The Impact of Smoking Bans in Bars and Restaurants on Alcohol Consumption and Smoking*

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Governments implemented bar and restaurant smoking bans to target smoking-related externalities, but these bans may also affect drinking. This paper studies smoking bans' effects on alcohol consumption and smoking behavior. I estimate a difference-in-differences model that exploits spatial and temporal variation in smoking bans. Bans result in a 1-drink-per-month (5%) increase in intensive-margin alcohol consumption, driven by changes in bar and restaurant consumption. I find no economically meaningful effects on extensive-margin smoking. These results imply that smoking bans lead to unintended consequences in the form of increased alcohol consumption.

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1 Introduction

Externalities are a classic example of a market failure that governments have long regulated. Smoking cigarettes is an example of a good that both generates significant negative externalities and constitutes a major public health problem in the United States.[1] Ever since the 1964 Surgeon General's report linked smoking cigarettes to adverse health consequences, federal, state, and local governments have implemented policies such as cigarette taxes, tobacco minimum purchasing ages, and smoking bans, to minimize the prevalence of smoking and mitigate the externalities generated by secondhand smoke.[2]

In this paper I study whether smoking bans in bars and restaurants, regulations ostensibly targeted at smoking behavior, affect the amount and location of alcohol consumption. Smoking bans in bars represent a change in a non-price determinant of demand for alcohol consumed in bars, which may differentially affect smokers and nonsmokers. If nonsmokers derive disutility from cigarette smoke, then a smoking ban in a bar increases nonsmokers' utility of drinking in a bar and increases their bar alcohol consumption, ceteris paribus. In contrast, if smokers derive utility from being able to smoke while they drink at a bar, then a smoking ban would lower smokers' utility from drinking in a bar and decrease their bar alcohol consumption, ceteris paribus. Indeed, many bar owners predicted that a smoking ban would cause smokers to substitute drinking at bars for drinking at home (to the detriment of bar owners' bottom lines).[3] An additional consideration is that individuals may

[1] Approximately one in five deaths (480,000) annually in the U.S. are a result of cigarette smoking (CDC, 2020). Of those, 41,000 are a result of exposure to secondhand smoke (CDC, 2020).

[2] Excessive alcohol consumption constitutes its own public health problem and also creates negative externalities. Annually, over 95,000 people die due to excessive alcohol consumption in the U.S., from both chronic (e.g. cancer, liver disease) and acute (e.g. suicide and motor vehicle crashes) causes (CDC, 2021). These deaths constitute 2.8 million years of potential life lost (CDC, 2021).

[3] e.g., "I was extremely worried about how the ban would affect my tavern, as probably 75 percent of my

derive utility from the presence of other patrons. If a smoking ban encourages nonsmokers to spend more time at bars, then both smokers and nonsmokers may find the bar to be a more enjoyable place. The effect of smoking bans on total alcohol consumption is also uncertain, as any change in marginal utility from drinking at a bar will change the marginal rate of substitution between drinking at a bar and drinking at home.[4]

Given the potentially heterogeneous effects of smoking bans on alcohol consumption, my analysis of the effects of smoking bans on alcohol consumption examines how the effects vary for smokers and non-smokers. I also investigate whether these bans affect the prevalence of smoking, as some individuals may change their smoking behavior after these bans are implemented.

I use the 2004-2012 waves of the Behavioral Risk Factor Surveillance System (BRFSS) and the Nielsen Consumer Panel. The BRFSS measures smoking status and alcohol consumption, and the Nielsen data include cigarette purchases and alcohol purchased for home consumption.[5] I estimate a difference-in-differences model where my identifying variation is the date of implementation of a smoking ban in bars and restaurants. During the sample period, 25 states and 651 local governments (cities or counties) implemented a smoking ban in bars, and 28 states and 751 municipalities implemented a smoking ban in restaurants, providing a wealth of spatial and temporal variation in treatment status.

Conditional on drinking alcohol in the past 30 days, smoking bans in bars and restaurants

customers were smokers."—Teri Regano, owner of the Roman Coin (Milwaukee Record, 2015) and "There will probably be a lot more homebodies."—Mark O'Brien, bartender at Who's Bar (Passi, 2010).

[4]Nonsmokers may substitute away from alcohol consumed at home to alcohol consumed at a bar. Alternatively, through habit formation or addiction, individuals may drink more at bars without reducing how much they drink at home.

[5]I assume total alcohol consumption equals alcohol consumption at home plus alcohol consumption at bars or restaurants.

lead to an increase of one serving of alcohol per 30 days (a 5% increase). Average alcohol consumption for current, never, and former smokers increase by 5-8%. I find small declines in the total quantity of alcohol purchased for home consumption in the past month. These declines occur for both smokers and nonsmokers, although the effects by smoking status are only marginally statistically significant. Taken together, these results imply that the increase in total alcohol consumption is likely driven by increases in bar and restaurant alcohol consumption. With respect to smoking bans in bars and restaurants' effect on extensive-margin smoking, I find no economically meaningful effects of smoking bans on smoking prevalence.

The results highlight the importance of thinking about the substitutability or complementarity of risky health behaviors when targeting one particular health behavior (in this instance, smoking). Changing the environment of bars to make smoking more difficult may have made bars more enjoyable places to drink.

This paper contributes to a literature in health economics on policies that target smoking and drinking, their respective effects on cigarette and alcohol consumption, and effects on related externalities.[6, 7] Earlier studies find mixed results of state-level smoking bans on alcohol consumption. Picone, Sloan, and Trogdon (2004) find that general smoking bans lead to reductions in alcohol consumption for older women while Koksal and Wohlgenant (2016) find that restaurant smoking bans lead to increases in restaurant alcohol consumption and decreases in at-home alcohol consumption. I extend this literature by incorporating city and

[6]Other papers on smoking study the effects of policies such as cigarette taxes, smoking bans, and clean indoor air laws (Adda and Cornaglia, 2006; Adda and Cornaglia, 2010; Anger et al., 2011; Cotti, Nesson, and Tefft, 2016; Evans et al., 1999; Kvasnicka et al., 2018, and many others).

[7]Other papers on alcohol consumption study the effect of policies such as the Minimum Legal Drinking Age and restrictions on the sale of off-premises alcohol on Sundays (Carpenter et al., 2016; Lovenheim and Steefel, 2011; Nilsson, 2017; and many others).

county-level smoking bans, which reduces the measurement error in the treatment status.[8] To determine how this measurement error affects the estimates, I run a robustness check that only analyzes the effect of state-level smoking bans. The results are qualitatively similar to my main results but attenuated, suggesting that ignoring local smoking bans understates the true effect of this policy on alcohol consumption.

My measure of smoking ban treatment incorporates the effects of the spatial heterogeneity in the laws, which is crucial for understanding potential behavioral responses. Spatial heterogeneity generates multiple margins along which individuals can respond, such as driving to a bar in a nearby city or county to avoid a smoking ban. It also relates to an important but understudied literature on the interaction of risky health behaviors and their externalities (exceptions include Adams and Cotti, 2008; and Anderson, Hansen, and Rees, 2013).

The next section of the paper (section 2) describes the BRFSS and Nielsen data sources and provides information on smoking bans in bars and restaurants. Section 3 details the difference-in-differences framework and section 4 describes the results, including a specification that uses the stacked difference-in-differences method. Section 5 concludes.

2 Data

Measures of "treatment" (effective dates of smoking bans in bars and restaurants) come from the American Nonsmokers' Rights Foundation, which I match to outcomes using county-level geographic identifiers. Measures of alcohol consumption and smoking status come from the 2004 to 2012 waves of the Behavioral Risk Factor Surveillance System (BRFSS) and the

[8]Many of the early laws were implemented at the county and city level, and states have tended to implement smoking bans after some of their cities or counties.

Nielsen Consumer Panel.[9, 10]

2.1 Alcohol Consumption and Smoking Status

The BRFSS measures an individual's self-reported smoking status and frequency and amount of alcohol consumption (measured in servings of alcohol), but not location of alcohol consumption. For my sample period, 2004-2012, 80-90% of observations in the BRFSS contain county identifiers (see Appendix Figure *C*.1).[11] During this period, nearly all states (and Washington, D.C.) participate in the BRFSS each year.[12] The BRFSS is designed to be representative at the state level.

I create alcohol-related outcomes from the BRFSS data using responses to four different questions: 1) whether individuals drank any alcohol during the past 30 days (extensive margin), 2) how many days in the past 30 individuals drank alcohol, 3) the average number of drinks consumed on the days an individual drank alcohol, and 4) the maximum number of drinks consumed on one occasion. Multiplying the number of days by the average amount consumed per day yields the total amount of alcohol consumed in the past 30 days (for individuals who drink), which measures intensive-margin consumption. Adding in non-drinkers' zero drinks to the intensive-margin measure yields the total amount of alcohol consumed in the past month. Smoking status comes from two questions: 1) whether individuals have

[9]These years have reliable county identifiers in both datasets. The Nielsen Consumer Panel does not start until 2004. Starting with the 2013 wave, BRFSS stopped publicly reporting county-level identifiers in the aggregated dataset due to privacy concerns. I use the same years in case smoking bans have heterogeneous effects over time; using different years for different datasets might lead to erroneous conclusions, particularly when comparing outcomes from the BRFSS and the Nielsen data.

[10]Summary statistics by treatment status are in Appendix Table C.1 for the BRFSS data and Appendix Table C.3 for the Nielsen data.

[11]BRFSS suppresses county identifiers if fewer than 50 respondents live in the same county.

[12]Hawaii did not participate in the BRFSS in 2004.

smoked at least 100 cigarettes during their lifetime, and 2) if yes, whether they smoke every day, some days, or not at all. Respondents answering no to the first question are classified as "never smokers". I classify individuals who report smoking every day or some days as current smokers and those who report smoking not at all as former smokers.

The Nielsen data contain scanned-in household-level cigarette and alcohol purchases from grocery stores, convenience stores, liquor stores, and other sources of off-premises consumption.[13,14] I use the county-level geographic identifier in the Nielsen data. Nielsen's sampling procedures are designed such that the data are representative at the national level. The scanned-in alcohol purchases provide details on both the quantity purchased and the UPC code (e.g., a 6-pack of Blue Moon wheat beer or 1 bottle of Chateau Ste. Michelle Cabernet Sauvignon wine). I convert alcohol purchases into servings of alcohol to make them comparable. Twelve ounces of beer, 5 ounces of wine, or 1.5 ounces of liquor are one serving of alcohol.[15] The Nielsen data do not included alcohol purchased for on-premises consumption, such as alcohol purchased and consumed at a bar.

The two alcohol-related outcomes from the Nielsen data are the total quantity of alcohol purchased and the prevalence of purchasing alcohol. The former is the total servings of all

[13]Participating households are provided UPC scanners and instructed to scan all of their purchases that are intended for at-home consumption. Scanned-in purchases could underreport alcohol and cigarettes; for example, if an item is consumed before the panelist arrives home (e.g., a bottle of wine bought for dinner at a friend's house). Another source of underreporting is the purchase of alcohol and cigarettes by underage consumers. It is not problematic that purchases by teenagers are excluded because I am estimating the effect of smoking bans on adults' behavior, so it would make the Nielsen data more comparable to the BRFSS.

[14]Other papers use the Nielsen Consumer Panel data to measure cigarette and or alcohol purchases (e.g., Cotti, Dunn, and Tefft, 2014; Cotti, Nesson, and Tefft, 2018; and Janssen and Parslow, 2021).

[15]This conversion is not exact as a serving of alcohol depends also on alcohol by volume (ABV). Twelve ounces of 5% ABV beer constitutes one serving of alcohol, 5 ounces of 12% ABV wine constitutes one serving, and 1.5 ounces of 40% ABV liquor constitutes one serving (NIAAA). Higher ABV beers have become more common in recent years. Some liquor has a higher ABV than 40%, such as Absinthe (at least 45% ABV), while others have a lower ABV, such as Irish Cream (15-20% ABV). While my conversion process generates some measurement error, as long as the purchase of beer or liquor with non-standard ABV is uncorrelated with the implementation of smoking bans, it does not present a problem for my analysis.

types of alcohol purchased in a month, while the latter is a measure of whether a household purchased any alcohol for off-premises consumption in a month. I infer smoking status by whether the household scanned in any cigarettes in the current calendar year. I use the year instead of the same month to allow for infrequent (or stockpiled) purchases of cigarettes.

The BRFSS and the Nielsen Consumer Panel have mismatched observational units (BRFSS is individual level but Nielsen is household level), so I use the respective sample weights and aggregate each dataset to the county-year level to make my estimates and data consistent across datasets.

Table 1 shows summary statistics for alcohol consumption by smoking status using BRFSS data. Current and former smokers are more likely to drink and to drink more alcohol than never smokers. The average current smoker consumes 22 servings of alcohol in a 30-day period, compared to 8 drinks for never smokers and 13 for former smokers. Sixty-two percent of current smokers report drinking any alcohol in the past 30 days, whereas only 49% of never smokers and 58% of former smokers do. Among individuals who drink, the gap in alcohol consumption between current, never, and former smokers grows. Current smokers who drink consume 36 drinks per 30 days, on average, compared to 17 drinks for never smokers and 23 drinks for former smokers.

2.2 Smoking Bans

The map in Figure 1 shows the timing of smoking bans in bars that were implemented prior to December 31, 2012 (the end of my sample period. Always-treated counties, earlier adopters, later adopters, and never-treated counties are shaded different colors. Earlier

adopters are concentrated in the West and the Northeast, while later adopters are primarily in the upper Midwest. The South had a mix of early and late adopters.

Incorporating city-level smoking bans is important because in the South, many cities implemented smoking bans in bars in the absence of legislation at the county or state level. An analysis that excludes city-level bans will consider most of the South as untreated, when much of that population is actually subject to a smoking ban in bars. As indicated in the map, there is quite a bit of spatial and temporal variation in the implementation of the laws.

My measure of treatment is the fraction of the county population that is subject to a smoking ban in both bars and restaurants. If a county has implemented a smoking ban, or the corresponding state, the treatment variable takes a value of 1. If some but not all cities in a county have implemented a smoking ban, the treatment variable takes a value strictly between 0 and 1. As a control variable, I include the fraction of the county that is subject to a smoking ban in restaurants only. I have constructed the variables in this way because there are very few places that have smoking bans in bars but not restaurants. Except for a handful of small cities, every jurisdiction that implemented a smoking ban in bars prior to December 2012 had either previously implemented a smoking ban in restaurants or implemented such a ban simultaneously. The policy-relevant regulation, because I am focusing on behavioral responses to banning smoking in bars, is therefore smoking bans in bars and restaurants.

2.3 Control Variables

Annual county-level demographic characteristics come from the U.S. Census Bureau. I control for annual county-level population percentages by sex, race and ethnicity, and age.

I also include measures of state-level alcohol and tobacco policies. I use the state-level legal blood alcohol concentration (BAC) limit for driving under the influence from the Alcohol Policy Information System (APIS), a database compiled by the National Institute on Alcohol Abuse and Alcoholism (NIAAA). State-level cigarette taxes come from the Tax Burden on Tobacco (TBOT).[16]

3 Methods

To identify causal effects of smoking bans in bars and restaurants on alcohol consumption, smoking, and alcohol consumption by smoking status, I estimate a difference-in-differences model. I exploit variation in the timing of effective dates of these smoking bans, incorporating bans implemented at the city, county, and state level.

3.1 Difference-in-Differences Identification and Assumptions

Two assumptions are needed for a difference-in-differences estimate to capture a causal effect:

1. *Parallel trends:* in the absence of smoking bans in bars and restaurants, trends in outcomes, conditional on control variables, would be the same across treated and untreated counties

2. At the time of the implementation of smoking bans in bars or restaurants, there are no other changes occurring in treated jurisdictions that affect the outcomes, conditional on the control variables

[16]Summary statistics for the control variables are shown in Appendix Table *C*.2.

Section 3.3 and Appendix *A* outline potential instances in which these assumptions may not be satisfied. To partially assess the validity of the parallel trends assumption, I conduct event studies, which are shown in section 4.6.

3.2 Reduced-Form Regression Equation

I estimate the following reduced-form Ordinary Least Squares equations for various measures of alcohol consumption:

$$Y_{c,t} = \alpha + \beta \cdot ban_{c,t} + \mathbf{X}_{c,t} \cdot \gamma + \delta_c + \rho_t + \varepsilon_{c,t} \tag{1}$$

$Y_{c,t}$ denotes the alcohol-related outcome for individuals in county c and year t. My primary measures of alcohol consumption using the BRFSS data are the total amount of alcohol consumed in the past 30 days, the probability of consuming any alcohol in the past 30 days (extensive margin), and the total amount of alcohol consumed in the past 30 days by drinkers (intensive margin). In Appendix *B*.1 I disaggregate the measure of total alcohol consumption in the past 30 days into the number of days drinking in the past 30 and the average amount of alcohol consumed on days an individual drank. For alcohol purchased for off-premises consumption (Nielsen Consumer Panel data), my primary measures are the total quantity of alcohol purchased in the past month and whether the household scanned in any alcohol purchases in the past month (extensive margin). The total quantity measure is a proxy for the amount of alcohol consumed at home and the extensive-margin measure is a proxy for whether alcohol was consumed at home.

In my main specification, $ban_{c,t}$ represents the fraction of the county population subject

to a smoking ban in both bars and restaurants in year t in county c. I also control for the fraction subject to a smoking ban in restaurants but not bars in county c and year t, which is included in the vector $\mathbf{X}_{c,t}$ along with other characteristics that vary at the county level over time. The omitted category is "no smoking ban in bars or restaurants".

$\mathbf{X}_{c,t}$ represents a vector of time-varying county characteristics. I include the percentages of the population in county c and year t that are male, non-Hispanic black, non-Hispanic Asian, Hispanic, other (non-Hispanic and non-white) races, under the age of 15, 15-24, 35-44, 45-64, or 65 or older; the state-level legal limit for blood alcohol concentration for operating a motor vehicle; and the state-level cigarette tax.[17, 18] I include state-level policy variables because anti-smoking measures, such as cigarette taxes and smoking bans, are frequently implemented in conjunction with each other. I control for these other policies to ensure that I am not conflating the effects of smoking bans with the effects of other anti-smoking policies.

The equation also includes county (δ_c) and year (ρ_t) fixed effects. I cluster the standard errors, $\varepsilon_{c,t}$, at the county level. I use the county population as probability weights, which makes my results interpretable as the effects of smoking bans on alcohol consumption for the average person as opposed to the average county.

In section 4.4, I estimate the effects of smoking bans on alcohol consumption for each smoking status, using equation 1 and restricting the sample to the relevant smoking status. Smoking status s varies between the Behavioral Risk Factor Surveillance System (BRFSS) data and the Nielsen Consumer Panel data. With the BRFSS data I can distinguish between

[17] Counties are subsets of states, which is why I can include time-varying state-level characteristics in a vector of time-varying county-level characteristics.

[18] The omitted categories for the demographic variables are the percentages of the population that are female, non-Hispanic white, and individuals between the ages of 25 and 34.

current, never, and former smokers. With the Nielsen data, I infer smoking status (smoker or nonsmoker) from whether the household scanned in any cigarettes during the year.

3.3 Potential Endogeneity of Smoking Type

One of the primary motivations of these bans was to induce smokers to quit. If they were effective, some individuals would quit smoking and others would not initiate smoking, which would cause the smoking and nonsmoking groups to change over time. Prior research finds anti-smoking policies lead some people to quit smoking (e.g., Evans et al., 1999; Bharadwaj et al., 2014) and prevent others from initiating smoking (Liu, 2010). If smoking bans in bars and restaurants are having these effects on smokers or would-be smokers during my sample period, the control groups would not be valid counterfactuals for the treated groups. My estimates of the effect of the smoking bans on alcohol consumption for each type would be biased if alcohol consumption was correlated with an individual's propensity to quit (or not initiate) smoking.

For example, suppose smoking bans have no effect on smokers' alcohol consumption. Also suppose that smoking bans in bars and restaurants induced the smokers who were the heaviest drinkers to quit smoking, thereby switching from "current smoker" to "former smoker". Average alcohol consumption among current smokers would mechanically decrease, making it appear that smoking bans induced smokers to quit drinking when in reality, smoking bans induced drinkers to quit smoking.

To address this potential endogeneity issue, I directly test the effect of smoking bans in bars and restaurants on smoking status by equation 1 with indicators for smoking status on

the left-hand side using the BRFSS data. I describe the results in more detail in section 4.3, but during this time period (2004-2012), bar and restaurant smoking bans do not have an economically meaningful effect on the prevalence of smoking.

4 Results

4.1 Overall Alcohol Consumption (BRFSS)

Column 1 of Table 3 shows the net effect of bar and restaurant smoking bans on alcohol consumption using the BRFSS data. Panel A shows the effect on the average amount of alcohol consumption (measured by the total quantity of alcohol consumed in the past 30 days): individuals consume an additional 0.63 drinks. This effect is statistically significant at the 1% level and represents a 5.81% increase in alcohol consumption on average, implying that smoking bans in bars and restaurants generate small-to-moderate increases in alcohol consumption.

Panel B (Column 1) shows what happens to the prevalence of drinking any alcohol in the past 30 days (extensive margin). Smoking bans in bars and restaurants are associated with a 0.20 percentage point reduction (-0.42%) in the percentage of individuals who report drinking alcohol in the past 30 days, which is not statistically significant. Smoking bans in bars and restaurants have a precisely estimated null effect on extensive-margin alcohol consumption.

The effect of smoking bans on the intensive margin of alcohol consumption (number of drinks consumed in the past 30 days conditional on drinking any alcohol) is shown in

Panel C, Column 1. The implementation of smoking bans in bars and restaurants results in an average intensive-margin increase of 1.22 servings of alcohol (5.46%). This effect is statistically significant at the 1% level, indicating that smoking bans lead to small-to-moderate intensive-margin increases in alcohol consumption.

Results for three more disaggregated measures of alcohol consumption (number of days per month an individual drank alcohol, average amount consumed per day, and maximum amount consumed on one occasion) are in Appendix *B*.

4.2 Alcohol Purchases for Off-Premises Consumption (Nielsen)

Analyzing the effect of smoking bans on off-premises alcohol purchases (a proxy for alcohol consumed at home) using the Nielsen data provides insight into how smoking bans affect the location of alcohol consumption (Column 1 of Table 4). The implementation of smoking bans in bars and restaurants is associated with an average decrease in the quantity of servings of alcohol purchased for off-premises consumption of 0.41 drinks per month (Panel A), which is statistically significant at the 5% level. This effect size corresponds to a 6.96% decrease in the quantity of servings of alcohol purchased, implying that smoking bans are associated with small-to-moderate declines in the quantity of alcohol purchased for off-premises consumption.

Smoking bans in bars and restaurants lead to a 0.38-percentage-point reduction in the prevalence of past-month off-premises alcohol purchases (Panel B). This effect represents a 1.62% decline and is not statistically significant, which means smoking bans have a precisely estimated null effect on the prevalence of past-month alcohol purchases for off-premises consumption.

Putting these results together, there are small-to-medium increases in alcohol consumption in the BRFSS and corresponding decreases in alcohol purchased for off-premises consumption in the Nielsen. Therefore, the net increases in alcohol consumption are most likely due to increases in bar and restaurant alcohol consumption as opposed to at-home consumption.

4.3 Smoking (BRFSS)

Estimating the effect of smoking bans on smoking can indicate whether the potential endogeneity of smoking status is likely to be a concern. After the implementation of a bar and restaurant smoking ban, there are no economically meaningful changes in extensive-margin smoking as measured by the BRFSS (Table 2).

The prevalence of self-reported smoking increases by 0.40 percentage points (1.87%), which is marginally statistically significant at the 10% level but an economically small effect. This increase is offset by declines in the prevalence of never smoking of 0.23 percentage points (-0.43%) and former smoking by 0.17 percentage points (-0.70%), which are neither statistically nor economically significant.

These results may seem different at first glance than earlier work that finds smoking bans reduce the prevalence of smoking (e.g., Evans, Farrelly, and Montgomery, 1999). However, these earlier papers study earlier time periods when smoking prevalence was higher and the marginal smoker presumably had a more elastic demand for cigarettes.[19]

[19]Figures 2 and 3 in DeCicca, Kenkel, and Lovenheim (forthcoming) document the precipitous decline in smoking prevalence in the U.S. in the last 55-60 years.

4.4 Alcohol Consumption by Smoking Status (BRFSS)

The net increases in alcohol consumption in section 4.1 may mask heterogeneous effects by smoking status. A smoking ban in a bar likely has differential effects on the non-price determinants of demand (the bar atmosphere) for smokers and nonsmokers, which means they may respond in different ways to this policy. Understanding who is changing their behavior and in what ways is crucial for understanding the policy implications and the ways in which these results may generalize to other settings. Given that I do not find meaningful changes in smoking prevalence, the potential endogeneity of smoking status is likely not a concern in this context.

As with the unconditional (with respect to smoking status) results, there are no economically meaningful changes in alcohol consumption along the extensive margin (Panel B, Columns 2 through 4 of Table 3). After the implementation of a bar and restaurant smoking ban, the fraction of current smokers who drank in the past 30 days declines by 1.21 percentage points (-2.09%), which is marginally statistically significant. For never smokers, the prevalence of drinking increases by 0.32 percentage points (0.72%), which is not statistically significant. For former smokers, the prevalence of drinking declines by 0.89 percentage points (-1.72%), which is marginally statistically significant.

These results are relatively precisely estimated null effects. Smoking bans in bars and restaurants do not lead to economically meaningful changes in the prevalence of alcohol consumption for any smoking status.

Along the intensive margin, after smoking bans in bars and restaurants are implemented, current smokers drink an additional 2.55 drinks per month (a 7.67% increase; Column 2 of

Panel C). This effect is statistically significant at the 5% level. Never smokers drink 0.79 more drinks per month (an increase of 5.03%) after the implementation of smoking bans, which is statistically significant at the 5% level. Former smokers drink an additional 1.56 drinks per month. This effect size is statistically significant at the 1% level and corresponds to a 6.84% increase in the average number of drinks consumed per month.

The 1.22 drink-per-month increase in alcohol consumption that I find reflects increases in small-to-moderate increases in alcohol consumption for each smoking status. I discuss potential explanations for these results in the next section.

Appendix *B*.1 includes results for disaggregated measures of alcohol consumption in order to analyze along what margins individuals are changing their alcohol consumption. Are they drinking on more days throughout the month, are they drinking more alcohol on the days they drink, or are they doing both? Understanding the effects at a more detailed level can illustrate whether these changes in drinking behavior may have negative health consequences.[20] In Appendix *B*.2, I compare the results from my primary specification, which includes city-level bans, to results from an alternative specification where I only use state-level bans, to more directly compare my results to the previous literature.

4.5 Alcohol Purchases by Smoking Status (Nielsen)

After the implementation of smoking bans in bars and restaurants, smokers' monthly off-premises alcohol purchases decline by 0.96 servings of alcohol (Panel A, Column 2 of Table 4). This 9.88% decrease is marginally statistically significant. Nonsmokers' monthly

[20]Taking up binge drinking and going from two to six drinks one night each week has different health effects than drinking two drinks each on an additional two days per week (even though the total change in weekly alcohol consumption is the same). Binge drinking is associated with negative health effects such as alcohol poisoning and other unintentional injuries (CDC, 2019).

off-premises alcohol purchases decline by 0.25 servings of alcohol (-5.26%) after smoking bans are implemented in bars and restaurants, which is also marginally significant. For both smokers and nonsmokers, I can rule out economically meaningful increases in the quantity of past-month alcohol purchases.

Smoking bans in bars and restaurants lead to a 0.93-percentage-point decrease in the prevalence of off-premises alcohol purchases for smokers (a 3.17% decline; Panel B, Column 2). For nonsmokers, smoking bans in bars and restaurants are associated with a 0.13 percentage point decline in the prevalence of past-month off-premises alcohol purchases (a decline of 0.62%). Neither of these effects are statistically significant. As with the total quantity of off-premises alcohol purchases, I can rule out economically meaningful increases in the prevalence of purchasing alcohol for off-premises consumption for both smokers and nonsmokers.

Given that there are no economically meaningful increases in the total quantity or the prevalence of alcohol purchases for smokers and nonsmokers, the increases in alcohol consumption in the BRFSS data are most likely driven by changes in bar and restaurant alcohol consumption for these groups.

4.6 Event Studies

Event studies test whether parallel pre-trends hold and also highlight dynamic treatment effects. I conduct event studies of various drinking outcomes using the BRFSS and Nielsen data and of smoking prevalence using the BRFSS data. I use a pre-period window of 4 years, a post-period window of 5 years, I bin the endpoints, and I omit the year prior to

implementation as the reference point.

In my primary specification, I use the fraction of the county population subject to a smoking ban in bars and restaurants as my treatment variable. However, an event study requires one implementation date. Therefore, I consider the year of implementation of a smoking ban in a bar to be the first year where any part of the county has implemented a smoking ban.[21,22]

The event-study equation is

$$Y_{c,t} = \alpha + \sum_{k=-4, k\neq -1}^{k=5} \beta_k \cdot ban_{k,c,t} + \mathbf{X}_{c,t} \cdot \gamma + \delta_c + \rho_t + \varepsilon_{c,t} \tag{2}$$

$Y_{c,t}$ represents the smoking or drinking-related outcome for county c in year t. $ban_{k,c,t}$ equals 1 if a smoking ban in a bar has been in place in any part of county c for k years as of year t (k ranges from -4 to 5, and $k = -1$ is omitted). The control variables and fixed effects are the same as in the original specification, standard errors are again clustered at the county level, and regressions are weighted by the county population.

For the total quantity of alcohol consumption, the pre-period coefficients are close to zero and not statistically significant (Figure 2). After a smoking ban is implemented, the coefficients become positive and increase to 1 to 2 drinks per month. Starting 1 year after

[21] Any definition of treatment will create measurement error in my treatment variable, as for some time periods, only parts of some counties are covered by a smoking ban. I must consider the county as fully or not-at-all treated in an event-study framework. The reason for using "any" law is that I do not want to include treated individuals in the pre period. As a result, there are untreated individuals in the post period, which may attenuate the post-period coefficients.

[22] Out of all observations corresponding to counties with at least one smoking ban, 83% were covered by laws that affected at least half the county population that were implemented in the same year as the first law. 10% of the observations corresponding to counties with at least one smoking ban were never covered by laws that affected at least half the county population by the end of the sample period. The remaining 7% of observations had laws that covered at least half the county population that were implemented sometime after the first law. Using the date that half the county population was covered by a smoking ban as the date of implementation yields broadly similar results.

implementation they are individually statistically significant at the 5% level. The effects increase slightly over time. The graph shows similar results as the difference-in-differences point estimate for overall alcohol consumption.

For extensive-margin consumption (top panel of Figure 3), the coefficients are small and not statistically significant, which is consistent with the difference-in-differences null result for extensive-margin alcohol consumption. For intensive-margin alcohol consumption (bottom panel), the pre-period coefficients are small and not statistically significant. The post-period effects are positive and steadily increasing over time, from no change in the year of implementation to an increase of approximately 2.5 drinks by year 5. The individual coefficients for years 1 to 5 are statistically significant at the 5% level. This graph is consistent with the difference-in-differences point estimate of an increase of 1.2 drinks per month.

For the effects of smoking bans on current smoking (bottom panel of Appendix Figure C.1), the pre-period coefficients are close to zero and not statistically significant. In the post period, the coefficients are also small (magnitude of less than 1 percentage point) and generally not individually significant. The effect sizes are statistically significant for years and 4 and 5 at the 5% level but the coefficients are economically small (less than 1 percentage point). These results are consistent with the difference-in-differences point estimates of no economically meaningful effect of smoking bans on the prevalence of current smoking. For never smoking (top panel of Appendix Figure C.2), the pre-period coefficients are close to zero but there may be a slight downward trend in the prevalence of never smoking. However, the post-period coefficients are close to zero and they are individually not statistically significant. For former smoking (bottom panel of Appendix Figure C.2), both the pre and post-period coefficients are close to zero and not statistically significant.

Event studies for extensive-margin alcohol consumption by smoking status are shown in Appendix Figures C.3 and C.4. The pre and post-period coefficients are small, fluctuate around zero, and mostly not individually statistically significant. These results are consistent with the difference-in-differences estimates of no economically meaningful effects on extensive-margin alcohol consumption for each smoking status.

For intensive-margin alcohol consumption for current smokers (Figure 4), the pre-period coefficients are close to 0 and not statistically significant. The post-period coefficients increase to 1-5 additional drinks per month and are occasionally individually statistically significant. For never smokers (top panel of Figure 5), the pre-period coefficients are close to zero and not statistically significant. There is a slight upward trend in the post period (effect sizes of 1 to 2 drinks per month) with some of the coefficients being statistically significant. For former smokers (bottom panel of Figure 5), the pre-period coefficients are small and not statistically significant. The post-period effect sizes steadily increase year over year (from 1 to 4 drinks between years 1 and 5) and are statistically significant at the 5% level starting in year 1. These results are consistent with the difference-in-differences point estimates: small-to-moderate increases in alcohol consumption for individuals who drink. The intensive-margin effects for each smoking status and overall (bottom panel of Figure 3) show some evidence of dynamic effects, where alcohol consumption increases more in later years. These effects may indicate a degree of habit formation in alcohol consumption.

For the Nielsen results, the difference-in-difference estimate of a small negative effect of smoking bans on alcohol purchases is driven by small declines in purchases in the short term (0-2 years after implementation), although these effects are not individually significant (top panel of Figure 6). In the medium term (3-5 years after implementation) the coefficients

are effectively 0. For smokers (top panel of Appendix Figure C.5), the effects of smoking bans on total purchases are noisy, fluctuate around 0, and not statistically significant. The coefficients for off-premises purchases for nonsmokers (bottom panel of Appendix Figure C.5) are small and not statistically significant, which is generally consistent with the difference-in-differences point estimate.

Bar and restaurant smoking bans also do not have an effect on the prevalence of purchasing alcohol in the past month (bottom panel of Figure 6); the coefficients are small, mostly negative, and not statistically significant. There is generally no effect of smoking bans on smokers' and nonsmokers' prevalence of purchasing alcohol for home consumption (top and bottom panels of Figure C.6), with the estimates for nonsmokers being more attenuated and precise. For smokers, there are economically meaningful increases in the prevalence of purchasing alcohol in years 4 and 5, but these effects are very imprecisely estimated and not statistically significant.

4.7 Stacked Difference-in-Differences Results

Numerous papers in recent years have highlighted potential issues with difference-in-differences models that rely on staggered timing. Using always treated or already-treated groups as controls for later-treated groups can yield biased effect sizes (Goodman-Bacon, 2021; Callaway and Sant'Anna, 2021). To address this issue, I conduct a robustness check using a stacked difference-in-differences method, where for each treated group, the control group consists of not-yet-treated or never-treated units. I follow Deshpande and Li (2019) in constructing the dataset and estimating the regression.

I create four different datasets, one for each treatment year, that include observations from 3 years before a smoking ban is implemented in bars through 2 years after for the treated group.[23] For the controls, I include observations that are treated more than 2 years in the future or not at all during the sample period, keeping the same years as the treated group. Event time is relative to the treatment year. Each of these datasets is identified by the treatment year, or stack. I then append the four datasets to each other, which allows for a county-year to appear in the final dataset multiple times (as both treated and control units for different treatment years). The event study specification regresses the outcome on event time indicators interacted with treatment indicators, county-by-stack fixed effects, and year-by-stack fixed effects. The standard errors are clustered at the county-by-stack level and regressions are probability weighted by the county population.

For brevity, I restrict these results to the unconditional (by smoking status) BRFSS alcohol measures. The event studies are shown in Figures 7 and 8. For the total amount of alcohol consumed (top panel of Figure 7), there is no pre-trend while in the years after a smoking ban in bars is implemented, alcohol consumption increases by approximately $\frac{3}{4}$ of a drink per month. The coefficients for years 1 and 2 are individually statistically significant at the 10% level. These results are quite similar to the traditional difference-in-differences event study results in Figure 2. For the extensive margin (bottom panel of Figure 7), the coefficients in both the pre and post periods are small and fluctuate around 0, and the post-period coefficients are not statistically significant. These results are also similar to the traditional event study results shown in the top panel of Figure 3. For the intensive margin

[23]The four treatment years are 2007, 2008, 2009, and 2010. Those are the only years that have both a 3-year pre-period and a 2-year post-period in the sample, which runs from 2004 to 2012.

(Figure 8), the pre-period coefficients are small and not statistically significant, while in the years following a smoking ban, alcohol consumption increases by a little over 1 drink per month. While the post-period coefficients are also not individually statistically significant, they are similar in magnitude to the traditional event study results shown in the bottom panel of Figure 3. Overall, the stacked difference-in-differences event study results are similar to the main findings and support the hypothesis that smoking bans in bars and restaurants led to increases in alcohol consumption.

5 Conclusion

The presence of externalities are a commonly accepted reason for governments to intervene in markets. In the case of cigarettes, the secondhand-smoke externality has well-documented negative health consequences.[24] In this paper, I use the Behavioral Risk Factor Surveillance System and the Nielsen Consumer Panel to test whether smoking bans in bars and restaurants have unintended consequences with respect to alcohol consumption. To identify causal effects of smoking bans on these outcomes, I estimate a difference-in-differences model where my identifying variation is variation in effective dates of smoking bans in bars and restaurants at the city, county, and state level.

Smoking bans in bars and restaurants result in average increases in alcohol consumption of approximately 1 drink per month (conditional on drinking), or 5%. These increases occur for current, never, and former smokers, are most likely driven by changes in bar and

[24] In other contexts, smoking bans in bars and restaurants led to improvements in population health with respect to smoking and secondhand-smoke-related health outcomes (e.g., Anger, Kvasnicka, and Siedler, 2011; Bharadwaj, Johnsen, and Løken, 2014; Jones et al., 2015; and Kvasnicka, Siedler, and Ziebarth, 2018).

restaurant consumption, and because they are small, probably do not have negative health effects.

What are mechanisms by which current, never, and former smokers would all increase their bar and restaurant alcohol consumption? Perhaps a smoking ban made the bar more enjoyable for everybody, as even smokers may derive disutility from (other smokers') cigarette smoke. Additionally, if smoking ban in bars encourage new customers (nonsmokers) to go to bars, existing customers (smokers) may stay longer and drink more as bars have become more social places.

Former smokers may have an additional reason for increasing their alcohol consumption. Prior to smoking bans, they may have been avoiding smoke-filled bars and restaurants, for fear that being around other people smoking may trigger them to take up smoking again (similar to the model of behavior described in Bernheim and Rangel, 2004).[25] After smoking bans are implemented, former smokers may feel more comfortable going out to bars and restaurants, or more comfortable staying there longer, hence their bar and restaurant alcohol consumption would increase.

How do these effect sizes compare to other policies that affect alcohol consumption? The overall effect on alcohol consumption (0.63 drinks per month) is much smaller than the change in alcohol consumption at the minimum legal drinking age in Canada. Upon reaching legal age, young adults' monthly alcohol consumption increases by approximately 5 drinks per month, which is eight times larger than the effect of smoking bans (Carpenter, Dobkin, and Warman, 2016). Stehr (2007) finds that repeal of a ban on Sunday alcohol sales leads to a 2.4% increase in beer sales and a 3.5% increase in liquor sales. Assuming sales are a

[25] Alternatively, they may have gone to bars and restaurants but not stayed very long.

good proxy for alcohol consumption, the effect of a Sunday sales ban is slightly smaller than the effect of a smoking ban (5.8% increase in overall alcohol consumption).

An interesting direction for future research would be to test for heterogeneity in the policy impacts; for example, whether smokers are exploiting the spatial heterogeneity in the policy and avoiding the ban by accounting for border county policies or the distance to the nearest county with a different policy.

One limitation of this paper is that I am unable to directly estimate the effect of smoking bans on the location of alcohol consumption. I estimate the effect on bar and restaurant alcohol consumption by comparing the effect on total alcohol consumption, as measured by the BRFSS, with the effect on alcohol purchased for at-home consumption, as measured by the Nielsen. To the extent that there are differences in these datasets in terms of their accuracy in measuring alcohol servings or their representativeness, those differences could be contributing to the effect sizes that I estimate.

When risky health behaviors are substitutes or complements, a policy change targeting one risky health behavior can have spillover effects on another. In this instance, a policy ostensibly aimed at minimizing smoking and secondhand smoke had unintended consequences for alcohol consumption. Optimal policy regarding risky health behaviors and their externalities needs to anticipate the behavioral responses arising from their substitutability or complementarity.

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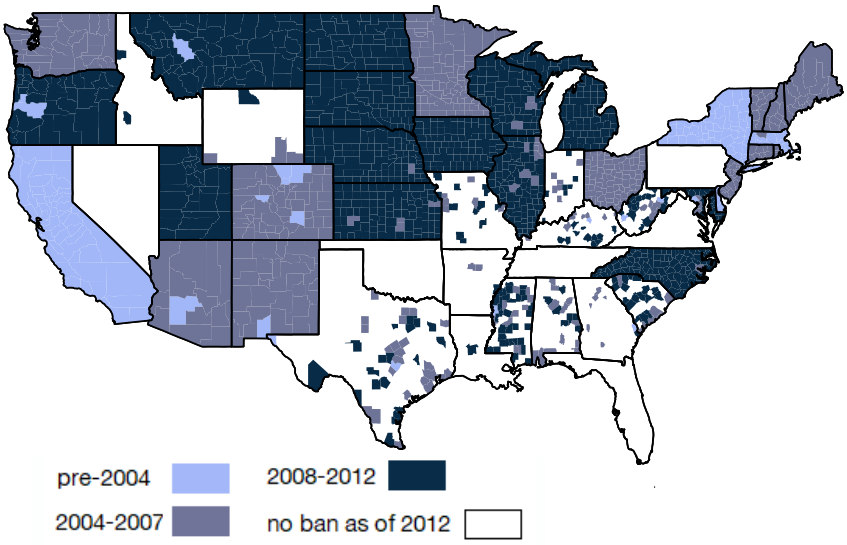
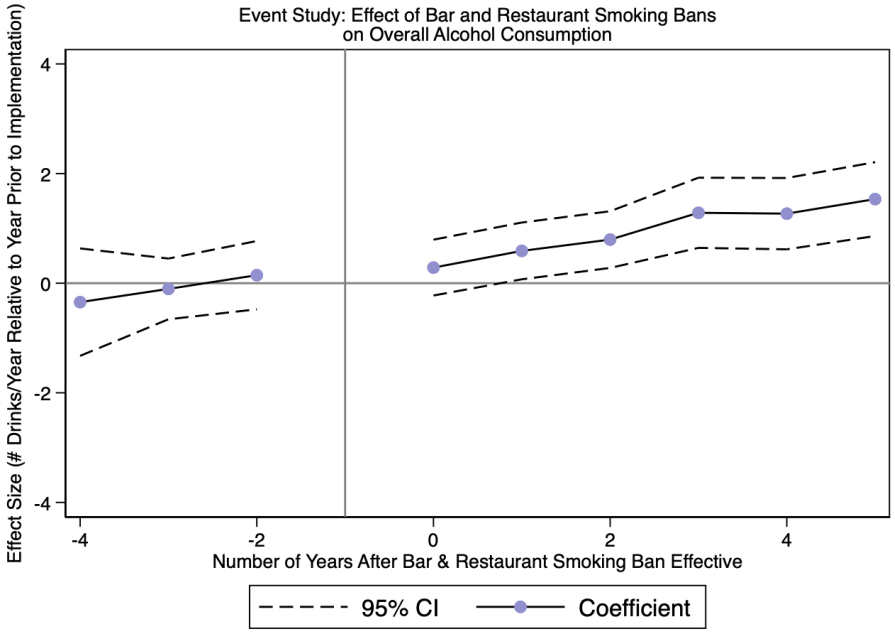
7 Figures and Tables

Figure 1: Map of Smoking Bans in Bars Implemented by Cities, Counties, and States by December 31, 2012



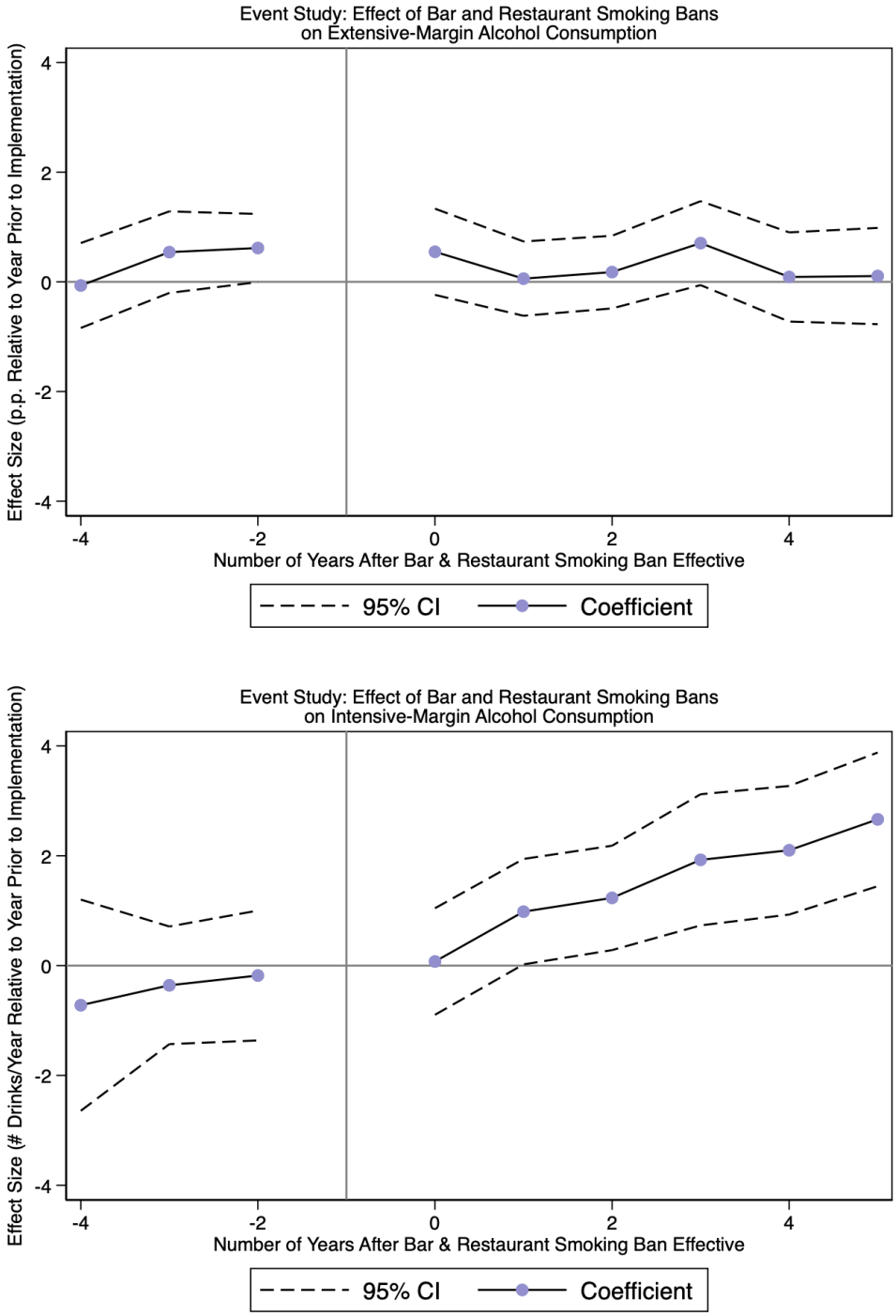
Data Source: American Nonsmokers' Rights Foundation

Figure 2



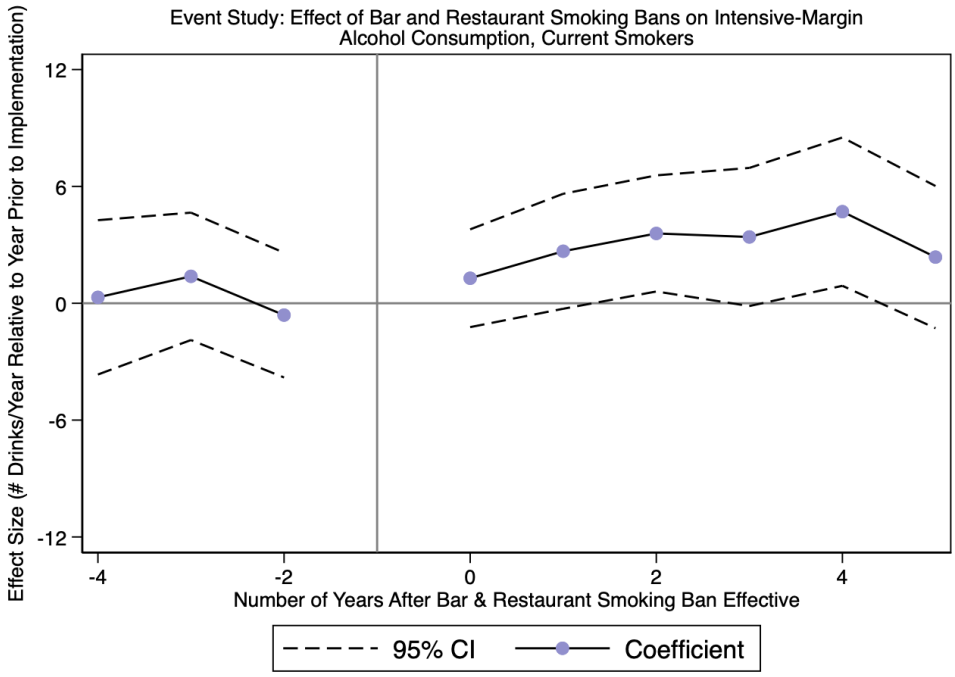
Note: Results from the estimation specified in Equation 2. Demographic controls are the percentages of the county population that is male, Hispanic, non-Hispanic black, non-Hispanic Asian, non-Hispanic non-white other racial groups, younger than 15, 15 to 24, 35 to 44, 45 to 64, and 65 or older. The omitted categories for the demographic controls are the percentage female, percentage white, and percentage aged 25 to 34. Policy controls are (1) the fraction of the county population subject to a smoking ban in restaurants only, (2) an indicator for a law mandating the BAC limit for driving under the influence is 0.08, and (3) the state cigarette tax per pack. Controls also include county and year fixed effects. Treatment is defined as being effective when any part of the county population is covered by a smoking ban in both bars and restaurants. Standard errors are clustered at the county level. Regressions are probability weighted using the county population. Data source: BRFSS 2004-2012.

Figure 3



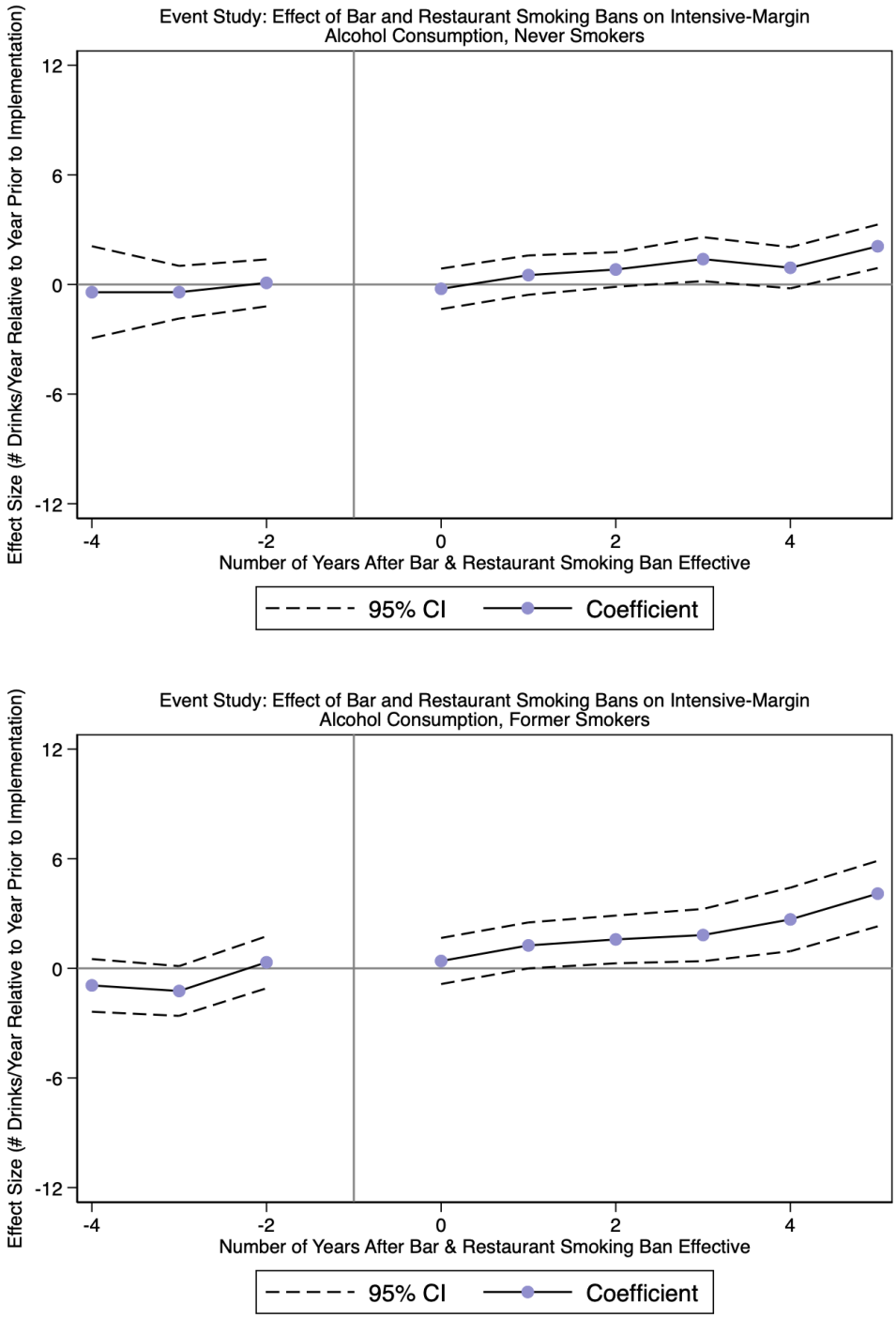
Note: Results from the estimation specified in Equation 2. Demographic controls are the percentages of the county population that is male, Hispanic, non-Hispanic black, non-Hispanic Asian, non-Hispanic non-white other racial groups, younger than 15, 15 to 24, 35 to 44, 45 to 64, and 65 or older. The omitted categories for the demographic controls are the percentage female, percentage white, and percentage aged 25 to 34. Policy controls are (1) the fraction of the county population subject to a smoking ban in restaurants only, (2) an indicator for a law mandating the BAC limit for driving under the influence is 0.08, and (3) the state cigarette tax per pack. Controls also include county and year fixed effects. Treatment is defined as being effective when any part of the county population is covered by a smoking ban in both bars and restaurants. Standard errors are clustered at the county level. Regressions are probability weighted using the county population. Data source: BRFSS 2004-2012.

Figure 4



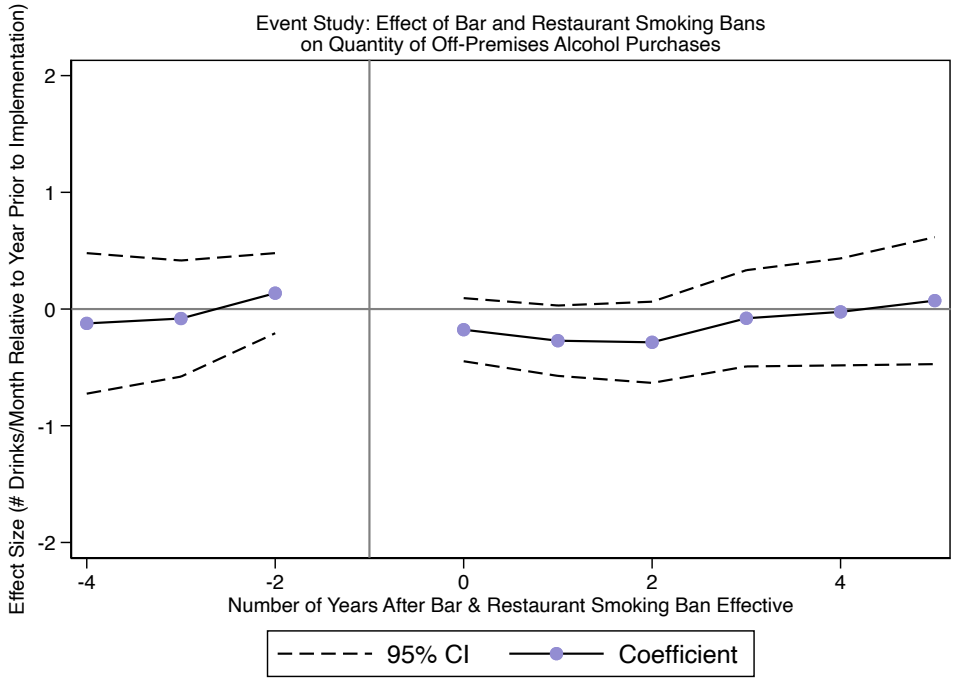
Note: Results from the estimation specified in Equation 2. Top panel sample restricted to frequent smokers. Bottom panel sample restricted to occasional smokers. Demographic controls are the percentages of the county population that is male, Hispanic, non-Hispanic black, non-Hispanic Asian, non-Hispanic non-white other racial groups, younger than 15, 15 to 24, 35 to 44, 45 to 64, and 65 or older. The omitted categories for the demographic controls are the percentage female, percentage white, and percentage aged 25 to 34. Policy controls are (1) the fraction of the county population subject to a smoking ban in restaurants only, (2) an indicator for a law mandating the BAC limit for driving under the influence is 0.08, and (3) the state cigarette tax per pack. Controls also include county and year fixed effects. Treatment is defined as being effective when any part of the county population is covered by a smoking ban in both bars and restaurants. Standard errors are clustered at the county level. Regressions are probability weighted using the county population. Data source: BRFSS 2004-2012.

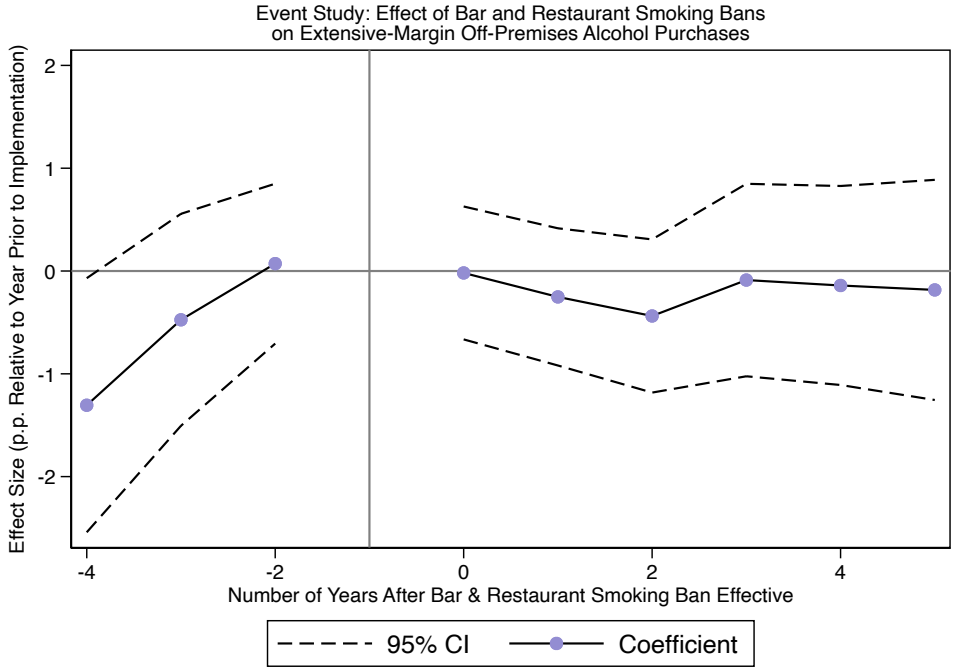
Figure 5



Note: Results from the estimation specified in Equation 2. Top panel sample restricted to never smokers. Bottom panel sample restricted to former smokers. Demographic controls are the percentages of the county population that is male, Hispanic, non-Hispanic black, non-Hispanic Asian, non-Hispanic non-white other racial groups, younger than 15, 15 to 24, 35 to 44, 45 to 64, and 65 or older. The omitted categories for the demographic controls are the percentage female, percentage white, and percentage aged 25 to 34. Policy controls are (1) the fraction of the county population subject to a smoking ban in restaurants only, (2) an indicator for a law mandating the BAC limit for driving under the influence is 0.08, and (3) the state cigarette tax per pack. Controls also include county and year fixed effects. Treatment is defined as being effective when any part of the county population is covered by a smoking ban in both bars and restaurants. Standard errors are clustered at the county level. Regressions are probability weighted using the county population. Data source: BRFSS 2004-2012.

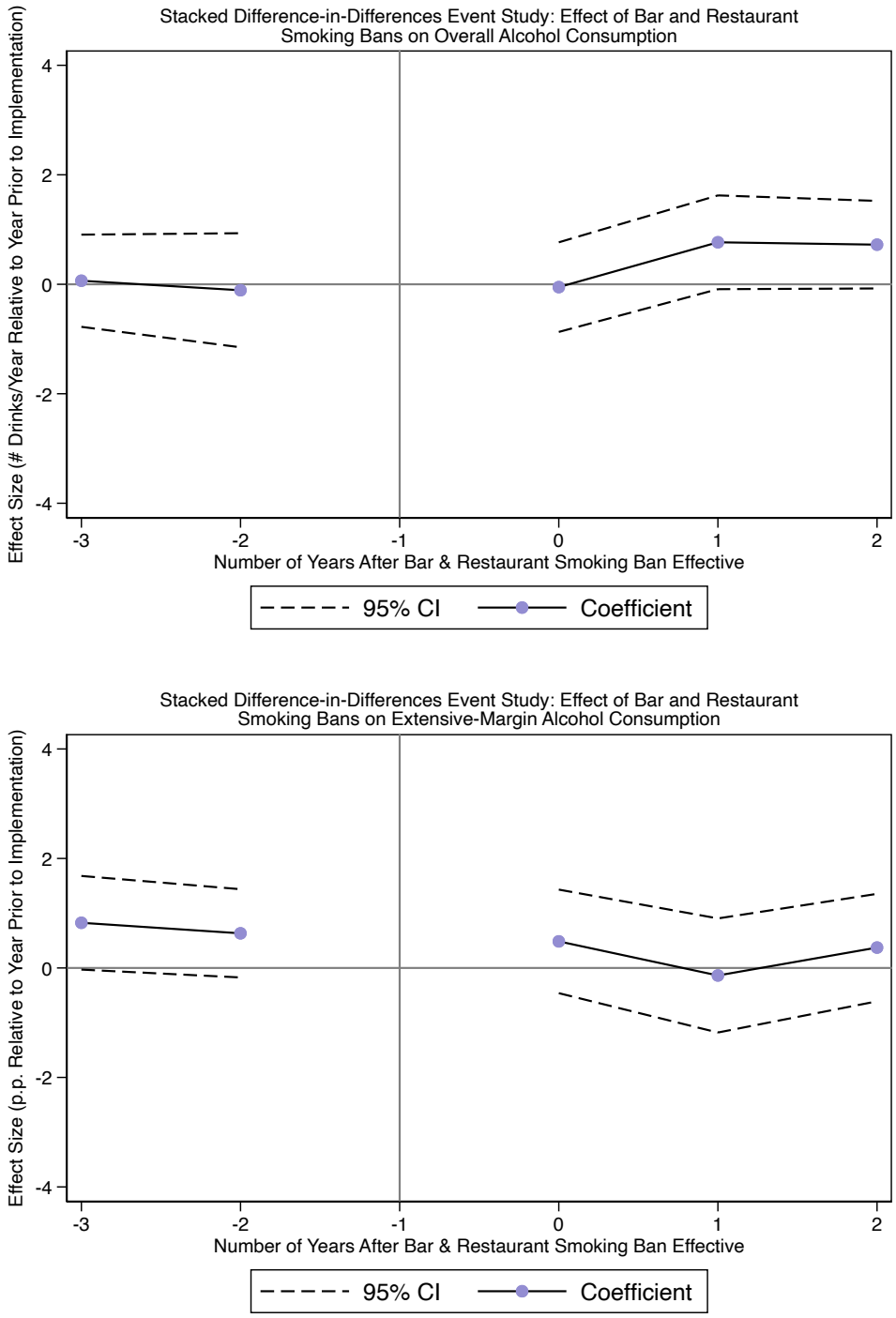
Figure 6





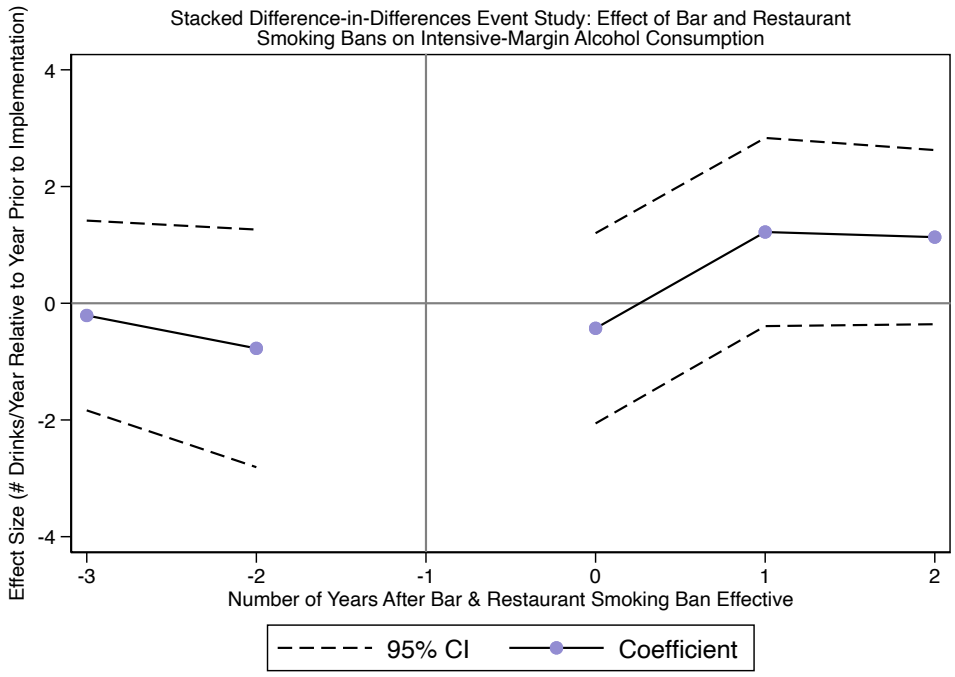
Note: Results from the estimation specified in Equation 2. Demographic controls are the percentages of the county population that is male, Hispanic, non-Hispanic black, non-Hispanic Asian, non-Hispanic non-white other racial groups, younger than 15, 15 to 24, 35 to 44, 45 to 64, and 65 or older. The omitted categories for the demographic controls are the percentage female, percentage white, and percentage aged 25 to 34. Policy controls are (1) the fraction of the county population subject to a smoking ban in restaurants only, (2) an indicator for a law mandating the BAC limit for driving under the influence is 0.08, and (3) the state cigarette tax per pack. Controls also include county and year fixed effects. Treatment is defined as the fraction of the county population covered by a smoking ban in both bars and restaurants in a given year. Standard errors are clustered at the county level. Regressions are probability weighted using the county population. Data source: Nielsen Consumer Panel 2004-2012.

Figure 7



Note: Results from the estimation specified in Section 4.7. Regressions include county-by-stack and year-by-stack fixed effects. Treatment is defined based on the first year any part of the county is covered by a smoking ban in both bars and restaurants. Standard errors are clustered at the county-by-stack level. Regressions are probability weighted using the county population. Data source: BRFSS 2004-2012.

Figure 8



Note: Results from the estimation specified in Section 4.7. Regressions include county-by-stack and year-by-stack fixed effects. Treatment is defined based on the first year any part of the county is covered by a smoking ban in both bars and restaurants. Standard errors are clustered at the county-by-stack level. Regressions are probability weighted using the county population. Data source: BRFSS 2004-2012.

Table 1: Summary Statistics of Alcohol Consumption by Smoking Status (BRFSS, Past 30 Days)

	(1) All	(2) Current	(3) Never	(4) Former
Overall	11.89	21.78	8.04	13.39
# Drinks (per month)				
N	16,998	16,719	16,977	16,888
Extensive Margin	53.34	61.55	48.89	57.53
percentage pts.				
N	16,998	16,724	16,979	16,890
Intensive Margin	22.57	35.50	16.51	23.38
# Drinks (per month) | Drinking				
N	16,917	16,021	16,543	16,262

Note: Data source: BRFSS 2004-2012.

Table 2: Effect of Bar and Restaurant Smoking Bans on Extensive-Margin Past-Month Smoking (BRFSS)

Smoking Status:	Current (1)	Never (2)	Former (3)
Bar and Restaurant Ban	0.40*	-0.23	-0.17
(standard error)	(0.22)	(0.24)	(0.20)
[95% confidence interval]	[-0.03, 0.84]	[-0.71, 0.25]	[-0.56, 0.22]
Dependent Variable Mean	21.62	53.79	24.59
% of Mean	1.87%	-0.43%	-0.70%
R^2	0.55	0.60	0.43
N	16,939	16,939	16,939

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Note: Results from the estimation specified in Equation 1. Demographic controls are the percentages of the county population that is male, Hispanic, non-Hispanic black, non-Hispanic Asian, non-Hispanic non-white other racial groups, younger than 15, 15 to 24, 35 to 44, 45 to 64, and 65 or older. The omitted categories for the demographic controls are the percentage female, percentage white, and percentage aged 25 to 34. Policy controls are (1) the fraction of the county population subject to a smoking ban in restaurants only, (2) an indicator for a law mandating the BAC limit for driving under the influence is 0.08, and (3) the state cigarette tax per pack. Controls also include county and year fixed effects. Treatment is defined as the fraction of the county population covered by a smoking ban in both bars and restaurants in a given year. Standard errors are clustered at the county level. Regressions are probability weighted using the county population.
Data source: BRFSS 2004-2012.

Table 3: Effect of Bar and Restaurant Smoking Bans on Various Measures of Past-Month Alcohol Consumption (BRFSS)

Panel A: Total alcohol consumption

Smoking Status:	All (1)	Current (2)	Never (3)	Former (4)
Bar and Restaurant Ban	0.63***	1.29*	0.50***	0.73**
(standard error)	(0.21)	(0.75)	(0.18)	(0.30)
[95% confidence interval]	[0.22, 1.03]	[-0.18, 2.77]	[0.14, 0.86]	[0.14, 1.32]
Dependent Variable Mean	10.80	19.09	6.96	11.75
% of Mean	5.81%	6.77%	7.20%	6.18%
R^2	0.26	0.18	0.29	0.24
N	16,939	16,660	16,918	16,835

Panel B: Extensive-margin alcohol consumption

Smoking Status:	All (1)	Current (2)	Never (3)	Former (4)
Bar and Restaurant Ban	-0.20	-1.21*	0.32	-0.89*
(standard error)	(0.26)	(0.63)	(0.34)	(0.47)
[95% confidence interval]	[-0.72, 0.31]	[-2.44, 0.02]	[-0.34, 0.98]	[-1.81, 0.03]
Dependent Variable Mean	49.02	57.78	44.24	51.51
% of Mean	-0.42%	-2.09%	0.72%	-1.72%
R^2	0.77	0.38	0.71	0.59
N	16,939	16,665	16,920	16,837

Panel C: Intensive-margin alcohol consumption

Smoking Status:	All (1)	Current (2)	Never (3)	Former (4)
Bar and Restaurant Ban	1.22***	2.55**	0.79**	1.56***
(standard error)	(0.38)	(1.09)	(0.36)	(0.50)
[95% confidence interval]	[0.48, 1.96]	[0.42, 4.68]	[0.09, 1.49]	[0.58, 2.54]
Dependent Variable Mean	22.34	33.31	15.69	22.82
% of Mean	5.46%	7.67%	5.03%	6.84%
R^2	0.18	0.16	0.17	0.17
N	16,859	15,944	16,481	16,198

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Note: Results from the estimation specified in Equation 1. Demographic controls are the percentages of the county population that is male, Hispanic, non-Hispanic black, non-Hispanic Asian, non-Hispanic non-white other racial groups, younger than 15, 15 to 24, 35 to 44, 45 to 64, and 65 or older. The omitted categories for the demographic controls are the percentage female, percentage white, and percentage aged 25 to 34. Policy controls are (1) the fraction of the county population subject to a smoking ban in restaurants only, (2) an indicator for a law mandating the BAC limit for driving under the influence is 0.08, and (3) the state cigarette tax per pack. Controls also include county and year fixed effects. Treatment is defined as the fraction of the county population covered by a smoking ban in both bars and restaurants. Standard errors are clustered at the county level. Regressions are probability weighted using the county population. Data source: BRFSS 2004-2012.

Table 4: Effect of Bar and Restaurant Smoking Bans on Various Measures of Past-Month Alcohol Purchases for Off-Premises Consumption (Nielsen)

Panel A: Total quantity of alcohol purchases for off-premises consumption			
Smoking Status:	All	Smoker	Nonsmoker
	(1)	(2)	(3)
Bar and Restaurant Ban	-0.41**	-0.96*	-0.25*
(standard error)	(0.17)	(0.51)	(0.15)
[95% confidence interval]	[-0.74, -0.08]	[-1.96, 0.05]	[-0.54, 0.04]
Dependent Variable Mean	5.87	9.70	4.74
% of Mean	-6.96%	-9.88%	-5.26%
R^2	0.49	0.40	0.45
N	23,313	16,244	22,268

Panel B: Extensive-margin alcohol purchases for off-premises consumption			
Smoking Status:	All	Smoker	Nonsmoker
	(1)	(2)	(3)
Bar and Restaurant Ban	-0.38	-0.93	-0.13
(standard error)	(0.33)	(0.99)	(0.38)
[95% confidence interval]	[-1.03, 0.28]	[-2.87, 1.00]	[-0.89, 0.62]
Dependent Variable Mean	23.20	29.52	21.40
% of Mean	-1.62%	-3.17%	-0.62%
R^2	0.61	0.45	0.59
N	23,313	16,244	22,268

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Note: Results from the estimation specified in Equation 1. Demographic controls are the percentages of the county population that is male, Hispanic, non-Hispanic black, non-Hispanic Asian, non-Hispanic non-white other racial groups, younger than 15, 15 to 24, 35 to 44, 45 to 64, and 65 or older. The omitted categories for the demographic controls are the percentage female, percentage white, and percentage aged 25 to 34. Policy controls are (1) the fraction of the county population subject to a smoking ban in restaurants only, (2) an indicator for a law mandating the BAC limit for driving under the influence is 0.08, and (3) the state cigarette tax per pack. Controls also include county and year fixed effects. Treatment is defined as the fraction of the county population covered by a smoking ban in both bars and restaurants in a given year. Standard errors are clustered at the county level. Regressions are probability weighted using the county population. Data source: Nielsen Consumer Panel 2004-2012.

A Measurement Error

Data sources that contain self-reported measures of the consumption of stigmatized "goods" (cigarettes and alcohol), such as the BRFSS and the Nielsen Consumer Panel, may be subject to social desirability bias. This bias could manifest as individuals underreporting their consumption of cigarettes or alcohol (both on the extensive and intensive margins), because there is stigma in some social circles associated with the consumption of these goods. A constant level of underreporting would not be an issue for my identification strategy; what would be problematic is if the level of underreporting is correlated with the implementation of smoking bans in bars and restaurants.[26] If individuals are going to change how they self report their smoking status, they would be more likely to underreport after the implementation of a smoking ban (as the smoking ban reflects an increase in the stigma surrounding smoking). Underreporting of smoking status would not bias the unconditional estimates of smoking bans on alcohol consumption, but it would bias the results for smoking toward finding a reduction in smoking prevalence when one didn't exist. The effects on alcohol consumption by smoking status could also be biased as the composition of the smoking status groups would be wrong (some people in the never or former smoker group should really be in the current smoker group), which is problematic if the underreporting of smoking is correlated with alcohol consumption, as detailed in section 3.3. Given that I find a small but positively signed effect of smoking bans on the prevalence of smoking, social desirability bias is likely not a concern in this context.

[26]For the Nielsen data, Cotti, Dunn, and Tefft (2015) find that households underreport extensive-margin alcohol purchases but not intensive-margin purchases, and DeCicca, Kenkel, and Lovenheim (forthcoming) suggest that the extent of measurement error in cigarette purchases is probably not changing with tobacco control policies such as smoking bans.

Recall bias is another issue with self-reported data, particularly for measures of alcohol consumption given that consuming sufficiently large quantities of alcohol can inhibit memory formation. Recall bias is the error in self-reported estimates of past behavior that arises because individuals cannot remember past events with complete accuracy. It could affect my estimates if smoking bans in bars and restaurants lead to sufficiently large increases in alcohol consumption for individuals to have no memory of how much alcohol they consumed. If individuals believe they drank less alcohol than their true consumption, then my estimates would be attenuated. Alternatively, if they do not remember how much alcohol they consumed, they could overestimate their alcohol consumption, in which case my results would be biased away from 0.

B Additional Robustness Checks

B.1 Disaggregated Measures of Alcohol Consumption (BRFSS)

The amount of alcohol consumed over 30 days is a function of the number of days an individual drank alcohol and the average amount of alcohol the individual consumed on each day the individual drank. Studying the effects on these outcomes can illuminate how individuals are responding to smoking bans: are they drinking more often, consuming more alcohol when they drink, or both?

Panels A and B of Appendix Table *C.4* disaggregate the effects on intensive-margin alcohol consumption into these two components. For individuals who drank alcohol in the past 30 days, smoking bans in bars and restaurants are associated with an increase in the

number of days spent drinking (out of the past 30 days) of 0.11 days (1.37%), on average, which is marginally statistically significant (Panel A, Column 1). Current smokers drink alcohol on 0.14 additional days per month, a 1.61% increase (Column 2). Never smokers drink on 0.10 additional days per month, a 1.50% increase (Column 3). Neither of these estimates are statistically significant. Former smokers see a 0.20-day increase in the number of days they drink (2.14%, Column 4), which is statistically significant at the 5% level. None of these effects are economically meaningful.

The implementation of smoking bans in bars and restaurants results in a 0.08-serving increase in the average amount of alcohol individuals consume, conditional on drinking (Column 1 of Panel B). This effect is statistically significant at the 1% level, and it represents a 2.98% increase. Current smokers drink an additional 0.07 drinks on days they drink (2.01% increase), but this effect is not statistically significant. Never smokers also drink an additional 0.07 servings of alcohol on days they drink (3.15% increase), which is statistically significant at the 1% level. Former smokers drink an additional 0.10 drinks per day on days they drink alcohol, which is also statistically significant at the 1% level and corresponds to a 4.42% increase. Each smoking status has very small increases in the average amount of alcohol consumed per day, but the effects are not statistically significant for current smokers.

Analyzing the effect on the maximum amount of alcohol consumed can indicate whether there are potentially unhealthy changes in drinking, such as binge drinking. The implementation of smoking bans in bars and restaurants leads to an increase in the maximum amount of alcohol consumed of 0.10 servings, on average (Panel C, Column 1). This effect is statistically significant at the 1% level, and it represents a 2.68% increase in maximum alcohol consumption. For current smokers, bar and restaurant smoking bans are associated

with a 0.05-drink increase in the maximum amount of alcohol consumed on one occasion (a 1.03% increase; Column 2), but this effect is not statistically significant. For never smokers, bar and restaurant smoking bans lead to an increase in the maximum amount of alcohol consumed of 0.08 drinks (a 2.62% increase; Column 3), which is statistically significant at the 5% level. For former smokers, smoking bans in bars and restaurants are also associated with a 0.08-drink increase in the maximum amount of alcohol consumed on one occasion (a 2.32% increase; Column 4), but this effect is not statistically significant. Smoking bans in bars and restaurants lead to small but not economically meaningful increases in the maximum amount of alcohol consumed by each smoking status group, although only the effect for never smokers is statistically significant. Given that the magnitudes of the effect sizes for the average amount consumed per day and the maximum amount consumed on one occasion are similar, individuals are drinking more on each day versus drinking the same amount most days and a lot more on 1 day.

B.2 State-Level Smoking Bans

To more directly compare my results with the previous literature on smoking bans and alcohol consumption, I run an alternative specification where I only consider a county as treated if it is subject to a statewide smoking ban. Any jurisdiction without a state-level ban (even if it is covered by a city or county-level ban) is considered part of the untreated group. The effects are similar but slightly attenuated relative to my main specification, which is not surprising given that some treated individuals are considered part of the untreated group. Smoking bans in bars and restaurants lead to an average increase in alcohol consumption of

0.50 drinks over the past 30 days (a 4.44% increase), which is statistically significant at the 5% level (Panel A, Column 1 of Table C.5). There is a corresponding 0.95-drink increase along the intensive margin (4.28% increase), which is also statistically significant at the 5% level. There is no effect of smoking bans on the extensive margin of alcohol consumption (-0.12 percentage points, a 0.24% decrease, which is not statistically significant).

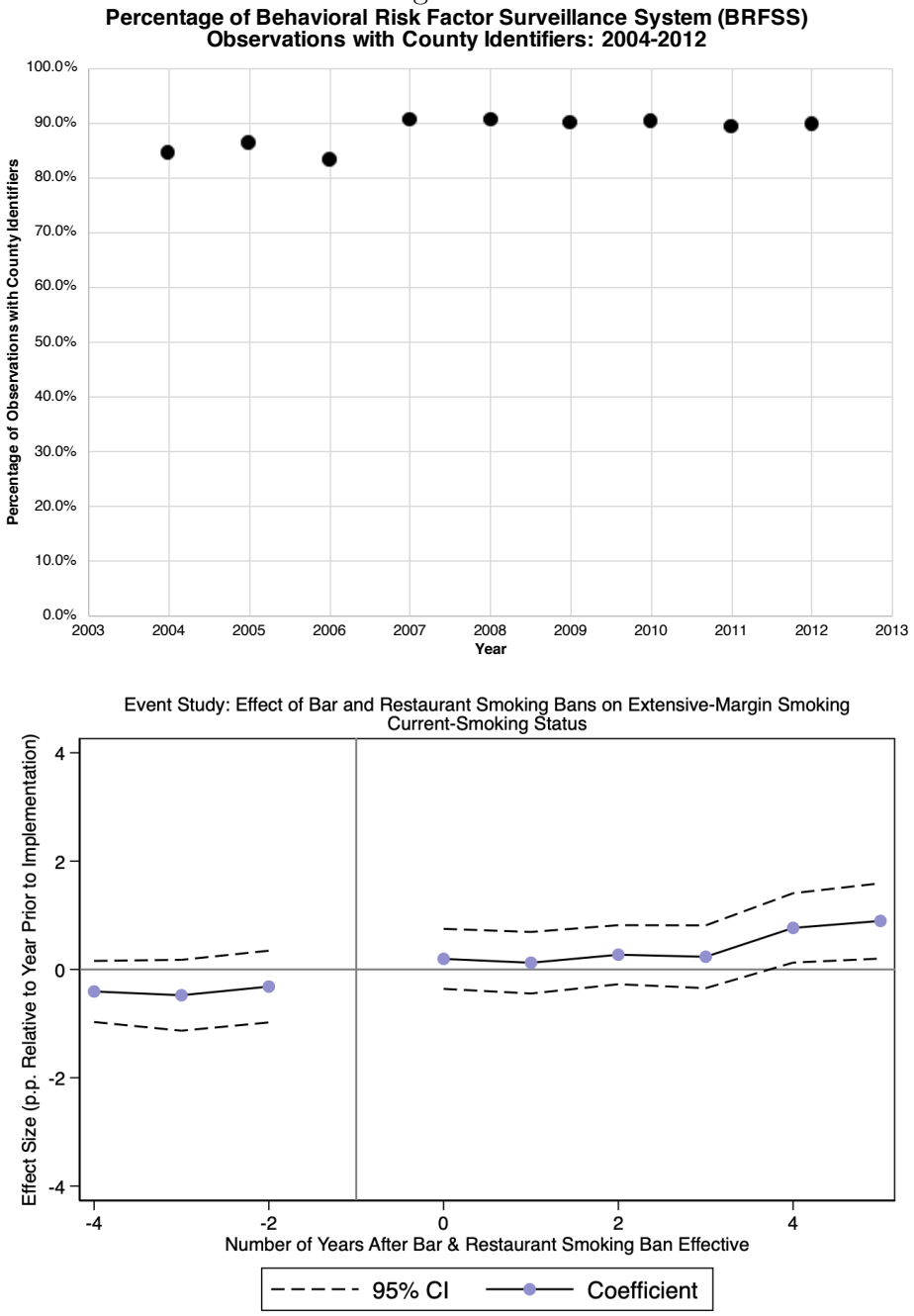
There are no economically meaningful effects of state-level smoking bans in bars and restaurants on extensive-margin alcohol consumption for any smoking status (Panel B, Columns 2-4). The prevalence of drinking declines by 0.99 percentage points (1.65%) for current smokers, which is marginally significant. It increases by 0.20 percentage points (0.42%) for never smokers, and it decreases by 0.48 percentage points (0.87%) for former smokers. Neither of those results are statistically significant. Along the intensive margin (Panel C), current smokers increase their alcohol consumption by 2.01 drinks per month (5.97%) after a smoking ban is implemented, which is statistically significant at the 5% level. Never smokers increase their alcohol consumption by 0.56 drinks per month (3.56%) which is not statistically significant. Former smokers increase their alcohol consumption by 1.39 drinks per month (6.17%), an effect that is significant at the 5% level.

The effects of statewide smoking bans on alcohol purchases for home consumption (Table C.6) are also quite similar to my main specification. On average, the total quantity of alcohol purchases declines by 0.41 drinks per month (6,73%), which is statistically significant at the 1% level. The prevalence of purchasing alcohol for off-premises consumption declines by 0.33 percentage points (1.40%), which is not statistically significant. For smokers, statewide smoking bans lead to reductions in the total quantity of alcohol purchases of 1.16 drinks per month (11.40%), which is statistically significant at the 5% level. Nonsmokers reduce

their quantity of alcohol purchases by 0.23 drinks per month (4.56%), which is marginally statistically significant. After statewide smoking bans are implemented, smokers are 0.40 percentage points less likely to purchase any alcohol for off-premises consumption (1.37%). Nonsmokers are 0.19 percentage points less likely to purchase alcohol (-0.84%). Neither of these effects are economically or statistically significant.

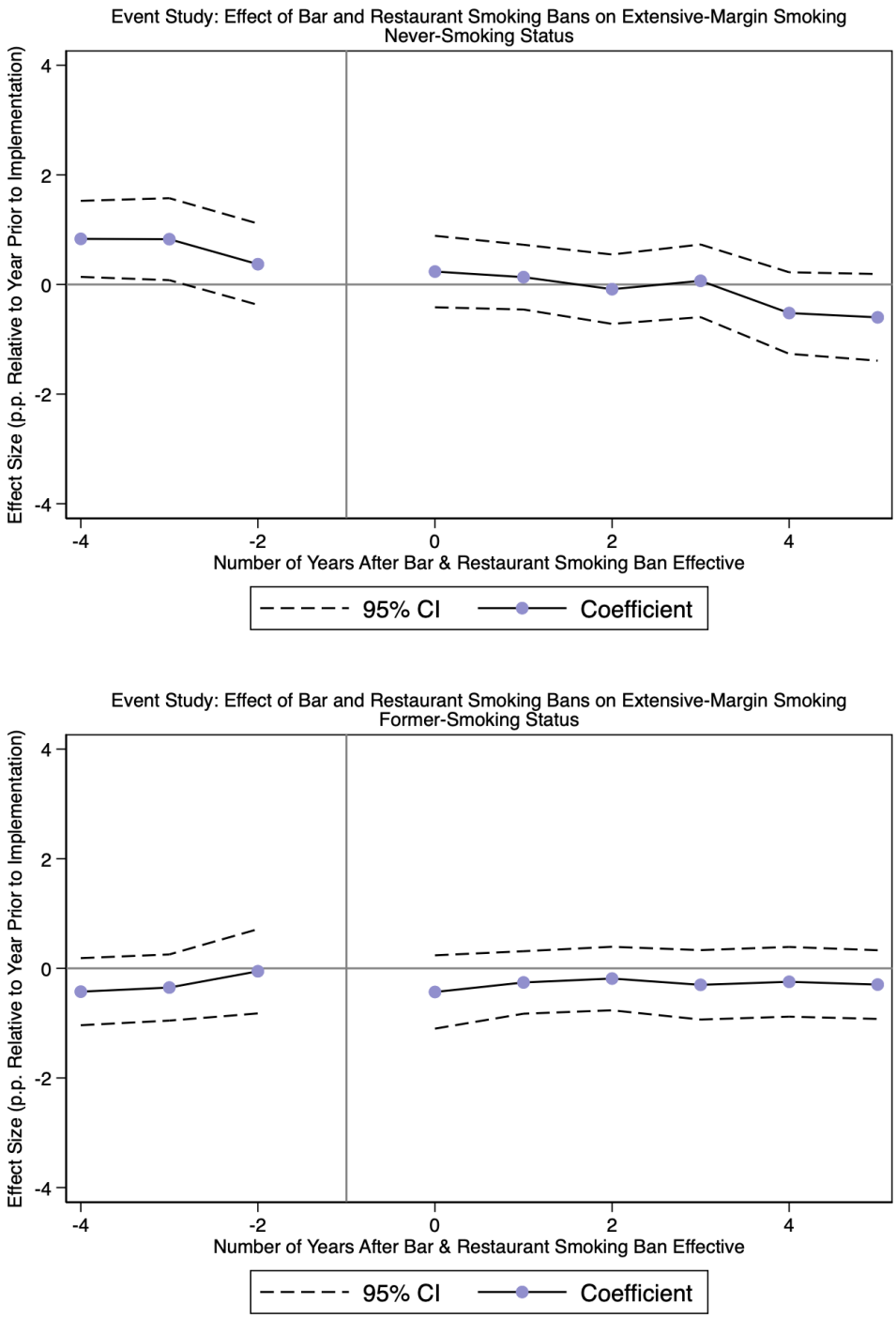
C Additional Figures and Tables

Figure C.1



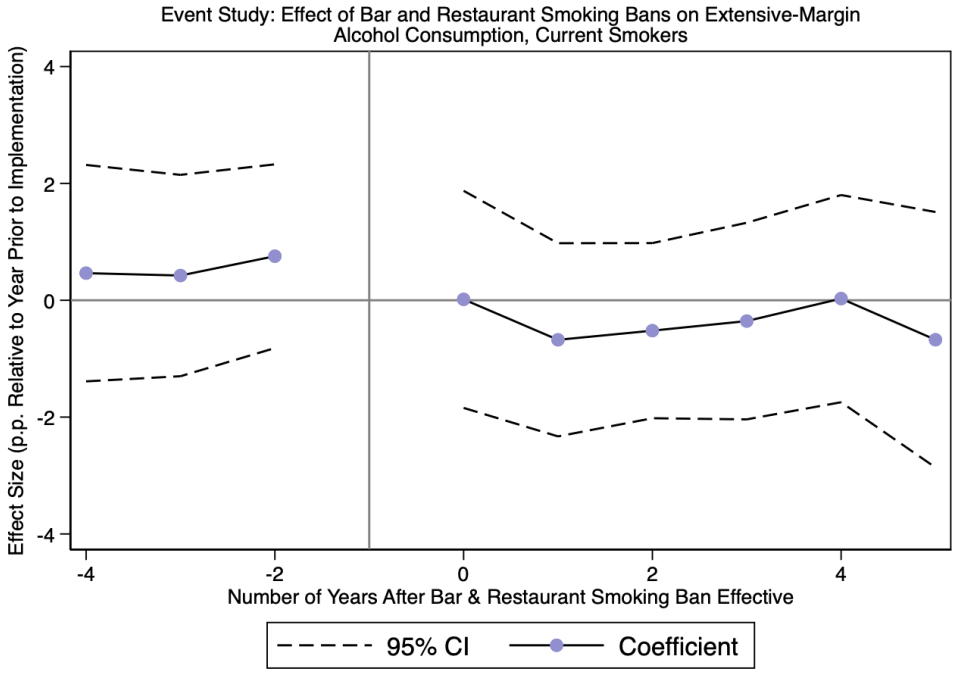
Notes: Top panel data source: BRFSS 2004-2012. Bottom panel: Results from the estimation specified in Equation 2. Sample restricted to current smokers. Demographic controls are the percentages of the county population that is male, Hispanic, non-Hispanic black, non-Hispanic Asian, non-Hispanic non-white other racial groups, younger than 15, 15 to 24, 35 to 44, 45 to 64, and 65 or older. The omitted categories for the demographic controls are the percentage female, percentage white, and percentage aged 25 to 34. Policy controls are (1) the fraction of the county population subject to a smoking ban in restaurants only, (2) an indicator for a law mandating the BAC limit for driving under the influence is 0.08, and (3) the state cigarette tax per pack. Controls also include county and year fixed effects. Treatment is defined as being effective when any part of the county population is covered by a smoking ban in both bars and restaurants. Standard errors are clustered at the county level. Regressions are probability weighted using the county population. Data source: BRFSS 2004-2012.

Figure C.2



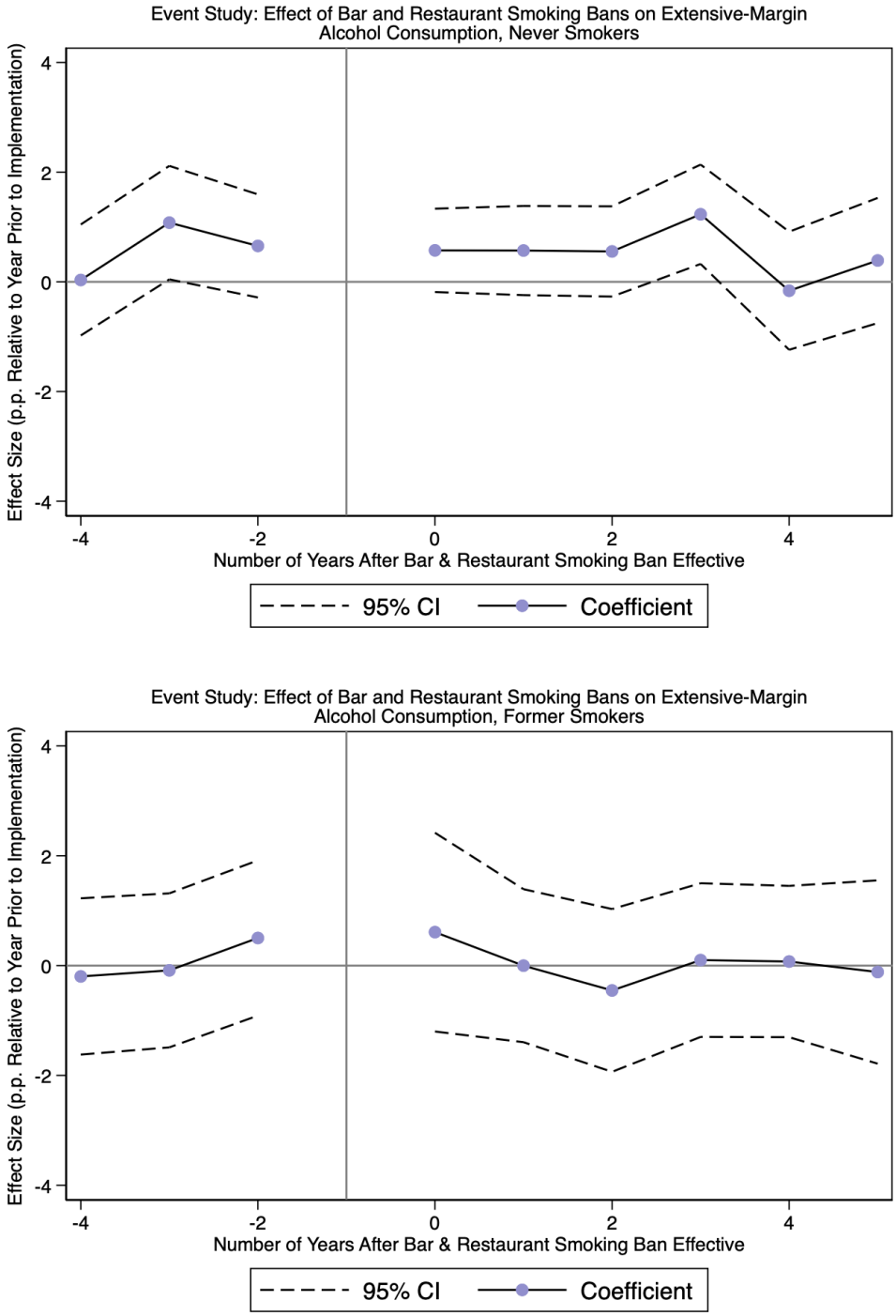
Note: Results from the estimation specified in Equation 2. Top panel sample restricted to never smokers. Bottom panel sample restricted to former smokers. Demographic controls are the percentages of the county population that is male, Hispanic, non-Hispanic black, non-Hispanic Asian, non-Hispanic non-white other racial groups, younger than 15, 15 to 24, 35 to 44, 45 to 64, and 65 or older. The omitted categories for the demographic controls are the percentage female, percentage white, and percentage aged 25 to 34. Policy controls are (1) the fraction of the county population subject to a smoking ban in restaurants only, (2) an indicator for a law mandating the BAC limit for driving under the influence is 0.08, and (3) the state cigarette tax per pack. Controls also include county and year fixed effects. Treatment is defined as being effective when any part of the county population is covered by a smoking ban in both bars and restaurants. Standard errors are clustered at the county level. Regressions are probability weighted using the county population. Data source: BRFSS 2004-2012.

Figure C.3



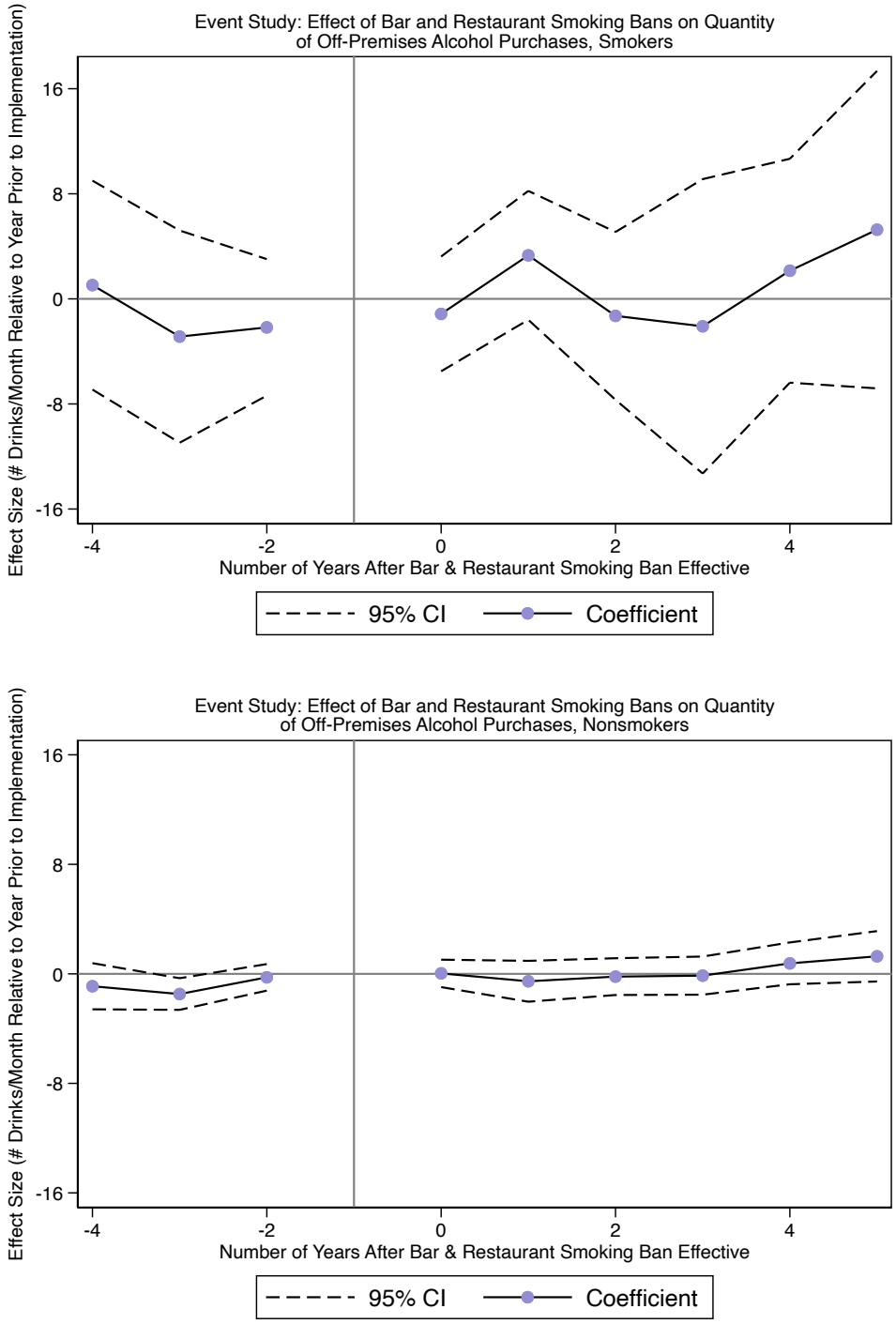
Note: Results from the estimation specified in Equation 2. Top panel sample restricted to frequent smokers. Bottom panel sample restricted to occasional smokers. Demographic controls are the percentages of the county population that is male, Hispanic, non-Hispanic black, non-Hispanic Asian, non-Hispanic non-white other racial groups, younger than 15, 15 to 24, 35 to 44, 45 to 64, and 65 or older. The omitted categories for the demographic controls are the percentage female, percentage white, and percentage aged 25 to 34. Policy controls are (1) the fraction of the county population subject to a smoking ban in restaurants only, (2) an indicator for a law mandating the BAC limit for driving under the influence is 0.08, and (3) the state cigarette tax per pack. Controls also include county and year fixed effects. Treatment is defined as being effective when any part of the county population is covered by a smoking ban in both bars and restaurants. Standard errors are clustered at the county level. Regressions are probability weighted using the county population. Data source: BRFSS 2004-2012.

Figure C.4



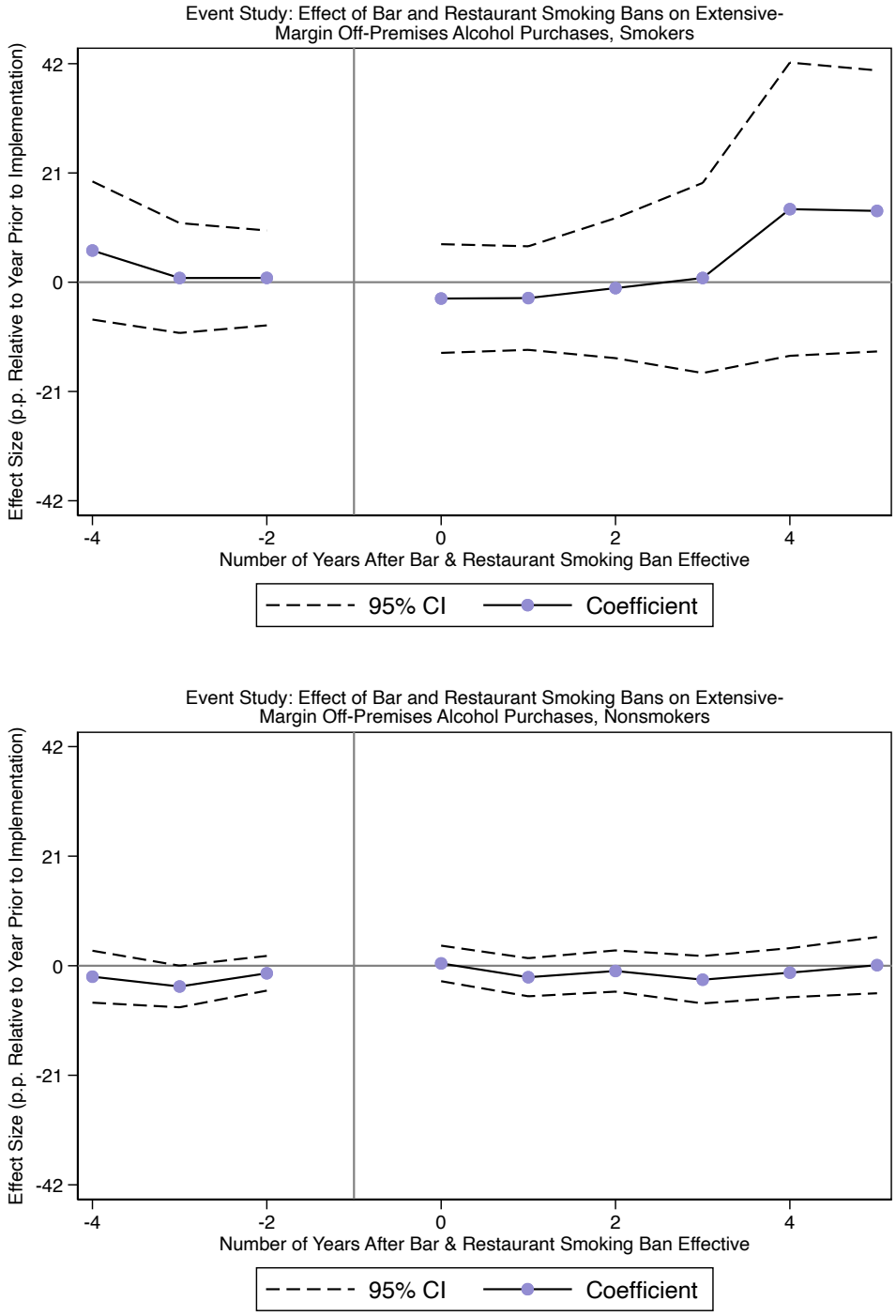
Note: Results from the estimation specified in Equation 2. Top panel sample restricted to never smokers. Bottom panel sample restricted to former smokers. Demographic controls are the percentages of the county population that is male, Hispanic, non-Hispanic black, non-Hispanic Asian, non-Hispanic non-white other racial groups, younger than 15, 15 to 24, 35 to 44, 45 to 64, and 65 or older. The omitted categories for the demographic controls are the percentage female, percentage white, and percentage aged 25 to 34. Policy controls are (1) the fraction of the county population subject to a smoking ban in restaurants only, (2) an indicator for a law mandating the BAC limit for driving under the influence is 0.08, and (3) the state cigarette tax per pack. Controls also include county and year fixed effects. Treatment is defined as being effective when any part of the county population is covered by a smoking ban in both bars and restaurants. Standard errors are clustered at the county level. Regressions are probability weighted using the county population. Data source: BRFSS 2004-2012.

Figure C.5



Note: Results from the estimation specified in Equation 2. Top panel sample restricted to smokers. Bottom panel sample restricted to nonsmokers. Demographic controls are the percentages of the county population that is male, Hispanic, non-Hispanic black, non-Hispanic Asian, non-Hispanic non-white other racial groups, younger than 15, 15 to 24, 35 to 44, 45 to 64, and 65 or older. The omitted categories for the demographic controls are the percentage female, percentage white, and percentage aged 25 to 34. Policy controls are (1) the fraction of the county population subject to a smoking ban in restaurants only, (2) an indicator for a law mandating the BAC limit for driving under the influence is 0.08, and (3) the state cigarette tax per pack. Controls also include county and year fixed effects. Treatment is defined as the fraction of the county population covered by a smoking ban in both bars and restaurants in a given year. Standard errors are clustered at the county level. Regressions are probability weighted using the county population. Data source: Nielsen Consumer Panel 2004-2012.

Figure C.6



Note: Results from the estimation specified in Equation 2. Top panel sample restricted to smokers. Bottom panel sample restricted to nonsmokers. Demographic controls are the percentages of the county population that is male, Hispanic, non-Hispanic black, non-Hispanic Asian, non-Hispanic non-white other racial groups, younger than 15, 15 to 24, 35 to 44, 45 to 64, and 65 or older. The omitted categories for the demographic controls are the percentage female, percentage white, and percentage aged 25 to 34. Policy controls are (1) the fraction of the county population subject to a smoking ban in restaurants only, (2) an indicator for a law mandating the BAC limit for driving under the influence is 0.08, and (3) the state cigarette tax per pack. Controls also include county and year fixed effects. Treatment is defined as the fraction of the county population covered by a smoking ban in both bars and restaurants in a given year. Standard errors are clustered at the county level. Regressions are probability weighted using the county population. Data source: Nielsen Consumer Panel 2004-2012.

Table C.1: Summary Statistics of Alcohol and Smoking Outcomes by Treatment Status, 2004-2012 Behavioral Risk Factor Surveillance System

	(1) Full Sample	(2) Never Smoking Ban	(3) Before Smoking Ban	(4) Ever Smoking Ban
Fraction bar ban	0.48	0.00	0.00	0.66
	(0.48)	(0.00)	(0.00)	(0.45)
Binary bar ban	0.57	0.00	0.00	0.78
	(0.50)	(0.00)	(0.00)	(0.41)
Ever bar ban	0.73	0.00	1.00	1.00
	(0.45)	(0.00)	(0.00)	(0.00)
Fraction restaurant-only ban	0.11	0.33	0.07	0.03
	(0.30)	(0.47)	(0.24)	(0.14)
Alcohol consumption:	11.89	11.30	11.37	12.11
total servings	(6.26)	(9.10)	(5.29)	(4.75)
Alcohol consumption:	53.34	48.87	52.79	55.02
extensive margin (p.p.)	(11.23)	(12.99)	(11.93)	(9.99)
Alcohol consumption:	22.57	23.51	21.84	22.22
intensive margin	(11.76)	(17.93)	(9.99)	(8.30)
Alcohol consumption:	8.26	8.28	7.89	8.25
# days	(1.75)	(2.24)	(1.55)	(1.52)
Alcohol consumption:	2.50	2.51	2.51	2.49
amount per day	(0.65)	(0.88)	(0.57)	(0.54)
Alcohol consumption:	3.66	3.63	3.74	3.67
max.	(0.94)	(1.28)	(0.82)	(0.77)
% Current smokers	18.74	21.08	20.27	17.85
	(6.71)	7.86	6.00	5.99
% Never smokers	56.71	54.19	55.81	57.65
	(8.29)	(9.47)	(7.56)	(7.59)
% Former smokers	24.56	24.73	23.92	24.49
	(5.70)	(6.85)	(5.23)	(5.21)
Observations	16,998	7,653	3,048	9,345

Note: Data are from the 2004-2012 waves of the Behavioral Risk Factor Surveillance System. Each observation is a county-year and the data are aggregated from the individual level. "Fraction bar ban" is defined as the fraction of the county population subject to a bar and restaurant smoking ban for that year. "Binary bar ban" equals 1 if any part of the county is subject to a bar and restaurant smoking ban for that year. "Fraction restaurant-only ban" is defined as the fraction of the county population that is subject to a restaurant smoking ban but not a bar smoking ban for that year. Alcohol consumption is measured as the total number of servings of alcohol consumed in the past 30 days. The number of days is measured as the number of days out of the past 30 individuals reported drinking alcohol. Amount per day is measured as the average number of servings per day of alcohol individuals drank on days they drank alcohol. Maximum alcohol is the maximum number of servings of alcohol consumed on one occasion. Statistics are weighted by the county population.

Table C.2: Summary Statistics of Control Variables by Treatment Status, 2004-2012 Behavioral Risk Factor Surveillance System

	(1) Full Sample	(2) Never Smoking Ban	(3) Before Smoking Ban	(4) Ever Smoking Ban
Fraction bar ban	0.48	0.00	0.00	0.66
	(0.48)	(0.00)	(0.00)	(0.45)
Fraction restaurant-only ban	0.11	0.33	0.07	0.03
	(0.30)	(0.47)	(0.24)	(0.14)
% Female	50.91	50.99	50.90	50.87
	(1.13)	(1.33)	(1.05)	(1.04)
% Black	12.59	15.77	13.33	11.39
	(12.75)	(14.75)	(13.82)	(11.69)
% Asian	4.85	2.43	2.88	5.76
	(5.88)	(2.65)	(3.89)	(6.47)
% Hispanic	16.18	10.99	11.45	18.13
	(16.31)	(13.15)	(14.80)	(16.94)
% White	63.83	68.49	69.87	62.08
	(21.58)	(19.99)	(19.92)	(21.90)
% Other race	2.56	2.32	2.48	2.64
	(3.54)	(3.21)	(4.19)	(3.65)
% Age < 15	20.05	19.41	20.89	20.29
	(2.61)	(2.44)	(2.50)	(2.63)
% Age 15-24	14.26	13.80	14.59	14.43
	(2.85)	(3.02)	(3.34)	(2.77)
% Age 25-34	13.44	12.83	13.36	13.67
	(2.30)	(2.22)	(2.06)	(2.29)
% Age 35-44	13.90	13.60	14.39	14.01
	(1.58)	(1.64)	(1.63)	(1.54)
% Age 45-64	25.65	26.25	24.89	25.43
	(2.70)	(2.42)	(2.74)	(2.77)
% Age 65+	12.71	14.11	11.89	12.19
	(3.38)	(4.32)	(2.92)	(2.77)
BAC 0.08%	1.00	1.00	0.98	0.99
	(0.07)	(0.00)	(0.14)	(0.08)
Cigarette tax per pack ($)	1.91	1.47	1.40	2.07
	(0.98)	(0.66)	(0.73)	(1.03)
County population	1,159,360	496,675	569,494	1,408,865
	(1,938,441)	(600,167)	(692,855)	(2,193,016)
Observations	16,998	7,653	3,048	9,345

Note: Data are from the 2004-2012 waves of the Behavioral Risk Factor Surveillance System. Each observation is a county-year and the data are aggregated from the individual level. "Fraction bar ban" is defined as the fraction of the county population subject to a bar and restaurant smoking ban for that year. "Fraction restaurant-only ban" is defined as the fraction of the county population that is subject to a restaurant smoking ban but not a bar smoking ban for that year. BAC 0.08% is defined as an indicator for a law mandating the BAC limit for driving under the influence is 0.08. Cigarette tax per pack is defined as the sum of the federal and state cigarette taxes per pack measured in dollars. Statistics are weighted by the county population.

Table C.3: Summary Statistics of Alcohol Outcomes by Treatment Status, 2004-2012 Nielsen Consumer Panel

	(1) Full Sample	(2) Never Smoking Ban	(3) Before Smoking Ban	(4) Ever Smoking Ban
Fraction bar ban	0.46	0.00	0.00	0.65
	(0.48)	(0.00)	(0.00)	(0.45)
Binary bar ban	0.55	0.00	0.00	0.77
	(0.50)	(0.00)	(0.00)	(0.42)
Ever bar ban	0.72	0.00	1.00	1.00
	(0.45)	(0.00)	(0.00)	(0.00)
Fraction restaurant-only ban	0.11	0.31	0.07	0.03
	(0.30)	(0.46)	(0.22)	(0.14)
Alcohol purchases:	5.33	5.19	5.63	5.38
total servings	(5.02)	(6.43)	(5.85)	(4.33)
Alcohol purchases:	25.79	23.77	25.92	26.59
extensive margin (p.p.)	(11.96)	(14.54)	(12.99)	(10.66)
% Smokers	21.96	24.53	24.45	20.94
	(14.99)	(19.00)	(17.06)	(12.92)
County	1,107,279	458,906	521,815	1,365,589
population	(1,909,391)	(588,503)	(677,382)	(2,173,989)
Observations	23,384	10,919	4,823	12,465

Note: Data are from the 2004-2012 waves of the Nielsen Consumer Panel. Each observation is a county-year and the data are aggregated from the household level. "Fraction bar ban" is defined as the fraction of the county population subject to a bar and restaurant smoking ban for that year. "Binary bar ban" equals 1 if any part of the county is subject to a bar and restaurant smoking ban for that year. "Fraction restaurant-only ban" is defined as the fraction of the county population that is subject to a restaurant smoking ban but not a bar smoking ban for that year. Alcohol purchases is measured as the total number of servings of alcohol purchased for off-premises consumption in a month. Statistics are weighted by the county population.

Table C.4: Effect of Bar and Restaurant Smoking Bans on Disaggregated Measures of Alcohol Consumption (Conditional on Drinking in Past 30 Days)

Panel A: Number of Days Spent Drinking in Past 30 Days

Smoking Status:	All	Current	Never	Former
	(1)	(2)	(3)	(4)
Bar/Restaurant Ban	0.11*	0.14	0.10	0.20**
(standard error)	(0.06)	(0.13)	(0.06)	(0.10)
[95% confidence interval]	[-0.00, 0.22]	[-0.12, 0.40]	[-0.02, 0.22]	[0.00, 0.41]
Dependent Variable Mean	7.87	8.62	6.59	9.59
% of Mean	1.37%	1.61%	1.50%	2.14%
R^2	0.43	0.21	0.36	0.31
N	16,867	15,985	16,502	16,225

Panel B: Average Alcohol Consumption per Drinking Day

Smoking Status:	All	Current	Never	Former
	(1)	(2)	(3)	(4)
Bar/Restaurant Ban	0.08***	0.07	0.07***	0.10***
(standard error)	(0.03)	(0.07)	(0.03)	(0.03)
[95% confidence interval]	[0.03, 0.13]	[-0.07, 0.20]	[0.02, 0.12]	[0.04, 0.16]
Dependent Variable Mean	2.56	3.47	2.16	2.25
% of Mean	2.98%	2.01%	3.15%	4.42%
R^2	0.29	0.19	0.23	0.20
N	16,863	15,964	16,491	16,213

Panel C: Maximum Alcohol Consumption on One Occasion

Smoking Status:	All	Current	Never	Former
	(1)	(2)	(3)	(4)
Bar/Restaurant Ban	0.10***	0.05	0.08**	0.08
(standard error)	(0.03)	(0.09)	(0.04)	(0.05)
[95% confidence interval]	[0.04, 0.17]	[-0.13, 0.24]	[0.00, 0.16]	[-0.02, 0.17]
Dependent Variable Mean	3.84	5.34	3.14	3.37
% of Mean	2.68%	1.03%	2.62%	2.32%
R^2	0.28	0.20	0.22	0.20
N	15,604	14,659	15,244	14,947

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Note: Results from the estimation specified in Equation 1. Demographic controls are the percentages of the county population that is male, Hispanic, non-Hispanic black, non-Hispanic Asian, non-Hispanic non-white other racial groups, younger than 15, 15 to 24, 35 to 44, 45 to 64, and 65 or older. The omitted categories for the demographic controls are the percentage female, percentage white, and percentage aged 25 to 34. Policy controls are (1) the fraction of the county population subject to a smoking ban in restaurants only, (2) an indicator for a law mandating the BAC limit for driving under the influence is 0.08, and (3) the state cigarette tax per pack. Controls also include county and year fixed effects. Treatment is defined as the fraction of the county population covered by a smoking ban in both bars and restaurants in a given year. Standard errors are clustered at the county level. Regressions are probability weighted using the county population. Data source: BRFSS 2004-2012.

Table C.5: Effect of Bar and Restaurant Smoking Bans on Various Measures of Past-Month Alcohol Consumption (State-Level Bans Only; BRFSS)

Panel A: Total alcohol consumption

Smoking Status:	All	Current	Never	Former
	(1)	(2)	(3)	(4)
Bar and Restaurant Ban	0.50**	1.01	0.33*	0.73**
(standard error)	(0.22)	(0.72)	(0.18)	(0.33)
[95% confidence interval]	[0.08, 0.93]	[-0.41, 2.43]	[-0.01, 0.68]	[0.08, 1.38]
Dependent Variable Mean	11.35	20.12	7.41	12.34
% of Mean	4.44%	5.02%	4.51%	5.92%
R^2	0.26	0.18	0.29	0.24
N	16,939	16,660	16,918	16,835

Panel B: Extensive-margin alcohol consumption

Smoking Status:	All	Current	Never	Former
	(1)	(2)	(3)	(4)
Bar and Restaurant Ban	-0.12	-0.99*	0.20	-0.48
(standard error)	(0.24)	(0.60)	(0.34)	(0.40)
[95% confidence interval]	[-0.59, 0.35]	[-2.18, 0.19]	[-0.48, 0.87]	[-1.26, 0.31]
Dependent Variable Mean	51.73	60.07	47.04	54.72
% of Mean	-0.24%	-1.65%	0.42%	-0.87%
R^2	0.77	0.38	0.71	0.59
N	16,939	16,665	16,920	16,837

Panel C: Intensive-margin alcohol consumption

Smoking Status:	All	Current	Never	Former
	(1)	(2)	(3)	(4)
Bar and Restaurant Ban	0.95**	2.01**	0.56	1.39**
(standard error)	(0.38)	(1.01)	(0.34)	(0.55)
[95% confidence interval]	[0.20, 1.70]	[0.02, 4.00]	[-0.11, 1.23]	[0.51, 2.46]
Dependent Variable Mean	22.13	33.63	15.68	22.47
% of Mean	4.28%	5.97%	3.56%	6.17%
R^2	0.18	0.16	0.17	0.17
N	16,859	15,944	16,481	16,198

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Note: Results from the estimation specified in Equation 1. Demographic controls are the percentages of the county population that is male, Hispanic, non-Hispanic black, non-Hispanic Asian, non-Hispanic non-white other racial groups, younger than 15, 15 to 24, 35 to 44, 45 to 64, and 65 or older. The omitted categories for the demographic controls are the percentage female, percentage white, and percentage aged 25 to 34. Policy controls are (1) whether the county is subject to a statewide smoking ban in restaurants only, (2) an indicator for a law mandating the BAC limit for driving under the influence is 0.08, and (3) the state cigarette tax per pack. Controls also include county and year fixed effects. Treatment equals 1 if the county is covered by a statewide smoking ban in both bars and restaurants at any point during the year. Standard errors are clustered at the county level. Regressions are probability weighted using the county population. Data source: BRFSS 2004-2012.

Table C.6: Effect of Bar and Restaurant Smoking Bans on Various Measures of Past-Month Alcohol Purchases for Off-Premises Consumption (State-Level Bans Only; Nielsen)

Panel A: Total quantity of alcohol purchases for off-premises consumption

Smoking Status:	All	Smoker	Nonsmoker
	(1)	(2)	(3)
Bar and Restaurant Ban	-0.41***	-1.16**	-0.23*
(standard error)	(0.16)	(0.49)	(0.13)
[95% confidence interval]	[-0.72, -0.11]	[-2.11, -0.20]	[-0.49, 0.03]
Dependent Variable Mean	6.14	10.14	5.04
% of Mean	-6.73%	-11.40%	-4.56%
R^2	0.49	0.40	0.45
N	23,313	16,244	22,268

Panel B: Extensive-margin alcohol purchases for off-premises consumption

Smoking Status:	All	Smoker	Nonsmoker
	(1)	(2)	(3)
Bar and Restaurant Ban	-0.33	-0.40	-0.19
(standard error)	(0.31)	(0.90)	(0.36)
[95% confidence interval]	[-0.94, 0.28]	[-2.17, 1.37]	[-0.88, 0.31]
Dependent Variable Mean	23.70	29.46	22.20
% of Mean	-1.40%	-1.37%	-0.84%
R^2	0.61	0.45	0.59
N	23,313	16,244	22,268

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Note: Results from the estimation specified in Equation 1. Demographic controls are the percentages of the county population that is male, Hispanic, non-Hispanic black, non-Hispanic Asian, non-Hispanic non-white other racial groups, younger than 15, 15 to 24, 35 to 44, 45 to 64, and 65 or older. The omitted categories for the demographic controls are the percentage female, percentage white, and percentage aged 25 to 34. Policy controls are (1) whether the county is subject to a statewide smoking ban in restaurants only, (2) an indicator for a law mandating the BAC limit for driving under the influence is 0.08, and (3) the state cigarette tax per pack. Controls also include county and year fixed effects. Treatment equals 1 if the county is covered by a statewide smoking ban in both bars and restaurants at any point during the year. Standard errors are clustered at the county level. Regressions are probability weighted using the county population. Data source: Nielsen Consumer Panel 2004-2012.