

# Private Politics and Public Regulation

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## Abstract

We build a model to analyze government regulation and self-regulation by a firm under the pressure of activists. Private politics is modeled as a dynamic war of attrition where, at any point in time, the firm can self-regulate while an activist group decides whether to initiate or call off a boycott. The two types of private politics are shown to be strategic complements. The regulator may step in, at any time, to regulate the firm. As a result, firms self-regulate to pre-empt regulation while activists start and continue boycotts because this raises the likelihood of public regulation - not self-regulation. However, the existence of private politics tend to crowd out public regulation. Our analytical results predict whether boycotts are likely, lengthy, and successful; generating a rich set of testable comparative statics.

*Keywords:* Private politics, boycotts, activism, regulation, self-regulation, corporate social responsibility (CSR), war of attrition.

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# 1 Introduction

On November 2, 2010, the San Francisco Board of Supervisors supported, with 8-3 vote, a ban on McDonald's Happy Meal. According to the act, no company could give away a free toy with a meal with nutritional value exceeding a certain limit. The Board subsequently overturned the veto of Mayor Gavin Newsom, thereby leaving McDonald's with a list of choices: pull out Happy Meals from the menu, cut the portion, or remove the toy.

Lobbying by special interest groups is hardly atypical in a democratic system, both on the federal and local levels, and a large body of research has focused on these issues (Grossman and Helpman, 2002). Yet cases like McDonald's stand out, as legislative decisions are hardly the most common way that activist and special interest groups use to push their agenda when fighting large corporations with brand names worth billions. More often, activist groups use private, as opposed to public, political channels. These private channels do not involve the government (thus 'private'), and usually take the form of running a campaign to pressure the company to adopt certain practices; threatening and organizing boycotts are particularly common. E.g., Rainforest Action Network (RAN), an activist group of a few dozen people, fought CitiCorp for its financing of non-sustainable mining and logging companies for a few years in 2000-05. After years of boycotts, RAN was about to give up and end its boycott when in 2005, surprisingly, CitiCorp decided to concede and give in to the demands of RAN. An even more famous example is Greenpeace's 1995 boycott of Shell for its plans to sink Brent Spar, a used offshore oil storage facility. After weeks of intense boycotting, Shell finally decided to give in to Greenpeace's demands and dismantle Brent Spar on land.<sup>1</sup>

Yet in San Francisco, health groups did not attempt to boycott McDonald's for selling Happy Meals, and relied on the legislature instead. This raises the broad question: When and why (self-) regulation of an industry or a firm happens as an outcome of private politics, and when the government chooses to regulate itself instead? This paper, to the best of our knowledge, is the first one to study government regulation and self-regulation, i.e., private and public politics, in a unified framework.

The term "private politics" was coined by David Baron (see Baron, 2001 and 2003) to

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<sup>1</sup>The statement released by Shell on June 20, 1995, contained: "Shell's position as a major European enterprise has become untenable. The Spar had gained a symbolic significance out of all proportion to its environmental impact. In consequence, Shell companies were faced with increasingly intense public criticism, mostly in Continental northern Europe. Many politicians and ministers were openly hostile and several called for consumer boycotts."

describe non-market interactions between individuals, NGOs, and companies, and has since been in the center of a relatively small but growing literature. Baron (2001) assumes that a company's reputation positively affects demand for its product, and thus is worth investing in. Baron and Diermeier (2007) consider a strategic activist who demands the firm to adopt certain practices, or else he would organize a damaging campaign. Baron (2009) extends the analysis by studying two competing firms, and allowing activist to be an (imperfect) agent of citizens. Feddersen and Gilligan (2001) model activist as a credible source of information about credence good rather than as a campaigner; they show that presence of such an activist may alter the equilibrium, and in particular lead to differentiation of the product. Baron (2011) combines the two approaches by assuming that there are two activist groups, one more moderate and one more aggressive, that never fight each other. In that case, it makes sense of each of the two competing firms to cooperate with the moderate group, as it makes a boycott less likely.<sup>2</sup> In a recent working paper, Besanko, Diermeier and Abito (2011) show that when (flow) investment in CSR affect the firm's reputation (stock), then activist can increase the firm's investment in CSR by occasionally destroying its reputation if it becomes too good. In general, the idea that socially responsible actions of companies have a positive impact on their reputation and performance has found empirical support. For example, Dean (2004) finds that pre-existing reputation at the time of crisis affects consumers' perception of the brand after the crisis. Minor and Morgan (2011) document that companies with good reputation take a lower hit on their stock price as a result of a crisis.

As one of the most typical, and certainly the most visible, implementation of private politics, boycotts have attracted quite a bit of attention. Delacote (2009) observes that heterogeneity of consumers makes boycotts less efficient, as those consumers who buy a lot and thus could hurt the firm most are also the ones with the highest cost of boycotting. Diermeier and Van Mieghem (2008) model boycotts as a dynamic process, where each of the (infinitesimal) consumers decides to participate or not depending on the number of other consumers boycotting the product. Innes (2006) builds a theory of boycotts under symmetric information, which suggests that either the activist targets a large firm, and then the boycott is very short (short enough to show that the activist has invested a lot in preparation), or the activist targets a small firm, and in this case the boycott is persistent, as the firm finds it too costly to satisfy the demand of the activist;

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<sup>2</sup>See also Baron (2010), which looks on cooperative arrangements where various types of activist groups can enforce cooperative behavior.

in the latter case, the reason for boycotting is to redistribute customers to a more responsible, larger firm. For an experimental study of boycotts, see Tyran and Engelman (2005).

Our paper contributes to the literature in two ways. First, it studies the interaction between private and public politics in a unified dynamic framework.<sup>3</sup> Second, it introduces modeling boycotts as a war of attrition. The latter proves to be a convenient and realistic way of modeling delayed response of firms and activists, given that each hopes the other one to act and stop the boycott. In addition, it removes the need to make ad hoc assumption about the sequence of moves in a bargaining game. More precisely, we build a dynamic model of interaction between an activist group (Activist), a firm (Firm), and perhaps also a government agency (Regulator). Throughout, we will use *he* for Activist, *she* for Regulator, and *it* for Firm. Firm produces and sells a good, but does so in a way that Activist believes to be wrong or harmful. Firm is aware of Activist's concern (it is typical that a firm is first approached by an activist with an ultimatum; see, e.g., Baron and Diermeier, 2007), and may decide to adjust its practice ("self-regulate") at any moment. In general, self-regulating is costly to Firm. As long as there is no regulation in place, Activist may decide to run a campaign against Firm, which we, to stay focused, call a boycott. The boycott is costly for Activist as well as for Firm; it will end if either Firm decides to self-regulate or if Activist gives up.

Regulator may step in at any point and regulate Firm. We assume that such regulations will be even less desirable for Firm than self-regulation: e.g., the regulator might enact legislation that reduces pollution by the same amount, but does not do this in a cost-efficient way. The objectives of Regulator may be thought of as exogenous to the model (e.g., she has a limited budget and manpower and her decision to regulate a particular firm is unrelated to the issue in question or to Activist's moves), or she may have preferences to regulate or refrain from regulation driven, say, by social welfare considerations. Moreover, it is not unrealistic to think that the government may be lobbied by activists and/or the firm, or it may be under political pressure if activists enjoy the support of voters. We thus find it instructive to start without the Regulator, and then introduce the Regulator who decides whether to step in or not.

We maintain an assumption that Activist can only run one campaign against Firm, and if he gives up, the campaign cannot be restarted. Our primary objective here is simplicity, but first of

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<sup>3</sup>Maxwell, Lyon, and Hackett (2000) have another model with both regulation and self-regulation. However, there, the rationale for lobbying for regulation is economic, namely, to reduce the number of competitors by effectively restricting entry, and self-regulation will happen as a way to stay in business. In our paper, the source of (self-)regulation is pressure by activists, which is an integral part of private politics.

all, this is what we observe in reality, and also what we would get in the model even if we allow for multiple campaigns.<sup>4</sup> Thus, the game features three phases, in which players effectively have different objectives and may play different strategies. Before a boycott starts, Activist waits, hoping that Firm will self-regulate (or that Regulator will step in). Activist is willing to wait because Firm will indeed self-regulate with some probability, as it wants to avoid a boycott. The unique Markov Perfect equilibrium (MPE) is in mixed strategies: Given the likelihood of a boycott, Firm is indifferent and will self-regulate with a positive probability. Taking this probability as given, Activist is indifferent when to initiate a boycott, and a boycott is initiated with some chance. If the boycott has started, we enter the second phase of the game. In this subgame, the MPE takes the form of a war-of-attrition between Activist and Firm: the boycott is costly for both, and both hope that the other will give in: Activist hopes that Firm starts to self-regulate, while Firm hopes that Activist gives in and ends the boycott. If Activist ends the boycott, then Firm will not self-regulate, unless the likelihood of intervention by Regulator is still high enough.

This simple structure of the model helps us identify some important comparative statics without having to consider a three-way bargaining model. If regulation is very costly to Firm, the boycott is more likely to start (and is likely to start soon), and it lasts longer; intuitively, only very credible boycotts can induce Firm to self-regulate in these circumstances. For similar reasons whenever regulation is very important to Activist, Firm is less likely self-regulate, which makes it more likely that Activist will start a boycott. Suppose Regulator is aggressive, in the sense that she regulates with a large probability. We show that in this case the boycott is less likely to start and, if it does start, it ends sooner. This results means that private activist campaigns are a strategic substitute to public regulation in our model. At the same time, in this case, Firm self-regulates at a faster rate, making self-regulation a strategic complement to public politics.

As we connect private politics with government regulation, our paper is related to the large literature in political economy focusing on the incentives and behavior of politicians and legislators (see Persson and Tabellini, 2002). Citizens and consumers are allowed to vote and sometimes run for office (as in Besley and Coate, 1997; Osborne and Slivinski, 1996), but boycotts are rarely

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<sup>4</sup>Multiple campaigns are impossible if starting a campaign has a positive cost. If starting a campaign also gives some extra reputational benefits to Activist, then it is reasonable to think that this reputational benefit disappears if the campaign is not successful. In this latter case, multiple campaigns would also be impossible.

considered. Nevertheless, it would be fair to say that activist groups were covered by the literature, at least if they are assumed to lobby governments by providing campaign contributions or information on public opinion (for an overview of this literature, see Grossman and Helpman, 2002).

Our choice of a war-of-attrition game to model boycotts is led by the desire to capture, in the simplest way, both the dynamics of a boycott and its inefficiency for all parties involved (and nevertheless show that they may be part of equilibrium). For similar purposes, wars of attrition are often used in industrial organization and game theory.<sup>5</sup> In political economy, they have also been used to explain gridlock in legislatures (Alesina and Drazen, 1991). As a matter of fact, the first waiting game (before the boycott) between Firm and Activist is *not* a war-of-attrition, since Firm is *not* hoping that Activist makes the move and starts a boycott). For this reason, this first game has asymmetric corner equilibria that are typical (and must be assumed away) in standard war-of-attrition models. In this sense, the waiting game before the boycott is more similar to the equilibrium in Harstad (2011), which studies whether and when a private owner of a valuable asset (say, rainforest) is compensated for its conservation.

The rest of the paper is organized as follows. We start with Section 2.1, where we introduce and analyze the model in the absence of Regulator. This gives us a number of results about boycotts which we then generalize. Section 3 introduces Regulator, and we study equilibria and comparative statics of the model with all three players. In Section 4 we discuss our results and explore possible extensions. Section 5 concludes.

## 2 Private Politics: Boycotts and Self-Regulation

This section shows how boycotts can be analyzed as a dynamic war-of-attrition model with only a firm and an activist group. The results are of independent interest and, more importantly, they serve as benchmarks when we introduce the regulator in the next section.

### 2.1 A Dynamic Model of Private Politics

The game has two players, Firm and Activist. Time is continuous and infinite, and the players share a common discount rate  $r \in (0, \infty)$ . The flow payoffs of Firm and Activist are normalized

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<sup>5</sup>War of attrition games were first applied to biological settings (Maynard Smith, 1974). There, as well as in economics, “the object of the fight is to induce the rival to give up. The winning animal keeps the prey; the winning firm obtains monopoly power. The loser is left wishing it had never entered the fight” (Tirole, 1998:311). The definition by Muthoo (1999:241) is similar.

to zero if there is no active boycott and if Firm has not yet self-regulated. Relative to the status quo, Activist would benefit if Firm self-regulates. Such self-regulation could mean, for example, that Firm installs technology reducing its pollution, switches to organically produced food, or improves working conditions for its employees. If Firm self-regulates, then it pays a (flow) cost  $-c < 0$  and Activist gets a flow benefit  $b > 0$ . For simplicity, we assume that self-regulation is an irreversible decision. Thus, the game practically ends after self-regulation, since no further action can be taken, although time continues and  $b$  and  $c$  measure flow payoffs.

We assume that Activist cannot pay Firm to self-regulate. The only choice Activist can make is whether to start a boycott and, if it has already started, whether to end it. A boycott is costly for both players: Firm gets a flow payoff of  $-y < 0$  due to lower sales, and Activist gets a flow payoff of  $-v < 0$ , as it is costly to keep the public interested, organize events interesting to the media, and perhaps forgo one's consumer surplus by participating in the boycott. In addition, starting a boycott requires the fixed set-up cost  $F$ , which we interpret as Activist's cost of initially informing and organizing customers. We permit  $F < 0$ , in which case Activist actually benefits from initiating a boycott; this allows us to describe activists who are long-term players and care about their reputation, for example. Once the boycott starts, Firm faces an instantaneous cost  $H \geq 0$  (reputation damage), although a fraction  $\delta \in [0, 1]$  may be recovered the moment when (and if) the boycott is called off by Activist. For example, if  $\delta < 1$ , even a short-lasting boycott is costly for the firm, because some reputational loss can never be fully recaptured. These assumptions and parameters are in line with Baron (2011).<sup>6</sup> We assume that  $c < y$ , so an immediate self-regulation is better for Firm than an eternal boycott.

The following table summarizes the payoffs in this simple stopping game:

Payoffs	Status quo	Self-regulation	Boycott	At start	At end
Activist	0	$b$	$-v$	$-F$	0
Firm	0	$-c$	$-y$	$-H$	$\delta H$

Each player maximizes the present discounted value of expected payoffs. The strategies of the players are as follows. At any point in time, Firm can either do nothing or self-regulate. If Firm self-regulates, the game ends. As long as the game has not ended, Activist chooses, at any point in time, whether to start a boycott or, if the boycott has already started, whether

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<sup>6</sup>In Baron (2011),  $\beta$  denotes the share that may not be recovered if the boycott is called off. With this notation,  $\beta = 1 - \delta$ .

to end it. If Firm self-regulates, we assume that any boycott is immediately stopped. We also assume, for simplicity, that once a boycott has taken place and ended, it is impossible to start a new boycott (we relax this assumption in Section 4). This implies that there are three possible situations: In phase 0, the boycott has not yet started. Phase 1 refers to a situation with a boycott currently in place. If the boycott has ended, we enter phase 2.

As in most dynamic games, we have a large set of Subgame Perfect equilibria. We thus restrict attention to Markov Perfect equilibria, so that the strategies only depend on the payoff-relevant partition of histories, i.e., whether the boycott has started and/or ended. Consequently, each player's probability of acting must be independent of how much time the players have spent in each phase. The equilibrium can thus be characterized by five Poisson rates:  $\{\phi_0, \phi_1, \phi_2, \alpha, \rho\}$ . The Poisson rate  $\phi_t \in [0, \infty]$  measures the equilibrium rate of self-regulation during phase  $t \in \{0, 1, 2\}$ . For example, the probability of self-regulating within a small time interval  $dt$  during the boycott is  $\phi_1 dt$ , so  $\phi_t = \infty$  would mean immediate self-regulation. In equilibrium, Activist starts a boycott at Poisson rate  $\alpha \in [0, \infty]$ . If the boycott has started, Activist ends it at rate  $\rho \in [0, \infty]$ .

## 2.2 Boycott as a War of Attrition

We will now solve the game by backward induction. Consider phase 2, the situation *after* the boycott has ended. In this phase, Firm is the only player capable of taking an action. Since self-regulation is costly, Firm prefers to stick to the status-quo and not self-regulate ( $\phi_2 = 0$ ), and thus both players receive a payoff of zero ( $U_2^f = U_2^a = 0$ ) in phase 2. This is anticipated during phase 1.

The boycott is costly for both players, but each of them can unilaterally stop the boycott game. If Activist ends the boycott, we enter phase 2, and Activist's flow payoff of 0 is larger than his flow payoff during the boycott,  $-v$ . Firm can end the game by self-regulating and enjoy the flow payoff  $-c$ , which is assumed to be larger than Firm's flow payoff during the boycott,  $-y$ . Thus, on the one hand, each player would strictly benefit from acting and stopping the game if the *other* player is *not* expected to end the game anytime soon. On the other, each player would benefit more if the other player acted. Thus, the boycott is a war of attrition where each player hopes that the other one will concede.

Activist's best response depends on  $\phi_1$  in the following way. If  $\phi_1$  is small, then Activist realizes that Firm is highly unlikely to self-regulate during the boycott. In this case, a positive

cost of boycott  $v$  implies that Activist should stop the boycott immediately. In contrast, if Firm is very likely to self-regulate, so that  $\phi_1$  is large, then Activist is better off waiting until Firm self-regulates. If Firm believes Activist is unlikely to end the boycott, so that  $\rho$  is small, then Firm is better off by self-regulating immediately. If  $\rho$  is large, Firm prefers to wait. As in every war of attrition, there are two corner solutions:  $(\phi_1, \rho) = (\infty, 0)$  and  $(\phi_1, \rho) = (0, \infty)$ . In both these equilibria, the boycott ends immediately. The more interesting equilibrium, in our view, is the one in mixed strategies where the boycott lasts, in expectation, a positive amount of time. Only in this equilibrium can the boycott actually be observed. Since both players are acting with a positive probability in this equilibrium, we call it *interior*.

**Lemma 1** *There is a unique interior equilibrium in the boycott game:*

$$\phi_1 = r \frac{v}{b} \in (0, \infty), \quad (1)$$

$$\rho = r \frac{y - c}{c + r\delta H} \in (0, \infty). \quad (2)$$

**Proof.** If Activist does not end the boycott, his expected payoff is driven by Firm's rate of self-regulation,  $\phi_1$ :

$$U_1^a(\rho = 0, \phi_1) = \int_0^\infty \phi_1 e^{-\phi_1 t} \left( \int_0^t (-v) e^{-r\tau} d\tau + \int_t^\infty b e^{-r\tau} d\tau \right) dt = \frac{1}{r} \left( \frac{\phi_1 b - rv}{\phi_1 + r} \right).$$

In this expression,  $t$  denotes the moment at which Firm self-regulates. This time is distributed exponentially with density  $\phi_1 e^{-\phi_1 t}$ . Alternatively, Activist can receive zero by terminating the boycott. For an interior solution to be optimal, these payoffs must be equal, giving (1).

Firm's strategy during the boycott depends on how likely it thinks Activist is to stop. The payoff from self-regulating is  $U_1^f(\phi_1 = \infty, \rho) = -c/r$ , while the payoff from never self-regulating is:

$$U_1^f(\phi_1 = 0, \rho) = \int_0^\infty \rho e^{-\rho t} \left( \int_0^t (-y) e^{-r\tau} d\tau + \delta H e^{-rt} \right) dt = \frac{1}{r} \left( \frac{r}{\rho + r} (-y) + \frac{\rho}{\rho + r} r\delta H \right).$$

For an interior (mixed) strategy to be optimal, these payoffs must be equal, requiring (2). ■

While there is no self-regulation after the boycott ( $\phi_2 = 0$ ), Firm is apparently willing to self-regulate during the boycott ( $\phi_1 > 0$ ): the boycott is costly and Firm prefers to end it. As a simple consequence, self-regulation is more likely during than after the boycott. This fact explains why Activist is willing to continue the boycott, despite its costs.

**Proposition 1 (Reasons for self-regulation and boycotts)** *Firm is willing to self-regulate during the boycott in order to end it; this motivates Activist to continue the boycott rather than end it.*

Once we have the rates of actions, as described by Lemma 1, it is straightforward to derive the expected length of the boycott as well as its likely outcome. For example, since the boycott-game ends with rate  $\rho + \phi_1$ , the expected length is simply  $1/(\rho + \phi_1)$ . This generates rich comparative statics.

**Proposition 2 (*Expected duration*)** *The expected duration of the boycott is short if it is costly ( $v$  and  $y$  large), but long if self-regulation is costly to Firm or beneficial to Activist ( $c$  and  $b$  large):*

$$\frac{1}{\rho + \phi_1} = \frac{1/r}{v/b + (y - c)/(c + r\delta H)}.$$

In other words, the boycott is more long-lasting if the stakes of either player are high relative to the cost of continuing the boycott. The intuition is the following. Suppose, for example, that self-regulation becomes more costly for Firm, so  $c$  is larger. In this situation, Firm is willing to self-regulate only if, as must be the case in a mixed-strategy equilibrium, Activist is less likely to call off the boycott. This implies that  $\rho$  must be smaller, and the boycott tends to last longer. In addition, the smaller  $\rho$  implies that Firm is more likely to self-regulate before the boycott has been called off by Activist. In other words, the more costly is self-regulation to Firm, the more likely the boycott is to succeed, from Activist's point of view. If  $b$  is large, Activist has more to gain from continuing the boycott and is willing to stop only if, as must be the case in equilibrium, Firm is unlikely to self-regulate. This implies that if  $b$  is large,  $\phi_1$  must be small, the boycott ends later, and it is more likely to fail, from Activist's point of view. Now, suppose the boycott is costly for Activist ( $v$  large) or for Firm ( $y$  large). In either case, the boycott is expected to end sooner. The difference is that, if  $v$  is large, Activist is willing to continue the boycott only if Firm is likely to self-regulate (so  $\phi_1$  must increase). Hence, the boycott is *more* likely to succeed if  $v$  is large. If  $y$  is large, however, Firm is willing to wait only if Activist is expected to soon call off the boycott (i.e.,  $\rho$  must increase), implying that the boycott must be *less* likely to succeed. The next proposition characterizes the probability of a successful boycott (since strategies are Markovian, this probability does not depend on the actual duration).

**Proposition 3 (*Probability of success*)** *The probability that the boycott succeeds is larger if regulation is costly to Firm ( $c$  large), not very beneficial to Activist ( $b$  small), and the boycott is costly to Activist ( $v$  large) but not to Firm ( $y$  small):*

$$\frac{\phi_1}{\rho + \phi_1} = \frac{1}{1 + b(y - c)/v(c + r\delta H)}.$$

Boycotts which happen to be over an issue that Activist does not care about too much ( $b$  small) but which are costly to maintain ( $v$  large) tend to be short and effective; this would be

the case of Greenpeace's boycott against Shell. Maintaining occupation of Brent Spar was much more costly than most activists could ever afford, but at the same time preventing it from being sunk was not the main issue that Greenpeace truly cared about. At the same time, high  $b$ , which corresponds to a situation where Activist cares deeply about a particular issue, such as RAN about rainforest, will tend to be longer and be less effective. In reality, RAN was almost ready to give up after a few years of campaigning when Citi got a blow to its reputation due to relations with Enron. At this point, we can assume that the need to improve reputation made  $\delta H$  higher, which decreased  $\rho$ , the rate at which Activist (RAN) would give up. Our model predicts that this did not decrease the length of the boycott, but increased the likelihood of success, which corresponds to what actually happened.

The equilibrium payoff of Activist in phase 1 is  $U_1^a = 0$ , since ending the boycott is a best response. The equilibrium payoff of Firm is  $U_1^f = -c/r$ , since self-regulating, generating this payoff, is a best response for Firm.

### 2.3 Before the Boycott

Suppose the players anticipate to enter the war of attrition, analyzed above, if the boycott is initiated. The boycott is costly to Firm, who is thus willing to self-regulate if and only if Activist is quite likely to initiate a boycott. However, if self-regulation is likely, then Activist prefers to *wait* rather than start an expensive boycott. As before, Activist wishes that Firm acts, but unlike the previous case, Firm wants Activist to wait rather than to act. Therefore, the game is actually not a typical war of attrition and the equilibrium is in fact unique.

**Lemma 2** *Assume the players anticipate that, if a boycott should start, the interior equilibrium will be played. Then, the pre-boycott game has generically a unique equilibrium which is given by the following:*

- (i) *If  $F > 0$ , then  $\alpha = \phi_0 = 0$ , so a boycott never starts and Firm never self-regulates.*
- (ii) *If  $F < -b/r$ , then  $\alpha = \phi_0 = \infty$ , so Firm immediately self-regulates under the threat of an immediate boycott.*
- (iii) *If  $F \in (-b/r, 0)$ , then there is a mixed strategy equilibrium, with rates given by:*

$$\begin{aligned}\alpha &= \frac{c}{H}; \\ \phi_0 &= r \frac{-F}{b/r + F}.\end{aligned}$$

**Proof.** If Activist starts the boycott, a best response is to immediately end it. Thus, starting the boycott gives Activist payoff  $-F$ , while waiting and hoping for self-regulation generates the payoff:

$$\frac{\phi_0 b}{r(\phi_0 + r)}.$$

The latter is larger if:

$$\phi_0 \geq r \frac{-F}{b/r + F}.$$

Firm can enjoy the payoff  $-c/r$  by self-regulating. By doing nothing, Firm risks that a boycott will start, causing the harm  $H$  even if it self-regulates immediately (which is a best response). Thus, self-regulation is a best response before the boycott starts if:

$$\frac{c}{r} \leq \frac{\alpha(H + c/r)}{r + \alpha} \Leftrightarrow \alpha \geq \frac{c}{H}.$$

The proposition immediately follows from these response functions. ■

Note that the incentive to initiate a boycott, in the situation without a public regulator, is very small: Once the costly boycott has started, a best response for Activist is to immediately end it, even though this will guarantee that there will be no self-regulation. Thus, if  $F > 0$ , then a boycott will never start on the equilibrium path. If  $F < 0$ , however, Activist experiences a gain (e.g., reputation-wise) if the boycott is started. If this gain is very large ( $F < -b/r$ ), it becomes a dominant strategy for Activist to start a boycott. Fearing this, Firm will concede immediately.

The explicit formulas give rise to rich comparative statics. If  $F \in (-b/r, 0)$  is small, i.e., Activist gains from starting a boycott, then Firm must self-regulate at a high rate to prevent a boycott. In other words, if the Activist is “aggressive,” he is less likely to start a boycott before Firm has already self-regulated. If self-regulation is costly for Firm ( $c$  is high), then it is more likely that Activist will need a boycott (and  $\alpha$  must be higher). However, if the reputational damage from a boycott ( $H$ ) is large, then  $\alpha$  is lower, and it is more likely that self-regulation will occur before the boycott, not as a result of it. The following proposition summarizes these results and adds additional insights.

**Proposition 4 (Likelihood of a boycott)** *Assuming  $F \in (-b/r, 0)$ , the probability of a boycott is increasing in  $b$ ,  $c$ , and  $F$ , but decreasing in  $H$ :*

$$\frac{\alpha}{\phi_0 + \alpha} = \frac{1}{1 - rFH/c(F + b/r)}.$$

This result suggests that boycotts are likely to occur over “big” issues, which are important for Activist and expensive for Firm. Furthermore, firms with recognizable brands, which have a lot to lose (in that  $H$  is large), are more likely to be socially responsible and self-regulate, without the need of starting a boycott. This goes in line with stylized facts; such companies often choose to self-regulate and invest in CSR before activists get a chance to start a boycott. Interestingly, if  $F$  tends to the lower boundary of this region ( $F \downarrow -b/r$ ), boycotts become less likely, as Firm knows that the threat of boycott is very credible, and thus self-regulation is to prefer. This trend persists if  $F < -b/r$  (so Activist gets a lot from the boycott); in that case, the presence Activist leads to immediate self-regulation.<sup>7</sup>

### 3 Private Politics meets Public Regulation

#### 3.1 A Model with Regulator

Regulator (“she”) is able, at any moment, to step in and impose regulation on Firm. Like self-regulation, direct regulation is irreversible, and we assume that Activist gets the same flow payoff  $b$  regardless of whether Firm self-regulates or is being directly regulated by Regulator.<sup>8</sup> However, direct regulation is costly to Firm, and we assume that it is more costly than self-regulation. This is realistic, as Regulator might have less information and may be “clumsy” and unable to mandate the cheapest or most efficient technology. In addition, it may be costly to deal with the administrative burden or the red tape involved. Firm’s additional cost is measured by  $k$ , so regulation imposed by Regulator imposes the total flow cost  $(c + k)$  on the firm. If  $k < 0$ , then Firm actually prefers governmental regulation to self-regulation.

We model Regulator’s preferences in a simple way. As with Firm and Activist, we normalize Regulator’s flow payoff to 0 if there is no regulation. If Firm self-regulates, Regulator gets flow payoff  $s > 0$ , measuring the net benefit of self-regulation. If Regulator regulates the firm directly, instead, her flow payoff is  $s - q$ , where  $q \in (0, s)$  by assumption. The assumption  $q > 0$  may hold for the same reasons as why  $k > 0$ : administrating regulation is costly and the regulator

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<sup>7</sup>Note that if  $F > 0$ , Activist would never start the boycott if one then expects the war of attrition equilibrium during boycotts. Similarly, if one expects to play the equilibrium  $(\phi_1, \rho) = (0, \infty)$  during the boycott, i.e., if Firm is not expected to ever concede, then Activist does not want to initiate a boycott if  $F > 0$ . However, if one expects that, during the boycott, the equilibrium  $(\phi_1, \rho) = (\infty, 0)$  will be played, where Firm gives in immediately, then Activist may start a boycott even if  $F > 0$ . It is then a unique equilibrium in the pre-boycott phase, with the rates  $\alpha = \frac{c}{H}$ ,  $\phi_0 = \frac{b-rF}{F}$ . Consequently, if  $F > 0$  and there is no public regulator, then a boycott is possible only if it is expected to succeed immediately.

<sup>8</sup>This assumption can be relaxed without affecting the major results, but the analysis would be less transparent.

is clumsy, so self-regulation is preferable.<sup>9</sup> We simplify by assuming that Regulator does not experience any direct benefit or cost from the boycott: the flow payoff during boycotts is just 0.<sup>10</sup> The following table extends the previous one for the case with Regulator:

Payoffs	Status quo	Self-regulation	Boycott	At start	At end	Regulation
Activist	0	$b$	$-v$	$-F$	0	$b$
Firm	0	$-c$	$-y$	$-H$	$\delta H$	$-(c+k)$
<b>Regulator</b>	0	$s$	0	0	0	$s-q$

This section solves the game by backward induction. We thus start with the post-boycott game, in which Regulator and Firm are the only players left in the game.

### 3.2 After the Boycott: Regulation vs. Self-Regulation

As long as neither regulation nor self-regulation have taken place, the game is practically a stopping game. Firm can stop the game by self-regulating and ensure the payoff  $-c/r$  (Regulator would then get  $s/r$ ), while Regulator can stop the game by directly regulating the firm, giving Firm payoff  $-(c+k)/r$  and Regulator  $(s-q)/r$ . An MPE is characterized by two Poisson rates:  $\phi_2$ , the rate of self-regulation by Firm in phase 2, and  $\gamma_2$ , the rate of direct regulation by Regulator in phase 2. The equilibrium turns out to be unique.

**Lemma 3** *There is a unique equilibrium when only Firm and Regulator can act, and the equilibrium is in mixed strategies:*

$$\begin{aligned}\phi_2 &= r \frac{s-q}{q} \in (0, \infty), \\ \gamma_2 &= r \frac{c}{k} \in (0, \infty).\end{aligned}$$

**Proof.** Firm is willing to self-regulate if and only if the flow cost of self-regulation is smaller than the expected flow cost when risking direct regulation:

$$c \leq \frac{\gamma_2(c+k)}{\gamma_2+r} \Rightarrow \gamma_2 \geq r \frac{c}{k}.$$

<sup>9</sup>A special case is  $s = b - c$  and  $q = k$ .

<sup>10</sup>This assumption is approximately correct if the benefits of regulation and self-regulation are much larger than Regulator's costs of a boycott. Note that Firm's lost market share may benefit its competitors, and Activist's forgone consumer surplus may benefit other consumers. So, to Regulator, the costs and benefits of a boycott may cancel, approximately. In any case, relaxing this assumption makes the algebra more complicated without generating much additional insight.

Regulator is willing to regulate directly if and only if its expected flow payoff is then larger than waiting for self-regulation:

$$s - q \geq \frac{\phi_2 s}{r + \phi_2} \Rightarrow \phi_2 \leq r \frac{s - q}{q}, \quad (3)$$

The two best-response curves cross only once, as described by the lemma. ■

Note that both players would actually prefer self-regulation to direct regulation when  $k$  and  $q$  are positive. Despite this agreement, it cannot be an equilibrium that the firm self-regulates with probability one: if Firm were expected to always self-regulate, then Regulator would simply wait; but given that there would be no threat from direct regulation, Firm would prefer to deviate and not self-regulate.

**Proposition 5 (*Self-regulation vs. direct regulation*)** (i) *Firm self-regulates if direct regulation is a credible threat, i.e., if Regulator's benefit from regulation is large relative to her administrative cost ( $s/q$  large).* (ii) *Regulator regulates if Firm is unwilling to self-regulate, i.e., if Firm's cost is large relative to its cost of direct regulation ( $c/k$  large).*

The comparative static is interesting. For example, if  $q$  decreases, the cost for Regulator to regulate Firm directly is smaller. Then, all things equal, Regulator would prefer immediate regulation. The best response for Firm would then be to self-regulate immediately, which in turn makes Regulator better off waiting. In equilibrium, therefore, Firm must self-regulate at a somewhat higher rate, such that Regulator is still indifferent. In other words,  $\phi_2$  must be a decreasing function of  $q$ . As Regulator becomes more efficient, its intervention is less likely to be required, as Firm will be more likely to self-regulate quickly. Similarly: a larger  $s$  makes Regulator more tempted to regulate unless, as will happen in equilibrium, Firm self-regulates at a higher rate.

We can easily derive the expected lag before some kind of regulation is introduced.

**Proposition 6 (*Delay*)** *The expected delay before regulation is introduced is smaller if regulation is beneficial to Regulator, costly to Firm, and if direct regulation has low costs:*

$$\mathbf{E}(\text{delay}) = \frac{1}{\phi_2 + \gamma_2} = \frac{1/r}{c/k + s/q - 1} \in (0, \infty).$$

In other words, the more costly is the red tape, the longer we should expect to wait before some kind of regulation is introduced. First, Regulator's reluctance to pay the administrative cost is taken advantage of by Firm, who becomes less likely to self-regulate at any point in time. Second, Firm becomes more eager to preempt direct regulation when  $k$  is large, and Regulator can thus regulate with a smaller probability while still ensuring that Firm is willing to act.

It is also straightforward to derive the most likely type of regulation, once the game has stopped.

**Proposition 7 (Regulatory Outcome)** *The probability for regulation to be imposed by Regulator rather than Firm is large if direct regulation is costly to Regulator, relative to her benefit of regulation, but inexpensive to Firm, relative to its cost of regulation:*

$$\Pr(\text{regulation}) = \frac{\gamma_2}{\phi_2 + \gamma_2} = \frac{1}{1 + (s/q - 1)k/c} \in (0, \infty).$$

The result might at first surprise: the more costly administration is to Regulator, the more likely it is that Regulator will have to eventually administer the regulation. The intuition is that Firm takes advantage of Regulator's cost by self-regulating at a lower rate.

The equilibrium payoffs of phase 2 are the following. Firm gets  $-c/r$  since it must be indifferent when considering self-regulation. Regulator must receive  $-(s - q)/r$ , since direct regulation is a best response for her. Activist's payoff is given by the following:

$$u_{A,2} = b \frac{\phi_2 + \gamma_2}{r(\phi_2 + \gamma_2 + r)} = \frac{b}{r} \left( 1 - \frac{1}{s/q + c/k} \right); \quad (4)$$

which is smaller if the expected delay before regulation is introduced is large.

### 3.3 The Boycott and its Three Outcomes

During the boycott, each of the three players can decide whether to end the game. While self-regulation or direct regulation will prevent any further action, if Activist "ends" the game by stopping the boycott, then the boycott game ends but the post-boycott game starts. Thus, the lessons from the previous subsection are anticipated during the boycott.

We will here focus on the interior equilibria where each player acts with some chance.

**Lemma 4** *There is a unique interior equilibrium during the boycott. The rate of self-regulation is the same as after the boycott, while the rate of direct regulation is larger during the boycott than after:*

$$\begin{aligned} \phi_1 &= \phi_2 = r \frac{s - q}{q} \in (0, \infty), \\ \gamma_1 &= r \left( \frac{c}{k} + \frac{s}{q} \right) \frac{v}{b} + r \frac{c}{k} > \gamma_2, \\ \rho &= \frac{yb + v(c + sk/q)}{\delta H b} \in (0, \infty). \end{aligned}$$

Interestingly, the rate of self-regulation is the same as in the post-boycott game. In both cases, the rate of self-regulation must be exactly so large that Regulator is just indifferent when

considering to administer regulation.<sup>11</sup> However, for Activist to be willing to continue the costly boycott, regulation must occur at a faster rate during the boycott than after. Consequently, Regulator must step in and regulate at a faster rate during the boycott, than after, particularly if the boycott is very costly to Activist.

**Proposition 8 (*Regulator and boycotts*)** *Regulator acts at a higher rate during than after the boycott ( $\gamma_1 > \gamma_2$ ). This motivates Activist to continue rather than end the boycott.*

While the lemma above describes the Poisson rates for any type of action, it may be even more interesting to consider the boycott's expected length and whether it is likely to succeed.

**Proposition 9 (*Expected duration*)**. *The expected length of the boycott is large if regulation is beneficial to Activist ( $b$  large), inexpensive to Firm ( $c$  small), and if the boycott itself is inexpensive to both Activist and Firm ( $v$  and  $y$  small):*

$$\frac{1}{\phi_1 + \gamma_1 + \rho} = \frac{1/r}{\left(\frac{s}{q} + \frac{c}{k}\right) \left(1 + \frac{v}{b} \left(1 + \frac{k}{r\delta H}\right)\right) + \frac{y}{r\delta H} - 1}.$$

The costlier the boycott, the sooner it ends. Intuitively, if Firm finds the boycott costly, then it is willing to delay self-regulation only if it expects the boycott to end relatively soon. If regulation is very beneficial to Activist, then he is willing to end the boycott only if the regulation is less likely to be introduced. Since the rate of self-regulation is unchanged in  $b$ , it must be the case that Regulator ends the game later if  $b$  is large and, therefore, the more long-lasting is the boycott expected to be.

**Proposition 10 (*Probability of success*)**. *The probability that the boycott succeeds (i.e., ends in regulation by Firm or Regulator) is larger if direct regulation is efficient ( $k$  and  $q$  small), regulation is expensive to Firm ( $c$  large), and beneficial to Regulator ( $s$  large):*

$$\frac{\phi_1 + \gamma_1}{\phi_1 + \gamma_1 + \rho} = \frac{r\delta H}{r\delta H + \frac{y+k(c/k+s/q)v/b}{(c/k+s/q)(1+v/b)-1}}.$$

Intuitively, if direct regulation is costly, then Activist faces a small continuation payoff by ending the boycott. He is then less willing to concede, unless the boycott is, in any case, unlikely to succeed. If  $s$  and  $c$  are small, Activist continuation value by ending the boycott is small, and Activist is willing to end the boycott only if, in any case, the boycott is unlikely to succeed.

The equilibrium payoffs in this subgame are the following. Firm must receive  $-c/r$  since it must be indifferent when considering self-regulation. Regulator must receive  $(s - q)/r$ , since direct regulation is a best response for her. The payoff to Activist is given by (4), since a best response is to end the boycott and then enter the post-boycott game.

<sup>11</sup>The reason for this identity is that, by assumption, Regulator values regulation and self-regulation by the same amounts whether or not there is a boycott.

### 3.4 Waiting for Boycott, Regulation, or Self-Regulation

Before the boycott has started, Firm can decide to self-regulate and thus preclude any further action. Similarly, Regulator can decide to regulate and, in this way, end the game. If Activist decides to start the boycott, we end the pre-boycott game but enter the boycott, described in the previous subsection. As before, we will focus on the interior equilibrium where all players act with some chance. This requires  $F \geq 0$  (explained below).

**Lemma 5** *Suppose  $F \geq 0$ . There is a unique interior equilibrium in the pre-boycott game. The rate of self-regulation is the same as during and after the boycott; the rate of direct regulation is lower before the boycott than it is during or after the boycott:*

$$\begin{aligned}\phi_0 &= \phi_1 = \phi_2 = r \frac{s-q}{q} \in (0, \infty), \\ \gamma_0 &= r \frac{bc - Fr(c + sk/q) s/q}{bk + Fr(c + sk/q)} \in (0, \infty) \text{ if } c > \frac{k(s/q)^2}{b/Fr - s/q}, \\ \gamma_0 &< \gamma_2 < \gamma_1, \\ \alpha &= r \frac{F}{Hb} \frac{(c + sk/q)^2}{(c + sk/q) rF/b + k} \in (0, \infty).\end{aligned}$$

Just as before, the rate of self-regulation is such that Regulator is just indifferent when considering direct regulation. Activist is willing to start a costly boycott only if this increases the chance for some kind of regulation, even if he decides to end the boycott immediately. Consequently, Regulator must impose regulation with a smaller chance before the boycott has started than after it has ended if  $F > 0$ . Activist is thus willing to initiate a boycott because direct regulation will then become more likely, not because Firm will self-regulate with a larger chance.

**Proposition 11 (*Reason to start a boycott*)** *Activist starts a costly boycott because Regulator acts at a higher rate during and after the boycott, than before it.*

The lemma, describing the equilibrium rates of actions, generates rich comparative statics. For example, if  $F$  is small, then Activist is quite tempted to initiate the boycott unless regulation is more likely to occur by waiting. Thus, an “aggressive” activist with a small cost of initiating a boycott is less likely to ever initiate a boycott. If  $b$  is large, Activist has more to gain from initiating a boycott, since regulation will thereafter be more likely. Thus, to keep him willing to wait, regulation must be more likely also before the boycott has started. For a large  $b$ , it is thus quite likely that regulation is introduced before the boycott has started.

**Proposition 12 (*Likelihood of a boycott*).** *The probability that a boycott occurs is larger if costly for Activist ( $F$  large), inexpensive for Firm ( $H$  small), and if regulation is not very beneficial for Activist ( $b$  small):*

$$\frac{\alpha}{\phi_0 + \gamma_0 + \alpha} = \frac{1}{1 + \frac{(c/k+s/q)(1-rF/b)-1}{(c/k+s/q)^2 F/Hb}}$$

Parameter  $F \leq 0$  deserves some further discussion. If  $F \searrow 0$ , it becomes less expensive to initiate a boycott and Activist is willing to wait only if  $\gamma_0$  increases, which must thus be the case, in equilibrium. For a larger  $\gamma_0$ , Firm becomes more eager to self-regulate unless the boycott is less likely to start. Thus,  $\alpha$  must increase in  $F$ , to keep Firm indifferent. This intuition can explain why, when  $F \searrow 0$ ,  $\gamma_0 \searrow \gamma_2$  and  $\alpha \searrow 0$ . If  $F < 0$ , Activist is willing to wait with the boycott only if  $\phi_0 + \gamma_0 > \phi_2 + \gamma_2$ , which can only hold if  $\gamma_0 = 0$ , implying that the equilibrium is not strictly “interior”.<sup>12</sup> In this case, the pre-boycott game between Firm and Activist is similar to that in the previous section.<sup>13</sup>

The equilibrium payoffs at the very start of the game are the following. Firm must get  $-c/r$  since it must be indifferent when considering self-regulation. The payoff to Activist is given by (4), minus the cost of starting the boycott, since a best response is to start the boycott today and end it, at the same time. If  $F > 0$ , then Regulator must receive  $-(s - q)/r$ , since direct regulation is a best response for the regulator.

## 4 Extensions

The model can easily allow for multiple firms as well as activist groups. With multiple firms, one can imagine that the activists play the above game with each of them independently. With multiple activist groups, it is reasonable that each of them hopes another activist group will instead pay the cost of organizing the boycott. This incentive to free-ride implies that each activist group may be unwilling to start the boycott unless, as will happen in equilibrium, the rate of regulation is smaller. We will postpone the analysis of these cases, however, and instead discuss how the model can allow for multiple boycotts by the same activist group directed at the same firm.

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<sup>12</sup>The explanation for this is the following Suppose  $\phi_0 + \gamma_0 > \phi_2 + \gamma_2$ , implying either  $\gamma_0 > \gamma_2$  or  $\phi_0 > \phi_2$ . In the first case, Firm would strictly prefer to self-regulate, implying that Regulator would prefer to not regulate, a contradiction. So,  $\phi_0 > \phi_2$ , but then we know (from the definition of  $\phi_2$ ) that Regulator strictly prefers to wait, so  $\gamma_0 = 0$ .

<sup>13</sup>This may be approximately correct if Firm’s lost market share is benefitting its competitors, and if Activist’s forgone consumer surplus is benefitting other consumers. Relaxing this assumption makes the algebra more complicated without generating much additional insight.

## 4.1 Multiple Boycotts

When introducing the model in Section 2, we assumed that a boycott could only take place once, and that it would never be re-started if it had earlier been stopped. The assumption is quite weak: Given the rates of public regulation, described above, Activist would never desire to start another boycott, once ended. This follows since the level of public regulation is larger after the boycott, than before. In effect, by starting and ending a boycott, Activist is able to switch from an equilibrium with little public regulation to an equilibrium with more public regulation. By assuming that the boycott cannot be restarted, the equilibria in the two regimes are Markov perfect.

If a boycott can be re-started, however, then insisting on Markov perfectness imply that the equilibrium rates of actions must be the same before and after the boycott, since the two sub-games are equivalent (the rates can be different *during* the boycott). With this requirement, Activist would never even start a boycott when  $F > 0$  if a best response is to immediately end the boycott: This would be costly, and nothing would have been achieved. If  $F < 0$ , Activist would prefer to continuously start and end boycotts. Thus, in the above model, we will see reasonable periods with and without multiple boycotts only if  $F = 0$ . This is henceforth assumed.

Let phase 0 refer to the situation without a boycott, while phase 1 refers to a situation with a boycott currently in place. There are multiple Markov-perfect equilibria since what matters for Activist is the rate of actions during boycotts *relative* to other times: For example, if  $\gamma_0$  is large, Activist is still willing to continue the boycott if  $\gamma_1$  is accordingly high, and Firm is still indifferent when considering to self regulate if the boycott is less likely to start and more likely to end.

**Lemma 6** *Suppose  $F = 0$ . There are multiple interior equilibria, but each of them must satisfy  $\gamma_0 < rc/k$  and:*

$$\begin{aligned}\gamma_1 &= \gamma_0 \left(1 + \frac{v}{b}\right) + r \frac{vs}{bq} > \gamma_0, \\ \phi_0 &= \phi_1 = r \frac{s - q}{q}, \\ \alpha &= \frac{cr - \gamma_0 k}{Hr}, \\ \rho &= \frac{yb + \gamma_0 kv/r + ksv/q}{H\delta b} - \frac{1}{\delta} \left( \frac{cr - \gamma_0 k}{Hr} \right).\end{aligned}$$

This result implies the following comparative statics.

**Proposition 13** *Activist may switch between boycotts, generating more regulation, and no boycotts, where the rate of regulation is lower. The boycotts are less frequent and shorter if the rates of regulation is high.*

Just as before, the rate of self-regulation is constant over time (and across all equilibria). Furthermore, the rate of public regulation must be larger during a boycott than at other times, particularly if a boycott is costly to Activist relative to his potential gain (i.e., if  $v/b$  is large). As above, boycotts and public regulation are strategic substitutes: If  $\gamma_0$  increases (then  $\gamma_1$  increases, as well), the boycott starts at a lower rate, and it ends at a higher rate. Boycotts are thus more rare and shorter-lasting when  $\gamma_0$  is large.

## 5 Conclusion

A firm's practices often create externalities for individuals or organizations. To adjust these practices, the government might regulate the firm, but increasingly often firms decide to self-regulate, perhaps to preempt regulation or activism. This paper provides a framework for studying regulation, self-regulation, and activism within a unified framework, and it thus bridges the literatures on private and public politics.

Our first contribution is to model boycotts as a war of attrition: The firm hopes that the activists give in by ending the boycott, while the activists hope the firm gives in by self-regulating. The two types of private politics are strategic complements: The firm self-regulates to preempt or end a boycott, while the boycott is started, or continues, because the firm is more likely to self-regulate during a boycott than at other times. The possibility to self-regulation is good for the activist, but bad for the firm.

When a regulatory agency is present, these results are reversed: The possibility to self-regulate is then good for the firm, since the regulator is then waiting, hoping that the firm will self-regulate. This is bad for the activist, which would prefer immediate regulation, as would have occurred if self-regulation were not possible. With a regulator, self-regulation is actually not more likely during boycotts than at other times. However, governmental regulation is more likely during boycotts, and this motivates the activists to start and continue boycotts. On the one hand, the existence of private politics (i.e., the possibility to boycott or to self-regulate) tends to decrease the likelihood for public regulation. On the other, the existence of a regulator motivates self-regulation, but it also makes a boycott less likely to occur and they tend to last shorter.

Our analytical results allow us to characterize the length and likelihood of boycotts, and their likelihood of succeeding. This generates a rich set of testable comparative statics. For example, a lengthy boycott is more likely to take place if self-regulation is costly to the firm, because, without a credible threat of boycott, such firm would never self-regulate. In fact, the boycott is more likely to succeed if the cost of self-regulation is large. Furthermore, a more effective regulator tends to make the boycotts short and successful. The boycott is more likely to start, in the first place, if the activists' benefit of regulation is relatively low, and its cost of initiating the boycott is large.

The rich set of results arise even if our model is quite simple: We permit only one firm, only one activist group, we abstract from lobbying, elections, as well as negotiations between any of the parties. By relaxing these assumptions, future research is bound to clarify the generality or limits of our benchmark results.

## Appendix: Proofs

**Proof of Proposition 2.** The boycott lasts longer than  $t$  if and only if neither Activist nor Firm act before that, i.e., with probability  $e^{-\rho t} e^{-\phi_1 t}$ . The duration of the boycott is thus distributed exponentially with density  $(\rho + \phi_1) e^{-(\rho + \phi_1)t}$ . The expected duration is thus  $\frac{1}{\rho + \phi_1}$ , and the remainder of the proof follows from Lemma 1. ■

**Proof of Proposition 3.** The probability that Firm acts earlier than Activist is

$$\int_0^\infty (\phi_1 e^{-\phi_1 t}) e^{-\rho t} dt = \frac{\phi_1}{\phi_1 + \rho}.$$

The rest follows from Lemma 1. ■

**Proof of Lemma 4.** Note that Regulator is willing to regulate if and only if (3) holds, just as before. Activist is willing to end the boycott if the payoff in the post-boycott game (4) is larger than what Activist can expect by waiting:

$$\begin{aligned} \frac{b}{r} \left( 1 - \frac{kq}{ks + cq} \right) &\geq -\frac{v}{r} + (b + v) \frac{\phi_1 + \gamma_1}{r(\phi_1 + \gamma_1 + r)} \Rightarrow \\ -b \left( \frac{kq}{ks + cq} \right) (\phi_1 + \gamma_1 + r) + br &\geq -rv \Rightarrow \\ R_1 \equiv \phi_1 + \gamma_1 &\leq \frac{(ks + cq - kq)br + vr(ks + cq)}{bkq} \\ &= \frac{(ks + cq)(b + v)}{bkq} r - r. \end{aligned}$$

Finally, Firm is willing to end the boycott if and only if:

$$c \leq \frac{ry + \rho(c - \delta Hr) + \gamma_1(c + k)}{\rho + \gamma_1 + r}$$

In the interior equilibrium, all inequalities must bind. Substituting for  $\gamma_1 = R_1 - \phi_1$  and solving the previous equation for  $\rho$  completes the proof. ■

**Proof of Lemma 5.** Just as before, Regulator is willing to regulate if and only if (3) holds. Activist is willing to initiate the boycott if and only if the payoff in the boycott-game, less the cost of initiating the boycott, is larger than the payoff of waiting:

$$\frac{b}{r} \left( 1 - \frac{kq}{ks + cq} \right) - F \geq \frac{bR_0}{r(r + R_0)},$$

where  $R_0 \equiv \phi_0 + \gamma_0$ . Firm is willing to self-regulate if the cost of doing so is smaller than the cost of risking regulation or a boycott:

$$c \leq \frac{\alpha(c + rH) + \gamma_0(c + k)}{\alpha + \gamma_0 + r}.$$

In the interior solution, all inequalities must bind. Solving the last equation for  $\alpha$  after substituting for  $\gamma_0 = R_0 - \phi_0$  completes the proof. ■

**Proof of Lemma 6.** An interior solution requires that (i) Regulator is indifferent when considering to regulate the firm, (ii) Firm is indifferent when considering self-regulation during as well as (iii) before/after a boycott, (iv) Activist is indifferent when considering to be in a boycott or not. Requirements (i)-(iv) lead to the following equations:

$$\begin{aligned} \phi_0 &= \phi_1 = r \frac{s - q}{q}, \\ c &= \frac{ry + \rho(c - \delta Hr) + \gamma_1(c + k)}{\rho + \gamma_1 + r}, \\ c &= \frac{\alpha(c + Hr) + \gamma_0(c + k)}{\alpha + \gamma_0 + r}, \\ \frac{(\phi_0 + \gamma_0)b}{\phi_0 + \gamma_0 + r} &= \frac{(\phi_1 + \gamma_1)b - rv}{\phi_1 + \gamma_1 + r}. \end{aligned}$$

It is straightforward to rearrange these equations to complete the proof. ■

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