

CEWP 22-05

# **Why Are Tobacco and Alcohol Control Policies So Different?—A Political-Economy Explanation**

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May 15, 2022

## **CARLETON ECONOMICS WORKING PAPERS**



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# Why Are Tobacco and Alcohol Control Policies So Different?

## – A Political-Economy Explanation

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### Abstract

This paper shows that the emergence (and the maintenance) of the striking different policy regimes applied to tobacco and alcohol in the U.S. and some other countries like the UK - that has increasingly puzzled many health policy experts - could be explained by their very different levels of industry concentration. The maintenance of the policy differences was further enhanced by the persistent government mass media anti-smoking campaigns, which ultimately contributed to the exclusion of the tobacco industry from direct and formal involvement in the policy-making processes. The model can also explain the very different levels of tobacco industry' political contributions before and after 2002, as well as the lack of government effort of anti-smoking campaigns in Canada.

*JEL Classification No.:* D72; I18

*Key Words:* Tobacco and alcohol control policies, Anti-smoking campaigns  
Government mass media campaigns, Political contribution, lobbying

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# 1 Introduction

Health policy experts have increasingly questioned the rationale for the relatively weak government alcohol control policy compared to tobacco, because there has been an increasing recognition of the substantial health harms caused by alcohol (Rehm, et al. 2009). Although tobacco is still the leading cause of avoidable death globally - responsible for around 5.4 million deaths per year, alcohol causes an estimated 3.3 million deaths per year and accounts for 5.1% of the global burden of diseases measured in disability-adjusted life-year (WHO, 2014) - that alone is harmful enough. Alcohol is also additionally responsible for a range of health and socio-economic harms. Furthermore, a recent study by a group of health experts (The Lancet 2018; 392: 1015-1035) even calls into question the belief of safe alcohol use at low levels, which is prominently advocated by the alcohol industry.<sup>1</sup>

The sale, use and marketing of tobacco products are subject to extensive regulation, but alcohol is subject to much less stringent forms of regulation in the US, UK and many other countries. In the United States, for example, the first major policy response to the 1964 Surgeon General's report on smoking and health was the 1965 Cigarette Labeling and Advertising Act ( mandating warning labels on all cigarette packages), although it was not until late 1970s anti-smoking campaigns became a priority for both the federal and state-level governments in the U.S. Moreover, while the alcohol industry continues to play a central role in policy making at the national and global levels, since late 1990s the tobacco industry has been increasingly excluded from direct and formal involvement in the policy-making process in many countries and at the global level (Brandt, 2012). Health policy experts have been trying to find a rationale for the policy divergence, but they are unable to explain the emergence and maintenance of the very different policy regimes applied to tobacco and alcohol, even under the political-economy framework (Hawkins, et al. 2016).

The traditional political-economy approach focusing on lobbying by special interest groups

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<sup>1</sup>“The evidence is adding up that no amount of drinking is safe,” says the study’s corresponding author Dr. Emmanuela Gakidou. According to a recent article by Jamie Ducharme of TIME, August 24, 2018, which further reports that the World Cancer Research Fund released a report in May of 2018 saying that, at least in terms of cancer prevention, “it’s best not to drink alcohol.” - the U.K. government issued a similar recommendation in 2016. It is also worth noting that even during the 1930s -1940s, concerns about smoking were considered alarmist - there was no definitive evidence that smoking could give you cancer or was bad for you.

may not be able to provide a good explanation for such policy divergences because, compared to alcohol, the tobacco industry has a much higher industry concentration ratio, which should have led to more successful lobbying and thus less (rather than more) stringent government regulation. However, recent development in the political-economy literature that focuses on the public persuasion by different special interest groups may provide new insights. Similar to Yu (2005), for example, suppose that the tobacco industry has a strong opponent (e.g. the American Lung Association) that engages in both lobbying the government and launching media campaigns to raise public awareness about the health hazards of smoking. Then, in response to the increased public awareness and demand, the government may adopt more stringent regulation towards the tobacco industry. The purpose of this current paper, however, is to investigate whether an incumbent government/politician has its own incentive to launch mass media anti-tobacco campaigns and, more importantly, why is it tobacco and not alcohol?

Tobacco is a very highly concentrated industry in the US and many other countries - often the most concentrated sector in the economy. Despite the fact that trade liberation has facilitated the consolidation of all segments of the alcohol industry (e.g. beer, cider, wine and spirits), the global and national market concentration in the alcohol industry remains much lower than the tobacco industry, with the beer sector being relatively more concentrated than the other segments (Hawkins et al 2016). We show that because of the high concentration in the tobacco industry, an incumbent government/politician would adopt much tougher tobacco control policies, compared to alcohol that has a relatively low industry concentration ratio. The result may seem counter-intuitive.

The paper develops a simple political-economy model with industry structure. It is shown that when there are no government mass media anti-smoking campaigns, the high industry concentration should lead to more political lobbying from the tobacco industry, which would reduce government direct regulation (e.g. sales taxes, etc.). However, when the incumbent government could engage in mass media campaigns to change the public's belief about the health hazards of smoking, the high industry concentration will likely work against the tobacco industry. The intuition can be illustrated in a simple cooperative game between the incumbent government and the industry lobby using the concept of Nash Bargaining Solution. Specifically, the mass media anti-smoking campaign, which raises public awareness of the health hazards of

smoking (and hence increases the public's demand for more stringent government regulation), will reduce the threshold level welfare for the industry lobby in the Nash bargaining and put the tobacco industry in an unfavorable position vis-à-vis the incumbent government. As a result, this will benefit the incumbent government in bargaining with the industry lobby and this effect is greater if the industry is more concentrated - that is, the industry then has a deeper pocket in lobbying the incumbent government/politicians. As shown in the model, the equilibrium political contribution from the tobacco industry could indeed go up as a result of government anti-smoking campaigns. But the persistent government mass media anti-smoking campaigns could eventually lead to the breakdown of the Nash Bargaining and result in the exclusion of the tobacco industry from direct involvement in the policy-making processes.

We have also observed very different tobacco control policies between countries of similar economic development. For example, according to an article by Gardiner Harris published in The New York Times on March 15, 2012, the US federal government spent \$54 million annually on anti-smoking advertising. In addition, governments at the state level in the US had also launched many anti-smoking campaigns. California, for instance, had spent about \$20 million annually since 2000 on anti-tobacco advertising.<sup>2</sup> However, it was surprising to many, according to an article by Kyle Duggan (2018), that "... Health Canada currently has no active mass media public education campaigns to discourage smoking, and that there have not been any for about a decade."<sup>3</sup> To explain such a divergence in government anti-smoking campaigns between the U.S. and Canada, we must also realize - as shown in our analysis - that government anti-smoking campaigns also increase the political cost of its current political-equilibrium policy (that deviates from the public/median-voter's preference). Thus, unless political contributions can play a much bigger role in the electoral system, the incumbent government/politicians have less incentives to engage in mass media anti-smoking campaigns. Since Canada has a much tighter limit on political donations compared to the United States, the very different government efforts in anti-smoking campaigns could be attributed to their different electoral systems on the limits of

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<sup>2</sup>"U.S. Backs Antismoking Ad Campaign" by Gardiner Harris in The New York Times, on March 15, 2012 (<https://www.nytimes.com/2012/03/15/health/policy/cdc-finances-nationwide-antismoking-ad-campaign-a-first.html>)

<sup>3</sup>"Health Canada still not spending on anti-smoking ads, documents show" by Kyle Duggan, published in iPolitics, on February 16, 2018 (<https://ipolitics.ca/2018/02/16/health-canada-still-not-spending-anti-smoking-ads-documents-show/>)

political donations and campaign financing.

The research on mass media campaigns emerged in the political-economy literature in early 2000. The first strand of the literature focused on the media industry.<sup>4</sup> The second strand focused on special interest groups engaging in mass media campaigns in order to influence government policy. As in Yu (2005), for example, a polluting industry (*resp.* an environmentalist group) engages in mass media campaigns to lower (*resp.* increase) public's belief about the harmful impact of pollution in order to influence government environmental policy.<sup>5</sup> In this paper, we focus on how the incumbent policy maker may (or may not) have the incentive itself to engage in mass media campaigns against a special interest group.

The rest of the paper is organized as follows. Section 2 develops the political-economy model with industry structure. Section 3 investigates the incumbent government/politicians' incentive to launch mass media anti-smoking campaigns (and how it is affected by the degree of industry concentration and different political systems), and the impact on the level of industry's political contribution. Section 4 concludes.

## 2 The Model

### 2.1 Market Equilibrium

#### ♦ Preference and Product Demand

Assume that a representative household/public has the following utility function<sup>6</sup>,

$$U = u(X) + x_o - \mu D(X), \quad u^0(.) > 0, u^0(.) < 0; \mu > 0, D^0(.) > 0, D^n(.) > 0 \quad (1)$$

where  $x_o$  is the consumption of the numeraire good,  $u(X)$  is the (direct) utility from consumption of the health-hazards product, and  $\mu D(X)$  is the perceived negative health impact (disutility). Parameter  $\mu$  is the public's perception (subjective belief) about the extent of the negative health

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<sup>4</sup>E.g. Besley and Burgess (2001, 2002) examine the effects of mass media on government responsiveness to the public needs in India. Strömberg (2001, 2004) investigates the role of mass media on public policy with a profit-maximizing media providing information to the public. Also, see more recent work by Sobbrío (2011), and Trombetta and Rossignoli (2021), on the media industry being influenced/captured by special interest groups.

<sup>5</sup>Pacca, et al (2020) is a comprehensive study of this topic on the state-level environmental policies in the U.S.

<sup>6</sup>Separability is a common assumption in the public economics literature and the quasi-linear specification implies that the good  $x$  industry is small relative to the rest of the economy.

impact.<sup>7</sup> Furthermore, we use a quadratic function to describe the direct utility from consuming the product<sup>8</sup>,  $u(X) = \alpha X - (\beta/2)X^2$ ,  $\alpha > 0, \beta > 0$ . Thus, the (inverse) demand function for the product is  $p = \alpha - \beta X$ .

#### ◆ Market Structure and Product Supply

Suppose the numeraire good is competitively produced by a constant-returns-to-scale technology using labor as the only input. To produce the health-hazards product, it requires a specific factor (which could also be a license/permit for production). In addition, it also uses labor, at a constant marginal cost ( $m$ ). For simplicity, assume that the market structure is characterised by a symmetric Cournot oligopoly of  $n$  producers. Thus, producer  $i$  maximizes its profit through the choice of  $x_i$ ,

$$\begin{aligned} \max_{x_i} \pi_i &= (p - m - t)x_i \\ &= [\alpha - \beta(x_1 + \dots + x_n) - m - t]x_i, \quad i = 1, \dots, n, \end{aligned}$$

where  $t$  is a government consumption tax on the health-hazards product. It is straightforward to derive the symmetric equilibrium output, profit for each producer, and the market equilibrium price,

$$x_i = \frac{\alpha - m - t}{(n+1)\beta}, \quad \pi_i(n, t) = \left[\frac{\alpha - m - t}{(n+1)\beta}\right]^2, \quad \forall i; \quad \text{and} \quad p = \frac{\alpha + n(m + t)}{n+1}$$

Thus, the total output of the industry is

$$X(t) = nx_i = \frac{n(\alpha - m - t)}{(n+1)\beta} \quad (2)$$

and the total industry profits,

$$\Pi(n, t) = n\pi_i(n, t) = \frac{n}{[(n+1)\beta]^2}(\alpha - m - t)^2 \quad (3)$$

where the number of firms in the industry  $n$  is also an indicator of the degree of industry concentration.

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<sup>7</sup>For tobacco, it also includes the impact caused by second-hand smoking. To avoid assuming users and non-users of the product (e.g. smokers and non-smokers), for simplicity, we assume a representative household.

<sup>8</sup>The quadratic function is an appropriate choice to describe the consumption of the health-hazards product since the utility level will eventually decrease as the consumption level is beyond a certain level (although it will never reach that point in the equilibrium outcome).

## 2.2 The Political-Equilibrium Consumption Tax

Assume that the representative household/public supplies one unit of labor and the wage, by choice of units for the numeraire good, is equal to 1. Thus, the indirect utility function corresponding to (1) can be written as,

$$V_P(t) = s(t) + 1 + \delta tX(t) - \mu D(X(t)) \quad (4)$$

where  $s(t) = u(X(t)) - p(t)X(t)$  is the consumer surplus, and  $\delta$  is the representative household's share of the rebate of government consumption tax revenue. Therefore, the optimal level of the consumption tax for the public is

$$t_P = \arg \max \{V_P(t) = u(X(t)) - p(t)X(t) + 1 + \delta tX(t) - \mu D(X(t))\} \quad (5)$$

It is straightforward to obtain the following result.

**Lemma 1**  $dt_P/d\mu > 0$ .

Following Yu (2005), we assume that an incumbent government cares about political contributions as well as the political cost of its policy that deviates from the median-voter's preference, which is  $t_P$  in our model provided that the population of the general public is large relative to the capitalists of the industry. Specifically, we assume that the incumbent government/politicians has the following objective function,

$$G = C + \theta[V_P(t) - V_P(t_P)], \quad \theta > 0 \quad (6)$$

where  $C$  is the political contribution from the industry and  $\theta$  is the relative weight between political contributions and the political cost for the incumbent government/politician to deviate its policy from the median-voter's preference:  $V_P(t) - V_P(t_P)$ . A smaller  $\theta$  indicates that the role of political contributions in the political/electoral system is more important.

Assume the industry lobby is the only organized special interest group in the model and it

provides political contributions to the incumbent government/politician to influence its policy. Such political interaction between the industry lobby and the incumbent government/politician

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<sup>9</sup>Yu (2005) provides a model with two opposing special interest groups to study the strategic interaction between lobbying the government and persuading the public.



can be captured in a cooperative game using the concept of Nash bargaining solution.<sup>10</sup> Specifically, the incumbent government/politician and the industry lobby engage in the following Nash bargaining over the level of consumption tax ( $t$ ) and political contribution ( $C$ ):

$$\max_{t, C} [C + \theta[V_P(t) - V_P(t_P)] - \underline{G}]^\gamma [\Pi(n, t) - C - \underline{H}]^{1-\gamma}, \quad 0 < \gamma < 1 \quad (7)$$

where  $\underline{G}$  and  $\underline{H}$  are the threat-point level of welfare (i.e. when political bargaining is broken down) for the incumbent government and the industry, respectively. That is, if  $C = 0$ , we have  $t = t_P$ ,  $\underline{G} = G(t_P) = 0$  from (6), and  $\underline{H} = \Pi(n, t_P) = \frac{n}{[(n+1)\beta^2]}(a - m - t_P)^2$  from (3). Parameter  $\gamma$  represents the bargaining power of the incumbent government relative to the industry lobby.

The political-equilibrium tax of the Nash bargaining solution is given by

$$\text{i)} \quad t^\circ = \arg \max \{J(t) = \Pi(n, t) + \theta[V_P(t) - V_P(t_P)]\} \quad (8)$$

where  $J(t)$  can be interpreted as their joint surplus in Nash bargaining. The equilibrium level of political contribution (as a "transfer" in the Nash bargaining) is

$$\text{ii)} \quad C^\circ = \theta[V_P(t_P) - V_P(t^\circ)] + \gamma\{\Pi(n, t^\circ) + \theta[V_P(t^\circ) - V_P(t_P)] - \Pi(n, t_P)\} \quad (9)$$

Using the first-order condition of (8),

$$\frac{\partial \Pi(n, t^\circ)}{\partial t} + \theta V_P'(t^\circ) = 0 \quad (10)$$

it is straightforward to show  $t^\circ < t_P$ . Totally differentiating (10) and using Lemma 1, we obtain the following result.

**Lemma 2**  $dt^\circ/d\mu > 0$ .

Using (9), we can obtain the equilibrium level of welfare for the incumbent government,

$$\begin{aligned} G^\circ &= C^\circ + \theta[V_P(t^\circ) - V_P(t_P)] \\ &= \gamma\{\Pi(n, t^\circ) + \theta[V_P(t^\circ) - V_P(t_P)] - \Pi(n, t_P)\} \end{aligned} \quad (11)$$

and the (net) welfare for the industry (after paying the political contribution),

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<sup>10</sup>Nash bargaining is used widely in cooperative games. E.g., Aidt (1997) uses a cooperative game to study the interaction between two opposing industry lobby groups to analyze government trade policy.

$$\begin{aligned}
\Pi^o &= \Pi(n, t^o) - \zeta^o \\
&= (1 - \gamma)[\Pi(n, t^o) + \theta(V_P(t^o) - V_P(t_P))] + \gamma\Pi(n, t_P)
\end{aligned} \tag{12}$$

### 3 Government Media Campaign: Market Structure, Political System, and the Impact on Political Contribution

Mass media campaigns do not have to change the public's preference. It is sufficient if they can influence the public's perception/belief about the health hazards of tobacco/alcohol products. In the political science literature, for example, political advertising can influence voters' perception about the political candidates and their policy platforms.

Specifically, in our model the incumbent government can engage in mass media campaigns to increase  $\mu(a)$  with  $\mu^0(\cdot) > 0$  and  $\mu^0(\cdot) < 0$ , where  $a$  is the spending on media campaigns - which is assumed to be financed by the tax revenue. Therefore, in the rest of our analysis the tax rebate to the representative household in (4) becomes  $\gamma(tX(t) - a)$ .

From (11), notice that the incumbent government's welfare is equal to  $\gamma$  share of the gain in their joint surplus:

$$\begin{aligned}
G^o &= \gamma[J(t^o) - J(t_P)] \\
&= \gamma[J(t^o) - \Pi(n, t_P)]
\end{aligned} \tag{13}$$

Taking derivative with respect to  $a$  and applying the envelope theorem, we obtain

$$\begin{aligned}
\frac{dG^o}{da} &= \gamma\left[\frac{dJ(t^o)}{da} - \frac{d\Pi(n, t_P)}{da}\right] \\
&= \gamma\mu^0\{\theta[D(X(t_P)) - D(X(t^o))]\} - \frac{\partial\Pi(n, t_P)}{\partial t_P} \frac{dt_P}{d\mu}
\end{aligned} \tag{14}$$

In the appendix, we show that  $dG^o/da > 0$  when  $n$  and/or  $\theta$  are small. Therefore, we have the following proposition.

**Proposition 1** *The incumbent government will benefit from launching mass media campaigns if (i) the industry is more concentrated; and/or (ii) political contributions are more important in the electoral system.*

Proof: See the appendix.

The intuitions for the result are as follows. On the one hand, a rise in  $\mu$  increases  $t_P$  (from Lemma 1) and thus reduces  $\Pi(n, t_P)$  - the threat-point level of welfare for the industry. This weakens industry lobby's bargaining position - see (7) - and hence benefits the incumbent government (even though the relative bargaining power  $\gamma$  remains the same<sup>11</sup>). This effect is greater if the industry is more concentrated because, as shown in the appendix, the reduction of  $\Pi(n, t_P)$  is greater if  $n$  is smaller. On the other hand, a rise in  $\mu$  increases the political cost of its current policy (because  $t^o < t_P$ ). But the incumbent government/politician may care less about this negative effect when political contributions are relatively more important in the political system (i.e.  $\theta$  is small).

Part (i) of Proposition 1 provides an explanation for the relatively weak government alcohol control policy, compared to tobacco. The highly concentrated tobacco industry - as discussed earlier - provides an incentive for the incumbent government/politician to launch mass media anti-smoking campaigns. For the rest of our analysis, we will investigate the impact of government mass media anti-smoking campaigns (assuming  $dG^o/da > 0$ ).

Part (ii) of Proposition 1 provides new insights, which could explain the lack of government mass media anti-smoking campaigns in Canada (compared to the neighbouring United States). Since an increase in  $\mu$  - as a result of government anti-smoking campaigns - raises the political cost of government policy that deviates from the public/median-voter's preference, unless political contributions can play a much bigger role in the political system, the incumbent government/politician has less incentives to launch anti-smoking campaigns. As discussed earlier, political contributions are indeed much more critical for running a successful campaign for public office in the U.S. than in Canada because, compared to the United States, Canada has much stricter rules/limitations on political donations.

How will the tobacco industry respond to government anti-smoking campaigns? Will the industry reduce its political contributions to the incumbent politicians? Using (6), we have

$$C^o = G^o + \theta[V_P(t_P) - V_P(t^o)]. \quad (15)$$

Therefore, the impact of government media anti-smoking campaigns on the level of political contribution is given by

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<sup>11</sup>Unlike the current analysis, the effects of a change in the bargaining power are much simpler. For instance, an increase in  $\beta$  will not affect  $t^o$  but will increase  $C^o$ . Consequently,  $G^o$  will be higher but  $\Pi^o$  will be lower.

$$\frac{dC^o}{da} = \underbrace{\frac{dG^o}{da}}_{(+)} + \theta \underbrace{\left\{ \frac{d[V_P(t_P) - V_P(t^o)]}{da} \right\}}_{(?)} \quad (16)$$

where the second term is the impact on the political cost of the rise in  $\mu$  (as a result of government anti-smoking campaigns). Applying the envelope theorem (i.e.  $dV_P(t_P)/d\mu = \partial V_P(t_P)/\partial\mu$ ), the second term becomes

$$\theta \left\{ \frac{d[V_P(t_P) - V_P(t^o)]}{da} \right\} = \theta \mu^0 \left\{ \underbrace{[D(X(t^o)) - D(X(t_P))]}_{(+)} - \underbrace{V_P^0(t^o)(dt^o/d\mu)}_{(\mathbf{i})} \right\} \quad (17)$$

where  $[D(X(t^o)) - D(X(t_P))]$  is the direct impact on the political cost. Under the normal condition, the first-order direct effect dominates the second-order feedback effect  $V_P^0(t^o)(dt^o/d\mu)$ . The latter is due to the adjustment of  $t^o$  (because of the rise in  $\mu$ ). Thus, we have the following proposition.

**Proposition 2** *In response to government anti-smoking campaigns, the tobacco industry will likely increase (rather than reduce) its political contributions.*

The first major policy response to the 1964 Surgeon General's report was the 1965 Cigarette Labeling and Advertising Act, which mandated warning labels on all cigarette packages. But it was not until late 1970s a strong anti-smoking campaign became a priority for the U.S. federal government (and many states). Twenties years later it reached a turning point with the ratification of 1998 Master Settlement Agreement between six major U.S. cigarette manufacturers and 46 states in the U.S. for a total amount of \$206 billion to be paid by the tobacco industry to the states.

However, the political contributions from the tobacco industry remained high and even trending up during this period. For example, according to a study for the State of New Jersey by Monardi and Glantz (1997), tobacco industry political contributions steadily increased between early 1980s and mid 1990s: from \$17,249 contributed candidates and parties in 1982-1983 election cycle to \$269,075 in the 1994-1995 election cycle. The earliest data on tobacco industry's total political contribution in the U.S. are from 1990 and, as shown in **Table 1**, there is also an increasing trend from 1990 to 2002.

<Insert Table 1 Here>

The intuition for the result of Proposition 2 can be further illustrated by investigating how anti-smoking campaigns affect the industry's welfare at the bargaining equilibrium relative to the threat-point level. The next proposition characterizes the result.

**Proposition 3**  $d\Pi/da < d\Pi^o/da < 0$  or  $d(\Pi^o - \Pi)/da > 0$ .

**Proof:** See the appendix.

Although mass media anti-smoking campaigns reduce the equilibrium level of industry's welfare, the threat-point outcome becomes even worse for the tobacco industry - that is, its potential loss of not/less lobbying increases. As a result, the net gain from the bargaining actually becomes greater for the industry. Thus, in the Nash bargaining solution the incumbent government/politician will share this gain through a higher level of transfer (i.e. political contribution).

However, for the results of propositions 2 and 3 to hold, the initial value of  $\mu$  has to be relatively small. From (14) and (16), the impact of anti-smoking campaigns on increasing  $G$  and  $C$  becomes very small when  $\mu$  is high (i.e.  $\mu^0$  becomes very small because  $\mu^0 < 0$ ). More importantly, from (8) and using the envelope theorem, we have

$$\frac{dJ(t^o)}{d\mu} = \theta[D(X(t_P)) - D(X(t^o))] < 0$$

That is, a rise in  $\mu$  reduces the equilibrium level of joint welfare in the Nash bargaining. If  $\mu$  is large, the equilibrium level of their joint welfare will be greater than the threat-point level and hence Equation (10), the first-order condition of (8), will not be satisfied. This will lead to the breakdown of the bargaining (i.e. the two parties will have no room to bargain for).

**Proposition 4.** *If the public's awareness about the health hazards of smoking increases to a very high level (e.g. as a result of persistent government anti-smoking campaigns), the Nash Bargaining between the industry lobby and the incumbent government will break down.*

The 1998 Master Settlement Agreement was considered a landmark development in the anti-smoking movement because it established several restrictions of cigarette advertising and

promotion to be phased in over several years and it provided substantial funding (\$1.7 billion) for the establishment of a national foundation (later named the American Legacy Foundation) to develop a major anti-smoking initiative (Goodman, 2005; pp51-59). During the next few years the tobacco industry was increasingly excluded from direct and formal involvement in policy-making processes in the United States, and at the global level after the adoption of WHO Framework Convention on Tobacco Control in 2003 (Brandt, 2012).

At the same time, the tobacco industry in the U.S. also drastically reduced its political contributions after 2002. As shown in **Table 1**, the tobacco industry's political contributions from 1990 to 2002 were trending up with \$2,327,780 for 1990 and \$9,277,629 for 2002, which was in line with the long-term trend of the total political contributions. But political contribution from the tobacco industry was reduced to \$3,724,631 in 2004 and remained relatively low afterwards.<sup>12</sup> This is very striking especially given that the total political contributions were still trending up for the period after 2004.

## 4 Concluding Remarks

As discussed at the beginning of this paper, government mass media anti-tobacco campaigns could also be driven by the political pressure from the opposition groups of the tobacco industry, which should not be ignored though it is not the focus of this current analysis. Nevertheless, we show that government mass media anti-tobacco campaigns are at least not against the incumbent politicians' own political interests. Our focus presented in this paper could provide a coherent explanation for the emergence and maintenance of the very different policy regimes applied to tobacco and alcohol, which has puzzled many health policy experts. Our model can also explain the very different tobacco industry' political contribution trend for the periods before and after 2002. Our analysis is based on the US data and the political system in the country, and we argue that the lack of government effort of anti-smoking campaigns observed in Canada could be attributed to its very different electoral system regarding campaign financing and tight limits on political donations.

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<sup>12</sup>Even for the Biden-Trump election year of 2020, which is an exception due to the influx of soft/outside money (from all industries), the level did not return to the level of 2002.

## Appendix A

**Proof of the Proposition 1:** From (8) and using the envelope theorem, we obtain

$$\frac{dJ(t^o)}{da} = \mu^0 \theta [D(X(t_P)) - D(X(t^o))]$$

From (11) noticing that  $G^o = \gamma[J(t^o) - J(t_P)] = \gamma[J(t^o) - \Pi(n, t_P)]$ , thus we have

$$\begin{aligned} \frac{dG^o}{da} &= \gamma \mu^0 \left\{ \theta [D(X(t_P)) - D(X(t^o))] - \frac{\partial \Pi(n, t_P)}{\partial t_P} \frac{dt_P}{d\mu} \right\} \\ &= \gamma \mu^0 \left\{ \theta [D(X(t_P)) - D(X(t^o))] + \frac{\partial \Pi(n, t_P)}{\partial t_P} \frac{D^0 X^0(t_P)}{\Delta} \right\} \end{aligned}$$

where  $\Delta < 0$  is the second-order condition for (5).

Therefore, we have  $dG^o/da > 0$  if

$$\left| \frac{\partial \Pi(n, t_P)}{\partial t_P} \right| > \frac{\Delta \theta}{D^0 X^0(t_P)} [D(X(t^o)) - D(X(t_P))] \quad (18)$$

Using Taylor expansion and neglecting the second-(and higher-)order effect, we obtain

$$D(X(t^o)) - D(X(t_P)) = (t^o - t_P) D^0 X^0(t_P)$$

Therefore, (18) becomes

$$\left| \frac{\partial \Pi(n, t_P)}{\partial t_P} \right| > |\Delta| \theta (t_P - t^o) \quad (19)$$

Finally, using (3), it is straightforward to show the left-hand side of (19) is decreasing in  $n$ ; the right-hand side is increasing in  $\theta$ . That is, the higher the industry concentration (i.e. smaller  $n$ ) and/or the more important the role of political contribution (i.e. smaller  $\theta$ ), the more likely the incumbent government/politician will engage in the mass media campaign.

**Proof of the Proposition 3** Notice that we can also write (12) as

$$\Pi^o = (1 - \gamma)[J(t^o) - J(t_P)] + \Pi(n, t_P)$$

Thus, using the envelope theorem, we obtain

$$\frac{d\Pi^o}{da} = (1 - \gamma) \underbrace{\mu^0 \theta [D(X(t_P)) - D(X(t^o))]}_{(\text{i})} + \underbrace{\mu^0 \frac{\partial \Pi(n, t_P)}{\partial t_P} \frac{dt_P}{d\mu}}_{(\text{i})} < 0$$

Also, since  $\Pi^o - \Pi = \Pi^o - \Pi(n, t_P) = (1 - \gamma)[J(t^o) - J(t_P)] = (1 - \gamma)G(t^o)$ , we obtain  $d(\Pi^o - \Pi)/da = (1 - \gamma)[dG(t^o)/da] > 0$ .

**Table 1: Ideology/Single-issue: long-term contribution trends\***

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Election Cycle	Industry Contributions: Tobacco	Total Contributions
2020	\$8,393,815	\$1,857,499,766
2018	\$5,804,585	\$621,091,934
2016	\$5,392,139	\$515,841,253
2014	\$4,013,788	\$341,690,475
2012	\$4,055,668	\$292,489,048
2010	\$3,344,020	\$237,075,424
2008	\$4,355,863	\$246,551,488
2006	\$3,720,118	\$210,196,247
2004	\$3,724,631	\$192,494,349
2002	\$9,277,629	\$120,937,912
2000	\$8,699,797	\$111,158,150
1998	\$8,692,488	\$66,607,297
1996	\$10,688,870	\$51,646,075
1994	\$5,416,163	\$28,471,084
1992	\$5,962,806	\$30,737,655
1990	\$2,327,780	\$20,895,955

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\*Source: The Center for Responsive Politics ([www.opensecrets.org](http://www.opensecrets.org), visited May 6, 2022)



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