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The impact of restaurant smoking bans on dining out expenditures: Evidence from panel data

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ABSTRACT

Many state and local governments in the United States have laws that prohibit smoking in restaurants to protect people from the harmful effects of secondhand tobacco smoke. The opponents of these laws have long argued that these laws may harm the restaurant industry by repelling customers who smoke on a regular basis. In this paper, using data from the confidential version of the Panel Study of Income Dynamics (PSID), we estimate the impact of restaurant smoking bans on dining out expenditures of smoking and nonsmoking households. We identify the impact of these bans by exploiting the substantial variation in the implementation of these bans across different cities, counties, and states. Our results indicate that although restaurant smoking bans are associated with a 15.1% decrease in dining out expenditures of smoking households, they increase the dining out expenditures of nonsmoking households by 8.6%. Since the majority of the U.S. population does not smoke, the aggregate impact of restaurant smoking bans on dining out expenditures is slightly positive but statistically insignificant. These results imply that restaurant smoking bans do not harm the restaurant industry.

1. Introduction

Adverse health effects of exposure to secondhand smoke are well-known. The established fact in the literature is that there is no risk-free level of contact with secondhand smoke and even brief exposure can be harmful to health. In children, secondhand smoke can cause ear infections, more frequent and severe asthma attacks, respiratory infections, and a greater risk for sudden infant death syndrome (SIDS). In adults, who have never smoked, secondhand smoke can cause heart disease and lung cancer.[1] In light of these findings, several state and local governments in the United States have imposed smoking restrictions in restaurants and in other indoor public places, to varying degrees, to protect nonsmokers from the hazards of secondhand smoke. In general, these cities, counties, and states experienced improved public health outcomes after such a ban was enforced.[2]

Nevertheless, this policy intervention remains controversial mainly due to its unintended consequences, ranging from heightened exposure to secondhand smoke among children in smoking households to a sharp increase in fatal accidents due to shopping jurisdiction (Adams and Cotti, 2008; Adda and Cornaglia, 2010). Furthermore, the opponents of complete smoking bans have long argued that these restrictions may harm the restaurant industry by repelling customers who smoke on a regular basis. The opposition to smoking bans from business owners was vocal even in the 1980s when the regulation in most states only required restaurants, bars, and night clubs to designate a no-smoking area, instead of prohibiting indoor smoking completely.[3] As a consequence, smoking restrictions were often incomplete and either allowed outdoor smoking in restaurants and bars or granted exemptions to adult-only venues, potentially compromising effectiveness of these policy measures. Today, smoking bans in restaurants and other indoor public places remain controversial. Although the majority of states have enforced complete smoking restrictions in indoor public places including restaurants during the past decade, these restrictions are still a subject of a policy debate in several other states mainly due to the concerns from the hospitality industry.

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[1] Adverse health effects of exposure to secondhand smoke are extensively discussed in the recent reports of U.S. Department of Health (2006, 2010) and International Agency for Research on Cancer (2002).

[2] See, for example, Dinno and Glantz (2007), Glantz and Smith (1994, 1997), Khuder et al. (2007), and Carpenter et al. (2011).

[3] See, for example, U.S. Department of Health and Human Services (1986).

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There is an extensive literature which investigates the economic impact of smoking bans in the United States. Using sales tax or restaurant level sales data, most of the studies find that smoking bans have neutral or positive impact on revenues of restaurants and bars (Scollo et al., 2003). In the United States, restaurant smoking bans are implemented at the city, county, or state level. The majority of existing studies focus on the effect of smoking bans in certain states and hence, fail to document the effect of these laws at the national level.[4] Pakko (2006) also argues that most of the studies in the literature suffer from potential sample selection bias since smoking habits in certain states might be considerably different than the rest of the nation. For instance, Utah and California were the first two states that adopted a state-wide smoking ban in restaurants. However, at the time of the introduction of the ban, smoking prevalence in these states was among the lowest in the nation.[5]

Few studies investigate the effect of restaurant smoking bans at the national level. For instance, Adams and Cotti (2007) use a nationally representative sample for the United States and find a neutral impact of smoking bans on employment in restaurants and a negative impact of these policies on employment in bars. However, results from studies that investigate the impact of restaurant smoking bans at the national level may also be misleading since the majority of these studies fail to control for the effect of county and city level bans due to the lack of data with detailed geographic information.

Evidence from the literature suggests that behavioral responses of smokers and nonsmokers to smoking bans should be considerably different (Biener and Siegel, 1997; Adams and Cotti, 2008; Adda and Cornaglia, 2010). Studies that investigate the impact of restaurant smoking bans also interpret their findings based on the hypothesis that overall impact of the ban is determined by its two separate effects on smokers and nonsmokers (Cowling and Bond, 2005). However, to our best knowledge, none of the existing studies investigate the impact of restaurant bans separately for smokers and nonsmokers.

In this paper, using the 1999–2009 waves of the confidential version of the Panel Study of Income Dynamics (PSID), which contain a nationally representative sample of smoking and nonsmoking households in the United States, we estimate the impact of restaurant smoking bans on dining out expenditures of households. The confidential version of the PSID has three major advantages over the restaurant level sales data that have been extensively used in previous studies. First, the panel structure of the data enables us to control for time-invariant household level unobserved characteristics that might be correlated with dining out expenditures and restaurant smoking bans and to obtain a consistent estimate of the impact of these laws on dining out expenditures of households. Second, since the PSID contains information on the smoking status of household heads and their spouses, we can separately estimate the impact of the restaurant smoking bans for smoking and nonsmoking households. Third, for each household, confidential PSID geocode supplement contains information on zip code, county, and state of residence. Using this information, we determine whether a particular household resides in a city, county, or state that enforces a restaurant smoking ban at the time of the interview and clearly identify the treatment and control groups.

In order to estimate the economic impact of restaurant smoking bans, we exploit the substantial variation in the implementation of these bans across different cities, counties, and states and use difference-in-differences (DD) and difference-in-difference-in-differences (DDD) type models. Our main result indicates that although restaurant smoking bans are associated with a 15.1% decrease in dining out expenditures of smoking households, they increase the dining out expenditures of nonsmoking households by 8.6%. Since the majority of the U.S. population does not smoke, the aggregate impact of restaurant smoking bans on dining out expenditures is slightly positive but statistically insignificant. Furthermore, we demonstrate that as long as the smoking prevalence in the population is below 36%, restaurant smoking bans will have either neutral or positive impact on restaurant revenues. In general, these results are robust under several alternative model specifications and given that smoking prevalence in all states is well below 36%, they imply that restaurant smoking bans do not harm the restaurant industry.

The rest of this paper is organized as follows. The next section provides a conceptual framework for the potential effects of restaurant smoking bans. Section 3 presents the data. Section 4 describes the empirical methodology. Section 5 presents the results, discusses the sensitivity of main findings under alternative model specifications, and provides a discussion of policy implications. Section 6 concludes.

2. Conceptual framework

Suppose that there are two kinds of households: smokers and nonsmokers.[6] Let $s \in [0,1]$ denote the share of smoking households in the population. Therefore, the share of nonsmoking households in the population is equal to $1-s$. We assume that in the absence of a smoking ban, smokers will choose to dine out if $B > C$, where C is the cost of dining out and B is the benefit from dining out. Both B and C are randomly and uniformly distributed over $[0,1]$ regardless of smoking status. A restaurant smoking ban will add a cost to smokers' dining out experience, which we denote by $y \in (0,1)$. Therefore, once a restaurant smoking ban is enforced, smokers will choose to dine out if $B > C + y$. On the other hand, smoking ban is desirable for nonsmoking households. In the presence of a restaurant smoking ban, nonsmokers will dine out if $B > C$. However, their dining out cost will increase if restaurants are not smoke-free. In this case, nonsmoking households will choose to dine out if $B > C + x$, where $x \in (0,1)$ is the additional cost of dining out for nonsmoking households who end up eating under the exposure to second-hand smoke.

In this simple set up, the change in restaurant expenditures following restaurant smoking bans can be written as

$$\Delta R = (1-s)\left(x - \frac{1}{2}x^2\right) - s\left(y - \frac{1}{2}y^2\right). \quad (1)$$

Notice that ΔR depends on s as well as x and y.[7] In particular, even when $y > x$, a restaurant smoking ban will either have a neutral or positive impact on restaurant expenditures ($\Delta R \geqslant 0$) provided that the share of nonsmoker in the population $(1-s)$ is sufficiently high. In our empirical analysis, we estimate the semi-elasticities of restaurant smoking bans with respect to restaurant expenditures for smoking and nonsmoking households separately. Using these estimates, we calculate the threshold level of smoking prevalence in the population $\tilde{s}$ above which restaurant smoking bans would hurt restaurant revenues. The threshold level of smoking prevalence $\tilde{s}$ is defined as s such that $\Delta R = 0$.

[4] Studies that investigated the impact of restaurant smoking bans for certain states include Glantz and Smith (1994, 1997), Hyland and Cummings (1999), Huang and McKuster (2002), Huang et al. (1995), Bartosch and Pope (1999), Cowling and Bond (2005), and Goldstein and Sobel (1998).

[5] See Adams and Cotti (2007).

[6] We thank an anonymous referee for proposing this framework.

[7] We provide a detailed discussion of Eq. (1) in Appendix A.1.