Regulation, Corporate Social Responsibility and Activism*

Aleix Calveras† Juan-José Ganuza‡ Gerard Llobet§

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Abstract

This paper analyzes the interplay between firms' self-regulation (often denoted as corporate social responsibility) as opposed to the formal regulation of a negative externality. Firms respond to increasing activism in the market (conscious consumers that take into account the external effects of their purchase) by providing more socially responsible goods. However, because regulation is the outcome of a political process, an increase in activism might imply an inefficiently high externality level. This may happen when a majority of non-activist consumers collectively free-ride on conscious consumers. By determining a softer than optimal regulation, they benefit from the behavior of firms, yet they have access to cheaper (although less efficient) goods.

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†Department of Business Economics, Universitat de les Illes Balears. Cra Valldemossa Km 7 07122 Palma de Mallorca, Spain. E-mail: `aleix.calveras@uib.es`.

‡Department of Economics and Business, Universitat Pompeu Fabra. C/ Ramon Trias Fargas 25-27 08005 Barcelona, Spain. E-mail: `juanjo.ganuza@econ.upf.es`.

§CEMFI. C/ Casado del Alisal 5 28014 Spain. E-mail: `llobet@cemfi.es`.

1 Introduction

Traditionally, market failures have been addressed using formal regulation. For instance, firms that produce goods that generate environmental externalities have been subject to pollution taxes, quotas and standards. Recently, however, these *public politics* have been complemented with *private politics*.[1] The rise of *activism* by consumers/citizens and the phenomenon of corporate social responsibility (CSR) have thus changed the way economics regard the control of externalities.[2] To the extent that some conscious consumers (which we call activists) take into account in their purchasing decisions the social behavior of the firm, a profit maximizing firm may go beyond the regulatory requirements by choosing more expensive production technologies that reduce its externalities.[3]

As Baron (2003) puts it, the choice between public and private politics is strategic. This is precisely the aim of our paper; to study whether private and public politics are really substitutes or not, and the overall result of this interaction over social welfare. We study this interaction in the context of the build-up of a negative externality (e.g. pollution) as a by-product of the consumers' purchasing decision. Our results show that if private politics are controlled by activist consumers, but public politics are in the hands of non-activist voters, a free-riding equilibrium can arise. The reason is that non-activists benefit from a loose regulation. This regulation (or lack of it) allows non-activists to buy cheap goods at the expense of a higher aggregate externality, and hence they shift the burden of the reduction of externality to the conscious purchasing decisions of activists. As a result, a society with consumers heterogeneous in their degree of activism might suffer from a higher externality than a more homogeneous (even if less conscious overall) society which would rely mainly on formal regulation. In other words, more activism may imply, in some cases, that self-regulation inefficiently *crowds out* formal regulation.

[1] According to Baron (2003) "The term *private* means that the parties do not rely on public order, i.e. lawmaking [...]. The term *politics* refers to individual and collective action [...]"

[2] See, for instance, Carroll (1979) and McWilliams and Siegel (2001) on the corporate social responsibility of the firm from a managerial perspective.

[3] The notion of CSR is highly controversial in the literature. In this paper, we denote as socially reponsible firms those that take actions consistent with the definition used by the UK's Department of Trade and Industry: "The voluntary actions that business can take over and above compliance with minimum legal requirements, to address both its own competitive interests and interests of the wider society."

At the heart of our analysis is the activism of consumers. By activism we denote the extent to which an agent takes internalize the externalities generated by his consumption when deciding which product to purchase. Generally, the direct impact on any given consumer of the externality generated by his or her own consumption is negligible. Thus, absent the so-called activism, we should expect every consumer to free-ride and ignore such external effects at the time of purchase. Evidence indicates, however, that for some consumers there exists a willingness to pay a higher price for products of firms that adopt some practices labeled as socially responsible or, alternatively, to penalize those firms that are perceived to be socially irresponsible (see, for instance, Mohr et al. (2001) and Murray and Volgel (1997)).[4] These conscious consumers take into account (to a varying degree) the externalities generated by their decisions despite the negligible consequence that they may have on their own welfare. Thus, such activists might be willing to pay a premium for goods that are produced without harming the environment, that are produced by firms that employ handicapped workers, or that do not involve child labor.[5]

Activism feeds back on the policies and strategies adopted by firms. Intuitively, the degree and the amount of activism in any given society should have a positive impact on the behavior of firms since it will lead them to adopt the socially responsible practices and strategies that activist consumers value at the time of their purchase. Hence, private politics by a larger amount of activists should imply a higher reduction in the equilibrium externality. As Bargnoli and Watts (2003) show, firm competition in this context might result in an inefficiently low level of externality. Instead, here we assume a perfectly competitive supply of goods with heterogeneous technologies and we ignore the strategic behavior of firms. We thus abstract from the debate regarding the motivation behind CSR, studied in papers such as Baron (2001) and Innes (2005).

[4] Other important issues around activism are the availability of information, the formation of organizations/lobbies among consumers, and the launching of boycotts by activists. Since in many instances the negative externalities generated by firm activity are not directly observed by consumers, their degree of potential activism is also restricted by the existence of organizations that are capable of providing such information. Feddersen and Gilligan (2001) address this issue by assuming that the output of the firm is a *credence good* and the role of an active organization is to provide information about its behavior. Baron (2001) discusses the effect of the possibilities of a boycott on a firm's strategy. We abstract from these issues by assuming perfect information regarding the behavior of the firm, and taking activism without explicitly modelling boycotts.

[5] Feddersen and Gilligan (2001) provide additional illustrations related, for example, to oil companies.

Our analysis then draws attention to the effect of activism on public politics. Regulation is often enacted either directly through the voting of particular decisions, like the California environmental initiatives studied by Kahn and Matsusaka (1997), or indirectly through political elections. The model we present shows that the effect of the level of activism among consumers in the degree of regulation resulting from the political process is not necessarily monotonic. In other words, more activism might imply a more or less stringent endogenous regulation. The intuition goes as follows. Initially, consumers/citizens decide collectively by means of majority voting (which in our setup is simply the choice of the median voter) the level of regulation (e.g. they may restrict the available type of technologies that firms are allowed to choose), taking into account the aggregate result of their actions. To simplify the discussion, suppose for the moment that there are only two type of consumers: activists, that completely internalize the externality, and non-activists that do not care at all about the externality at the time of purchase. Our results show that a society with very few activists will choose to regulate very strictly (e.g. allow firms to produce only with the cleanest and most socially efficient technologies) since market oriented incentives through the willingness to pay of conscious consumers do not operate. This result arises from the fact that the non-activist median voter can use regulation to limit the inefficient private behavior of other non-activists. Similarly, a society with a majority of activists will also choose a very strict regulation to reduce free-riding of the non-activist minority.

However, a society with a majority of non-activists, but a significant proportion of activist consumers, may choose to regulate less strictly than socially optimal. The reason is that non-activists know that the regulation is not binding for activists that, in any case, will consume the socially efficient products and thus limit the level of the externality. But a weaker regulation allows non-activists to consume cheaper products with a lower marginal cost of production (despite its higher social cost). Thus, in a sense, non-activists consumers choose to *collectively* free-ride on activists.

This is the main message of our paper, and we view it as throwing caution against the present trend towards the request of socially responsible behavior of firms, rather than a precise regulation of their activity. It may very well be true that activism (conscious consumption) has increased in present societies; however, this trend does not guarantee that CSR is a good substitute of full-fledged regulation.

Our analysis lies within the literature dealing with the political economy of environmental regulations. Part of this literature focuses on the process whereby policymakers make their decisions over environmental regulations, discussing issues such as, for instance, the capture of the regulator by some specials interest group.[6] Some other recent papers have recently incorporated the endogenization of environmental regulation. Their emphasis is on sociodemographic variables, such as income, that affect the public support towards environmental regulations both from an empirical point of view (Kahn and Matsusaka (1997) or Elliott et al. (1997)) and from a theoretical one (Marsiliani and Renstrom (2002)). Closer to this latter approach, ours is, to our knowledge, the first work to endogenize the environmental regulation in the presence of activist consumers/voters.

The trade-off between private decisions and public policy has been studied under a different focus in the literature on philanthropy (see Andreoni (2004) for a survey). This strand of the literature studies voluntary contributions (charity) by individuals to a public good. One of their findings is precisely that the public provision of the public good may crowd-out to some extent the voluntary contribution of individual agents. It is argued that because the public provision of the good is funded through distortionary taxation, this crowding out may lead to inefficiencies. Our results point to the opposite direction. The political process that sets the public contribution of the good is affected by the level of activism. The control of the political process by non-activist consumers might allow them to free-ride on the voluntary contribution of activist consumers. Hence, a low level of public contribution might signal an inefficiently low level of provision of the good.

Focusing on individual behavior, a growing body of literature has studied the non-pecuniary motivation of agents for being involved in activities that benefit others. Examples include doing referee reports for journals, recycling products, or donating blood. Among other possible explanations, papers such Engers and Gans (1998), Francois (2000, 2003) and Besley and Ghatak (2005) attribute this motivation to the idea that agents are concerned about the final outcome of the activity they are involved in. Benabou and Tirole (2006) provide a general

[6]see Ciorcirlan and Yandle (2003) for a short survey of this policymaking strand of the literature.

framework to study these issues related to three kinds of motivations: intrinsic, extrinsic and reputational. In our setting the activism of consumers could include both the intrinsic and reputational incentives. However, extrinsic motivation (in our case, regulation) is an equilibrium outcome. This paper is a first step in understanding how intrinsic and reputational incentives might shape the extrinsic incentives that are implemented through, for example, the political process.

The paper is structured as follows. In section 2, we present the model and we characterize the market equilibrium for a given regulation. In section 3, we solve the voting game and present the main results of the paper. Section 4 analyzes the robustness of the model to the existence of a cost of enacting a regulation and to adding heterogeneity in the valuation of consumers. We also show that alternative regulatory instruments, such as pollution taxes, lead to similar results. Section 5 concludes. All proofs are relegated to the appendix.

2 The Model

Consider a market with only one good that can be produced with different technologies. The quality and characteristics of the good are independent of the technology used. The different technologies are indexed by x, which belongs to the $[0,1]$ interval. Technology x implies that the constant marginal cost of production of the good is $c(x)$. Each unit of production also generates $b(x)$ units of externality which is suffered by all consumers, where $b(1) = 0$. We assume that $c(x)$ and $b(x)$ are twice-continuously differentiable in x, with $c(x)$ increasing in x and $b(x)$ decreasing in x, so that technologies that generate a lower externality are associated with a higher marginal cost.[7] Moreover, the social cost of each unit of production, $c(x) + b(x)$, is decreasing in x. Finally, we assume that $c''(x) \geq 0$ and $b''(x) > 0$.

A unit mass of consumers have quasilinear preferences and derive utility $v > 0$ from the consumption of a single unit of the good. We assume that v is sufficiently large so that consumers always buy.[8] The externality generates two costs on the agent. One is linked to the

[7] This last assumption is obviously without loss of generality, since technologies dominated in terms of c and b would not be used.

[8] We later show the implications of considering that the size of the market is endogenous. Although the main results of the paper still hold, additional distortions might arise in that case.

physical externality originated by the overall consumption of all agents. The other is related to how bad he feels over his own consumption. We assume agents are homogeneous in the first cost but heterogeneous in the second. This heterogeneity is comprised in a parameter θ that is distributed according to $F(\theta)$ where $F(0) = 0$ and $F(1) = 1$. We interpret θ as a degree of activism of the consumer: the higher θ is, the more conscious and activist the consumer is, internalizing to a larger extent the externality generated.[9]

The two kinds of disutilities that the externality entails can be explained and formalized as follows. First, utility is reduced by the aggregate externality *generated on others*. Specifically, a technology choice x implies an externality on others of

$$\int_0^1 b(x)dF(\theta) = b(x).$$

As a result, a θ-type agent that consumes technology x suffers a disutility $\theta b(x)$. In other words, θ measures how guilty the consumer feels about the consequences on others of his purchase. Second, utility is reduced by the aggregate externality B *generated by others*. If $x(\theta)$ is the technology embedded in the good purchased by a θ-type agent, B can be defined as

$$B \equiv \int_0^1 b(x(\theta))dF(\theta).$$

Summarizing the previous discussion we can represent the utility of a consumer of type θ that buys a unit of the good created with technology x at a price $p(x)$ as

$$U(\theta, x) = v - p(x) - \theta b(x) - B.$$

Firms are assumed to be competitive in this market and they face no fixed or entry costs. Consequently, competition will lead all firms producing a good using technology x to set a price equal to marginal cost, $p(x) = c(x)$.

The stages and the timing of the game are as follows. In the first stage, voters decide, according to a majority rule, on a minimal technological standard $\bar{x}$. In the second stage,

[9] Similar preferences are those in which people experience a "warm-glow" from giving, as in Andreoni (2004). The philanthropy literature (which discusses the private provision of public goods) assumes that individuals actually derive utility from they themselves making a contribution to some public good. Notice this is analogous to the direct disutility (represented by θ) that activists experience in our model from purchasing a good that is produced by a polluting technology.

consumers decide simultaneously which good to purchase and firms produce using technologies with $x \geq \bar{x}$.[10] As usual, we solve the game by backward induction.

As it is often the case in environments with externalities, the competitive equilibrium will fail to be efficient. Consumers do not fully internalize the cost that their consumption imposes on others (they only internalize a share $\theta \leq 1$ of their own externality), and therefore they might choose a good produced with an inefficient technology. We start by describing the first best solution, that we use as a benchmark in the rest of the paper.

2.1 The First Best

An immediate consequence of the previous technological assumptions, is that the total social cost of production is minimized if all firms choose to produce with technology $x = 1$. In other words, social welfare is maximized when only the best technology is used. As an illustration, consider first the case where consumers do not internalize at all the cost of the externality resulting from their own consumption. That is, F is degenerate around 0. In this case, all consumers will choose goods produced with the same technology[11] and social welfare maximization is equivalent to minimizing the social cost of the consumption of a representative agent, which includes the disutility suffered by all other consumers. That is,

$$\min_{x} \; c(x) + \int_{0}^{1} b(x) dF(\theta).$$

Given the assumptions of the model, the first derivative is negative for any value of x,

$$c'(x) + b'(x) < 0$$

and hence the corner solution, $x^s = 1$, describes the optimal outcome. The next lemma states that this result is general for any distribution function.

Lemma 1 $x^s = 1$ *for all* θ *and any distribution* F.

[10] We will refer to agents as *voters* in the first stage, and as *consumers* in the second in order to distinguish between the two decisions.

[11] Alternatively, social welfare maximization could assign to homogeneous consumers different technologies if, for example, the social cost of the externality were concave in the contribution of each individual.

Given the assumptions stated above, from a social standpoint, technologies indexed with a higher x reduce the social cost of production of the good and increase total welfare. This result holds true regardless of the level of activism, or whether society takes into account the private costs that activists incur when buying high externality products or not. As we later see, this simplifying assumption reinforces our results.

2.2 The Market Equilibrium

We start by deriving consumer demand in the second stage of the game for a given minimal standard $\bar{x}$. Consumers choose from the set of goods produced with the allowed technologies $[\bar{x}, 1]$ the one that maximizes their utility taking as given the aggregate level of the externality.[12] In other words, a consumer of type θ chooses x so as to

$$\max_{x \geq \bar{x}} \; v - c(x) - \theta b(x).$$

As mentioned earlier, consumers only internalize a proportion θ of the external effect derived from their purchase. The first order condition of this problem implies that the activist's optimal choice of technology $x^*(\theta)$ satisfies

$$\theta = -\frac{c'(x^*)}{b'(x^*)}, \tag{1}$$

whenever $x^* \geq \bar{x}$. Otherwise, the minimum standard is binding and $x^* = \bar{x}$. Hence, the optimal choice is defined as

$$\hat{x}(\theta, \bar{x}) \equiv \max\left\{x^*(\theta), \bar{x}\right\}.$$

It is easy to verify from the assumptions of the model that $x^*(\theta)$ is continuous and strictly increasing[13] in θ so that, as expected, more conscious consumers choose goods produced with cleaner technologies. A higher standard also implies that consumers choose goods with (weakly) higher x. The next simple lemma is a direct consequence of these results.

[12] This result is due to the assumption that there is a continuum of consumers and their impact on the total externality is negligible. However, in the Appendix we show by means of example that results would still follow in a context with a finite number of agents in which they have a significant impact over the externality.

[13] To guarantee strict monotonicity we need to introduce the additional assumption that $c'(1) = -b'(1)$, so that $x^*(\theta) = 1$ only for $\theta = 1$. This assumption is only made for expositional purposes and all the results would follow if $x^*(\theta) = 1$ for some $\theta < 1$. In that case, the distribution of θ could be redefined to bunch all consumers for which the optimal choice was 1.

Lemma 2 *A higher standard $\bar{x}$ or a distribution F' that first-order stochastically dominates F result in a lower externality level.*

This lemma states two clear and intuitive results. First, if the minimal standard $\bar{x}$ is higher, the level of the externality is lower; and, second, if the degree of activism is higher, the externality will also decrease. We next show, however, that this second result does not necessarily translate to the context of majority voting on the minimum standard. The reason is precisely that activism and a higher standard are substitutes in terms of achieving a lower level of externality.

3 Voting a Standard

We now turn to the first stage in which consumers vote on the technology with the highest externality allowed, defined by the minimal standard $\bar{x}$. We assume a majority voting system. Then, to begin with, notice that the most preferred standard for a consumer of type θ, $\bar{x}^*(\theta)$, solves

$$\max_{\bar{x}} \; v - c(\hat{x}(\theta, \bar{x})) - \theta b\left(\hat{x}(\theta, \bar{x})\right) - \int_0^1 b\left(\hat{x}(s, \bar{x})\right) dF(s). \tag{2}$$

Thus, when considering their preferred minimal standard, consumers do take into account the externalities generated by *all* consumers together with their own cost. An immediate result from the previous specification is stated in the following lemma.

Lemma 3 *$\bar{x}^*(\theta) \geq x^*(\theta)$.*

This means that a voter always prefers a standard $\bar{x}^*(\theta)$ that precludes, at least, any technology worse than his most preferred choice. The reason is that a lower standard does not affect the technology that the consumer chooses in the last stage but allows technologies that increase the externality of less conscious consumers. Moreover, a voter might be interested in prohibiting technologies beyond his most preferred choice if the decrease in the total externality that this higher standard generates, is higher than his loss in utility from buying a more expensive variety. Therefore, the previous lemma implies that $\hat{x}(\theta, \bar{x}^*) = \bar{x}^*$ and the problem of the voter regarding her most preferred minimal standard $\bar{x}(\theta)$ can be rewritten as

$$\max_{\bar{x}} U(\bar{x}, \theta),$$

where

$$U(\bar{x}, \theta) \equiv v - c(\bar{x}) - \theta b(\bar{x}) - b(\bar{x}) F(\theta^{-1}(\bar{x})) - \int_{\theta^{-1}(\bar{x})}^{1} b(x^*(s))\, dF(s),$$

and $\theta^{-1}(x)$ is the value θ for which $x^*\left(\theta^{-1}(x)\right) = x$; thus, $x^*\left(\theta^{-1}(\bar{x})\right) = \bar{x}$. Notice that by setting a standard, a consumer *de facto* sets the level of pollution of consumers below $\theta^{-1}(\bar{x})$, and this is the reason why he may only internalize part of the aggregate cost of the externality, not all of it.

The consumer' preferences described by the utility function outlined in the previous paragraph are not necessarily single-picked in the choice of the standard. In fact, the consumer utility function is likely to have multiple local maxima, corresponding to a standard of 1 and other interior values of $\bar{x}$. However, the structure of the problem is such that consumers' preferences for a level of a standard can be ordered according to their degree of activism.

Lemma 4 *U satisfies the single-crossing condition, i.e., for all $\bar{x} > \bar{x}'$ and $\theta > \theta'$, $U(\bar{x}, \theta') - U(\bar{x}', \theta') > 0$ implies $U(\bar{x}, \theta) - U(\bar{x}', \theta) > 0$.*

As a consequence, a lower (higher) minimal standard is preferred by less (more) activist consumers than the median voter. The result of the voting process will be, therefore, defined by the most preferred option of the median voter, denoted as $\tilde{\theta}$.[14] The next proposition characterizes the outcome of the voting decision.

Proposition 1 *Majority voting determines a standard that is either the socially optimal level $\bar{x}^* = 1$, or $x^*(\theta_1) < 1$, where*

$$\theta_1 = \tilde{\theta} + F(\theta_1). \tag{3}$$

The previous expression implies that, as stated in the lemma above, the choice of standard of the median voter applies not only to him but also to more activist voters, up to θ_1. For this

[14] See Gans and Smart (1996) for a proof and illustrations of the Median Voter Theorem when preferences satisfy the single-crossing condition.

reason, the standard that the median voter chooses has two effects on his welfare. First, it sets the good he consumes, affecting his private utility. Second, it sets the total externality generated by activists of type θ up to θ_1. The sum of the two effects implies that, in the interior solution, we can interpret θ_1 as the *virtual type* of the median voter, so that the minimal standard results from

$$\max_x \; v - c(x) - \left(\tilde{\theta} + F(\theta_1)\right) b(x).$$

This expression shows that, as opposed to the social planner, in an interior solution the median voter internalizes only partially (by an amount $\tilde{\theta} + F(\theta_1)$) the increase in social welfare of a higher standard. The resulting standard arises from the comparison between the interior solution (or solutions) and the socially optimal standard corresponding to the most efficient technology, $x^s = 1$. The next proposition shows that the choice between the two standards is not monotonic in the level of activism.

Proposition 2 *When all consumers are non-activists, the socially optimal standard is the outcome of majority voting. However, a higher degree of activism (i.e, moving from a distribution F to F', where F' stochastically dominates F) may imply an increase in the externality level.*

In order to illustrate this proposition it is useful to start considering the following extreme cases. Suppose that all voters are non-activists, so that the distribution of θ is degenerate around 0. In this case, the interior solution characterized by equation (3) and the socially optimal standard coincide, so that $\theta_1 = 1$. The resulting standard is binding for all consumers and, hence, the median voter internalizes all the effects of the externality generated as a planner would do. Similarly, if the median voter is higher than 1/2, then $\theta_1 > 1$ and the optimal standard is also enacted. However, for intermediate degrees of activism of the median voter an inefficiently low level of the standard – corresponding to the interior solution – can arise.

The increase in activism has two opposed effects. The first is due to the fact that more activism in the society increases each consumer/voter preference for a (weakly) lower standard. The reason for this *free-riding* is simple: agents are less interested in sacrifying the consumption of their most preferred quality x because the impact on the total externality of a higher standard is lower. A second effect operates in the opposite direction and it is related to changes in the

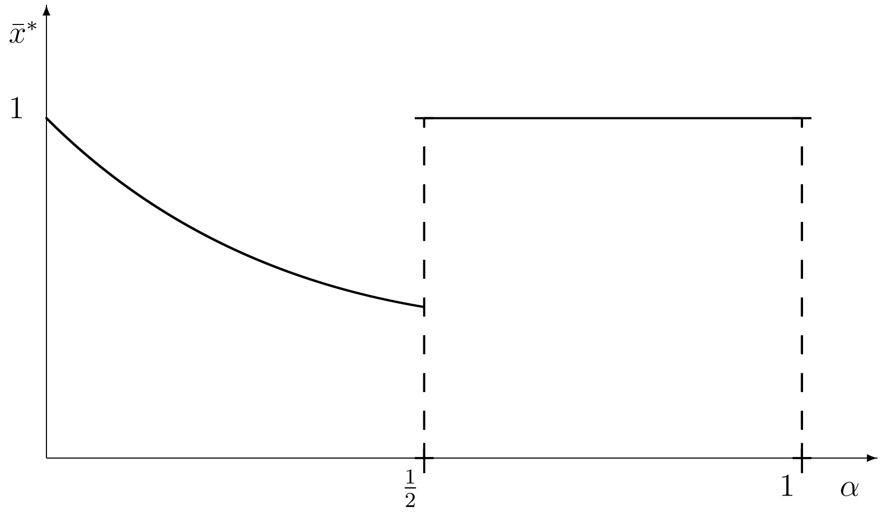

Figure 1: A lower standard is chosen for intermediate levels of activism.

median voter. To the extent that the median voter increases when activism rises, and a more activist median voter prefers a higher standard, this is a countervailing force. Hence, more activism may imply a higher externality level when the first effect dominates the second.

Finally, the previous two effects provide some intuitions about the characteristics of distributions of θ that might lead to inefficiencies. In particular, a lower than optimal standard might be implemented when the median voter is relatively non-activist, and a significant proportion of voters is highly activist. In other words, the more polarized is the distribution the more likely it is that a suboptimal standard arises as a result of the political equilibrium. The example we provide next studies the most extreme situation and it also serves as a proof of Proposition 2.

3.1 The Binomial Case

Let F be a two-point distribution for which $\theta = 1$ with probability α and $\theta = 0$ with probability $1 - \alpha$. We simply denote consumers with $\theta = 0$ as "non-activist" and those with $\theta = 1$ as "activist" consumers. The median voter will be non-activist as long as $\alpha < \frac{1}{2}$. We characterize next the standard chosen by this median voter for different values of α, and we represent it in *Figure 1.*

When α is small and the median voter is "non-activist", *Proposition 1* states that the optimal standard corresponds either to the corner solution $\bar{x}^*(1) = 1$ or to an interior solution $\bar{x}^*(\theta_1)$, characterized by (3). The interior solution implies a unique virtual type $\theta_1 = F(\theta_1) = 1 - \alpha$, the proportion of non-activists in the population.

Notice that the utility of the median voter can be written in this case as $v - c(\bar{x}) - (1 - \alpha)b(\bar{x}) - \alpha 0$. In other words, the *ex-ante* utility of the median voter corresponds to the *ex-post* utility of a fictitious consumer with $\theta = 1 - \alpha$. Given that $\bar{x}^*(1-\alpha)$ is the optimal choice of this virtual consumer, it is immediate that the median voter will prefer an interior standard to the socially optimal technology $x^s = 1$.

The standard illustrated in *Figure 1* also constitutes a proof of *Proposition 2*. When there are no activists, the level of externality is 0. However, as activism increases the level of the standard is reduced and a positive level of externality arises in equilibrium. Thus, interestingly, for all positive $\alpha < \frac{1}{2}$ there is a crowding out of the formal regulation (minimal standard) by the consumer "activism".

It is important to notice that although the standard decreases with the level of activism, the total externality does not necessarily increase. This result is the sum of two countervailing effects corresponding to the extensive and the intensive margin. On the one hand, there are less people that choose the technology that generates the externality. But on the other hand, these consumers will choose an even inferior technology.

Finally, when $\alpha \geq \frac{1}{2}$, the median voter is an "activist" and, according to the previous proposition (given that $\tilde{\theta} = 1 > \frac{1}{2}$), he will choose the socially optimal standard $\bar{x}^*(1) = 1$. The intuition is simply that at the time of purchase an activist does internalize *fully* the social cost of pollution and, thus, he does take it into account at the time of voting.

The previous example can provide intuition on the effect of the voting equilibrium over the welfare resulting from regulation. When the median voter is a non-activist (which occurs when $0 \leq \alpha < \frac{1}{2}$), the resulting minimal standard will be too low from a social point of view. In such a case, does more activism among consumers/voters imply higher welfare? For a given level of regulation consumers in general benefit from more activism. However, when regulation is endogenous to the voting decision, activist consumers might be worse off after an increase in activism.

To see this, take $\alpha < 1/2$ (which means that the median voter is non-activist), and consider a change in the preferences of a small group of size γ of "non-activists" consumers that become "activist" consumers with $\theta = 1$. Assume this group is sufficiently small so that the median voter remains non-activist; that is, $0 < \alpha + \gamma < \frac{1}{2}$. Then, this increase in the number of activists will reduce the standard from $x^*(1-\alpha)$ to $x^*(1-\alpha-\gamma)$. This change in the minimal standard implies that: (i) the welfare of non-activist consumers will obviously increase by a revealed preference argument: they prefer to enjoy a cheaper good even if that increases the aggregate externality; (ii) those consumers that were already activists in the first place might be worse off since they will not change their consumption decision, yet they might face a higher externality; and (iii) more surprisingly, the group of new activists (that previously were non-activists) may also obtain a lower utility. In this latter case, however, since their preferences have changed, in order to compare both results we need to define a welfare ordering that allows us to compare allocations with ex-ante as well as with ex-post preferences. Thus, we consider that the consumer's welfare unambiguously increases if and only if under the new allocation utility increases with respect to ex-ante and ex-post preferences.[15]

Given this restrictive partial order, we can see that the welfare of this group of new activists may well be lower than before. Consider the extreme case where $\alpha = 0$. Then, before the change of preferences, all consumers buy the good produced with the socially efficient technology $x = 1$, given that the standard was $\bar{x}^*(1) = 1$. With the change in preferences, the new activists choose to consume the same socially efficient good but the level of externality rises due to the lower standard $x^*(1-\gamma)$. Similarly, by definition, with the new allocation they would be worse off under the original preferences given that the initial solution coincided with the first best and all consumers were alike.

4 Extensions

We now examine the robustness of the results to three different variations of the model. First, we study the implications of a cost of enacting a regulation and show that the same distortions are likely to arise. Second, we show that the distortions we analyze are not an

[15] This welfare ordering has been used in other contexts in papers such as Benhabib and Bisin (2002).

artifact of the use of standards and they also appear with other mechanisms such as pollution taxes. Finally, we introduce a related model in which the market is not covered in the first best, and we show that this might be an additional force towards a lower standard.

4.1 Cost of Regulation

Throughout the paper we have assumed that enacting a regulation has no cost. In practice, though, regulation is costly and in this section we show that, in fact, the crowding out of formal regulation by increasing activism is reinforced when regulation has a cost, $K > 0$, evenly spread among all consumers. Not surprisingly, the median voter will be willing to regulate to the extent that the cost of regulation is lower than a certain threshold, $\overline{K}$. In the next proposition we show that a distribution with more activists where the median voter remains unchanged is less likely to enact a regulation.

Proposition 3 *Let $F(\theta, s)$ be a family of distributions differentiable in s with the same median such that if $s > s'$ then $F(\theta, s) \leq F(\theta, s')$. That is, distributions are ordered according to the first order stochastic sense. Then, the threshold value for which the median voter regulates, $\overline{K}(s)$ is decreasing in s.*

The intuition for the result is that the median voter is less interested to regulate when society becomes more conscious, since the more activist consumers there are, the smaller is the gain from setting a standard. Hence, along the same lines of the results in the previous section, an increase in the activism reinforces the free-riding effect and may lead to an increase in the equilibrium level of the externality because the median voter decides not to regulate to avoid the cost.[16]

The binomial distribution example provides an illustration of the effect of considering the (fixed) cost of regulation. *Figure 2* shows that when the proportion of activists increases and the median voter remains constant at either $\theta = 0$ or $\theta = 1$, regulation is less likely to occur.

[16]Notice that the first best and the decision of the median voter on whether to implement the regulation are not likely to coincide. While in the first best we compare the cost of the regulation with the average utility gain from this regulation, the median voter compares his own benefit with his share of the cost of the regulation.

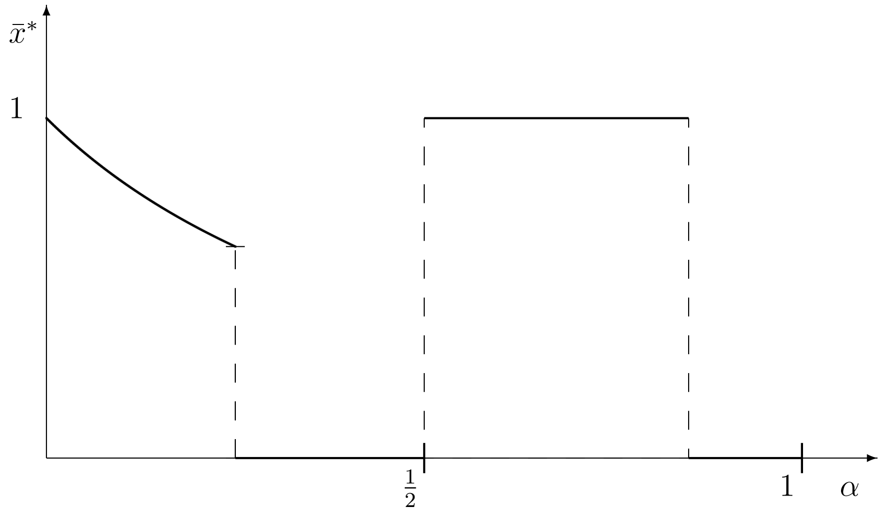

Figure 2: The standard chosen by the median voter when there is a cost of regulation.

4.2 Voting on Pollution taxes

The main point of the paper concerns the opportunistic behavior that non-activist voters might exert over activist consumers through setting a low standard at the expense of a higher externality. One may wonder whether the result is specific of standards or it also applies to other regulatory mechanisms. Here, we show that this result applies to the most commonly studied remedy to the existence of externalities, pollution taxes. In particular, we show that while the first best can be supported with taxes, the majority voting solution on the magnitude of a tax may also be inefficient, leading to a higher than optimal overall externality. However, we also obtain that this mechanism provides additional interesting trade-offs caused by the fact that pollution taxes apply to all consumers (as opposed to the case of a minimal standard, where activist consumers were not affected by a low standard), and by the assumption that taxes are rebated back to consumers. As we will see, both factors diminish, but do not eliminate, the extent of the collective free-riding problem.

In particular, suppose that, as an alternative scheme, a tax τ is enacted to penalize each unit of externality beyond the optimal level $b(1) = 0$. In the second stage of the game, a consumer of type θ will now choose the technology x of the good he consumes according to

$$\max_x \; v - c(x) - (\theta + \tau)b(x).$$

Hence, a tax $\tau > 0$ means that a consumer of type θ will choose a technology as if in the previous scenario he were of type $\min\{\theta + \tau, 1\}$. With some abuse of notation, we denote the consumer's optimal choice as

$$\hat{x}(\theta + \tau) = \min\{x^*(\theta + \tau), 1\}.$$

Trivially, the first best can be implemented with a tax $\tau = 1$, which implies that all consumers behave as if they were of type $\theta = 1$.

In the first stage of the game, each voter maximizes his utility by choosing the tax rate that solves

$$\max_\tau \; v - c(\hat{x}(\theta + \tau)) - (\theta + \tau)b\left(\hat{x}(\theta + \tau)\right) - \int_0^{1-\tau} b\left(\hat{x}(s + \tau)\right) dF(s) + T,$$

where T corresponds to the taxes collected, rebated back to consumers as lumpsum payments. That is, consumers receive a payment corresponding to the *average* tax collected from all consumers,

$$T = \int_0^1 \tau b\left(\hat{x}(s + \tau)\right) dF(s).$$

It is easy to verify that a counterpart of the single-crossing condition stated earlier also holds in this case. Using the results in Gans and Smart (1996), majority voting leads to the preferred tax of the median voter. Then, the median voter maximization problem can be rewritten as

$$\max_\tau \; v - c(\hat{x}(\tilde{\theta} + \tau)) - (\tilde{\theta} + \tau)b\left(\hat{x}(\tilde{\theta} + \tau)\right) - (1 - \tau)\int_0^{1-\tau} b\left(\hat{x}(s + \tau)\right) dF(s).$$

Notice that pollution taxes have two main differences with respect to the scenario where a minimal standard was set. First, while taxation also precludes inefficient technologies (those with $x < \tau$), it applies uniformly to all consumers that purchase a good that uses technologies worse than $x = 1$. Thus, taxes have a different effect than a minimal standard, which only applies to the consumption decision of non-activists with a low θ. Activist consumers with a high θ are not affected when a low minimal standard is set. Second, consumers that generate above average externalities make a net transfer to the rest of consumers through the taxes rebated. As a consequence, a non-activist median voter can reduce this net transfer by either choosing a very small tax, at the cost of a high externality, or else by choosing a high tax that provides large incentives to choose a low level of externality, approaching the first best.

Start with the case where all consumers are identical. Then, regardless of their equal degree of activism, no redistribution would occur through taxation and, as a result, the problem would be equivalent to the choice of the optimal standard studied earlier, and the socially optimal tax would be chosen.[17] However, when the distribution of the type θ of consumers becomes very polarized, a lower than optimal tax is likely to arise. As an illustration consider again the binomial example studied earlier.

Example 1 *Suppose that $F(\theta)$ is a binomial distribution with $\theta = 1$ with probability α and $\theta = 0$ with probability $1-\alpha$. Also suppose that $c(x) = x$ and $b(x) = \beta(1-x)$ where $1 < \beta < \frac{1}{1-\alpha}$. It is immediate that $x^*(1) = 1$ and*

$$x^*(0) = \begin{cases} 1 & \text{if } \tau\beta > 1 \\ 0 & \text{otherwise.} \end{cases}$$

If the median voter is non-activist – that is, $\alpha < 1/2$ – the utility of choosing $\tau = 1$ and suffering no externality is $v - c(1) = v - 1$. However, under the previous parameter restrictions, the utility of choosing $\tau = 0$, $v - c(0) - (1-\alpha)\beta$, is larger.

As opposed to the case of a minimal standard, additional conditions on $c(x)$ and $b(x)$ are necessary for a lower than socially optimal tax to arise.[18] This is the case because the socially optimal level of externality is more likely to be implemented using taxes. Compared to the case of the minimal standard where a median voter could implement a moderate level of externality and still consume a cheap good, the use of taxes induces a more extreme choice. A moderate tax rate implies a high transfer to activist consumers due to a typical Laffer Curve argument.

[17] The problem of the median/representative voter becomes

$$\max_{\tau} \; v - c(\hat{x}(\tilde{\theta} + \tau)) - \tilde{\theta} b\left(\hat{x}(\tilde{\theta} + \tau)\right),$$

where by choosing $\tau = {x^*}^{-1}(\bar{x}) - \theta$ we implement the standard $\bar{x}$.

[18] For simplicity and contrary to the rest of the paper, the example we provide assumes that $b(x)$ is weakly convex in x. As a result consumer decisions x^* correspond to corner solutions, simplifying calculations. Strictly convex approximations of this function will certainly result in the same distortions.

As a consequence, this tougher decision between a very low tax and a high externality and the socially efficient outcome makes free-riding less likely.

4.3 Endogenous Market Size

As a last extension of the base model, we relax one of the assumptions that we have maintained throught the paper, namely, that all consumers purchase the good regardless of the standard they are subject to. So far, we have shown that the distortion in the standard chosen by the median voter originated from the dispersion in the activism of consumers. Interestingly, we now illustrate how the results can be reinforced if consumers are heterogeneous in their valuation for the good v. To do so, and in order to simplify the exposition we assume that all consumers have the same level of activism θ. The consumer valuation v is drawn from a distribution $G(v)$ with density $g(v)$. In this case, consumer's participation (that is, their decision to buy the good) is endogenous to the technologies allowed.

The social welfare problem amounts to choosing the smallest valuation for the good, $\underline{v}^s$, for which consumption is allowed, together with the technology that each consumer should use, $x^s(v)$. It turns out that in the first best either no consumption should occur (if, for example, the support of v is too low) or else $\underline{v}^s = c(1)$ and $x^s = 1$ for all v. This result is immediate from the fact that, when not all consumers buy the good, the optimal standard should take into account that the externality is suffered by all consumers even though only some purchase the good. Because only the cleanest technology is allowed, optimality implies that the marginal consumer should obtain utility equal to the *total* cost of producing the good.[19]

Absent any regulation all consumers maximize their utility using the same technology, $x^*(\theta)$. As a result, the externality will be above the social optimum due to both the fact that an inefficient technology is used and that overconsumption occurs. The consumer with the lowest valuation that buys the good is defined by

$$\underline{v}^c = c(x^*(\theta)) + \theta b(x^*(\theta)) < \underline{v}^s.$$

Consider now the case in which a meaningful minimal standard $\bar{x} > x^*(\theta)$ is implemented

[19] If $b(1)$ were strictly positive, optimality would imply that $\underline{v}^s = c(1)+(\theta+1)b(1)$ since the marginal consumer must add utility that compensates the private cost of the externality and the social cost that it generates to everybody.

as the outcome of a voting decision. For a given standard $\bar{x}$, the consumer with the lowest willingness to pay that will buy corresponds to

$$\underline{v}^*(\bar{x}) = c(\bar{x}) + \theta b(\bar{x}).$$

This function is strictly increasing in $\bar{x}$ for all $\bar{x} > x^*(\theta)$. As a result, a voter with valuation v prefers a standard that maximizes

$$\max_{\bar{x}} \ (v - c(\bar{x}) - \theta b(\bar{x}))\, I(v \geq \underline{v}^*(\bar{x})) - (1 - G(\underline{v}^*(\bar{x})))b(\bar{x}), \tag{4}$$

where $I(v \geq \underline{v}^*(\bar{x}))$ equals 1 when $v \geq \underline{v}^*(\bar{x})$, and 0 otherwise.

Notice that if the voter v does not purchase the good, he will choose the socially optimal standard in order to minimize the externality he suffers. Similarly, contingent on purchasing the good, any voter v will choose the same standard. Hence, this argument provides a simple single-crossing condition that implies that a voter with a higher valuation prefers a *weakly* lower standard. As before, the standard chosen as a result of the voting decision, $\tilde{v}$, corresponds to the preferred standard of the median voter. We characterize this result in the next proposition that turns out to be a counterpart of *Proposition 1.*

Proposition 4 *Majority voting determines a standard that is either the socially optimal level* $\bar{x}^* = 1$*, or* $x^*(\theta_2) < 1$*, where*

$$\theta_2 = \theta + H(\theta_2), \tag{5}$$

with

$$H(\theta_2) \equiv \frac{1 - G\left(\underline{v}^*(x^*(\theta_2))\right)}{1 - g\left(\underline{v}^*(x^*(\theta_2))\right) b(x^*(\theta_2))} > 0.$$

From equation (5) we can observe that the standard implemented does not depend on the specific willingness to pay of the median voter, but rather on whether he purchases the good or not. We conclude this section by illustrating the previous result with an example similar to the one used when the heterogeneity among voters was due to the difference in their degree of activism.

Example 2 *Let* $G(v)$ *be a two-point distribution with* $v = 0$ *with probability* α *and* $v = 1$ *with probability* $1 - \alpha$*, for* $\bar{v}$ *sufficiently high to guarantee that high valuation consumers always buy* *the good. Assume all consumers are non-activist $\theta = 0$. In a similar way as in the rest of the paper, when $\alpha > 1/2$, the median voter does not buy the good and hence he is only concerned about minimizing the externality, choosing $\bar{x}^* = 1$.*

If $\alpha < 1/2$ the median voter buys the good. Adapting equation (4) to a discrete distribution of valuations we obtain that the median voter solves

$$\max_{\bar{x}} \tilde{v} - c(\bar{x}) - (1-\alpha)b(\bar{x}),$$

so that the standard that maximizes utility for the median voter is $x^*(1-\alpha)$. As a function of α the optimal standard turns out to be identical to the one depicted in Figure 1. Moreover, for $\theta > 0$ the standard would correspond to $x^*(\theta_2)$, where $\theta_2 = \min\{1-\alpha+\theta, 1\}$, and in the picture it would be represented as a vertical shift of the curve.

5 Concluding Remarks

In this paper we provide a model in which the level of activism of consumers drives the production decision of competitive firms. We assume that the more activist consumers are, the lower is their willingness to pay for goods produced with technologies that create larger externalities. As a consequence, and as intuition would suggest, more activism induces firms to choose technologies closer to the socially optimal ones. This simple mechanism is only half of the story, since these *private politics* take place in an environment where the firms' decisions can also be affected by the regulatory framework. Private politics co-exist with formal regulation.

This formal regulation is established by activist and non-activist consumers alike, as a result of a political decision process (*public politics*). To the extent that voters take into account the private politics subsequent to the established regulation, surprising results might arise. If all voters are non-activists, they are aware that private politics doesn't play any role in controlling the externality and they commit themselves to a strict regulatory framework. However, when a majority of voters are non-activist in an environment with highly activist consumers, they can take advantage of these private politics. They might choose a loose regulatory framework that allows them to choose goods produced with technologies with a low private cost (and price) and *free-ride* over the conscious behavior of activist consumers to limit the externality.

Hence, contrary to what the intuition might suggest, taking into account the endogeneity of the regulation might lead to the result that societies with more activists suffer a higher level of externality.

Our analysis also contributes to the ongoing debate on corporate social responsibility (CSR) by cautioning against the present trend towards a higher reliance on private politics and against formal regulation. The potential crowding out of strict regulation by looser firm self-regulation might result in activists carrying alone the burden of a conscious consumption (which increases social welfare), whereas non-activists would enjoy the benefits of both a less regulated environment and the conscious consumption of activists, without incurring either cost. As a consequence, an increasing reliance on the social responsibility of firms rather than on regulatory guidelines might be overall welfare diminishing.

The objective of the paper was to show that the complex interaction between private and public politics may yield unexpected outcomes. To make this point, we have chosen a very simple framework that makes clear the possible conflict. We now discuss the role of some alternative assumptions.

First, we have limited the extent of activism so that conscious consumers cannot internalize more than their share of the total externality. Moreover, we do not include inefficiently clean technologies. Relaxing both assumptions would make it easier to show that increasing activism could lead to inefficient outcomes. However, the result would arise from the complementarity between private politics and public politics under the control of activist consumers that would choose inefficiently high standards. This is in contrast with our model where inefficiency arises from the control of public politics by non-activists.

Second, we have assumed perfect competition in the supply side. Because our results rely on demand-side behavior, we are confident that imperfect competition would yield similar outcomes as long as consumers can capture some of the rents from their purchase. If consumers faced a monopolist that could perfectly discriminate among them, the free-riding equilibrium would not occur. Consumers would not be able to benefit from choosing a lower standard and consuming a cheaper good.

Finally, the model abstracts from several interesting dimensions in the debate on the role activism that might lead to further research. In particular, the one we consider most important is extending the analysis to multidimensional voting decisions where, for example, environmental decisions are voted alongside with redistributional issues.

A Proofs

Proof of Lemma 1

For a consumer of type θ that consumes a good x, a marginal increase in x increases the utility of the consumer in $-c'(x) - \theta b'(x)$ and reduces the externality in $-b'(x)$. Given that $c'(x) + b'(x)$ is negative,

$$-c'(x) - b'(x) - \theta b'(x) > 0,$$

which results in the corner solution $x^s = 1$.

Proof of Lemma 2

Immediate from the definition of $B = \int_0^1 b\left(\hat{x}(\theta, \bar{x})\right) dF(\theta)$, $\hat{x}$ weakly increasing in θ and $b' < 0$.

Proof of Lemma 3

We can simply show that voter's utility is larger for $\bar{x} = x^*(\theta)$ than for any lower standard $\tilde{x}$. In particular, from (2) we can compute the difference in utility between the two standards as

$$-\int_{\theta^{-1}(\tilde{x})}^{\theta} \left(b(\bar{x}) - b\left(x^*(s)\right)\right) dF\left(s\right) > 0$$

which proves the result.

Proof of Lemma 4

It is immediate to observe that

$$\frac{\partial^2 U}{\partial \bar{x} \partial \theta} = -b'(\bar{x}) > 0$$

which implies that U satisfies the single-crossing condition.

Proof of Proposition 1

The maximum of $U(\bar{x}, \tilde{\theta})$ is characterized by the first order condition

$$-c'(\bar{x}) - \tilde{\theta} b'(\bar{x}) - b'(\bar{x}) F(\theta^{-1}(\bar{x})) \geq 0,$$

with equality if $\bar{x} < 1$. Using the definition of $\theta^{-1}(\bar{x})$, equation (1), and by dividing by $b'(\bar{x}^*)$, the previous expression can be rewritten for interior values of the optimal standard $\bar{x}^*$ as

$$\tilde{\theta} = \theta^{-1}(\bar{x}^*) - F\left(\theta^{-1}(\bar{x}^*)\right).$$

Defining $\theta_1 \equiv \theta^{-1}(\bar{x}^*)$ we obtain the desired result. Notice that $\bar{x} = 1$ will always be a local maximum since the first order condition evaluated at that point is greater than 0.

Proof of Proposition 2

See section 3.1.

Proof of Proposition 3

The median voter will regulate if

$$U(\bar{x}^*, \tilde{\theta}) - U(0, \tilde{\theta}) \geq K.$$

This expression corresponds to

$$\overline{K}(s) = U(\bar{x}^*, \tilde{\theta}) - U(0, \tilde{\theta}) = c(x^*(\tilde{\theta})) + \tilde{\theta} b(x^*(\tilde{\theta})) - c(\bar{x}^*) - \tilde{\theta} b(\bar{x}^*) - \int_0^{\theta^{-1}(\bar{x}^*)} \left(b(\bar{x}^*) - b(x^*(z))\right) dF(z, s).$$

Taking the derivative with respect to s,

$$\frac{d\overline{K}}{ds} = \frac{\partial \overline{K}}{\partial \bar{x}^*}\frac{\partial \bar{x}^*}{\partial s} + \frac{\partial \overline{K}}{\partial s} = \frac{\partial}{\partial s}\left(-\int_0^{\theta^{-1}(\bar{x}^*)} \left(b(\bar{x}^*) - b(x^*(z))\right) dF(z, s)\right) < 0,$$

where the envelop condition allows us to show that $\frac{\partial \overline{K}}{\partial \bar{x}^*} = 0$ and the last expression originates from $b(\bar{x}^*) - b(x^*(z))$ being increasing in z and the definition of first order stochastic dominance.

Proof of Proposition 4

We need to consider two separate problems. When the median voter does not buy the good, it is immediate that his objective function corresponds to the minimization of the externality. In other words, $\bar{x} = 1$.

When the median voter buy the good, the first order condition corresponding to problem (4) is

$$\left(1 - g\left(\underline{v}^*(\bar{x})\right)\right) b(\bar{x})) \left(-c'(\bar{x}) - \theta b'(\bar{x})\right) - \left(1 - G\left(\underline{v}^*(\bar{x})\right)\right) b'(\bar{x}) = 0.$$

Denote θ_2 the type for which $\bar{x} = x^*(\theta_2)$. Replacing $\frac{c'(\bar{x})}{b'(\bar{x})}$ evaluated at θ_2 from equation (1) and rearranging we obtain the desired result. A necessary condition for the previous equation to hold is that $1 - g\left(\underline{v}^*(\bar{x})\right) b(\bar{x}) > 0$ so that $H(\theta_2) > 0$ and $\theta_2 > \theta$.

B The Finite Number of Types Case

Consider a modified version of the paper with only three agents, $i = 1, 2, 3$. The utility of an agent of type θ_i that chooses technology x_i can now be described (already imposing the equilibrium price $p(x) = c(x)$) as

$$v - c(x_i) - \theta_i 2b(x_i) - \sum_{j=1}^{3} b(x_j)$$

where the third term accounts for guiltiness due to the externality generated by agent's i consumption suffered by the other two agents. The fourth term is the aggregate externality in which, as opposed to the case with the continuum, the agent has a significant impact.

A finite counterpart to the condition that implies efficiency of $x = 1$ in this context is

$$-c'(1) - 3b'(1) > 0$$

so that the social cost of consumption (including the externality on all 3 consumers) is minimized using only the cleanest technology. By inspection of the utility function it is easy to see that an agent with $\theta = 1$ will also choose to consume the cleanest technology, $x = 1$, that generates an externality $b(1)$ normalized to 0.

To make results non-trivial, consider that

$$x^* \in \arg\min -c(x) - nb(x)$$

when $n < 3$ is lower than 1.

It is easy to show that the model proceeds in exactly the same way as before. Namely, the market equilibrium means that more activist consumers prefer a cleaner technology and that no agent would be interested in implementing a standard lower than their most preferred choice.

Let activism take only two possible values $\theta \in \{0, 1\}$, and let $\theta_3 \geq \theta_2 \geq \theta_1$. Three cases can arise:

- All agents are non-activist ($\theta_i = 0$ for all i). Here the median voter, $\theta_2 = 0$ chooses the standard that minimizes

$$\max_{\bar{x}} v - c(x) - 3b(\bar{x})$$

which according to the previous efficiency condition implies $\bar{x}^* = 1$.

- When $\theta_3 = 1$ but all other voters are non-activist, inefficiencies arise. The median voter maximizes

$$\max_{\bar{x}} v - c(x) - 2b(\bar{x})$$

that according to the previous assumption implies $\bar{x}^* < 1$.

- When the median voter is activist (that is, $\theta_2 = 1$) he will choose a standard at least as high as his most preferred choice that as we have shown before is $x = 1$.

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