In contrast, wealthier smokers are less likely to attempt to quit smoking than poorer smokers. These finding could imply that wealthier smokers are less price sensitive than poorer smokers. With the exception of the likelihood of being a current smoker, individuals with higher levels of educational attainment who have smoked are less likely to be current smokers, more likely to smoke less frequently, and more likely to attempt to quit.

In the regression of smoking continuation, however, those with high school diplomas and some college are 8% more likely to have successfully quit than those without a high school degree, while those with some college are 1% more likely, and those with a college degree are 28% more likely. The decreased likelihood of successfully quitting among those with some college could be because of differences in discount rates among these individuals. In other words, completing only some college could indicate issues with commitment or indicate the valuation of the current period over future periods.

In terms of demographics, within the population of individuals who have smoked, women are more likely to be current smokers and smoke more frequently than men. At the same time, they are more likely to attempt to quit than men. This finding could be due to issues with child bearing. Finally, in terms of race, results for the regressions among the smoking population indicate that nonwhites are less likely to smoke as frequently as whites and are more likely than whites to attempt to quit smoking. At the same time, African-American and Hispanic smokers are less likely to quit successfully.

Because the data oversample those over 30, college graduates, and those earning over $50,000 per year, I further examine the effects of bans on 9 subpopulations: respondents aged 18-30, 30-40, and over 40, respondents with an annual income less than $25,000, between

$25,000 and $75,000, and over $75,000, and respondents at each level of educational attainment. The estimated coefficients for the highest and lowest income subpopulations differed most from those in the original regression in terms of magnitude and statistical significance. Generally, for each of these groups, the estimated coefficients on the ban variables were smaller and became statistically insignificant. The exception to this trend is the coefficient on the interaction term for employment and a work ban, which was larger in magnitude and statistically significant for those earning less than $25,000/year. This result could indicate the effects of expanding smoke-free workplace policies to a new class of worker, supporting the findings of Carpenter (2007) and Carpenter (2009). Within the various age and educational attainment groups, there was little change in the estimated coefficients. The statistical significance of the coefficients on all bans, however, largely disappeared for those aged 18-30 and those with less than a high school degree.[18]

Robustness Checks.

To assess the robustness of my results, I run four different checks: two which correct for potential multicollinearity issues in the core regression (Tables 12 and 13, one that further controls for ban prevalence(Table 14), and one which combines these approaches (Table 15). I then run all of the regressions again with state fixed effects to correct for endogeneity (Tables 16 through 20).

Multicollinearity Checks. As indicated by the pairwise correlation coefficients in Table 11, there is a high level of multicollinearity between the three types of bans, especially bar and restaurant bans. To illustrate, individuals who experience any 100% smoke-free bans are between 67% and 83% more likely to experience another ban. Bans at the same level (e.g.

[18]For these results, contact the author.

county or state) have correlation coefficients between 0.60 and 0.88, of which the highest correlations occur between restaurant and bar bans.

The results in Table 12 address the multicollinearity between bans by combining bar and restaurant bans. Specifically, I use a dummy variable to indicate whether a county has either a restaurant or bar ban and one to indicate whether a state has either a restaurant or bar ban. I also replace the previous interaction term for bar bans and drinking with an interaction term for either a bar or restaurant ban and drinking. When running regressions with this variable, the estimated marginal effects for bar/restaurant bans are negative and statistically significant in the initiation and prevalence regressions for county-level bans. Hence, county-level bans are correlated with a 0.9% decrease in smoking initiation and a 1.0% decrease in smoking prevalence. For state-level bans, all regressions except for cessation have negative and statistically significant estimates for bar/restaurant bans, ranging from -2.5% to -3.8%. Because the estimates for state-level smoke-free work bans remain positive and statistically significant, state level bans have marginal effects falling between -2.5% and 1.0%.

For individuals who are employed and drink, the estimated overall coefficients on the ban variables in this specification generally remain small and negative, ranging from -0.4% to -3.1% for county-level bans and -0.7% to -1.6% for state-level bans. These estimates are similar to the estimated total effects from the core regression. The overall estimated marginal effects for the bar and restaurant smoke-free ban variables, however, are consistently negative and larger in magnitude than the sum of the coefficients on bars and restaurants in the core regression. The reason the overall effects are similar is because of the interaction term. The combined bar/restaurant ban interaction term with drinking status is large, positive, and

statistically significant across all dependent variables in this specification of the model. This finding may be because the interaction term overestimates the number of people encountering bar bans. This positive coefficient may also have occurred because the interaction term is picking up on positive correlation of state-level restaurant bans and the various smoking behaviors, as shown in Table 9.

Despite the differences in the estimated coefficients on the bar and restaurant ban variables, the rest of the coefficients are robust to changes in specification. In fact, all of the work ban and price control coefficients are within 0.5% of those in the core regression. This finding indicates that multicollinearity does not affect the estimates for tobacco policy controls. Also, the results of this specification indicate that state tobacco control funding is statistically significant in estimates of smoking initiation and attempts to quit. Hence, a 1-percent increase in per capita tobacco control spending is correlated with a 0.3% increase in the likelihood that an individual has smoked and a 0.4% decrease in the likelihood that an individual has attempted to quit smoking in the past year. These correlations indicate that state tobacco control policies are endogenous.

The specification in Table 13 address the problem of overestimating the combined effects of bans in specification II and the potential multicollinearity problems due to the high correlations between restaurant and bar bans by explicitly controlling for each combination of bans an individual in my sample could encounter. In other words, I create a dummy variables for all combinations of smoke-free workplace, bar, and restaurant bans at the county- and state-level. The coefficients for the interaction terms and each individual ban are robust to this change in specification except for the coefficients on state work and restaurant bans. For both of these state-level bans, the magnitudes on the coefficients are larger. In addition,

the state work bans became negative and statistically significant. In this regression, the estimated overall effects of all three types of bans on the county- and state- level are also consistent with those from the core regression.

When looking beyond the estimated effects of individual bans to those of combinations of various bans, three major trends emerge. First, in examining pairs of bans, the estimated effects are similar to those in the core regression. Further, the estimates tend to be statistically significant if there is a state-level ban involved. The combinations of all three bans, however, tend to lack statistical significance in the regressions with continuation and frequency. In other words, facing all three types of bans at varying levels is not correlated with a statistically significant likelihood of behavioral change for smokers. This finding could be the result of sample issues, as smaller portions of individuals facing bans in these combinations of varying county- and state-level bans. Alternatively, this finding could indicate that bans have diminishing marginal effects. Thus, the first ban enacted may cause smokers to change their behavior, but once another ban is imposed, they are less likely to adjust their behavior. The second trend to emerge is the consistently larger estimated effect of state-level restaurant bans on smoking behavior. Imposing a state-restaurant ban is correlated with at least a 3.3% likelihood of behavioral change. Further, the combinations of bans which include state restaurant bans tend to have larger estimated effects. This finding could be due to the fact that I do not control for the likelihood of encountering one of these bans. Finally, the estimated effect of a 1-percent increase in the cigarette price on smoking behavior remains consistently larger than the estimated effects of bans.

Ban Prevalence. Because the core regression assumes that all individuals encounter restaurant bans, I control for the number of bars and restaurants per capita. (table 14)[19] These per capita variables were constructed by taking the log of the total number of bars and restaurants in each county divided by thousands of residents in the county. I also interact the logged per capita establishments with their respective bans. For per capita bars, this creates a triple interaction tern between ban presence, drinking behavior, and drinking establishments.

The results in table 14 are largely robust to the inclusion of per capita bar and restaurant controls. Indeed, the coefficients on work bans, bar bans, and the interaction between employment and a work ban are the same as those in the core regression. Unexpectedly, the coefficients for county and state restaurant bans increased in magnitude, indicating that after controlling for how likely an individual is to encounter a restaurant ban, these bans are even more effective at changing smokers' behaviors. Nonetheless, the estimated coefficients still remain negative and statistically significant. Further, their magnitudes still remain larger than those for bar and work bans. For example, a state restaurant ban is correlated with a 4.1% decrease in the likelihood of a respondent being a current smoker, while a state work and bar bans are correlated with 2.1% and 1.4% increases in the probability of a respondent being a current smoker, respectively.

Overall, the interaction terms containing per capita establishments indicate that the higher the number of establishments per capita, the greater the probability of a respondent smoking less and quitting successfully. Hence, for individuals who drink, the total effects of a one-percent increase in bars per capita results in at least a 4.0% change in smoking

[19]These data come from the County Business Patterns: http://www.census.gov/econ/cbp/download/index.htm.

behavior when facing a county-level bar ban and a 0.8% change when facing a state-level ban. An increase in restaurants per capita in an area with a county-level ban correlates with between a 0.2% and 2.6% change in behavior, and between 0.8% and 1.8% for a state-level ban. The signs on the interaction terms and per capita establishment variables, however, indicate that bar and restaurant bans may work differently. For bars, the number of bars per capita is negatively associated with changes in smoking behavior, while the interaction term is positively associated with changes in smoking behavior. Hence, areas with higher levels of bars per capita have higher levels of smoking, and respondents living in these areas are more likely to smoke and more likely to smoke more frequently. At the same time, individuals who drink are much less likely to smoke and to smoke frequently if there is a ban and an increase in the number of bars per capita. The opposite is true for those facing restaurant bans. Nonetheless, the overall effect of enacting a smoking ban in either a bar or restaurant is negative for regressions of smoking initiation, prevalence, continuation, and frequency.

Table 15 controls for each combination of bans an individual could encounter and establishments per capita, combining specification III and IV. In this specification, the coefficients are consistent with those of previous regressions. Thus, including a control for restaurants per capita increases the magnitude of the coefficients for county and state restaurant bans, as well as the magnitudes for combinations of bans that include restaurants. As a result, combinations of bans that include restaurants become statistically significant. At the same time, the coefficients for per capita establishments and the interaction terms which include per capita measures are robust to the redefinition of the ban variables. Thus, controlling for the number of restaurants indicates an increase in the efficacy of bans in changing smokers' behaviors.

Interestingly, when controlling for different ban combinations and per capita establishments, the coefficients for individuals facing any county bans at the county-level are statistically significant and negative, except for those facing all three types of bans at different levels. All three bans bans at the state-level only have statistically significant correlations with initiation and prevalence. This difference from the rest of the specifications could indicate that bans have a diminishing marginal effect on changing the behavior of those who have smoked. This implies that, once acclimated to facing more restrictions on where to smoke, smokers may not perceive additional the additional opportunity costs that new bans impose. The results for this specification, however, need to be interpreted with caution because such low percentages of the sample actually face the various combinations of bans at different levels.

A Further Examination of Endogeneity.

Because of the positive coefficients on many of the state level bans and the small magnitudes on county level bans, I further examine whether endogeneity was a factor in these estimates by running all of my regressions with state fixed effects (Tables 16 through 20).[20] This method is stronger than simply using regional fixed effects because it controls for time-invariant characteristics in each state (Farrelly et al., 2001). Taken in conjunction with controls for time fixed effects, the inclusions of state fixed effects would control for cultural/regional and temporal variation in smoking attitudes.[21]

Across all of the models and specifications, the inclusion of state fixed effects generally decreases the magnitudes of the state-level ban and policy coefficients. In most cases, these smaller magnitudes result in a loss of statistical significance for the ban coefficients. Consequently, the state fixed effects regressions estimate smaller overall marginal effects of smoking bans on smoking behavior. The main exceptions to this trend are the coefficients on state-level bar bans in the initiation and prevalence models (Tables 16), where the bans are correlated with statistically significant negative decreases the number of people who have smoked and are current smokers within the sample population. Additionally, restaurant bans have a negative, statistically significant correlation with initiation and prevalence. In the estimates of continuation and smoking frequency, combinations of bar and restaurant bans tend to have negative, statistically significant correlations with these smoking behaviors.

Though the coefficients on the ban variables are not robust to inclusion of state fixed effects, the estimated marginal effects on the interaction terms for models are robust. From

[20]These tables report the coefficients for the tobacco policy variables. Despite using state fixed effects, the coefficients on the demographic control variables remained the same as with regional fixed effects.

[21]Because of the severe multicollinearity issues between all of the endogenous variables, a more aggressive method – namely a 2SLS probit regression – would not be possible because the estimates could not converge.

these findings, one can conclude that imposing 100% smoke-free bans in workplaces and bars can change the smoking behaviors of employees and patrons by up to 3.6%. This change in behavior, however, is still much smaller than the change in behavior associated with an increase in the price of cigarettes (up to 7.9%). For regressions controlling for bars and restaurants per capita, however, the estimated effects of bans on smoking continuation are larger than those for cigarette price (-10.6% vs. -6.4% in Table 19 and -9.7% vs. -6.4% in Table 20).

V. Conclusions and Directions for Further Research

This study examines the effect of 100% smoke-free bans in workplaces, bars, and restaurants on smoking initiation, prevalence, cessation, and frequency using both regional and state fixed effects. Generally, this paper finds that these bans exert little influence on smoking behavior. Depending on the specification, the magnitudes and the directions on the coefficients on the variables marking the presence of bans change. These changes were largely driven by problems endogeneity. When correcting for this issue using state fixed effects, the estimated marginal effects on smoking behavior for those encountering bans were robust. Nonetheless, the estimated effects of bans on the smoking behavior of those employed and those who drink were minimal, except in regressions controlling for bars and restaurants per capita. Despite these estimation issues, the results indicate that smokers react to bans in workplaces, less than those in restaurants and bars, supporting the notion that these factors need to be controlled for separately in future studies.

Three main policy implications emerge from my results. First, the results of this paper imply that increasing cigarette taxes is more effective in changing smoking behavior than implementing a ban or increasing the amount of per capita tobacco control funding.

In the majority of the estimates, the magnitude of an increase in cigarette prices are larger and of greater statistical significance than any of the magnitudes for an individual ban or the aggregate effect of all three types of ban. Hence, it appears that increasing taxes is the best policy in terms of minimizing the number of smokers. This finding is especially true in analyses of current smokers and their attempts to quit smoking. In all models of smoking cessation attempts, the ban variables are not statistically or economically significant, but the price variables are.

Second, in comparing county- and state level bans both before and after controlling for state fixed effects, the estimated effects of county bans are higher than those of state bans for individuals who encounter the bans. These results are consistent regardless of whether one controls for per capita establishments. This finding may imply that bans have diminishing marginal effects on smokers. Hence, as bans become more stringent – moving from the county to state level – smokers will not change their behavior proportionally.

Finally, this paper finds that estimates on restaurant bans have the highest magnitudes and those on workplace bans have the smallest. This finding is robust to controlling for the number of restaurants per capita and state fixed effects. Furthermore, in regressions controlling for the various combinations of smoking bans, the marginal effects of an individual restaurant ban are at times larger than those for different ban combinations. This finding implies that imposing bans in areas where individuals choose to go may have a larger effect than imposing bans on areas where their activities may already be limited (i.e. at work).

Though the effects of bans on smokers tend to be small relative to changes in price controls, one cannot rule out the benefits of these bans in terms of limiting individuals' exposure to secondhand smoke. In fact, previous studies find that smoking bans do not

have significant effects on smoker, but do decrease the amount of second hand smoke in workplaces, bars, and restaurants (Carpenter, 2009; Carpenter, Postolek, & Warman, 2010) and the number of smoking-related hospital admissions (Juster et al., 2007). Consequently, there are social welfare benefits in enacting 100% smoke-free bans.

To further examine the role 100% smoke-free laws play in the spectrum of tobacco control, further research is necessary. This study does not control for the presence of less smoking restrictions before the passage of these bans. In some regions, these bans may not have exogenously arisen; they may have simply amplified existing policies. Additionally, it is likely that because the data on bans this paper are only on 100% smoke-free bans, individuals who have been characterized as not facing bans may actually be facing other smoking restrictions.

Additionally, future research that takes into account the likelihood of commuting to an area without a ban would improve the accuracy of the estimates. At this point, this paper assumes that an individual will work, eat, and drink only in his or her own county. It does not take into account the ability of individuals to travel across county or state lines to areas without smoking bans. Depending on the ease of such travel, it is possible that a county level regulation would not affect certain individuals' smoking habits, just their driving habits.

Finally, case studies and more disaggregated geographic identifications for individuals in the study could be more effective at accounting for endogeneity. Because endogeneity is apparent in the state-level variables and likely affected county-level measures of smoking bans, matching respondents to policies on the municipality level could avoid some of these problems. In the end, there is more to be learned about these bans as they continue to shape the face of American tobacco control policy at all levels of government.

References

Adams, S., & Cotti, C. (2008). Drunk driving after the passage of smoking bans in bars. *Journal of Public Economics, 92*(5-6), 1288-1305.

Adda, J., & Cornaglia, F. (2006). Taxes, cigarette consumption, and smoking intensity. *American Economic Review, 96*(4), 1013-1028.

Adhikari, B., Kahende, J., Malarcher, A., Pechacek, T., & Tong, V. (2008). Smoking-attributable mortality, years of potential life lost, and productivity losses–United States, 2000-2004. *Morbidity and Mortality Weekly Report, 57*(45).

Americans for Nonsmokers' Rights. (2010). Local 100% smoke-free laws in all workplaces, restaurants, and bars: effective by year. ([URL: http://www.no-smoke.org/goingsmokefree.php?id=519#venues)

Bask, M. & Melkersson M. (2004) . Rationally addicted to drinking and smoking? *Applied Economics, 36*, 373-381

Becker, G.S., & Murphy, K.M. (1988). A theory of rational addiction. *The Journal of Political Economy, 96*(4), 675-700.

Benowitz, N. L. (2001). The nature of nicotine addiction. In P. Slovic (Ed.), *Smoking: Risk, perception, & policy* (pp. 159-187). Thousand Oaks, CA: Sage Publications.

Benowitz, N. L., Jacob, P. III, Kozlowski, L. T., & Yu, L. (1986) Influence of smoking fewer cigarettes on exposure to tar, nicotine, and carbon monoxide. *New England Journal of Medicine, 315*(21), 1310-1313.

Boyes, W. J ., & Marlow, M. L. (1996). The public demand for smoking bans. *Public Choice, 88*(1), 57-67.

Bitler M.P., Carpenter C., & Zavodny M. (2011). Smoking restrictions in bars and bartender smoking in the US, 1992-2007. *Tobacco Control, 20*(3), 196-200.

Brownson, R., Hopkins, D., & Wakefield, M. (2002). Effects of smoking restrictions in the workplace. *Annual Review of Public Health, 23*, 333-348.

Carpenter, C. S. (2007). How do workplace smoking laws work? quasi-experimental evidence from local laws in Ontario, Canada. *NBER Working Paper Series, w13133.*

Carpenter, C. S. (2009). The effects of local workplace smoking laws on smoking restrictions and exposure to smoke at work. *Journal of Human Resources, 44*(4), 1023-1046.

Carpenter, C. S., Postolek, S., & Warman, C. (2010) Public-place smoking laws and exposure to environmental tobacco smoke (ETS). *NBER Working Paper w15849.*

Centers for Disease Control and Prevention (CDC). (2011). State smoke-free laws for worksites, restaurants, and bars — united states, 2000–2010. *MMWR.Morbidity and Mortality Weekly Report, 60*(15), 472-5.

Chaloupka, F. (1992). Clean indoor air laws, addiction and cigarette smoking. *Applied Economics, 24*, 2, 193-205.

Chaloupka, F. J., & Saffer, H. (1992). Clean indoor air laws and the demand for cigarettes. *Contemporary Policy Issues, 10*(2), 72-83.

Cheng, K. W. & Kenkel, D. S. (2010). U.S. cigarette demand: 1944-2004. *The B.E. Journal of Economic Analysis & Policy, 10* (1), Article 78.

Cutler, D. M., & Glaeser, E. L. (2007). Social interactions and smoking. *NBER Working Paper Series, w13477.*

Czart, C., Pacula, R. L., Chaloupka, R. J., & Wechsler, H. (2001). The impact of prices and control policies on cigarette smoking among college students. *Contemporary Economic Policy, 19*(2), 135.

Deaton, A., & Muellbauer, J. (1980). Economics and consumer behavior. Cambridge: Cambridge University Press.

DeCicca, P., Kenkel, D., & Mathios, A. (2008). Cigarette taxes and the transition from youth to adult smoking: Smoking initiation, cessation, and participation. *Journal of Health Economics, 27*(4), 904-917.

DeCicca, P., Kenkel, D., Mathios, A., Shin, Y., & Lim, J. (2008). Youth smoking, cigarette prices, and anti-smoking sentiment. *Health Economics, 17*(6), 733-749.

Decker, S. (2000). Cigarettes and alcohol: Substitutes or complements? *NBER Working Paper No. 7535.*

Dedobbeleer, N., Beland, F. Contandriopoulos, A., & Adrian, M.(2004). Gender and the social context of smoking behavior. *Social Science Medicine, 58*(1), 1-12.

DiFranza, J. (1990). Alcoholism and smoking. *Journal of Studies on Alcohol, 51*(2), 130-5.

Dodgen, C. E. (2005) Nicotine dependence: understanding and applying the most effective treatment interventions. Washington, D.C.: American Psychological Association.

Dunham, J., & Marlow, M. L. (2000). Smoking laws and their differential effects on restaurants, bars, and taverns. *Contemporary Economic Policy, 18*(3), 326-333.

Farrelly, M. C., Bray, J. W., Pechacek, T., & Woollery, T. (2001). Response by Adults to Increases in Cigarette Prices by Sociodemographic Characteristics. *Southern Economic Journal, 68*(1), 156-165.

Farrelly, M., Evans, W., & Sfekas, A. (1999). The impact of workplace smoking bans: Results from a national survey. *Tobacco Control, 8*(3), 272-277.

Gallet, C. S., Hoover, G. A., & Lee, J. (2006) Putting out fires: An examination of the determinants of state clean indoor-air laws. *South Economic Journal, 73*(1), 112-124.

Hamilton, W. L., Biener, L., & Brennan, R. T. (2008). Do local tobacco regulations influence perceived smoking norms? Evidence from adult and youth surveys in Massachusetts. *Health Education Research, 23*(4), 709-722.

Harris J.E., & Chan S.W. (1999). The continuum-of addiction: Cigarette smoking in relation to price among Americans aged 15-29. *Health Economics, 8*(1), 8-86.

Hersch, J. (2000). Gender, income levels, and the demand for cigarettes. *Journal of Risk and Uncertainty, 21*(2/3), 263-282.

Irvine, I. J. & Nguyen, V. H., (2009), Toxic choices: The theory and impact of smoking bans, textitGeary Institute, University College Dublin, Working Paper no. 200951.

Juster, H., Loomis, B., Hinman, T., Farrelly, M., Hyland, A., & Bauer, U. (2007). Declines in hospital admissions for acute myocardial infarction in new york state after implementation of a comprehensive smoking ban. *American Journal of Public Health, 97*(11), 2035-2039.

Keeler, T. E., Hu, T., Manning, W. G., & Sung, H.-Y. (January 01, 2001). State Tobacco Taxation, Education, and Smoking: Controlling for the Effects of Omitted Variables. *National Tax Journal, 54,* 1, 83.

Kim, S., & Shanahan, J. (2003). Stigmatizing smokers: Public sentiment toward cigarette smoking and its relationship to smoking behaviors. *Journal of Health Communication, 8*(4), 343-367.

Knudsen, H. K., Boyd, S. E., & Studts, J. L. (2010). Substance abuse treatment counselors and tobacco use: A comparison of comprehensive and indoor-only workplace smoking bans. *Nicotine & Tobacco Research, 12*(11), 1151-1155.

Liu, H., & Tan, W. (2009). The effect of anti-smoking media campaign on smoking behavior: The California experience. *Annals of Economics and Finance, 10*(1), 29-47.

Marlow, M. (2007). Do Tobacco-Control Programs Lower Tobacco Consumption?. *Public Finance Review, 35*(6), 689-709.

National Institute on Alcohol Abuse and Alcoholism. (2007). Alcohol alert no: 71 alcohol and tobacco No. 71).

Picone, G., Sloan, F., & Trogdon, J. (2004). The effect of the tobacco settlement and smoking bans on alcohol consumption. *Health Economics, 13*(10), 1063-1080.

Raptou, E., Mattas, K., & Katrakilidis, C. (2009). Investigating smoker's profile: The role of psychosocial characteristics and the effectiveness of tobacco policy tools. *American Journal of Economics and Sociology, 68*(2), 603-638.

Ross, H., & Chaloupka, F. J. (2004). The effect of public policies and prices on youth smoking. *Southern Economic Journal, 70*(4), 796-815.

Siegel, M., & Biener, L. (2000). The impact of an antismoking media campaign on progression to established smoking: Results of a longitudinal youth study. *American Journal of Public Health, 90*(3), 380-386.

Singleton, P. (2008). Public sentiment and tobacco control policy. *Center for Policy Research Working Paper Series, w106.*

Smetters, K. A., & Gravelle, J. (2001). The exchange theory of teenage smoking and the counterproductivenes of moderate regulation. *NBER Working Papers Series, w8262.*

Sung, H.Y., & Keeler, T. E. (1994) Cigarette taxation and demand: an empirical model. *Contemporary Economic Policy, 12*(3): 91-100.

Wasserman, J., Manning, W. G., Newhouse, J. P., & Winkler, J. D. (1991). The effects of excise taxes and regulations on cigarette-smoking. *Journal of Health Economics, 10*(1), 43-64.

Varian, H. R. (1993). Intermediate microeconomics: A modern approach. New York: W.W. Norton.

Yurekli, A. A., & Zhang, P. (2000). The impact of clean indoor-air laws and cigarette smuggling on demand for cigarettes: An empirical model. *Health Economics, 9*(2), 159-170.

Tables and Figures

FIGURE 1. Changes in Cigarette Consumption for Individuals with Different Levels of Addiction Given an Increase in the Cost of Smoking in an Area with a Ban

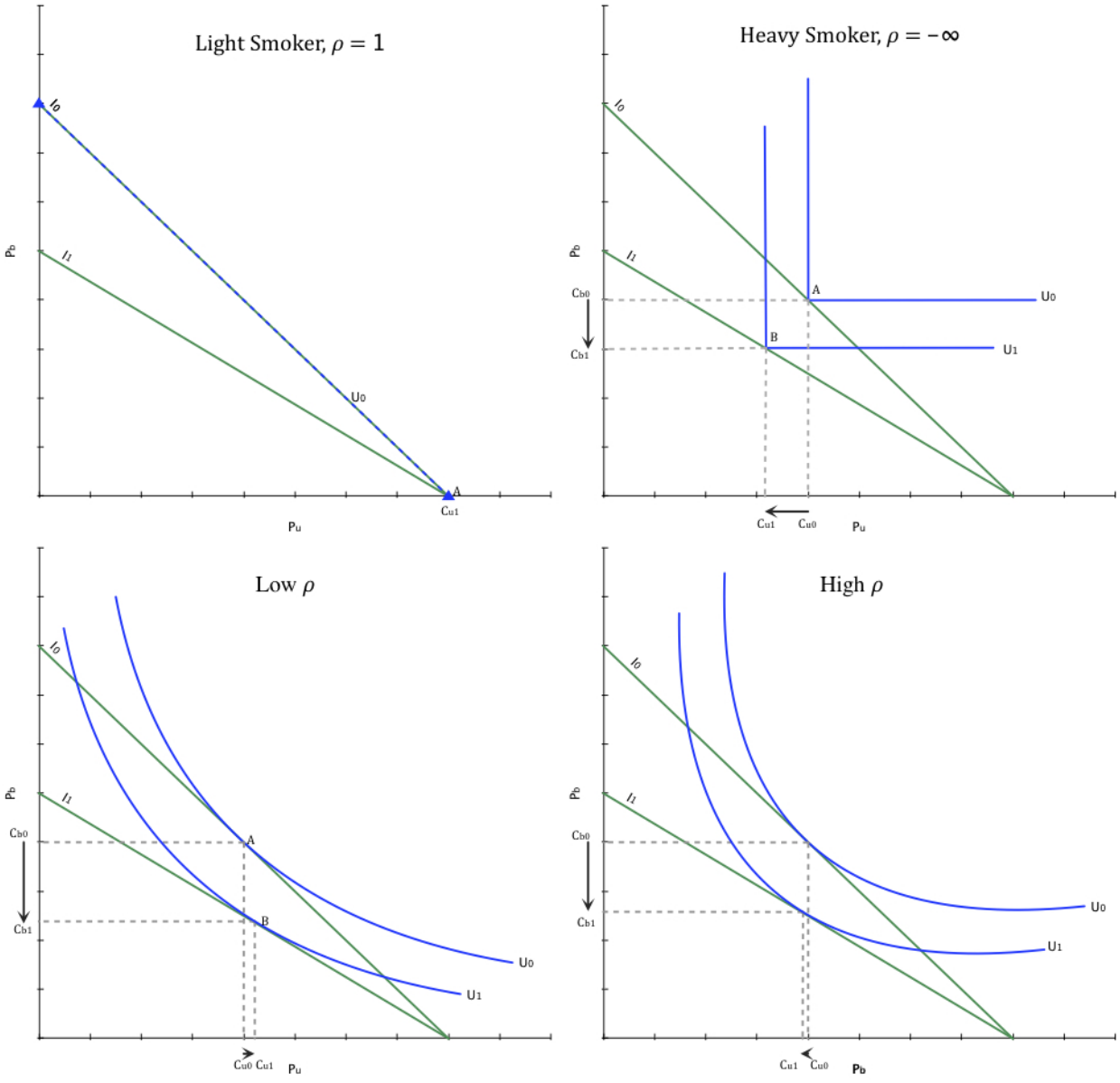

FIGURE 2. Trends in Smoking Rates and Ban Presence

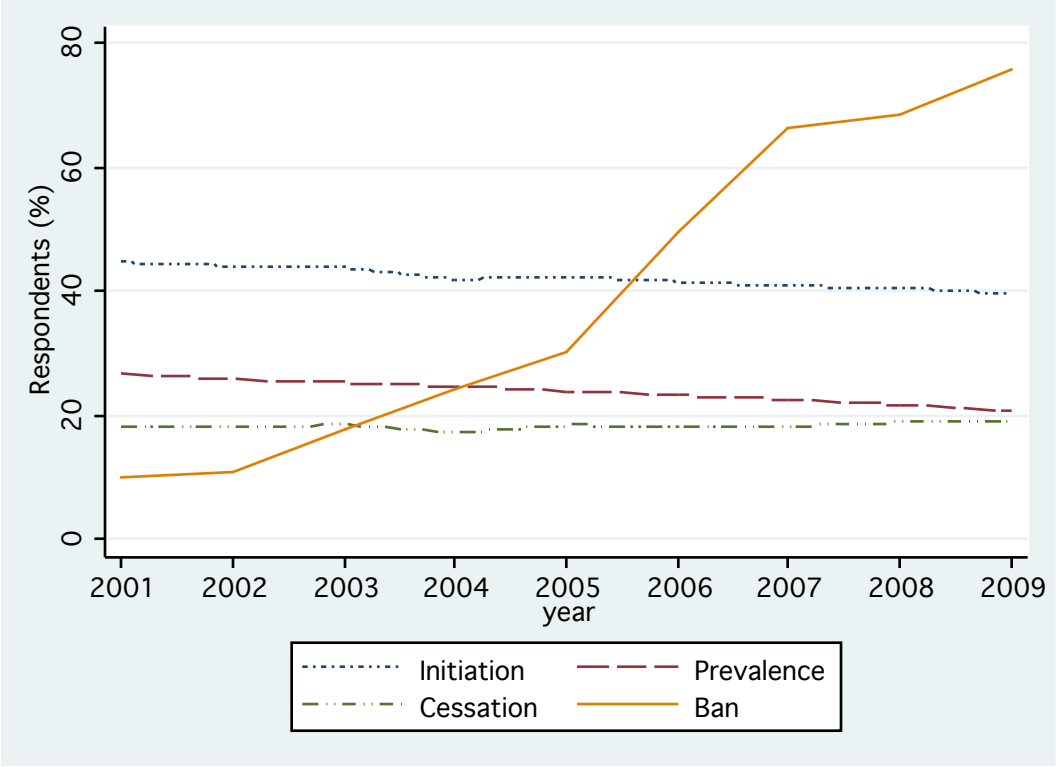

FIGURE 3. Trends in Smoking Frequency and Ban Presence

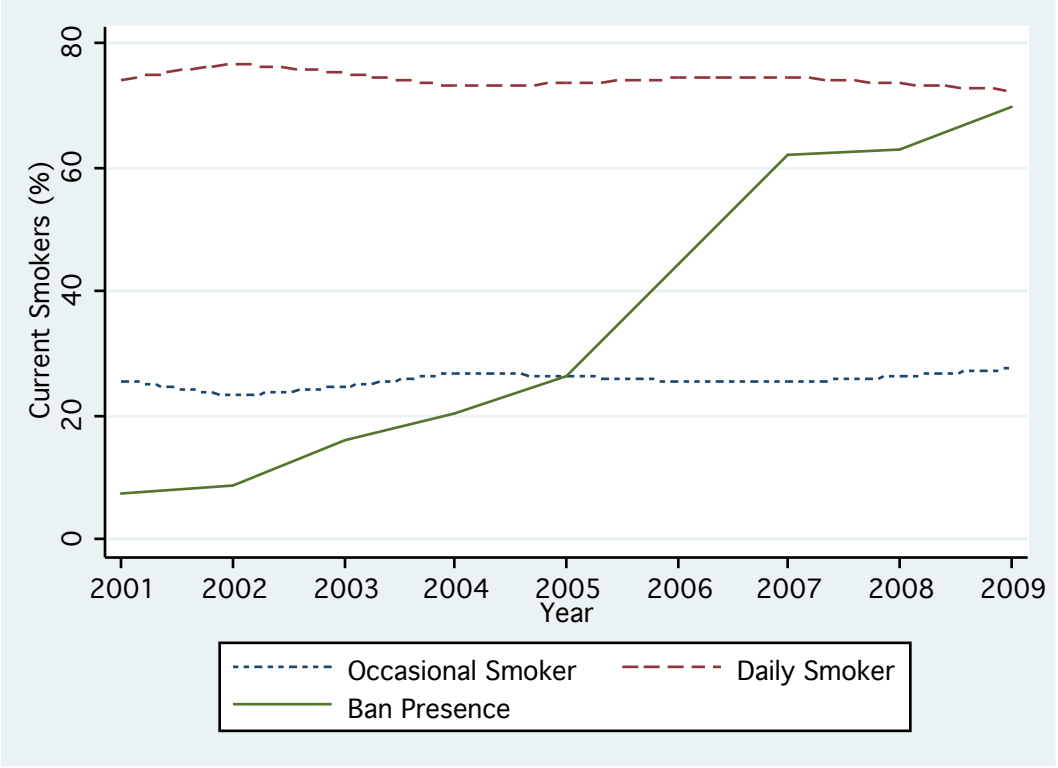

FIGURE 4. Trends in Cessation and Ban Presence

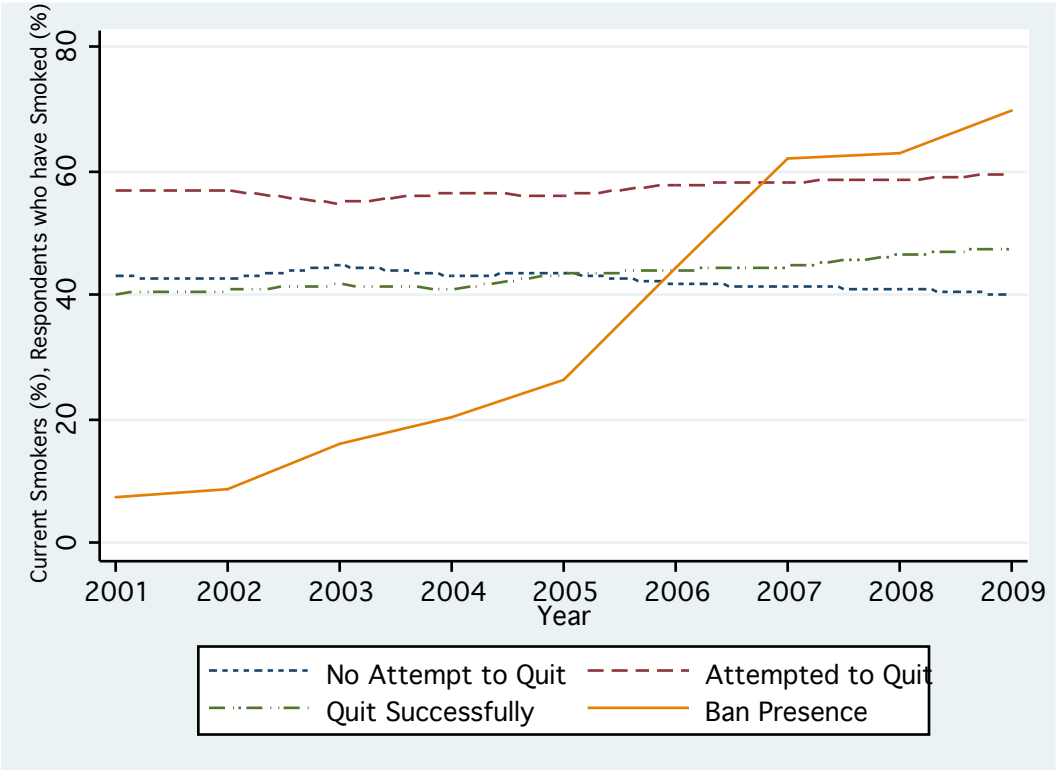

TABLE 1. Sample Demographics

	Mean (Standard Deviation)		
	All	No Ban	Ban
Female	0.60	0.60	0.61
	(0.49)	(0.49)	(0.49)
White	0.74	0.76	0.73
	(0.44)	(0.43)	(0.45)
African-American	0.10	0.11	0.08
	(0.30)	(0.31)	(0.27)
Hispanic (Non-White)	0.09	0.07	0.12
	(0.29)	(0.07)	(0.32)
Other Race	0.07	0.02	0.08
	(0.25)	(0.02)	(0.26)
Age	36.79	36.45	37.24
	(8.33)	(8.40)	(8.20)
Single	0.38	0.39	0.36
	(0.48)	(0.49)	(0.48)
Child Present	0.62	0.61	0.64
	(0.48)	(0.49)	(0.48)
Drinker	0.59	0.59	0.60
	(0.49)	(0.49)	(0.49)
New England	0.12	0.05	0.21
	0.32	(0.21)	(0.40)
Mid Atlantic	0.09	0.09	0.08
	(0.28)	(0.29)	(0.27)
East-North Central	0.09	0.12	0.06
	(0.29)	(0.32)	(0.24)
West-North Central	0.11	0.12	0.09
	(0.31)	(0.33)	(0.28)
South Atlantic	0.19	0.23	0.14
	(0.39)	(0.42)	(0.35)
East-South Central	0.06	0.08	0.02
	(0.23)	(0.27)	(0.15)
West-South Central	0.08	0.11	0.05
	(0.27)	(0.31)	(0.21)
Mountain	0.14	0.11	0.18
	(0.35)	(0.32)	(0.39)
Pacific	0.12	0.08	0.17
	(0.32)	(0.28)	(0.37)
Observations	964925	557018	407907

Notes: All variables except age are dummy variables.

TABLE 2. Sample Socioeconomic Characteristics

	Mean (Standard Deviation)		
	All	No Ban	Ban
HS Non-Graduate	0.07	0.07	0.07
	(0.26)	(0.26)	(0.26)
HS Graduate	0.26	0.28	0.24
	(0.44)	(0.45)	(0.43)
Some College	0.28	0.29	0.28
	(0.45)	(0.45)	(0.44)
College Graduate	0.38	0.36	0.41
	(0.49)	(0.48)	(0.49)
Income <$10,000	0.05	0.05	0.04
	(0.21)	(0.21)	(0.20)
Income <$15,000	0.04	0.04	0.04
	(0.20)	(0.20)	(0.19)
Income <$20,000	0.06	0.07	0.06
	(0.24)	(0.25)	(0.23)
Income <$25,000	0.08	0.09	0.07
	(0.27)	(0.28)	(0.26)
Income <$35,000	0.12	0.13	0.10
	(0.32)	(0.34)	(0.30)
Income <$50,000	0.17	0.18	0.15
	(0.37)	(0.38)	(0.36)
Income <$75,000	0.19	0.19	0.19
	(0.39)	(0.39)	(0.39)
Income>$75,000	0.29	0.25	0.34
	(0.45)	(0.43)	(0.47)
Employed	0.77	0.77	0.77
	(0.42)	(0.42)	(0.42)
Observations	964925	557018	407907

Notes: All variables are dummy variables.

TABLE 3. Sample Smoking Statistics

	Mean (Standard Deviation)		
	All	No Ban	Ban
Ever Smoked	0.42	0.44	0.40
	(0.49)	(0.50)	(0.49)
Current Smoker	0.24	0.26	0.21
	(0.43)	(0.44)	(0.40)
Occasional Smoker	0.06	0.60	0.60
	(0.24)	(0.24)	(0.23)
Daily Smoker	0.28	0.29	0.15
	0.38	(0.40)	(0.36)
Attempt to Quit	0.57	0.57	0.59
	(0.49)	(0.50)	(0.49)
Former Smoker	0.44	0.41	0.48
	(0.50)	(0.49)	(0.50)
Cigarette Price	4.41	4.31	4.55
	(0.68)	(0.59)	(0.76)
State Funding	2.79	2.86	2.70
	(2.80)	(2.75)	(2.87)
Alcohol Price	8.36	8.44	8.26
	(0.46)	(0.46)	(0.45)
Bars Per Capita	0.19	0.20	0.15
	(0.22)	(0.23)	(0.14)
Restaurants Per Capita	0.72	0.72	0.71
	(0.41)	(0.41)	(0.39)

Notes: [1] 977,981 total individual observations, 564,614 not facing bans, 413,367 facing bans. [2] Quit looks at current smokers (231,228 individuals) of whom 146060 are facing bans and 85,168 are not facing bans. [3] Former smoker looks individuals who had smoked in their lifetime (408,498 individuals) of whom 246,134 live in an area without a ban and 162,364 live in an area with a ban. [4] Smoking variables are dummy variables. [5] 2,429 counties in the sample, 2,156 without bans and 273 with bans. [6] Minimum cigarette price: $3.02 (area with a ban); maximum cigarette price: $7.21 (area with and without ban). [7] Minimum per capita tobacco control funding: $0.00; maximum per capita tobacco control funding: $15.34 (area without ban). [8] Minimum alcohol price: $7.11 (area without a ban), Maximum alcohol price: $10.00 (area with a ban). [9] Minimum per capita bars (county-level, per 1000 people): 0.00 (areas with and without bans); maximum per capita bars: 1.70 (area without ban). [10] Minimum per capita restaurants(county-level, per 1000 people): 0.00 (areas with and without bans); maximum per capita bars: 4.48 (area without ban).

TABLE 4. Ban Statistics

	All Years	2001	2009
No Ban	0.59	0.90	0.25
	(0.49)	(0.39)	(0.43)
County Work Ban	0.07	0.05	0.16
	(0.25)	(0.23)	(0.37)
State Work Ban	0.23	0.00	0.45
	(0.42)	0.00	(0.50)
County Bar Ban	0.07	0.03	0.11
	(0.26)	(0.18)	(0.31)
State Bar Ban	0.25	0.02	0.54
	(0.43)	(0.16)	(0.50)
County Restaurant Ban	0.08	0.04	0.13
	(0.27)	(0.20)	(0.34)
State Restaurant Ban	0.31	0.05	0.59
	(0.46)	(0.22)	(0.49)
All 3 Bans - County Level	0.05	0.02	0.10
	(0.22)	0.15	(0.30)
All 3 Bans - State Level	0.16	0.00	0.39
	(0.37)	0.00	(0.49)
Observations	977981	76483	119036

Notes: All variables are dummy variables.

TABLE 5. Demographics of Non-Smokers and Current Smokers

	Never Smoked			Daily Smokers			Occasional Smokers		
Variable	All	No Ban	Ban	All	No Ban	Ban	All	No Ban	Ban
Female	0.62	0.62	0.62	0.59	0.59	0.59	0.56	0.57	0.56
	(0.49)	(0.49)	(0.49)	(0.49)	(0.49)	(0.49)	(0.50)	(0.50)	(0.50)
White	0.71	0.73	0.70	0.79	0.80	0.77	0.69	0.67	0.71
	(0.45)	(0.45)	(0.46)	(0.41)	(0.40)	(0.42)	(0.46)	(0.47)	(0.45)
African American	0.11	0.13	0.09	0.09	0.09	0.07	0.11	0.09	0.12
	(0.31)	(0.34)	(0.28)	(0.28)	(0.29)	(0.26)	(0.31)	(0.28)	(0.32)
Hispanic	0.11	0.08	0.13	0.06	0.05	0.08	0.12	0.15	0.10
	(0.31)	(0.28)	(0.34)	(0.23)	(0.21)	(0.27)	(0.32)	(0.36)	(0.30)
Asian/Pacific Islander	0.03	0.02	0.05	0.01	0.01	0.02	0.02	0.02	0.02
	(0.18)	(0.16)	(0.21)	(0.11)	(0.10)	(0.14)	(0.14)	(0.15)	(0.13)
American Indian	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03
	(0.11)	(0.11)	(0.10)	(0.14)	(0.15)	(0.13)	(0.17)	(0.16)	(0.17)
Other Race	0.02	0.02	0.03	0.03	0.03	0.04	0.03	0.04	0.03
	(0.15)	(0.15)	(0.16)	(0.18)	(0.17)	(0.19)	(0.18)	(0.19)	(0.17)
Age	36.26	35.89	36.73	37.00	36.70	37.54	35.42	35.97	35.05
	(8.33)	(8.38)	(8.23)	(8.49)	(8.51)	(8.41)	(8.65)	(8.51)	(8.72)
Single	0.35	0.36	0.33	0.50	0.50	0.51	0.50	0.49	0.51
	(0.48)	(0.48)	(0.47)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)
Child Present	0.64	0.63	0.66	0.58	0.58	0.57	0.57	0.58	0.56
	(0.48)	(0.48)	(0.47)	(0.49)	(0.49)	(0.50)	(0.50)	(0.49)	(0.50)
Drinker	0.56	0.55	0.56	0.62	0.61	0.63	0.72	0.73	0.72
	(0.50)	(0.50)	(0.50)	(0.49)	(0.49)	(0.48)	(0.45)	(0.44)	(0.45)
Observations	565959	316493	249466	172084	110338	110338	59755	23657	36098

Notes: All variables except age are dummy variables

TABLE 6. Socioeconomic Characteristics of Non-Smokers and Current Smokers

	Never Smoked			Daily Smokers			Occasional Smokers		
Variable	All	No Ban	Ban	All	No Ban	Ban	All	No Ban	Ban
HS Non Graduate	0.05	0.05	0.06	0.14	0.14	0.13	0.10	0.10	0.10
	(0.22)	(0.22)	(0.23)	(0.35)	(0.35)	(0.34)	(0.30)	(0.29)	(0.30)
HS Graduate	0.22	0.23	0.20	0.41	0.41	0.39	0.31	0.31	0.30
	(0.41)	(0.42)	(0.40)	(0.49)	(0.49)	(0.49)	(0.46)	(0.46)	(0.46)
Some College	0.27	0.28	0.26	0.30	0.30	0.31	0.32	0.32	0.32
	(0.44)	(0.45)	(0.43)	(0.46)	(0.46)	(0.46)	(0.47)	(0.46)	(0.47)
College Degree	0.46	0.44	0.49	0.15	0.14	0.16	0.27	0.27	0.29
	(0.50)	(0.50)	(0.50)	(0.36)	(0.35)	(0.37)	(0.44)	(0.44)	(0.46)
Income <$10,000	0.04	0.04	6.29	0.08	0.08	0.08	0.07	0.07	0.07
	(0.19)	(0.19)	(1.96)	(0.28)	(0.27)	(0.27)	(0.25)	(0.25)	(0.25)
Income<$15,000	0.03	0.03	0.04	0.07	0.07	0.07	0.06	0.06	0.06
	(0.18)	(0.18)	(0.19)	(0.25)	0.25	(0.25)	(0.24)	(0.24)	(0.24)
Income<$20,000	0.05	0.06	0.03	0.11	0.11	0.09	0.09	0.09	0.08
	(0.22)	(0.23)	(0.18)	(0.30)	(0.31)	(0.29)	(0.28)	(0.29)	(0.30)
Income <$25,000	0.07	0.08	0.05	0.12	0.13	0.11	0.11	0.11	0.10
	(0.26)	(0.27)	(0.22)	(0.33)	(0.33)	(0.32)	(0.31)	(0.31)	(0.30)
Income <$35,000	0.11	0.12	0.06	0.15	0.16	0.14	0.14	0.15	0.13
	(0.31)	(0.33)	(0.25)	(0.36)	(0.37)	(0.34)	(0.35)	(0.36)	(0.33)
Income <$50,000	0.16	0.18	0.09	0.18	0.19	0.17	0.17	0.18	0.16
	(0.37)	(0.38)	(0.29)	(0.39)	(0.39)	(0.38)	(0.38)	(0.38)	(0.37)
Income <$75,000	0.20	0.21	0.15	0.14	0.15	0.16	0.16	0.16	0.17
	(0.40)	(0.40)	(0.35)	(0.36)	(0.36)	(0.38)	(0.37)	(0.37)	(0.37)
Income>$75,000	0.33	0.29	0.38	0.13	0.12	0.17	0.20	0.18	0.24
	(0.47)	(0.45)	(0.49)	(0.34)	(0.32)	(0.34)	(0.40)	(0.38)	(0.43)
Working	0.78	0.79	0.78	0.72	0.72	0.71	0.74	0.74	0.75
	(0.41)	(0.41)	(0.42)	(0.45)	(0.45)	(0.45)	(0.44)	(0.44)	(0.43)
Observations	565959	316493	249466	172084	110338	110338	59755	23657	36098

Notes: All variables are dummy variables.

TABLE 7. Demographic Characteristics of Smokers with Respect to Quitting

	No Quit Attempt			Quit Attempt			Former Smokers		
Variable	All	No Ban	Ban	All	No Ban	Ban	All	No Ban	Ban
Sex	0.56	0.56	0.56	0.60	0.60	0.59	0.58	0.57	0.58
	(0.50)	(0.50)	(0.50)	(0.49)	(0.49)	(0.49)	(0.49)	(0.49)	(0.49)
White	0.80	0.81	0.78	0.74	0.75	0.72	0.82	0.83	0.80
	(0.40)	(0.39)	(0.41)	(0.44)	(0.43)	(0.45)	(0.39)	(0.38)	(0.40)
African American	0.07	0.08	0.06	0.11	0.12	0.09	0.05	0.06	0.04
	(0.26)	(0.27)	(0.24)	(0.31)	(0.32)	(0.29)	(0.22)	(0.24)	(0.20)
Hispanic	0.06	0.05	0.08	0.08	0.07	0.11	0.07	0.06	0.09
	(0.24)	(0.22)	(0.28)	(0.27)	(0.25)	(0.31)	(0.26)	(0.24)	(0.29)
Asian/Pacific Islander	0.01	0.01	0.02	0.02	0.01	0.02	0.02	0.01	0.02
	(0.11)	(0.10)	(0.13)	(0.13)	(0.11)	(0.15)	(0.13)	(0.11)	(0.15)
American Indian	0.02	0.02	0.02	0.02	0.03	0.02	0.01	0.02	0.01
	(0.15)	(0.15)	(0.14)	(0.15)	(0.16)	(0.15)	(0.12)	(0.13)	(0.11)
Other Race	0.03	0.03	0.04	0.04	0.03	0.04	0.03	0.02	0.03
	(0.17)	(0.16)	(0.19)	(0.18)	(0.18)	(0.20)	(0.16)	(0.15)	(0.17)
Age	37.53	37.25	38.04	35.90	35.57	36.45	38.69	38.43	39.02
	(8.27)	(8.30)	(8.20)	(8.70)	(8.75)	(8.60)	(7.75)	(7.89)	(7.55)
Single	0.50	0.50	0.50	0.50	0.50	0.50	0.32	0.32	0.31
	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.47)	(0.47)	(0.46)
Child Present	0.55	0.55	0.54	0.59	0.59	0.60	0.63	0.62	0.64
	(0.50)	(0.50)	(0.50)	(0.49)	(0.49)	(0.49)	(0.48)	(0.49)	(0.48)
Drinker	0.65	0.64	0.66	0.65	0.64	0.66	0.65	0.63	0.67
	(0.48)	(0.48)	(0.47)	(0.48)	(0.48)	(0.47)	(0.48)	(0.48)	(0.47)
Observations	98313	63420	34893	132915	82640	50275	180183	101685	78498

Notes: All variables except age are dummy variables.

TABLE 8. Socioeconomic Characteristics of Smokers with Respect to Quitting

	No Quit Attempt			Quit Attempt			Former Smokers		
Variable	All	No Ban	Ban	All	No Ban	Ban	All	No Ban	Ban
HS Non Graduate	0.13	0.13	0.13	0.13	0.13	0.13	0.07	0.06	0.06
	(0.34)	(0.34)	(0.34)	(0.34)	(0.34)	(0.33)	(0.26)	(0.24)	(0.23)
HS Graduate	0.40	0.40	0.38	0.37	0.38	0.36	0.26	0.29	0.25
	(0.49)	(0.49)	(0.48)	(0.48)	(0.48)	(0.48)	(0.44)	(0.45)	(0.44)
Some College	0.29	0.29	0.32	0.32	0.32	0.32	0.27	0.31	0.29
	(0.46)	(0.45)	(0.47)	(0.47)	(0.47)	(0.47)	(0.25)	(0.46)	(0.46)
College Degree	0.18	0.17	0.17	0.18	0.17	0.20	0.38	0.34	0.39
	(0.38)	(0.38)	(0.38)	(0.38)	(0.38)	(0.40)	(0.49)	(0.47)	(0.49)
Income <$10,000	0.07	0.07	0.08	0.08	0.08	0.08	0.05	0.03	0.03
	(0.26)	(0.26)	(0.27)	(0.27)	(0.27)	(0.27)	(0.21)	(0.18)	(0.17)
Income <$15,000	0.06	0.06	0.01	0.07	0.07	0.07	0.04	0.03	0.03
	(0.24)	(0.24)	(0.25)	0.25	(0.25)	(0.25)	(0.20)	(0.18)	(0.17)
Income <$20,000	0.09	0.10	0.11	0.10	0.11	0.10	0.07	0.05	0.04
	(0.29)	(0.30)	(0.31)	(0.30)	(0.31)	(0.30)	(0.25)	(0.22)	(0.21)
Income <$25,000	0.12	0.12	0.13	0.12	0.13	0.11	0.09	0.08	0.06
	(0.32)	(0.32)	(0.33)	(0.33)	(0.33)	(0.32)	(0.28)	(0.26)	(0.24)
Income <$35,000	0.15	0.16	0.16	0.15	0.16	0.17	0.12	0.12	0.10
	(0.36)	(0.37)	(0.37)	(0.36)	(0.37)	(0.37)	(0.33)	(0.33)	(0.29)
Income <$50,000	0.18	0.19	0.18	0.17	0.18	0.16	0.17	0.18	0.16
	(0.39)	(0.39)	(0.38)	(0.38)	(0.38)	(0.36)	(0.37)	(0.39)	(0.36)
Income <$75,000	0.16	0.16	0.15	0.15	0.14	0.16	0.19	0.22	0.21
	(0.37)	(0.37)	(0.35)	(0.36)	(0.35)	(0.36)	(0.39)	(0.41)	(0.40)
Income >$75,000	0.16	0.14	0.13	0.15	0.13	0.18	0.28	0.28	0.37
	(0.36)	(0.35)	(0.34)	(0.36)	(0.34)	(0.39)	(0.45)	(0.45)	(0.48)
Working	0.74	0.75	0.74	0.71	0.72	0.70	0.79	0.79	0.80
	(0.44)	(0.43)	(0.44)	(0.45)	(0.45)	(0.46)	(0.40)	(0.41)	(0.40)
Observations	98313	63420	34893	132915	82640	50275	180183	101685	78498

Notes: All variables are dummy variables.

TABLE 9. Regression Results for the Core Regression

	Initiation	Prevalence	Continuation	Frequency	Cessation
County Work Ban	-0.004	-0.004	-0.003	-0.019	0.002
	(1.444)	(1.501)	(0.556)	(1.703)	(0.308)
State Work Ban	0.009	0.014	0.022	0.054	0.000
	(3.448)**	(6.386)**	(5.284)**	(5.661)**	(0.074)
Work Ban * Employed	0.000	-0.005	-0.012	-0.028	0.003
	(0.104)	(2.985)**	(3.335)**	(3.403)**	(0.677)
County Bar Ban	-0.001	0.004	0.015	0.021	-0.004
	(0.110)	(1.121)	(1.972)*	(1.208)	(0.424)
State Bar Ban	0.035	0.022	0.016	0.042	-0.027
	(11.705)**	(8.699)**	(3.469)**	(3.750)**	(4.249)**
Bar Ban * Drinker	-0.004	-0.009	-0.021	-0.044	0.006
	(1.596)	(5.087)**	(6.105)**	(5.275)**	(1.216)
County Rest. Ban	-0.005	-0.008	-0.013	-0.020	0.000
	(1.278)	(2.209)*	(1.910)	(1.246)	(0.017)
State Rest. Ban	-0.049	-0.033	-0.021	-0.050	0.019
	(18.055)**	(14.666)**	(4.815)**	(4.788)**	(3.244)**
Cigarette Price	-0.014	-0.042	-0.074	-0.209	0.086
	(2.368)*	(8.378)**	(7.823)**	(9.440)**	(6.934)**
State Funding	0.002	0.000	-0.002	-0.001	-0.003
	(1.794)	(0.078)	(1.767)	(0.300)	(1.808)
Alcohol Price	-0.066	-0.010	0.041	0.122	-0.054
	(9.919)**	(1.890)	(3.967)**	(4.961)**	(3.971)**
Observations	964925	964925	404707	404707	227648
% Correctly Predicted	65.278	77.288	65.087	-	58.882

Notes: [1] Marginal effects reported for all dependent variables except smoking frequency. [2] Absolute value of z-statistics in parentheses [3] * significant at 5%, ** significant at 1%.

TABLE 10. Regression Results for Demographic and Socioeconomic Controls

	Initiation	Prevalence	Continuation	Frequency	Cessation
Female	-0.03**	-0.01**	0.01**	0.03**	0.02**
African-American	-0.09**	0.04**	-0.03**	-0.19**	0.12**
Hispanic	-0.11**	-0.06**	-0.28**	-0.18**	0.07**
Asian/Pacific Islander	-0.06**	0.04**	0.05**	-0.13**	0.06**
Native American	0.04**	0.05**	-0.01	0.05**	0.03**
Other Race	0.03**	0.05**	0.09**	0.02**	0.04**
Age	0.02**	0.02**	0.00**	0.02**	0.02**
Age Squared	0.00**	0.00**	0.00**	0.00**	0.00**
Single	0.04**	0.06**	0.10**	0.23**	-0.02
Child Present	-0.02**	-0.02**	-0.04**	-0.09**	0.04**
HS Graduate	-0.09**	-0.08**	-0.08**	-0.20**	0.01**
Some College	-0.16**	-0.13**	-0.01**	-0.39**	0.05**
College Graduate	-0.32**	-0.26**	-0.28**	-0.75**	0.06**
Income<$15,000	0.01	0.00	-0.00	0.01	-0.01
Income<$20,000	-0.01	0.00	-0.01	0.01	-0.01
Income <$25,000	-0.02**	-0.02**	-0.03**	-0.04**	-0.01**
Income <$35,000	-0.05**	-0.05**	-0.07**	-0.13**	-0.02**
Income <$50,000	-0.08**	-0.07**	-0.10**	-0.20**	-0.02**
Income <$75,000	-0.11**	-0.11**	-0.15**	-0.33**	-0.03**
Income>$75,000	-0.15**	-0.15**	-0.21**	-0.49**	-0.03**
Employed	-0.02	-0.02	-0.01**	-0.01**	-0.03**
Drinker	0.14**	0.10**	0.07**	0.11**	-0.01**

Notes: [1] Marginal effects reported for all dependent variables except smoking frequency. [2] * significant at 5%, ** significant at 1%.

TABLE 11. Pairwise Correlation Coefficients for Ban Variables

	Any Ban			County Ban			State Ban	
	Work	Bar	Rest.	Work	Bar	Rest.	Work	Bar
Any Bar Ban	0.67	-	-	-	-	-	-	-
Any Restaurant Ban	0.74	0.83	-	-	-	-	-	-
County Work Ban	0.49	0.37	0.37	-	-	-	-	-
County Bar Ban	0.27	0.41	0.34	0.60	-	-	-	-
County Restaurant Ban	0.28	0.32	0.39	0.64	0.88	-	-	-
State Work Ban	0.78	0.49	0.57	-0.17	-0.13	-0.14	-	-
State Bar Ban	0.57	0.84	0.70	0.05	-0.15	-0.17	0.61	-
State Restaurant Ban	0.62	0.69	0.83	0.00	-0.17	-0.20	0.70	0.85

Notes: [1] Correlation coefficients ≥ 0.75 may indicate a problem with multicollinearity.

TABLE 12. Regression Results for Combined Bar and Restaurant Bans

	Initiation	Prevalence	Continuation	Frequency	Cessation
County Work Ban	0.001	-0.001	-0.002	-0.017	-0.001
	(0.201)	(0.452)	(0.358)	(1.524)	(0.149)
State Work Ban	0.013	0.016	0.022	0.057	-0.001
	(4.960)**	(7.498)**	(5.519)**	(5.896)**	(0.269)
Work Ban ∗ Employed	-0.004	-0.008	-0.013	-0.030	0.004
	(1.918)	(4.334)**	(3.617)**	(3.687)**	(0.944)
County Bar/Rest. Ban	-0.022	-0.013	-0.005	-0.012	0.003
	(7.353)**	(5.484)**	(1.105)	(1.072)	(0.493)
State Bar/Rest. Ban	-0.038	-0.026	-0.012	-0.025	0.004
	(15.919)**	(12.883)**	(2.991)**	(2.695)**	(0.702)
Bar/Rest. Ban * Drinker	0.018	0.005	-0.013	-0.025	-0.001
	(8.491)**	(2.629)**	(3.777)**	(3.166)**	(0.120)
Cigarette Price	-0.011	-0.040	-0.073	-0.208	0.082
	(1.779)	(8.106)**	(7.857)**	(9.496)**	(6.683)**
State Funding	0.003	0.000	-0.002	0.000	-0.004
	(2.964)**	(0.613)	(1.705)	(0.129)	(2.313)*
Alcohol Price	-0.078	-0.016	0.041	0.118	-0.046
	(11.754)**	(2.868)**	(3.961)**	(4.881)**	(3.450)**
Observations	964925	964925	404707	404707	227648
% Correctly Predicted	65.270	77.297	65.095	-	58.879

Notes: [1] Marginal effects reported for all dependent variables except smoking frequency. [2] Absolute value of z-statistics in parentheses [3] * significant at 5%, ** significant at 1%.

TABLE 13. Regression Results for Ban Combinations

	Initiation	Prevalence	Continuation	Frequency	Cessation
CW	0.005	-0.002	-0.010	-0.055	0.014
	(0.711)	(0.362)	(0.961)	(2.164)*	(0.966)
SW	-0.012	-0.012	-0.015	-0.058	0.007
	(2.737)**	(3.295)**	(2.162)*	(3.522)**	(0.829)
CB	-	0.341	0.081	0.333	-
	-	(0.947)	(0.228)	(0.372)	-
CR	-0.012	-0.012	-0.015	-0.042	-0.011
	(1.783)	(2.176)*	(1.398)	(1.657)	(0.781)
SR	-0.072	-0.053	-0.053	-0.128	0.033
	(19.640)**	(17.950)**	(8.373)**	(8.595)**	(3.947)**
CW + CR	-0.004	-0.006	-0.010	-0.012	0.012
	(0.726)	(1.366)	(1.118)	(0.575)	(1.049)
CB + CR	-0.009	-0.006	0.001	0.002	0.006
	(2.114)*	(1.560)	(0.184)	(0.140)	(0.620)
SW + CR	-0.023	-0.023	-0.034	-0.094	-0.014
	(1.635)	(2.062)*	(1.523)	(1.792)	(0.478)
SW + SR	-0.026	-0.007	0.015	0.039	0.012
	(7.879)**	(2.696)**	(2.862)**	(3.145)**	(1.790)
SB + SR	-0.007	-0.010	-0.008	-0.029	-0.010
	(2.249)*	(3.599)**	(1.662)	(2.367)*	(1.432)
All County Bans	-0.009	-0.007	-0.002	-0.023	-0.005
	(2.904)**	(2.706)**	(0.483)	(2.033)*	(0.807)
CW + SR + SB	-0.027	-0.020	-0.007	-0.026	-0.006
	(6.645)**	(5.874)**	(1.105)	(1.633)	(0.678)
SW + CB + SR	-0.077	-0.028	0.032	0.083	0.032
	(3.059)**	(1.311)	(0.730)	(0.790)	(0.548)
SW + CB + CR	-0.013	-0.021	-0.030	-0.122	0.019
	(0.478)	(0.937)	(0.678)	(1.164)	(0.310)
All State Bans	-0.007	0.001	0.017	0.048	-0.007
	(2.564)*	(0.643)	(4.017)**	(4.893)**	(1.325)

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Notes: [1] C - county; S - state; W - work ban; B - bar ban; R - restaurant ban. [2] Marginal effects reported for all dependent variables except smoking frequency. [2] Absolute value of z-statistics in parentheses [3] * significant at 5%, ** significant at 1%.

Table 13 (continued)

	Initiation	Prevalence	Continuation	Frequency	Cessation
Work Ban ∗ Employed	0.001	-0.005	-0.011	-0.026	0.003
	(0.231)	(2.640)**	(3.166)**	(3.168)**	(0.704)
Bar Ban ∗ Drinker	-0.003	-0.009	-0.022	-0.044	0.005
	(1.534)	(5.053)**	(6.114)**	(5.316)**	(1.171)
Cigarette Price	-0.018	-0.046	-0.079	-0.229	0.086
	(2.893)**	(8.929)**	(8.107)**	(9.978)**	(6.693)**
State Funding	0.002	0.001	-0.001	0.002	-0.004
	(2.285)*	(0.904)	(0.930)	(0.775)	(2.028)*
Alcohol Price	-0.057	0.001	0.058	0.172	-0.057
	(8.302)**	(0.206)	(5.466)**	(6.869)**	(4.101)**
Observations	964923	964925	404707	404707	227647
% Correctly Predicted	65.274	77.287	65.113	-	58.911

Notes: [1] C - county; S - state; W - work ban; B - bar ban; R - restaurant ban. [2] Marginal effects reported for all dependent variables except smoking frequency. [2] Absolute value of z-statistics in parentheses [3] * significant at 5%, ** significant at 1%.

TABLE 14. Regression Results Controlling for Per Capita Bars and Restaurants

	Initiation	Prevalence	Continuation	Frequency	Cessation
County Work Ban	-0.004	-0.004	-0.003	-0.021	0.002
	(1.362)	(1.521)	(0.701)	(1.882)	(0.305)
State Work Ban	0.011	0.014	0.021	0.050	-0.001
	(4.279)**	(6.507)**	(4.974)**	(5.114)**	(0.092)
Work Ban * Employed	-0.001	-0.006	-0.014	-0.032	0.004
	(0.313)	(3.579)**	(4.056)**	(4.029)**	(0.841)
County Bar Ban	0.002	0.004	0.012	0.013	-0.002
	-0.331	-1.048	-1.599	-0.743	-0.249
State Bar Ban	0.034	0.021	0.014	0.038	-0.025
	(11.799)**	(8.562)**	(3.122)**	(3.451)**	(4.109)**
Bar Ban * D * Bars/Cap.	-0.042	-0.046	-0.080	-0.137	0.014
	(3.690)**	(4.882)**	(4.524)**	(3.264)**	(0.603)
Bars/Capita	0.011	0.034	0.071	0.169	-0.013
	(1.783)	(7.032)**	(7.789)**	(7.930)**	(1.089)
County Rest. Ban	-0.040	-0.029	-0.031	-0.058	0.004
	(7.069)**	(6.348)**	(3.364)**	(2.691)**	(0.357)
State Rest. Ban	-0.084	-0.055	-0.041	-0.092	0.023
	(17.529)**	(14.159)**	(5.268)**	(5.100)**	(2.294)*
Rest. Ban * Rest./Cap.	0.066	0.042	0.033	0.071	-0.008
	(9.138)**	(7.028)**	(2.894)**	(2.639)**	(0.520)
Rest./Capita	-0.007	-0.042	-0.094	-0.258	0.010
	(1.324)	(10.317)**	(12.456)**	(14.532)**	(1.088)
Cigarette Price	-0.016	-0.043	-0.076	-0.215	0.086
	(2.677)**	(8.660)**	(8.027)**	(9.672)**	(6.936)**
State Funding	0.001	-0.001	-0.003	-0.001	-0.003
	(1.001)	(0.720)	(2.024)*	(0.404)	(1.679)
Alcohol Price	-0.065	-0.009	0.042	0.124	-0.054
	(9.710)**	(1.695)	(4.058)**	(5.060)**	(3.982)**
Observations	964925	964925	404707	404707	227648
% Correctly Predicted	65.275	77.288	65.125	-	58.872

Notes: [1] D - drinker; Cap - capita. [2] Marginal effects reported for all dependent variables except smoking frequency. [3] Absolute value of z-statistics in parentheses [4] * significant at 5%, ** significant at 1% [5] The ban and interaction term variables are dummy variables. [4] Per capita variables represent the log of the number of establishments per 1000 people.

TABLE 15. Regression Results for Ban Combinations, Controlling for Bars and Restaurants Per Capita

	Initiation	Prevalence	Continuation	Frequency	Cessation
CW	0.005	-0.001	-0.009	-0.051	0.013
	(0.798)	(0.186)	(0.823)	(2.033)*	(0.939)
SW	-0.013	-0.013	-0.017	-0.062	0.008
	(2.821)**	(3.582)**	(2.439)*	(3.784)**	(0.846)
CB	-	0.344	0.080	0.327	-
	-	(0.956)	(0.224)	(0.366)	-
CR	-0.044	-0.032	-0.034	-0.083	-0.007
	(5.833)**	(5.303)**	(2.728)**	(2.889)**	(0.426)
SR	-0.102	-0.071	-0.072	-0.173	0.037
	(19.619)**	(17.488)**	(8.173)**	(8.327)**	(3.193)**
CW + CR	-0.038	-0.027	-0.028	-0.052	0.016
	(5.750)**	(5.052)**	(2.584)**	(2.053)*	(1.120)
CB + CR	-0.041	-0.028	-0.021	-0.050	0.012
	(7.097)**	(5.912)**	(2.326)*	(2.323)*	(0.977)
SW + CR	-0.054	-0.044	-0.055	-0.142	-0.011
	(3.843)**	(3.830)**	(2.339)*	(2.606)**	(0.343)
SW + SR	-0.058	-0.029	-0.005	-0.009	0.016
	(11.596)**	(7.121)**	(0.637)	(0.477)	(1.535)
SB + SR	-0.043	-0.032	-0.028	-0.071	-0.004
	(8.391)**	(7.662)**	(3.436)**	(3.664)**	(0.378)
All County Bans	-0.040	-0.028	-0.022	-0.068	0.001
	(8.621)**	(7.271)**	(2.976)**	(3.881)**	(0.052)
CW + SR + SB	-0.060	-0.042	-0.032	-0.084	0.000
	(10.707)**	(9.376)**	(3.541)**	(3.918)**	(0.015)
SW + CB + SR	-0.107	-0.048	0.014	0.036	0.038
	(4.255)**	(2.274)*	(0.318)	(0.339)	(0.641)
SW + CB + CR	-0.039	-0.040	-0.049	-0.172	0.024
	(1.453)	(1.762)	(1.097)	(1.625)	(0.396)
All State Bans	-0.038	-0.021	-0.005	-0.002	-0.002
	(8.322)**	(5.494)**	(0.646)	(0.145)	(0.160)

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Table 15: (continued)

	Initiation	Prevalence	Continuation	Frequency	Cessation
Work Ban ∗ Employed	0.000	-0.006	-0.013	-0.030	0.004
	(0.027)	(3.198)**	(3.847)**	(3.755)**	(0.863)
Bar Ban ∗ D ∗ Bars/Cap.	-0.039	-0.046	-0.084	-0.155	0.011
	(3.456)**	(4.882)**	(4.717)**	(3.665)**	(0.463)
Bars/Capita	0.012	0.035	0.072	0.171	-0.012
	(2.080)*	(7.260)**	(7.847)**	(7.989)**	(1.060)
Rest. Ban∗ Rest./Cap.	0.064	0.041	0.033	0.074	-0.007
	(8.762)**	(6.763)**	(2.879)**	(2.731)**	(0.480)
Rest./Capita	-0.007	-0.042	-0.095	-0.259	0.011
	(1.394)	(10.372)**	(12.474)**	(14.547)**	(1.116)
Cigarette Price	-0.021	-0.049	-0.083	-0.238	0.086
	(3.303)**	(9.370)**	(8.452)**	(10.344)**	(6.712)**
State Funding	0.001	0.000	-0.002	0.002	-0.003
	(1.585)	(0.286)	(1.213)	(0.611)	(1.909)
Alcohol Price	-0.055	0.003	0.059	0.174	-0.057
	(7.989)**	(0.455)	(5.562)**	(6.940)**	(4.115)**
Observations	964923	964925	404707	404707	227647
% Correctly Predicted	65.26	77.295	65.15	-	58.921

Notes: [[1] C - county; S - state; W - work ban; B - bar ban; R - restaurant ban; D - drinker; Cap - capita. [2] Marginal effects reported for all dependent variables except smoking frequency. [2] Absolute value of z-statistics in parentheses [3] * significant at 5%, ** significant at 1%. [4] Per capita variables represent the log of the number of establishments per 1000 people.

TABLE 16. Regression Results for the Core Regression with State Fixed Effects

	Initiation	Prevalence	Continuation	Frequency	Cessation
County Work Ban	0.002	0.003	0.002	-0.001	0.004
	(0.668)	(0.943)	(0.444)	(0.059)	(0.546)
State Work Ban	0.003	0.004	0.002	0.014	0.001
	(1.000)	(1.370)	(0.450)	(1.110)	(0.210)
Work Ban $*$ Employed	0.000	-0.006	-0.012	-0.026	0.002
	(0.041)	(3.082)**	(3.442)**	(3.237)**	(0.502)
County Bar Ban	0.001	0.002	0.008	0.009	0.003
	(0.227)	(0.508)	(1.003)	(0.520)	(0.289)
State Bar Ban	-0.015	-0.01	-0.004	-0.007	-0.017
	(3.284)**	(2.636)**	(0.501)	(0.426)	(1.760)
Bar Ban $*$ Drinker	-0.006	-0.011	-0.024	-0.05	0.007
	(2.597)**	(6.165)**	(6.701)**	(6.047)**	(1.561)
County Rest. Ban	-0.009	-0.009	-0.013	-0.024	-0.004
	(1.999)*	(2.505)*	(1.756)	(1.409)	(0.384)
State Rest. Ban	0.003	0.005	0.011	0.024	0.006
	(0.707)	(1.258)	(1.598)	(1.419)	(0.603)
Cigarette Price	0.003	-0.028	-0.064	-0.163	0.06
	(0.285)	(3.881)**	(4.675)**	(5.029)**	(3.357)**
State Funding	0.002	0.002	0.003	0.011	-0.007
	(1.622)	(2.102)*	(1.340)	(2.432)*	(2.803)**
Alcohol Price	-0.004	0.012	0.029	0.093	-0.07
	(0.227)	(0.836)	(1.068)	(1.442)	(1.959)
Observations	964925	964925	404707	404707	227648
% Correctly Predicted	65.317	77.299	65.175	-	58.989

Notes: [1] Marginal effects reported for all dependent variables except smoking frequency. [2] Absolute value of z-statistics in parentheses [3] * significant at 5%, ** significant at 1%.

TABLE 17. Regression Results for Combined Bar and Restaurant Bans with State Fixed Effects

	Initiation	Prevalence	Continuation	Frequency	Cessation
County Work Ban	0.003	0.003	0.002	-0.002	0.004
	(0.823)	(0.964)	(0.393)	(0.167)	(0.602)
State Work Ban	0.004	0.004	0.002	0.013	0.000
	(1.222)	(1.455)	(0.384)	(1.061)	(0.036)
Work Ban ∗ Employed	-0.003	-0.008	-0.013	-0.029	0.003
	(1.415)	(4.162)**	(3.760)**	(3.536)**	(0.741)
County Bar/Rest. Ban	-0.017	-0.013	-0.009	-0.021	0.002
	(5.262)**	(4.762)**	(1.707)	(1.699)	(0.251)
State Bar/Rest. Ban	-0.018	-0.009	0.005	0.011	-0.004
	(5.961)**	(3.591)**	(1.048)	(0.935)	(0.649)
Bar/Rest. Ban * Drinker	0.013	0.001	-0.014	-0.030	0.001
	(6.017)**	(0.666)	(4.222)**	(3.795)**	(0.120)
Cigarette Price	0.000	-0.031	-0.067	-0.170	0.059
	(0.046)	(4.280)**	(4.895)**	(5.254)**	(3.328)**
State Funding	0.002	0.002	0.002	0.011	-0.007
	(1.488)	(1.940)	(1.261)	(2.352)*	(2.811)**
Alcohol Price	-0.009	0.008	0.025	0.085	-0.075
	(0.487)	(0.576)	(0.926)	-1.326	(2.095)*
Observations	964925	964925	404707	404707	227648
% Correctly Predicted	65.313	77.293	65.162	-	58.997

Notes: [1] Marginal effects reported for all dependent variables except smoking frequency. [2] Absolute value of z-statistics in parentheses [3] * significant at 5%, ** significant at 1%.

TABLE 18. Regression Results for Ban Combinations with State Fixed Effects

	Initiation	Prevalence	Continuation	Frequency	Cessation
CW	0.002	0.001	-0.004	-0.026	0.011
	(0.235)	(0.089)	(0.323)	(1.022)	(0.795)
SW	0.007	0.003	-0.004	0.004	-0.022
	(1.160)	(0.591)	(0.365)	(0.178)	(1.811)
CB	-	0.383	0.13	0.475	
	-	(1.057)	(0.374)	(0.532)	
CR	-0.008	-0.009	-0.013	-0.032	-0.011
	(1.162)	(1.561)	(1.162)	(1.260)	(0.787)
SR	0.006	0.001	-0.001	-0.004	-0.007
	(1.215)	(0.237)	(0.141)	(0.213)	(0.613)
CW + CR	-0.011	-0.008	-0.007	-0.01	0.008
	(1.906)	(1.621)	(0.798)	(0.451)	(0.63)
CB + CR	-0.008	-0.007	-0.004	-0.012	0.01
	(1.665)	(1.786)	(0.548)	(0.703)	(1.073)
SW + CR	0.001	-0.008	-0.027	-0.06	-0.02
	(0.035)	(0.692)	(1.141)	(1.087)	(0.627)
SW + SR	0.006	0.012	0.023	0.057	0.014
	(1.044)	(2.724)**	(2.719)**	(2.883)**	(1.316)
SB + SR	-0.012	-0.004	0.01	0.023	-0.017
	(2.932)**	(1.125)	(1.668)	(1.513)	(1.984)*
All County Bans	-0.005	-0.005	-0.003	-0.017	-0.001
	(1.685)	(1.794)	(0.635)	(1.417)	(0.134)
CW + SR + SB	-0.007	0.001	0.015	0.026	-0.001
	(1.039)	(0.092)	(1.412)	(1.055)	(0.103)
SW + CB + SR	-0.057	-0.012	0.051	0.14	0.04
	(2.204)*	(0.536)	(1.134)	(1.306)	(0.669)
SW + CB + CR	0.014	-0.003	-0.019	-0.075	0.01
	(0.499)	(0.112)	(0.415)	(0.702)	(0.162)
All State Bans	-0.008	-0.002	0.009	0.028	-0.009
	(2.752)**	(0.753)	(1.942)	(2.535)*	(1.452)

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Notes: [1] C - county; S - state; W - work ban; B - bar ban; R - restaurant ban. [2] Marginal effects reported for all dependent variables except smoking frequency. [2] Absolute value of z-statistics in parentheses [3] * significant at 5%, ** significant at 1%.

Table 18 (continued)

	Initiation	Prevalence	Continuation	Frequency	Cessation
Work Ban ∗ Employed	0	-0.006	-0.012	-0.026	0.002
	(0.077)	(3.098)**	(3.451)**	(3.235)**	(0.499)
Bar Ban ∗ Drinker	-0.006	-0.011	-0.024	-0.05	0.007
	(2.589)**	(6.146)**	(6.677)**	(6.017)**	(1.547)
Cigarette Price	0.003	-0.028	-0.063	-0.162	0.061
	(0.311)	(3.795)**	(4.599)**	(4.983)**	(3.417)**
State Funding	0.002	0.002	0.003	0.011	-0.007
	(1.558)	(2.099)*	(1.383)	(2.457)*	(2.596)**
Alcohol Price	-0.006	0.014	0.034	0.102	-0.065
	(0.316)	(0.925)	(1.227)	(1.577)	(1.820)
Observations	964923	964925	404707	404707	227647
% Correctly Predicted	65.316	77.297	65.177	-	58.999

Notes: [1] C - county; S - state; W - work ban; B - bar ban; R - restaurant ban. [2] Marginal effects reported for all dependent variables except smoking frequency. [2] Absolute value of z-statistics in parentheses [3] * significant at 5%, ** significant at 1%.

TABLE 19. Regression Results Controlling for Per Capita Bars and Restaurants with State Fixed Effects

	Initiation	Prevalence	Continuation	Frequency	Cessation
County Work Ban	0.002	0.003	0.003	0.001	0.004
	(0.669)	(1.064)	(0.585)	(0.073)	(0.538)
State Work Ban	0.006	0.006	0.005	0.018	0.001
	(1.728)	(2.079)*	(0.999)	(1.498)	(0.085)
Work Ban * Employed	-0.001	-0.007	-0.015	-0.032	0.003
	(0.236)	(3.746)**	(4.266)**	(3.982)**	(0.695)
County Bar Ban	0.003	0.002	0.006	0.005	0.004
	(0.623)	(0.534)	(0.788)	(0.252)	(0.423)
State Bar Ban	-0.014	-0.010	-0.007	-0.015	-0.015
	(3.063)**	(2.814)**	(0.919)	(0.873)	(1.621)
Bar Ban * D * Bars/Capita	-0.047	-0.053	-0.091	-0.175	0.026
	(4.020)**	(5.493)**	(5.002)**	(4.055)**	(1.086)
Bars/Capita	0.066	0.071	0.092	0.219	-0.006
	(8.684)**	(11.409)**	(7.809)**	(7.944)**	(0.401)
County Rest. Ban	-0.032	-0.023	-0.026	-0.049	-0.004
	(5.365)**	(4.717)**	(2.738)**	(2.226)*	(0.337)
State Rest. Ban	-0.022	-0.010	-0.002	-0.002	0.005
	(3.506)**	(1.980)*	(0.222)	(0.071)	(0.395)
Rest. Ban * Rest./Capita	0.043	0.025	0.021	0.039	0.002
	(5.803)**	(4.036)**	(1.803)	(1.417)	(0.100)
Rest./Capita	-0.012	-0.040	-0.082	-0.222	0.003
	(2.319)*	(9.381)**	(10.222)**	(11.785)**	(0.286)
Cigarette Price	0.002	-0.028	-0.064	-0.161	0.060
	(0.204)	(3.890)**	(4.644)**	(4.965)**	(3.351)**
State Funding	0.002	0.002	0.002	0.010	-0.007
	(1.480)	(1.821)	(1.087)	(2.177)*	(2.783)**
Alcohol Price	0.001	0.016	0.032	0.097	-0.070
	(0.053)	(1.080)	(1.152)	(1.506)	(1.944)
Observations	964925	964925	404707	404707	227648
% Correctly Predicted	65.311	77.304	65.166	-	58.985

Notes: [1] Marginal effects reported for all dependent variables except smoking frequency. [2] Absolute value of z-statistics in parentheses [3] * significant at 5%, ** significant at 1% [4] The ban and interaction term variables are dummy variables. [4] Per capita variables represent the log of the number of establishments per 1000 people.

TABLE 20. Regression Results for Ban Combinations, Controlling for Bars and Restaurants Per Capita with State Fixed Effects

	Initiation	Prevalence	Continuation	Frequency	Cessation
CW	0.003	0.000	-0.005	-0.031	0.012
	(0.379)	(0.063)	(0.456)	(1.191)	(0.803)
SW	0.007	0.003	-0.003	0.003	-0.023
	(1.140)	(0.564)	(0.357)	(0.122)	(1.863)
CB	-	0.376	0.118	0.439	-
	-	(1.039)	(0.338)	(0.491)	-
CR	-0.030	-0.021	-0.024	-0.053	-0.012
	(3.921)**	(3.408)**	(1.950)	(1.836)	(0.772)
SR	-0.018	-0.013	-0.014	-0.028	-0.009
	(2.667)**	(2.318)*	(1.262)	(1.073)	(0.590)
CW + CR	-0.034	-0.021	-0.021	-0.037	0.006
	(4.980)**	(3.839)**	(1.911)	(1.424)	(0.414)
CB + CR	-0.029	-0.021	-0.020	-0.046	0.011
	(4.960)**	(4.321)**	(2.131)*	(2.049)*	(0.847)
SW + CR	-0.016	-0.015	-0.030	-0.065	-0.022
	(1.018)	(1.218)	(1.241)	(1.136)	(0.695)
SW + SR	-0.018	-0.002	0.012	0.036	0.012
	(2.642)**	(0.273)	(1.092)	(1.423)	(0.871)
SB + SR	-0.037	-0.020	-0.007	-0.012	-0.017
	(6.254)**	(4.087)**	(0.748)	(0.546)	(1.332)
All County Bans	-0.026	-0.018	-0.017	-0.044	-0.001
	(5.399)**	(4.413)**	(2.156)*	(2.395)*	(0.080)
CW + SR + SB	-0.031	-0.014	0.000	-0.002	-0.002
	(4.071)**	(2.213)*	(0.003)	(0.079)	(0.093)
SW + CB + SR	-0.068	-0.017	0.050	0.137	0.036
	(2.625)**	(0.730)	(1.116)	(1.262)	(0.594)
SW + CB + CR	0.002	-0.008	-0.021	-0.083	0.007
	(0.080)	(0.323)	(0.459)	(0.766)	(0.115)
All State Bans	-0.029	-0.015	-0.004	0.001	-0.009
	(6.032)**	(3.737)**	(0.532)	(0.050)	(0.921)

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Notes: [1] C - county; S - state; W - work ban; B - bar ban; R - restaurant ban; D - drinker; Cap. -capita. [2] Marginal effects reported for all dependent variables except smoking frequency. [3] Absolute value of z-statistics in parentheses [4] * significant at 5%, ** significant at 1%. [5] Per capita variables represent the log of the number of establishments per 1000 people.

Table 20 (continued)

	Initiation	Prevalence	Continuation	Frequency	Cessation
Work Ban ∗ Employed	-0.001	-0.007	-0.015	-0.032	0.003
	(0.280)	(3.776)**	(4.283)**	(3.989)**	(0.694)
Bar Ban ∗ D ∗ Bars/Cap.	-0.046	-0.053	-0.091	-0.174	0.024
	(3.928)**	(5.400)**	(4.967)**	(4.006)**	(0.972)
Bars/Capita	0.067	0.071	0.092	0.218	-0.006
	(8.683)**	(11.407)**	(7.805)**	(7.914)**	(0.389)
Rest. Ban ∗ Rest./Cap.	0.044	0.025	0.020	0.037	0.003
	(5.823)**	(3.987)**	(1.746)	(1.347)	(0.203)
Rest./Capita	-0.013	-0.040	-0.082	-0.221	0.003
	(2.373)*	(9.368)**	(10.180)**	(11.730)**	(0.250)
Cigarette Price	0.002	-0.028	-0.063	-0.160	0.061
	(0.208)	(3.835)**	(4.592)**	(4.943)**	(3.412)**
State Funding	0.002	0.002	0.002	0.010	-0.006
	(1.468)	(1.872)	(1.173)	(2.245)*	(2.579)**
Alcohol Price	0.000	0.018	0.037	0.108	-0.065
	(0.023)	(1.203)	(1.338)	(1.671)	(1.807)
Observations	964923	964925	404707	404707	227647
% Correctly Predicted	65.313	77.305	65.166	-	58.979

Notes: [1] C - county; S - state; W - work ban; B - bar ban; R - restaurant ban; D - drinker; Cap. -capita. [2] Marginal effects reported for all dependent variables except smoking frequency. [3] Absolute value of z-statistics in parentheses [4] * significant at 5%, ** significant at 1%. [5] Per capita variables represent the log of the number of establishments per 1000 people.