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A BEHAVIOURAL THEORY OF POLICY FEEDBACK IN TOBACCO CONTROL: EVIDENCE FROM A DIFFERENCE-IN-DIFFERENCE-IN-DIFFERENCE STUDY

ABSTRACT

Public policy scholars argue that in highly tangible policies, such as tobacco control, the public learns from the direct experience of the beneficial effects of the policy. Empirical evidence supports this argument, suggesting that in the US the introduction of tobacco control measures make people more inclined to further regulation. By relying on a set of cases which allows testing the effects of the introduction of tobacco control measures across European countries on a series of relevant variables, this study confirms that the introduction of tobacco control measures makes the public more inclined to further regulation. Yet, when the effects of these policies are disaggregated between smokers and non-smokers, results show that these positive effects are driven by smokers. This puzzle suggests that different effects than mass attitudinal policy feedback effects, driven by learning from direct experience, might explain the positive reaction to tobacco control. This study puts forward a behavioural theory of policy feedback, which suggests that smokers react positively to the introduction of tobacco control measures because they see these measures as commitment devices, which can help them quit smoking. Evidence for this argument is found by demonstrating that the introduction of tobacco control measures increases smokers' welfare.

Keywords: public policy, tobacco control, policy feedback, public opinion

INTRODUCTION

In the last decades, the effects of the introduction of tobacco control measures on public opinion have received great attention in the public policy literature (Marshall 2014, 2016; Pacheco 2013, 2012). These studies suggest that tobacco control is a tangible issue, which shapes mass attitudes through learning from direct experience (Pacheco 2013), differently from other issues, such as redistributive and economic issues, where other mechanisms, most notably framing, might also play an important role (Svallfors 2010; Gusmano et al. 2002; Haselswerdt and Bartels 2015; Soss and Schram 2007; Gilens 1999). People experience the positive effects of tobacco control on a daily basis and change their attitudes accordingly.

Pacheco (2013) finds that the introduction of smoking bans in public places across US states makes people more supportive of further regulation. Moreover, recent evidence suggests that the interaction between public opinion and public policy in tobacco control is not characterised by backlashes or negative feedback effects (Marshall 2016), which are instead present in other issues (Wlezien 1995). In conclusion, the public policy literature provides strong evidence for positive mass policy feedback effects in tobacco control, based on direct experience and learning.

This study uses a difference-in-difference(-in-difference) analysis applied to a series of cross-sectional surveys on attitudes towards various issues, including smoking and tobacco control, conducted across European countries by Eurobarometer in the period 1991-1995 (CEC 1991, 1992, 1994, 1995). It exploits the lagged introduction of tobacco advertisement bans in four countries, namely Ireland, Italy, France and Spain, where these types of bans were introduced respectively in 1992 and 1994. Findings suggest that tobacco control measures have positive effects on the public as a whole, as public policy scholars suggest. Yet, when the effects of these

policies are disaggregated between smokers and non-smokers, results show that these effects are driven by smokers. More specifically, the introduction of tobacco advertisement bans makes smokers more in favour of tobacco control. This finding cannot be fully explained by mass attitudinal policy feedback theories based on learning and direct experience.

By building on behavioural welfare economics, this study introduces a behavioural theory of policy feedback. In so doing, it argues that the positive effects of the introduction of tobacco control measures are not only due to direct experience and learning, but also to the fact that tobacco control policies act as self-control devices for smokers. In cue-triggered models of addiction, tobacco control measures help the individual quit smoking, by creating a less 'tempting' environment. The argument put forward in this study is that these dynamics help explain why smokers react to the introduction of tobacco control measures by becoming more in favour of further regulation. Empirical evidence is found for this theory, by showing that the introduction of tobacco control measures has a positive effect on smokers' welfare.

These findings elicit interesting theoretical and practical implications. At theoretical level, the behavioural approach proposed in this work goes beyond mass policy feedback effects driven by direct experience and learning, focusing on the actual effects of policies on target groups. In so doing, it provides a more detailed account of the chain of mechanisms in place between an external stimulus, such as the introduction of a policy, and attitudinal change, by building on behavioural welfare economics. At empirical level, the findings below show that, once the initial opposition to the implementation of stronger health policies is overcome, these policies have positive effects on the groups they try to help and eventually receive further support from them.

POLICY FEEDBACK IN THE PUBLIC POLICY LITERATURE

Traditional work on policy feedback looks at public opinion reactions in 'traditional' policies, such as economic policy (Svallfors 2010; Gusmano et al. 2002; Haselswerdt and Bartels 2015; Soss and Schram 2007; Gilens 1999). Some work focuses on how elites frame policies and how these frames are perceived by the public (Brewer 2003; Gusmano et al. 2002; Johnson et al. 2005). The process of framing works by emphasizing certain characteristics of the policy, such as whether the policy has broad effects on the society as a whole or proximate effects on specific target groups (Gusmano et al. 2002; Soss and Schram 2007). Other work in this area finds that policy feedback is dependent on personal experience, partisanship and political knowledge (Lerman and McCabe 2017; McCabe 2016).

Other strands of the literature look at the effects of public policy on public opinion. For instance, some work studies the interaction between public policy and public opinion, by arguing that the relationship between public opinion and public policy works like a thermostat. When the public mood shifts towards more conservative positions, for instance, politicians will adapt to this shift, by adjusting public policy accordingly and, as a result, public opinion will go back to its equilibrium position. This approach is known as thermostatic model (Wlezien 1995).

More recently, public policy scholars have looked beyond economic or redistributive policies and started focusing on more 'tangible' policies (Pacheco 2013, 2012; Marshall 2014, 2016). The latter are policies with which individuals have direct experience on a daily basis, such as alcohol and smoking regulation (Pacheco 2013). Building on Soss and Schram (2007), the main difference with traditional policies, such as economic policy, is the proximity with citizens. These tangible policies define what is socially acceptable, such as smoking or not, and define

perceptions towards target populations, such as how people perceive smokers (Pacheco 2013). More importantly, tangible policies create support for further regulation (Pacheco 2013; Marshall 2016). This is in sharp contrast with what the traditional public policy literature finds in economic policies, as the thermostatic model of public policy discussed above suggests (Wlezien 1995). The reason lies in the different mechanism driving policy feedback in place in tangible policies. The main mechanism through which policy feedback effects take place is individual learning from direct experience and not framing, for instance, which has stronger effects in more traditional policies (Soss and Schram 2007). In tangible policies, citizens experience the positive effects of the policy on their daily life and see the link between these positive effects and the government action, differently from the economy, where this link is not straightforward (Powell 2000, Powell and Whitten 1993). Policies with positive effects for the majority of citizens will trigger support for further intervention.

Empirical findings confirm these claims. Pacheco (2013) finds that the introduction of policies prohibiting smoking in public places (so called 'smoking bans') across US states makes people view smokers in a more negative way and passive smoking as more dangerous. More importantly, as a result of the introduction of these measures, people become more inclined to favour further regulation in similar areas. These positive attitudinal feedback effects are found to influence the diffusion of tobacco control policies across countries (Pacheco 2012). In a similar vein, Marshall (2016) finds that public opinion tends to react to tobacco control measures in a positive manner, showing increasing support for further regulation.

In conclusion, recent public policy studies go beyond 'traditional' policies, like economic policy, and focus on tangible issues, which affect people's everyday life, such as tobacco control. Findings suggest the policy feedback dynamics in these tangible issues differ from those in place

in traditional policies, so far studied by the literature. Most notably, in tobacco control the public reacts positively to public policy, becoming more inclined to further regulation. The reason is that people see the positive effects of these policies in their everyday life and they understand the benefits of regulation. In the section below, a complementary explanation which looks at the effects of those policies on target groups, such as smokers, is provided. The argument put forward in this study is that the positive policy feedback effects are not only due to mass feedback effects based on learning from direct experience, but also to behavioural effects on specific segments of society.

A BEHAVIOURAL THEORY OF POLICY FEEDBACK

The traditional strand of welfare economics suggests that smoking is rational, meaning that smokers take into consideration the trade-off between the long term costs of smoking and its short-term benefits and act accordingly (Becker and Murphy 1988). In this model, the taxation of addictive substances, such as excise taxes on cigarettes, will reduce addictive behaviour, curbing negative externalities for third parties (i.e. non-smokers) and arguably making them better off, but will make addicts, such as smokers, worse off. This is arguably in line with extant work in the public policy literature, which implies that tobacco control measures address the externalities of smoking, creating a safer environment for the population as a whole, but making smokers worse off. Talking about tobacco control and smokers, Pacheco (2013) argues that: “if a policy is exclusive, alienates a segment of the population, or signals that policy targets are of lesser status, then attitudes about those people are expected to be negative”.

Behavioural models of addiction criticize the rational models discussed above and rest on three main assumptions: use among addicts is due to a divergence between choices and preferences and hence, it is not rational; environmental cues trigger the use of the addictive substance;

addicts understand their susceptibility to these cues (Bernheim and Rangel 2004). In other words, smokers have self-control problems: they wish to quit, but they cannot (Gruber and Mullainathan 2005). This situation is made worse by an environment where cigarettes are cheap, smoking is allowed everywhere, cigarette commercials are on television and so on, and smokers are fully aware of the negative effects of this environment on their addiction.

Importantly for public policy, these behavioural models of addiction rely on the importance of environmental cues and self-control through cue avoidance or management (Bernheim and Rangel 2004). Policies reduce the likelihood of cue triggered 'mistakes' by removing cues or establishing counter-cues. This in turn reduces the divergence between the smoker's preferences, namely wishing to quit smoking, and her choices, namely quitting smoking. Advertisement bans, for instance, reduce the likelihood of being exposed to tobacco company logos, namely environmental cues. An example of counter-cues can be considered the pictorial warnings on cigarette packages which seek to create a strong emotional reaction against the harmful effects of smoking. Both policies create a less 'tempting' environment, where quitting or reducing smoking is easier. The result is an increase in welfare for addicts, namely smokers. In conclusion, this behavioural approach to tobacco control suggests that smokers are better off as a result of the introduction of tobacco control measures.

Gruber and Mullainathan (2005) test the effects of excise taxes on smokers and non-smokers on self-reported life satisfaction in US and Canada, finding that taxes make smokers happier. In a similar vein, Odermatt and Stutzer (2013) study the impact of smoking bans and cigarette prices on the subjective wellbeing across European countries and find that these measures increase people's life satisfaction, especially among smokers.

This study builds on these behavioural models of addiction to explain policy feedback in tobacco control. As seen above, tobacco control measures are conceived as self-control devices, which help smokers quit and hence make them happier. The argument put forward in this study is that these dynamics help also explain positive feedback effects. The introduction of a tobacco control policy affects smokers' choices. More specifically, this policy makes the choice of quitting, which is in line with smokers' preferences, more credible. This makes smokers better off, but it also affects attitudes towards regulation. Just like smokers are aware of the detrimental effects of environmental cues on their addiction, it is reasonable to assume that once a policy restricting these cues or producing counter-cues is in place, they become aware of the positive effects of this policy on their choices and in turn their welfare. In other words, they become aware that their attempts to quit become more credible (i.e. more likely to succeed) as a consequence of that policy. Hence, we see a shift in the attitudes towards tobacco control among smokers, as they start to support further regulation.

The mechanisms at play in this case are more complex than learning from direct experience. As mentioned above, learning is more in line with rational welfare economics approaches, which conceive public policy as a way to reduce negative externalities on third parties, namely to reduce passive smoking for non-smokers. Citizens see the positive effects of the policy on their welfare and they change their attitudes, becoming more supportive of regulation, for instance. Instead, behavioural approaches lie on the irrationality of smokers and how tobacco control policies may help create the right environment to reduce this irrationality, by aligning smokers' choices with their preferences, hence increasing their welfare. Moreover, in line with behavioural psychology (de Vries et al. 1988; Tykocinskl et al. 1994; Rains and Turner 2007), this argument

assumes that an external stimulus, public policy in this case, triggers a complex reaction, which affects not only attitudes, but eventually also intentions and behaviours.

The main theoretical contribution of this work is to bridge the gap between the public policy strand which studies policy feedback dynamics in tangible issues and the welfare economics strand which looks at behavioural models of addiction. On an empirical level, this study presents the first analysis where the effects of tobacco control policies both on the support for further regulation and the policy target groups' welfare are investigated. These two effects have so far been studied separately, with public policy scholars focusing on the former (Pacheco 2013, 2012) and welfare economics work scholars focusing on the latter (Gruber and Mullainathan 2005).

RESEARCH DESIGN

The test of this behavioural theory focuses on two empirically observable implications. The first expectation is to find that the introduction of tobacco control measures has stronger effects on smokers. More specifically, the expectation is to find that the introduction of these policies in an area makes smokers more in favour of further regulation in that area, as well as in similar areas. This is not to say that these policies do not have an effect also on the population as a whole, as the public policy literature would expect. Mass attitudinal effects based on direct experience and learning can co-exist with the behavioural effects on smokers described in this work.

The second expectation is that smokers' welfare increases as the result of the introduction of tobacco control measures. The reason is that behavioural addiction theories, on which the behavioural theory of policy feedback proposed in this work builds, suggest that public policy works as a cue management or avoidance device, thus positively affecting smokers' welfare

(Gruber and Mullainathan 2005; Odermatt and Stutzer 2013). Instead, extant public policy approaches to policy feedback would suggest that tobacco control measures make non-smokers better off.

To put it more formally:

> H1: The introduction of advertisement bans increases the likelihood of smokers to be in favour of tobacco advertisement regulation, as well as smoking regulation in work and public places
>
> H2: The introduction of advertisement bans increases smokers' life satisfaction

This section commences by discussing tobacco advertisement regulation, why it is a suitable case study for the behavioural theory proposed above and which tobacco advertisement bans are include in the analysis. Then, the surveys used to measure the effects of these bans on the public as a whole and then on smokers are introduced. Finally, the use of difference-in-difference(-in-difference) analysis is discussed.

Tobacco Advertisement Regulation

Today, smoking is considered the primary cause of preventable illness and death in the world, accounting for nearly six million deaths a year (ASH 2016; Eriksen et al. 2012). As smoking becomes increasingly prevalent in developing countries, the death toll is likely to rise to eight million deaths a year by 2030 (Eriksen et al. 2012). Not only does smoking impose large human costs, but it also seriously affects national economies. In England alone, the National Health Service estimates that smoking costs two billion pounds a year (ASH 2015). On top of that, smoking imposes huge indirect costs, through loss of economic productivity due to premature

deaths, smoking-related sick days and the productivity cost to businesses due to smoking breaks among others. Research commissioned by the main anti-smoking NGO in the UK, Action Again Smoking (ASH) UK, estimates that in England these indirect costs are around 14 billion pounds a year (ASH 2015).

In light of this, recent years have witnessed unprecedented activity in tobacco control. New and more effective policy instruments have been introduced at a rapid pace across the world. The scope of tobacco control measures and their speed of introduction across countries have today reached unprecedented levels. In the course of a few years, most countries around the world have established complex tobacco control regimes, characterised by a combination of different policy instruments (Cairney et al. 2012): regulation, such as smoking bans, tobacco advertisement control and sales restriction; finance, such as tobacco taxation; capacity building, such as smoking cessation programmes provided by the national health system; education, such as health warning labels and awareness campaigns; learning and information tools, such as research funding.

The choice of tobacco advertisement regulation to test the behavioural theory formulated above is dictated by different factors. First, by reducing the presence of tobacco advertisement in media outlets, advertisement bans specifically aim at cue avoidance, in an attempt to prevent people from starting smoking and help smokers quit. Hence, these bans are particularly suitable to test the theory above, which is based on cue triggered addiction models. When discussing public policy that can help addicts attenuating exposure or sensitivity to cues, Bernheim and Rangel (2004) point out that: “policies that reduce the likelihood of cue-triggered mistakes by removing problematic cues or establishing counter-cues unambiguously increase welfare”.

Second, advertisement regulation represents one of the first attempts to curb smoking across developed countries through legislation, when tobacco started to be considered a threat in the mid-1980s (Cairney et al. 2012). Behavioural effects are arguably stronger where smokers are not already saturated with many attempts to reduce exposure to cues or to introduce counter-cues. Finally, the choice of the countries is dictated by the availability of surveys which ask questions relevant for this study. As these questions are present only in the surveys from 1991 to 1995, this study compares the effects of the introduction of advertisement bans in Ireland, Italy, France and Spain. The final part of this section discusses these advertisement bans.

In France, the Evin law (named after the then French Health Minister) was enacted as part of a broader programme on public health, which included also alcohol consumption regulation, led by the French medical community. A team of physicians published a report in 1987 on the fight against smoking. The idea was to revive the 1977 Veil law, which intended to address both smoking in certain public places, such as government buildings and transportation, and tobacco advertisement, but which had been previously poorly enforced. The Evin law was voted in the cabinet on 6 June 1990 and enacted by the parliament few months later (Nathanson 2004; Foltz 1990). The Evin law sought to curb smoking also by increasing tobacco taxation, as well as strengthening the smoking ban in government buildings and transportation and the advertisement ban in printed media, both already covered by the Veil law. Nonetheless, its main objective was to ban the advertisement of tobacco products in mass media, namely television, cinema and radio, as well as the sponsorship of cultural and sports events, aired by those means, by tobacco companies (Kagan et al. 1991).

The Italian advertisement ban was enacted through an administrative act (decree 30 November 1991, n. 425), based on article 17 Law n. 400/1988. This decree, called Vizzini I (named after

the then Italian Minister of Posts and Telecommunications), prohibited the direct and indirect advertisement of tobacco and alcohol products on television. Another decree (Vizzini II) was also enacted. This second decree banned the promotion of diversified products through TV commercials intended to advertise cigarettes, namely it banned sponsorship of cultural and sport events. These two decrees were strongly tied to Mammi law (Law 6 August 1990, n. 223), which limited investment in private TV advertisement. Differently from the Evin law, which included also other tobacco control measures, the Italian ban specifically addressed direct and indirect tobacco advertisement in mass media.

The Tobacco Products (Control of Advertising, Sponsorship and Sales Promotion) Regulations enacted in Ireland on 10 December 1991 entered into force at the end of that month. This piece of legislation prohibited both the direct advertisement and the sponsorship of cultural and sports events in mass media, such as television and cinema. The 1988 act, which gave the Minister the power to enact regulations on tobacco advertisement under Section 2 (Tobacco (Health Promotion And Protection) Act, 1988 1988), created the momentum for legislating on tobacco advertisement. A series of parliamentary debates in the Dáil Éireann, initiated by MPs from different parties, show the strong public support tobacco advertisement regulation enjoyed already at the end of 1980s (Written Answers. - Smoking Controls 1988; Tobacco (Health Promotion and Protection) Bill, 1988: Second Stage 1988). Public support was gained also thanks to major public campaigns in 1989, led by the Health Ministry, coinciding with the Europe Against Cancer Year (Written Answers. - Smoking Controls 1988).

Finally, in 1994 a European directive on radio and television broadcasting was incorporated into the Spanish legislation with the Law 25/1994. Similarly to the other cases, this law prevents

tobacco companies from promoting directly or indirectly their products on radio and television, such as through product placement or endorsement (Lillard and Christopoulou 2015).

The analysis compares countries very different from a tobacco control perspective, as Italy and Spain are considered part of the Southern family, France is part of the Continental family and Ireland of the English-speaking one (Cairney et al. 2012). These families of countries have undergone different developments in the last decades and today are still very different in terms of tobacco control. Nonetheless, although the four policies slightly differ in terms of how they were introduced and their scope, these policies represented the first attempt to prohibit direct and indirect tobacco advertisement in main media outlets in the countries under study. Hence, it is reasonable to assume that their effects are uniform. Also, it should be noted that, differently from traditional issues, such as economic policies, where the political context mediates the effect of these policies on public opinion, empirical evidence suggests that in tangible issues this is not the case (Odermatt and Stutzer 2013). Hence, policy feedback dynamics are assumed to be the same across the policies under study. Table 1 in the Appendix shows the date of introduction of the bans.

Data

The analysis relies on cross-sectional surveys. The most common approach to analyse this type of survey is called the pooled approach (Horton and Fitzmaurice 2004; Schenker and Raghunathan 2007). This approach allows for obtaining overall estimates by combining different samples with different weights into a larger one. The result is a sample containing independent and not identically distributed observations, with separate dummy variables for each time period (Wooldridge 2002).

Four survey samples are pooled to analyze the effect of the introduction of the advertisement bans in Ireland, Italy, France and Spain (CEC 1991, 1992, 1994, 1995). Each of these survey waves questioned more than 1000 individuals from random samples drawn in 12 European countries on several topics. In 1993 no Eurobarometer survey with relevant questions was carried out. Originally, more countries were included in these surveys, but observations from some countries needed to be dropped, due to comparability and other issues. The observations from Norway are dropped, due to the lack of several important questions. Furthermore, in 1994 Finland and in 1995 Sweden and Austria were added, but the observations from these countries are dropped to maintain the comparability. Finally, the observations from West Germany and East Germany are pooled together. Table 1 in the Appendix illustrates the timing of the surveys, with respect to the introduction of the bans. It should be noted that in this analysis relatively short-term effects are captured. In most cases, attitudinal changes are measured after a few months of the introduction of the policy and no subsequent surveys are available.

This study tests the effects of the introduction of the advertisement ban on: first, being in favour of tobacco advertisement regulation; second, being in favour of regulating smoking in work and public places; third, life satisfaction. Table 2 in the Appendix shows how variables are coded from the survey questions. As some questions are not present across all years or are worded differently, in these cases the analysis is restricted to a subsample of years. This means that, for instance, for the analysis of the effects of the introduction of the advertisement bans on the propensity of the public of being in favour of tobacco advertisement regulation, the analysis is restricted to the 1991 and 1992 surveys, where the question wording is comparable. As a result, the analysis is restricted to the effects of the Irish and Italian bans. It should be noted that the sample of countries under study is the same across the different analyses.

Model Specification

This study uses a difference-in-difference(-in-difference) analysis to investigate the effects of the introduction of advertisement bans. A difference-in-difference analysis is used to observe the effects of the tobacco advertisement bans on the population as a whole, by comparing the situation before and after the introduction of those bans in those countries where those bans was introduced with those where they were not. This method has already been used to test the effects of tobacco control measures on the public (Odermatt and Stutzer 2013; Odermatt and Stutzer 2015; Pacheco 2013)

Then, a further comparison term is included in the analysis, namely smoker, to test the effect of those bans among smokers and non-smokers. This method takes the name of difference-in-difference-in-difference (Imbens and Wooldridge 2007). The baseline model is the following:

$$Y = \beta 0 + \beta 1\ (After\ Treatment) + \beta 2\ (Treated\ Countries)\ \beta 3\ (Treated\ Countries * After\ Treatment) + \beta 4\ (Smoker) + \beta 5\ (Smoker * After\ Treatment) + \beta 6\ (Smoker * Treated\ Countries) + \beta 7\ (Smoker * Treated\ Countries * After\ Treatment) + u$$

$$\hat{\beta}7 = [(\bar{Y}\ After\ Treatment, Treated\ Countries, Smoker - \bar{Y}\ Before\ Treatment,$$
$$Treated\ Countries, Smoker)$$
$$- (\bar{Y}\ After\ Treatment, Non\ Treated\ Countries, Smoker$$
$$- \bar{Y}\ Before\ Treatment, Non\ Treated\ Countries, Smoker\ )$$
$$- (\bar{Y}\ After\ Treatment, Treated\ Countries, Non - smoker$$
$$- \bar{Y}\ Before\ Treatment, Treated\ Countries, Non - smoker)]$$

There are three dummy variables: $After\ Treatment$, which takes value 0 before the introduction of the ban and value 1 after the introduction of the ban; $Treated\ Countries$, which takes value 1 for those countries where the tobacco measure is introduced and 0 for the other countries; *Smoker*, which takes value 1 if the individual is a smoker and 0 if he/she is not. This method allows for testing for the effects of public policy on target groups, such as smokers and non-smokers, by analyzing the effects of the interaction between the three dummy variables above. This triple interaction starts with the time changes in averages for the smokers in the country where the ban is introduced and then nets out the change in means for smokers in the other countries and the change in means for the non-smokers in that country (Imbens and Wooldridge 2007).

As done in Gruber and Mullainathan (2005) and Odermatt and Stutzer (2013), this study also calculates difference-in-difference-in-difference estimates with the propensity of smoking as the third interaction term. More specifically, it analyzes the determinants of being a smoker and imputes the propensity to smoke into the main dataset. The reason is that the tobacco advertisement bans studied in this work might have a strong effect on smoking prevalence. Some smokers, probably those who already wish to quit, might quit as a consequence of the ban. This

means that those who indicate to be a smoker in the pre-treatment survey (namely before the introduction of the ban) might not be directly comparable to those who indicate to be a smoker in the post-treatment survey (namely after the introduction of the ban).

RESULTS

This section starts by looking at the effects of the introduction of the bans on the public as whole, confirming the findings of the public policy literature. Then, it moves to study the effects on smokers and non-smokers. Findings provide support for the behavioural theory put forward above, showing that learning from direct experience alone cannot explain policy feedback in tobacco control. Full regression outputs are in the Appendix, while in the main body margins plots are shown, to make it easy for the reader to understand the effects of these policies on the different target groups, in line with the best practice in presenting statistical results (King et al. 2000). More specifically, margins plots show predictive margins (on the vertical axes), a statistic calculated from predictions from a model for different levels of a covariate, for before and after the introduction of the policy (on the horizontal axes), for those countries where the policy is introduced (right sub-graphs, labelled 'Country with Policy') and those where the policy is not introduced (left sub-graphs, labelled 'Country with no Policy'). In other words, the vertical axes show respectively the likelihood of being in favour tobacco control advertisement regulation (top-left quadrants, labelled 'In Favour of Ad Ban'), smoking regulation in work and public places (bottom-left and bottom-right quadrants, labelled 'In Favour of Work Place Regulation' and 'In Favour of Public Place Regulation') and the propensity of being satisfied with life (top-right quadrants, labelled 'Life Satisfaction). Figure 2 shows the margins for smokers (circle marker with solid line) and non-smokers (diamond marker with dashed line). Figure 2 in the Appendix shows the margins for individuals with low (circle marker with solid line), medium

(diamond marker with dashed line) and high propensity to smoke (rectangle marker with dotted line). [1]

Mass Attitudinal Effects

This study starts by looking at the effects of the introduction of the advertisement bans on the propensity of the public of being in favour of tobacco advertisement regulation. In this case, the analysis is restricted to the 1991 and 1992 surveys, where the question wording is comparable (see Table 2 in the Appendix). This means that the analysis is restricted to the effects of the Irish and Italian bans.

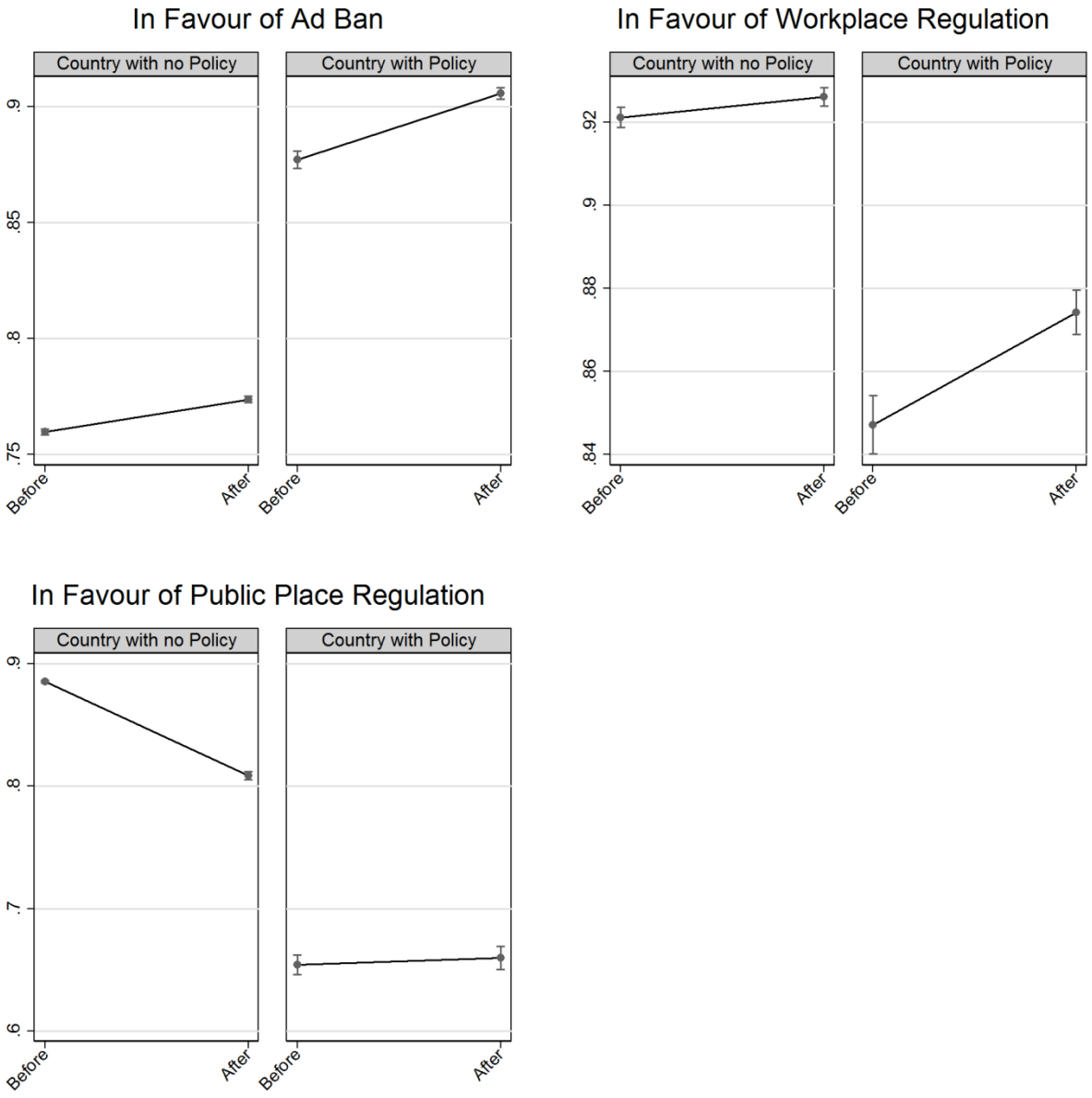
Findings suggest that the introduction of the advertisement ban is associated with an increase in the propensity of being in favour of regulating tobacco advertisement, as it can be seen from the top-left quadrant of Figure 1. In Ireland and Italy the likelihood of being in favour of tobacco advertisement control increases by three per cent from 1991 to 1992, whereas in the other countries this likelihood increases only by one per cent, all other things being equal. This result is statistically significant at $p<0.01$, as shown in Table 3 in the Appendix. Hence, it is concluded that the public reacts positively to the introduction of tobacco control measures. This result confirms the findings in the public policy literature, mainly from the US.

Then, this section moves to study whether the introduction of the advertisement ban affects being in favour of regulation in similar areas, namely smoking regulation in work and public places. In this case, the analysis compares the 1992 survey with the 1995 survey, thus including only the Spanish and French bans (again, due to the comparability of the questions). Results are shown in

[1] All Models 1 include weights, to account for the complex survey design, standard errors clustered on country, state fixed effects, year fixed effects and state-year fixed effects. Models 2 add a series of individual demographic characteristics which might affect attitudes towards tobacco control (e.g. gender, age, income). For the plots in the main text, the estimates from Models 2 are used.

the top-right and bottom-left quadrants of Figure 1. The likelihood of being in favour of regulation in the work place in Spain and France increases by three per cent from 1992 to 1995, whereas this likelihood increases only by 0.5 per cent in the other countries, all other things being equal. The effect is even stronger for the regulation of smoking in public places. The likelihood of being in favour of regulating smoking in public places increase by 0.6 per cent in Spain and France, but decreases in the other countries, by one per cent. Full regression results show the statistical significance of this effect and are shown in Table 4 and Table 5 in the Appendix. Again, these results confirms the findings drawn by public policy scholars, who find that the introduction of tobacco control measures make the public more in favour of regulating similar areas.

Figure 1 Predictive Margins of the Effects of the Introduction of the Advertisement Bans on the Propensity of Being in Favour of Tobacco Advertisement Regulation (1991-1992), Smoking Regulation in the Work Place and Public Place (1992-1995)



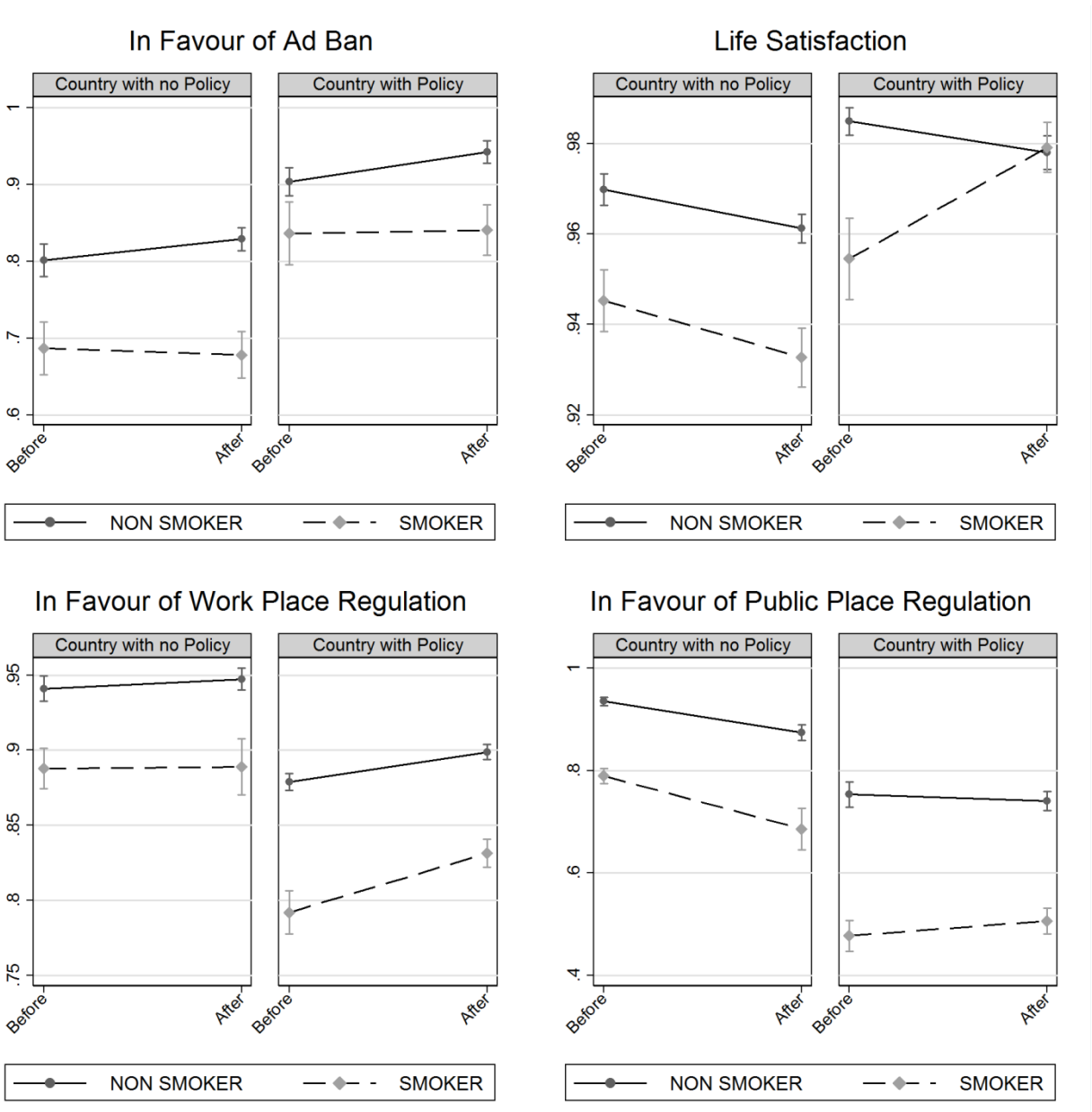
The Effects on Smokers and Non-Smokers

This section tests whether these bans have different effects for smokers and non-smokers. Figure 2 disaggregates the effects of the introduction of the advertisement bans on the public into the effects on smokers and non-smokers. More specifically, Figure 2 compares the effects of the introduction of the bans on the propensity of being in favour of tobacco advertisement control (comparing the 1991 with the 1992 survey, hence using the Italian and Irish bans as treatment), smoking regulation in the public and work places (comparing the 1992 with the 1995 survey, hence using the French and Spanish bans as treatment), between those countries which introduced the ban and those which did not and between smokers and non-smokers. Results show different effects between smokers and non-smokers. Overall, the introduction of tobacco control measures has (more) positive effects on smokers. It should be noted that, although similar effects are in place across the three cases, as shown in Figure 2, these differential effects are statistically significant only in the case of tobacco advertisement regulation (see Table 6, Table 7 and Table 8 in the Appendix). Results show that the propensity of being in favour of advertisement regulation among smokers increases in the treated countries and in the other countries decreases, while the propensity among non-smokers increases in both cases. In conclusion, the introduction of tobacco control measures has a positive effect on smokers' attitudes, providing empirical support the first hypothesis formulated above.

Finally, this study tests whether the introduction of these bans affects smokers' life satisfaction (see Table 9 in the Appendix). The bottom right quadrant of Figure 2 suggests that the introduction of the advertisement ban is associated with an increase in life satisfaction among smokers, whereas in the control group both smokers' and non-smokers' life satisfaction decrease. It is acknowledged that unobserved heterogeneity, namely the presence of unobserved variables

which are correlated with life satisfaction, might represent an issue for this analysis. Yet, it should be noted that results prove to be robust to different specifications. Also, they are in line with the findings both from US and European studies (Odermatt and Stutzer 2013; Gruber and Mullainathan 2005). In conclusion, these findings suggest that tobacco control measures work as cue management or avoidance mechanisms and hence they increase smokers' welfare, as stated in the second hypothesis formulated above, which builds on behavioural models of addiction (Gruber and Mullainathan 2005; Odermatt and Stutzer 2013). This means that other dynamics than learning from direct experience drive policy feedback effects in this instance.

Figure 2 Predictive Margins of the Effects of the Introduction of the Advertisement Bans on the Propensity of Being in Favour of Tobacco Advertisement Regulation (1991-1992), Smoking Regulation in the Work Place and Public Place (1992-1995), on the Propensity of Being Satisfied with Life (1991-1992), among Smokers and Non-Smokers



As a robustness check, the propensity of smoking is used to calculate difference-in-difference-in-difference estimates. First, the propensity of smoking is estimated by regressing the smoker variable on a series of demographic factors. Table 10 in the Appendix shows the results of the probit regression with smoker as dependent variable, from which the propensity scores are derived, and Figure 1 in the Appendix shows the histogram of the propensity of smoking. Then, this estimate is associated to each individual in the dataset and the analyses above are run by replacing the smoker variable with that estimate. Table 11-14 and Figure 2 replicate the regressions above, with propensity of smoking as the third term of the interaction. Results are overall robust.

CONCLUSION

This study tests whether tobacco control measures have different effects on smokers and non-smokers. Results suggest that tobacco control makes smokers more inclined to further regulation, in comparative terms. This finding suggests that different effects than mass attitudinal policy feedback effects driven by learning from direct experience might be in place. Indeed, policy feedback effects from learning are considered by the public policy literature to affect the public in a homogenous manner (Pacheco 2013).

The literature on welfare economics, in its behavioural strand (Bernheim and Rangel 2004; Gruber and Kőszegi 2004; O'Donoghue and Rabin 1999), may shed light on these findings. Cue-triggered models of addiction suggest that addictive behaviours, like smoking, are triggered by environmental cues, such as being surrounded by people smoking or seeing a commercial for a tobacco product. A policy reducing these cues, such as a tobacco advertisement ban, works as a

commitment device for smokers, making quit smoking easier. As a result, smokers tend to become more in favour of future regulation and overall happier.

The findings in this work must be seen in conjunction with the extant work in welfare economics (Gruber and Mullainathan 2005; Odermatt and Stutzer 2013) and public policy (Marshall 2014, 2016; Pacheco 2013, 2012), which already finds evidence of the effects of tobacco control measures respectively on life satisfaction and attitudes, by looking at different tobacco control measures and countries. Hence, it is reasonable to assume that the mechanisms studied in this work are applicable to tobacco control in general, even in those countries with a strong laissez faire tradition, such as France, as seen in this analysis, and with respect to stronger policy measures which seriously limit the smokers' freedom or affect their finances, such as smoking bans or taxation (Odermatt and Stutzer 2013).

This study can also inform the current attempts to address other non-communicable diseases, which may be explained by irrational addiction models. One example might be obesity. Obesity is the second greatest cause of preventable death and disease, right after smoking (Stephens 2014). The attempts to regulate nutrition made so far have followed the steps taken in the regulation of smoking. For instance, education campaigns on healthy nutrition are regularly organized around the world. Yet, policies which would make it easier for citizens to switch to healthier food, such as regulating the advertisement of unhealthy food, are still a long way in some countries (WHO 2014). These types of policies might play a crucial role in the fight of obesity, as not only will they help people, but they will also make them more in favour of further regulation.

REFERENCES

ASH. 2015. "The economics of tobacco." December 2015. http://www.ash.org.uk/files/documents/ASH_121.pdf (July 2016)

———. 2016. "Smoking statistics Illness and death." June 2016. http://ash.org.uk/files/documents/ASH_107.pdf (July 2016)

Becker, Gary, and Kevin Murphy. 1988. "A Theory of Rational Addiction." *Journal of Political Economy* 96 (4):675-700.

Bernheim, Douglas, and Antonio Rangel. 2004. "Addiction and Cue-Triggered Decision Processes." *The American Economic Review* 94 (5):1558-90.

Brewer, Paul. 2003. "Values, Political Knowledge, And Public Opinion About Gay Rights: A Framing-Based Account." *Public Opinion Quarterly* 67 (2):173-201.

Cairney, Paul, Donley Studlar, and Hadii Mamudu. 2012. *Global Tobacco Control: Power, Policy, Governance and Transfer*. Basingstoke, UK: Palgrave Macmillan.

CEC. 1991. "Eurobarometer 36, October-November 1991." ed. B. International Research Associates (INRA). Brussels: GESIS, Cologne [Publisher]: ZA2081, dataset version 1.1.0, doi:10.4232/1.10848.

———. 1992. "Eurobarometer 38.0, September-October 1992." ed. B. International Research Associates (INRA): GESIS, Cologne [Publisher]: ZA2294, dataset version 1.1.0, doi:10.4232/1.10903.

———. 1994. "Eurobarometer 41.0, March-May 1994." ed. B. International Research Associates (INRA): GESIS, Cologne [Publisher]: ZA2490, dataset version 1.1.0, doi:10.4232/1.10909.

———. 1995. "Eurobarometer 43.0, March-April 1995." ed. B. International Research Associates (INRA): GESIS, Cologne [Publisher]: ZA2636, dataset version 1.1.0, doi:10.3886/ICPSR06662.v1 (DOI), 1998-05

de Vries, Hein, Margo Dijkstra, and Piet Kuhlman. 1988. "Self-Efficacy: The Third Factor Besides Attitude And Subjective Norm As A Predictor Of Behavioural Intentions." *Health education research* 3 (3):273-82.

Eriksen, Michael , Judith Mackay, and Hana Ross. 2012. "The Tobacco Atlas, 4th Edition." http://3pk43x313ggr4cy0lh3tctjh.wpengine.netdna-cdn.com/wp-content/uploads/2015/03/TA5_2015_WEB.pdf (June 2016)

Foltz, Kim. 1990. "France Limits Ads." *New York Times*, June 28, 1990. http://www.nytimes.com/1990/06/28/business/the-media-business-addenda-france-limits-ads.html (July 2015)

Gilens, Martin. 1999. *Why Americans Hate Welfare: Race, Media, and the Politics of Antipoverty Policys*. Chicago, IL: University of Chicago Press.

Gruber, Jonathan, and Botond Kőszegi. 2004. "Tax Incidence When Individuals Are Time-Inconsistent: The Case Of Cigarette Excise Taxes." *Journal of Public Economics* 88 (9–10):1959-87.

Gruber, Jonathan, and Sendhil Mullainathan. 2005. "Do Cigarette Taxes Make Smokers Happier." *The B.E. Journal of Economic Analysis & Policy* 5 (1):1935-682.

Gusmano, Michael K, Mark Schlesinger, and Tracey Thomas. 2002. "Policy Feedback And Public Opinion: The Role Of Employer Responsibility In Social Policy." *Journal of Health Politics, Policy and Law* 27 (5):731-72.

Haselswerdt, Jake, and Brandon Bartels. 2015. "Public Opinion, Policy Tools, and the Status Quo: Evidence from a Survey Experiment." *Political Research Quarterly* 68 (3):607-21.

Horton, Nicholas, and Garrett Fitzmaurice. 2004. "Regression Analysis Of Multiple Source And Multiple Informant Data From Complex Survey Samples." *Statistics in Medicine* 23 (18):2911-33.

Imbens, Guido, and Jeffrey Wooldridge. 2007. Difference-in-Differences Estimation. Presented at NBER Summer School.

Johnson, Martin, Paul Brace, and Kevin Arceneaux. 2005. "Public Opinion And Dynamic Representation In The American States: The Case Of Environmental Attitudes." *Social science quarterly* 86 (1):87-108.

Kagan, Robert, David Vogel, and Dennis Galvan. 1991. "The Politics Of Smoking Regulation; The United States, Canada, France, And Japan " In *Annual Meeting of the Law and Society Association*. Amsterdam, Netherlands: University of California at Berkeley.

King, Gary, Michael Tomz, and Jason Wittenberg. 2000. "Making The Most Of Statistical Analyses: Improving Interpretation And Presentation." *American Journal of Political Science* 44 (2):347-61.

Lerman, Amy, and Katherine McCabe. 2017. "Personal Experience And Public Opinion: A Theory And Test Of Conditional Policy Feedback." *The Journal of Politics* 79 (2):624-41.

Lillard, D.R., and R. Christopoulou. 2015. *Life-Course Smoking Behavior: Patterns and National Context in Ten Countries*. Oxford, UK: Oxford University Press.

Marshall, Thomas. 2014. Smoking, Public Policy, and Public Opinion: What's the Connection? Presented at Annual Meeting of the Western Political Science Association, Seattle, WA.

———. 2016. *Public Opinion, Public Policy, and Smoking: The Transformation of American Attitudes and Cigarette Use, 1890–2016*. Lanham, MD: Lexington Books.

McCabe, Katherine T. 2016. "Attitude Responsiveness And Partisan Bias: Direct Experience With The Affordable Care Act." *Political Behavior* 38 (4):861-82.

Nathanson, Constance. 2004. "Liberté, Egalité, Fumée: Smoking and Tobacco Control in France." In *Unfiltered: Conflicts over tobacco policy and public health*, ed. E. Feldman and R. Bayer. Cambridge, MA: Harvard University Press.

O'Donoghue, Ted, and Matthew Rabin. 1999. "Doing It Now or Later." *The American Economic Review* 89 (1):103-24.

Odermatt, Reto, and Alois Stutzer. 2015. "Smoking Bans, Cigarette Prices And Life Satisfaction." *Journal of Health Economics* 44:176-94.

Odermatt, Reto, and Alois Stutzer. 2013. "Smoking Bans, Cigarette Prices and Life Satisfaction." *IZA Discussion Paper* 7177.

Pacheco, Julianna. 2012. "The Social Contagion Model: Exploring The Role Of Public Opinion On The Diffusion Of Antismoking Legislation Across The American States." *The Journal of Politics* 74 (1):187-202.

———. 2013. "Attitudinal Policy Feedback and Public Opinion: The Impact of Smoking Bans on Attitudes towards Smokers, Secondhand Smoke, and Antismoking Policies." *Public Opinion Quarterly* 77 (3):714-34.

Rains, Stephen, and Monique Turner. 2007. "Psychological Reactance and Persuasive Health Communication: A Test and Extension of the Intertwined Model." *Human Communication Research* 33 (2):241-69.

Schenker, Nathaniel, and Trivellore E. Raghunathan. 2007. "Combining Information From Multiple Surveys To Enhance Estimation Of Measures Of Health." *Statistics in Medicine* 26 (8):1802-11.

Soss, Joe, and Sanford Schram. 2007. "A Public Transformed? Welfare Reform as Policy Feedback." *American Political Science Review* 101 (1):111-27.

Stephens, Pippa. 2014. "Food Should Be Regulated Like Tobacco, Say Campaigners." *BBC News*, 19 May 2014. http://www.bbc.co.uk/news/health-27446958 (May 2016)

Svallfors, Stefan. 2010. "Policy Feedback, Generational Replacement, And Attitudes To State Intervention: Eastern And Western Germany, 1990–2006." *European Political Science Review* 2 (1):119-35.

Oireachtas. 1988. *Tobacco (Health Promotion And Protection) Act, 1988*. Number 24 of 1988.

Oireachtas. 1988. Dáil Eireann Debate. *Tobacco (Health Promotion and Protection) Bill, 1988: Second Stage*. Wednesday, 27 April 1988.

Tykocinskl, Orit, Tory Higgins, and Shelly Chaiken. 1994. "Message Framing, Self-Discrepancies, and Yielding to Persuasive Messages: The Motivational Significance of Psychological Situations." *Personality and Social Psychology Bulletin* 20 (1):107-15.

WHO. 2014. "Protecting Children From The Harmful Effects Of Food And Drink Marketing." *WHO*, September 2014. http://www.who.int/features/2014/uk-food-drink-marketing/en/ (May 2016)

Wlezien, Christopher. 1995. "The Public As Thermostat: Dynamics Of Preferences For Spending." *American Journal of Political Science* 39 (4):981-1000.

Wooldridge, Jeffrey. 2002. *Econometric Analysis of Cross Section and Panel Data*. Cambridge, MA: MIT Press.

Oireachtas. 1988. Dáil Eireann Debate. *Written Answers. - Smoking Controls*. Wednesday, 2 November 1988.