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Smoking bans have been widely introduced in recent years in an effort to reduce non-smokers' exposure to tobacco smoke. **Jérôme Adda** and **Francesca Cornaglia** evaluate the effect of these restrictions – and of taxes on cigarettes – on the incidence of passive smoking and, in particular, their unintended consequences for children.

# Passive smoking: the effect of bans and taxes

A substantial body of medical research has demonstrated the dangers of exposure to environmental tobacco smoke. Passive smoking has been linked to a number of serious illnesses, such as lung cancer and heart disease in adults. And it particularly affects the health of young children and babies, causing asthma, bronchitis and sudden infant death syndrome. In the United States, the Environmental Protection Agency estimates that exposure to smoke causes about 200,000 lower respiratory tract infections in young children each year, resulting in 10,000 hospitalisations.

Public intervention uses two instruments to try to discourage smoking: directly, by limiting or banning smoking in public places; and indirectly, by raising taxes on cigarettes. Economic evaluations of the impact of these policies have mainly focused on the latter. For example, our research has shown that taxes reduce the number of cigarettes smoked, but smokers compensate by smoking each cigarette more intensively (Adda and Cornaglia, 2006).

Few studies have considered the effect of bans, and those that do focus on the impact on smokers. One example shows



that workplace bans decrease the prevalence of smoking among those who work (Evans et al, 1999). But there is hardly any evidence on the effectiveness of either raising taxes or restricting smoking in reducing exposure to tobacco smoke among non-smokers.

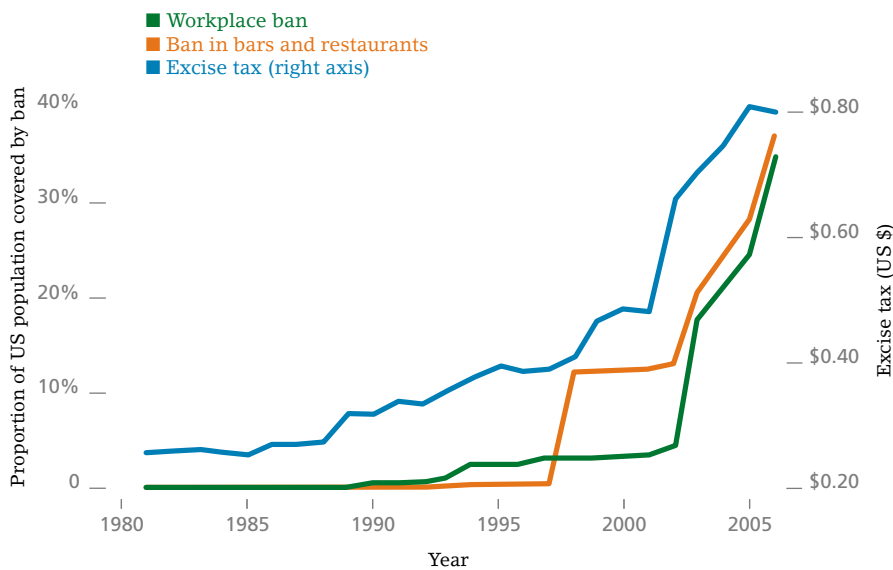
Public debate on the effectiveness of different measures has intensified, and policies to ban smoking are often justified on the grounds of protecting non-smokers rather than smokers. But there is to our knowledge no study evaluating the response of passive smoking to the growing set of regulations and clean air legislation passed in the last decade or to changes in excise taxes.

## The emergence of smoking bans

Just as in the UK, widespread smoking bans and smoking restrictions are a relatively novel phenomenon in the United States. Some attempts to ban smoking and the sale of cigarettes were made during Prohibition in the 1920s, when 15 states banned cigarette sales. But these laws were repealed by the end of that decade.

Half a century later, as research progressively made clear the effect of tobacco smoke, support for smoking bans

Figure 1:  
Bans and excise taxes by year (US average)



in public places has steadily risen. The proportion of individuals supporting a total ban in restaurants increased from 20% in 1985 to 54% in 2005. And local authorities and governments have come under pressure from anti-tobacco groups and the general public to limit the exposure of non-smokers and generally to discourage smoking.

The first smoking bans to be introduced in the United States were in place in Minnesota in the mid-1970s. They required restaurants to have a non-smoking section, while exempting bars. During the 1970s and the 1980s, smoking bans were progressively imposed, usually by requiring separate areas for smokers and non-smokers, as in airlines in 1973.

During the 1990s, US smoking bans became more stringent, with the imposition of total bans in workplaces, public places, restaurants and bars. These were pioneered by municipalities and counties, mainly in California in the early 1990s. The first states to impose such a ban were California and Utah with 100% smoke-free restaurants in 1995.

### The impact of bans on passive smokers

Our research uses data on smoking bans obtained from the American Non

Smokers' Rights Foundation, which collected the date of introduction of smoking bans and whether these were introduced at city, county or state level. We merge these data with information on state level excise taxes. Figure 1 plots the time trend of these policies at the national level.

Excise taxes have risen from around 30 cents per pack in the late 1980s to more than 80 cents in 2006, with a sharp rise from 2001 onwards. Hardly any bans were in place before the mid-1990s. But in 2006, about 40% of the population was living in an area with a smoking ban in workplaces or with smoking bans in bars and restaurants.

We have a direct measure of passive smoking, which has not previously been used in economic research. The concentration of cotinine (a chemical naturally derived from nicotine) in blood, saliva or urine samples is a good marker of exposure to environmental smoke (Jarvis et al, 2000). Using this indicator, we can evaluate the effect of bans and taxes on smokers and non-smokers and, in particular, their unintended consequences for children.

Analysing the effect of smoking regulation on smoking, time use and passive smoking, we show that smoking

Children who share a house with smokers suffer particularly adversely from smoking bans

bans can have two distinct effects on non-smokers' exposure to tobacco smoke: they decrease exposure in public places but can lead to a perverse increase in exposure by displacing smoking towards private areas.

We find that during the last two decades, bans in workplaces, bars and restaurants have led to a relative *increase* in the exposure of non-smokers, particularly those who share a household with smokers.

We hypothesise that such bans displace smoking to places where non-smokers are more exposed. To support these findings, we provide evidence of the

Smoking bans in workplaces, bars and restaurants have led to a relative increase in the exposure of non-smokers

effect of bans on smoking behaviour and how individuals spend their time in various locations.

We show that there is no clear evidence that smoking bans have a causal effect either on the prevalence of smoking or on smoking cessation and attempted quits. Using time use data, we show evidence of a displacement of smokers away from bars and restaurants when smoke-free laws are passed. The evidence therefore supports the hypothesis of a displacement of smokers to places shared with non-smokers, such as watching TV with the children, who then get more exposure to tobacco smoke.

In contrast, we find that changes in tobacco taxes have a significant effect of reducing exposure to environmental smoke. The effect is particularly sizable for children who are exposed to their parents' smoke. This suggests that excise taxes are an efficient tool to curb passive smoking as smokers cut down on cigarettes smoked in the company of non-smokers, especially children.

### The value of bans for reducing passive smoking

Our results question the usefulness of bans in reducing smoking exposure for non-smokers. More precisely, we show that policies aimed at reducing exposure to tobacco smoke induce changes in behaviour, which can offset these policies.

It is therefore of crucial importance to understand how smoking behaviour is affected by regulations. To date, economic research has not gone far enough in studying smoking behaviour to be able to evaluate their effect on non-smokers. It is not enough to show that smokers react to prices or taxes. Information on which particular cigarette is cut down during the day, where smokers smoke and with whom are also relevant.

There are complex interactions at play and considerable variation in their effects across socio-economic groups. Using a biomarker such as cotinine concentrations is a very direct way of evaluating the overall effect of interventions and the induced changes in behaviour.

On the policy side, it is clearly important when designing public policies aimed at reducing tobacco exposure of non-smokers to distinguish between the different public places where bans are introduced. Displacing smoking towards

places where non-smokers spend time is particularly inefficient.

The displacement may also increase health disparities across socio-economic groups and in particular among children, a vulnerable group with little choice to avoid contamination. Children are particularly prone to tobacco-related diseases, and poor health in childhood has lasting consequences not only for future health but also for the accumulation of human capital.

Governments in many countries are under pressure to limit passive smoking. Some pressure groups can be very vocal about these issues and suggest bold and radical reforms. Their point of view is laudable but too simplistic in the sense that they do not take account of how public policies can generate perverse incentives and effects. Our study provides insights on how to design optimal policies to curb passive smoking.

This article summarises 'The Effect of Bans and Taxes on Passive Smoking' by Jérôme Adda and Francesca Cornaglia, CEP Discussion Paper No. 950 (<http://cep.lse.ac.uk/pubs/download/dp0950.pdf>).

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### Further reading

Jérôme Adda and Francesca Cornaglia (2006) 'Taxes, Cigarette Consumption and Smoking Intensity', *American Economic Review* 96(4): 1013-28.

William Evans, Matthew Farrelly and Edward Montgomery (1999) 'Do Workplace Smoking Bans Reduce Smoking?', *American Economic Review* 89(4): 728-47.

Martin Jarvis et al (2000) 'Children's Exposure to Passive Smoking in England since the 1980s: Cotinine Evidence from Population Surveys', *British Medical Journal* 321: 343-45.



Excise taxes lead smokers to cut down smoking in the company of non-smokers, especially children