



# Smoking bans, cigarette prices and life satisfaction<sup>☆</sup>



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## ABSTRACT

The consequences of tobacco control policies for individual welfare are difficult to assess, even more so when related consumption choices challenge people's willpower. We therefore evaluate the impact of smoking bans and cigarette prices on subjective well-being by analyzing data for 40 European countries and regions between 1990 and 2011. We exploit the staggered introduction of bans and apply an imputation strategy to study the effect of anti-smoking policies on people with different propensities to smoke. We find that higher cigarette prices reduce the life satisfaction of likely smokers. Overall, smoking bans are barely related to subjective well-being, but increase the life satisfaction of smokers who would like to quit smoking. The latter finding is consistent with cue-triggered models of addiction and the idea of bans as self-control devices.

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## 1. Introduction

Adverse health effects of smoking motivate tobacco control policies in many countries. Most prominent are smoking bans introduced at workplaces as well as in restaurants, bars and clubs. Moreover, excise taxes are levied on tobacco products in order to increase their prices. These policies, however, are controversially discussed, as they have a multitude of consequences affecting

people's health and welfare in various ways with sometimes countervailing effects.

At first sight, non-smokers are expected to be the primary beneficiaries of these policies, for example, by positive effects on health due to the potential protection from environmental tobacco smoke (see, e.g., Pell et al., 2008, Meyers et al., 2009 or Kuehnle and Wunder, 2013). However, smoking bans might also lead to negative side effects such as the displacement of smoking from the targeted public places to officially unregulated private places (Adda and Cornaglia, 2010). Smoking bans may then have negative welfare effects even for non-smokers.

For smokers, competing welfare predictions emerge for other reasons. From a traditional economic perspective (pioneered in the domain of addictive goods by Becker and Murphy, 1988), public health interventions constrain smokers in their habits, and this tends to make them worse off. Benefits arise only to the extent that the policies successfully internalize social costs. However, from a behavioral economics perspective smokers may face self-control problems and are therefore unable to make short-term decisions according to their long-term preferences. For them, a policy that restricts smoking might have a positive impact on individual well-being as it can serve as a self-control device. According to the models of O'Donoghue and Rabin (1999) and Gruber and Köszegi (2001, 2004), smoking bans as well as higher cigarette prices

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substantially increase the costs of smoking and thus reduce the need to rely on willpower to adhere to a time-consistent consumption plan. In contrast, the models of [Gul and Pesendorfer \(2001\)](#) and [Bernheim and Rangel \(2004\)](#) predict that higher prices will have a negative welfare effect on smokers, as they have a limited effect in reducing overconsumption. The models rather emphasize that successful policy interventions have to protect people from tempting situations. Smoking bans might achieve this more directly than higher cigarette prices.

Thus, depending on the assumed time consistency in smokers' consumption behavior, different predictions for the welfare consequences of anti-smoking policies emerge. This holds even though the different models predict similar reactions to tobacco control policies in terms of smoking behavior. Accordingly, it is very difficult to discriminate between the theoretical perspectives based on observed consumption behavior. Still, previous research concentrates mainly on the impact on smoking behavior and health outcomes.<sup>2</sup> Furthermore, the partly countervailing behavioral reactions and health consequences have rarely been assessed with regard to a net effect on people's well-being so far.

In this paper, we propose the use of data on subjective well-being as a complementary approach to study the welfare consequences of policies in areas that might involve suboptimal consumption choices.<sup>3</sup> Such an approach allows capturing welfare effects due to the potential reduction of negative externalities as well as internalities. We thereby go beyond existing research and simultaneously analyze the net welfare effects of smoking bans and cigarette prices not only for smokers and non-smokers, but also for smokers who failed to stop smoking. The latter group potentially captures people with limited willpower. Besides a general policy evaluation, this approach enables us to test in an original way two classes of behavioral economic models and their relevance within the scope of large-scale health policy interventions.

We exploit repeated cross-sectional data from 41 waves of the Eurobarometer survey series which include 629,930 individuals from 40 European countries and regions between 1990 and 2011. The staggered introduction of smoking bans in the different countries and regions enables us to study the effect of the bans on individual life satisfaction in a difference-in-differences-type framework. Importantly, the investigation of the ban introduction process does not indicate concurring (health) policy interventions. Therefore, the developments of life satisfaction in regions and countries that do not introduce smoking bans in a given point of time can be studied as counterfactuals. The variation in cigarette prices over time is exploited to identify the consequences of higher prices on subjective well-being. The rich data pool allows us further to take into account unobserved country-specific effects, survey wave-specific effects, linear and quadratic country-specific time trends, and measures for macro-economic conditions as well as for other tobacco control activities.

<sup>2</sup> The related literature is vast, in particular regarding the consequences of tobacco control policies on consumption behavior. For reviews on the economics of smoking and tobacco policy, see, e.g., [Viscusi \(1992\)](#), [Chaloupka and Warner \(2000\)](#), [Gruber \(2001\)](#), and [Cnossen \(2006\)](#). Generally, negative price elasticities in the range from  $-0.3$  to  $-0.5$  are found ([Chaloupka and Warner, 2000](#)), whereby recent refined estimates report smaller elasticities ([Tauras, 2006](#)). Similarly for smoking bans, recent analyses with refined identification strategies only find small negative effects on cigarette smoking (e.g., [Adda and Cornaglia, 2010](#), [Carpenter et al., 2011](#), or [Anger et al., 2011](#)) compared to earlier reviews (see, e.g., [Fichtenberg and Glantz, 2002](#) or [Hopkins et al., 2010](#)).

<sup>3</sup> For a general account see [Kőszegi and Rabin \(2008\)](#), [Stutzer \(2009\)](#) and [Hsee et al. \(2012\)](#). Introductions to the economic analysis of subjective well-being are, e.g., provided in [Frey and Stutzer \(2002\)](#), [Layard \(2005\)](#) and [Stutzer and Frey \(2010\)](#). Applications to suboptimal consumption choices are, e.g., [Stutzer and Meier \(2015\)](#) on obesity and [Benesch et al. \(2010\)](#) on TV viewing.

The selection into a particular smoking status is taken into account when studying treatment effects for different groups such as likely smokers and non-smokers (thereby following and extending the approach pursued by [Gruber and Mullainathan, 2005](#)). As tobacco control policies affect people's smoking status, individuals who indicate that they are smokers pre- and post-intervention are not comparable. Some smokers might quit and are thus no longer observed in the group of smokers after the intervention. Any measured difference in subjective well-being for actual smokers consequently compounds a possible treatment effect and a selection effect. In our analysis, we instead concentrate on a counterfactual smoking status of every person in the sample for the case that no smoking ban is in place and cigarette prices are low.

We find, on average, a small positive partial correlation between the introduction of smoking bans and people's reported life satisfaction that more likely holds for smokers than for non-smokers; however, the effects here are rather imprecisely measured and not statistically significant. Higher cigarette prices are statistically weakly related to a lower level of reported subjective well-being. The strong negative effect that higher prices have on the life satisfaction of likely smokers drives the negative correlation, whereas non-smokers are not affected by higher prices. Within the group of smokers, higher prices also reduce the life satisfaction of people who want to give up smoking. However, smokers in this latter group, report a higher level of life satisfaction when smoking bans are in place. These people (roughly one third of the smokers according to surveys) are likely to perceive smoking bans as a self-control device that helps them pursue their preferred consumption plan. Altogether, the findings question the idea that higher tobacco taxes act as an effective internalization strategy and self-control device, while the partially positive effects of smoking bans are consistent with models of addiction based on cue-triggered decision processes.

The proposed negative effect of higher cigarette prices is contrary the prominent result published in the study by [Gruber and Mullainathan \(2005\)](#). In two longitudinal analyses across states of the United States and Canada, they find that higher tobacco taxes significantly reduce the likelihood of being unhappy among people who have a high propensity to smoke compared to people who have a low propensity to smoke. We discuss possible reasons for the difference in these results in Section 3.4. Our findings also relate to two other recent studies. In another analysis for the United States, [Brodeur \(2013\)](#) finds no differential effects of higher taxes on the life satisfaction of smokers compared to non-smokers. However, he reports a positive differential effect of smoking bans in bars and restaurants on smokers who do not quit smoking following the implementation of the ban. Using data from the British Household Panel Survey and relying on the different introduction dates across the four regions in the United Kingdom, [Leicester and Levell \(2013\)](#) find no robust effect for the introduction of smoking bans on mental well-being. With regard to higher cigarette taxes, they find a positive differential effect on the well-being of smokers compared to non-smokers. However, if the negative baseline effect for non-smokers – who serve as the control group – are taken into account, the net effect for smokers remains ambiguous.

Our analysis complements and extends the specific studies for Canada, the United Kingdom and the United States in several ways. First, we compile and analyze the largest available dataset on tobacco control policies and subjective well-being for Europe so far. The large variation in the introduction dates of bans and in country-specific cigarette prices allow us to assess tobacco control policies in an econometrically rigorous way. Moreover, since Europe is a region with high average smoking rates, any policy might have a potentially bigger impact than in the United States, where smoking is socially less well accepted and smoking prevalence is lower. Second, we simultaneously analyze the welfare effects of smoking

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