Activism versus Captured Regulators*

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Abstract

We introduce an activist agent into a model of public regulation with a pro-industry-biased regulatory agency. Private politics by activists and public regulation are the two basic ways by which modern market economies influence externality-generating industrial decisions. In the light of recent regulatory failures in the financial and energy sectors, the issue of regulatory capture is receiving renewed attention. We extend the conventional setup of the "new economics of regulation" to consider cases of pro-industry regulatory bias. In such context, we find that a benevolent legislature may want to legally protect the actions of activists; the result applies even if activists are less informed than supervising agencies, thus taking actions that are socially inappropriate, and even if their interventions generate non-negligible dead-weight costs. Indeed, activism turns out to be a regulator-disciplining device that reduces the social cost of regulation.

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1. Introduction

Modern market economies influence externality-generating industrial decisions in two basic ways. The first one is to implement and enforce coercive regulations: it is a prerogative of public agencies. The other one consists in strategic actions on the part of private activist parties. While both types of interventions may prevent socially detrimental decisions, they both have their respective limitations, which are not independent of each other.

This paper takes a normative regulatory perspective to address the question of the optimal intervention structure. Public regulation is a task in itself, which is delegated by the legislature to expert supervisors. The dichotomic nature of public regulation should be examined through the lens of principal-agent models: in general, the optimal regulatory mechanism is distortionary. In particular, regulators may be swayed by the special interests of the industries they supervise (Laffont and Tirole, 1993, Chapter 11). The notion of regulatory capture can be traced back to Marx. It was considerably consolidated a few decades ago, mainly by the so-called Chicago (e.g. Stigler, 1971, among others) and Virginia (see Buchanan et al., 1980) schools of thoughts. In the light of recent regulatory failures to impose adequate standards in the financial and energy sectors among others, the idea is receiving renewed attention, less thought by economists[1] than by other social scientists or policy makers.[2]

When regulators are captured by the industries they supervise, they make (or do not make) decisions at the expense of other stakeholders. More often than not, activists represent those non-industry stakeholders who bear the cost of status-quo. Unlike regulators, they cannot rely on the public order to take part in the mitigation of social conflicts. Now more than ever, activists do "private politics" (Baron, 2001 and 2003): they use their nuisance potential to directly induce firms to act on a voluntary basis (Baron and Diermeier, 2007, and Egorov and Harstad, 2012). The most noticeable manifestations of private politics go

[1] But see Acemoglu and Johnson (2012).

[2] See International Centre for Financial Regulation (2012) for a series of reflections, especially from a policy-making perspective, on the topic of capture in the regulation of the financial sector.

through a process of threats of punishments, as for instance to file a lawsuit, to call for a boycott or to deteriorate firms' reputation. As pointed out by Baron, the currently most important facet of private politics is the unobservable pro-active measures adopted by firms in anticipation of such process.[3]

Activists do not directly lobby regulators. In Laffont and Tirole's (1993, Chapter 11) canonical regulatory setup with multiple interest groups, a firm and an activist compete for their exclusive influence on the regulator. As a matter of fact, any attempt of lobbying by activists, Paul Guilding (former head of Greenpeace) says, is now "easily counter-lobbied by corporations". Hence, activists have given up spending resources for direct lobbying.[4] Instead, they spend resources to persuade the public. Indeed, public mobilization is essential to the credibility of activists' threats. Public persuasion might well affect regulation indirectly, via the pressure it puts on the legislature. Yet, such indirect effect would only arise to the extent that regulators are under the control of the legislature.

In that context, the capture of regulators by the industry may be unavoidable.[5] A meaningful way to represent effective regulatory capture is to assume regulators' objectives to be biased in favor of the industry they supervise. As in Laffont and Tirole (1993), the "new economics of regulation" adheres to the dichotomic view of regulatory bodies: a supervisory agency is delegated the regulatory task by Congress; Congress has limited resources for monitoring the agency; when the latter pursues another objective than the former, they are not at one with each other. Baron and Myerson (1982) and Baron and Besanko (1984) take

[3]The war-of-attrition mixed-strategy equilibrium of Egorov and Harstad (2012) elegantly describes the joint process by which firms pro-actively change their practices in anticipation of activists' boycotts and by which activists start and stop boycotts so as to induce firms to do so. Egorov and Harstad's paper can be seen as the positive, dynamic counterpart of our normative study. They examine the interplay between activism-induced regulation and public regulation of a particular activity, taking the regulation structure as given.

[4]See Kollman (1998) for empirical evidence. Besides financial constraints, Yu (2005) pointed at the activists' comparative advantage in public persuasion. Chiroleu-Assouline and Lyon (2011) also remarked the role of activists' ideology; "radical" groups may not be credible lobbyists.

[5]In Laffont-Tirole setting where only the firm's type is privately observed, the optimal regulation mechanism is collusion free. This should not hide that more generally, "Equilibrium collusion may be unavoidable in situations in which Congress has incomplete information about the agency's cost of colluding." (1993, Page 486, Footnote 20).

the view that supervisors are pro-consumer, rather than pro-industry, in the sense that they give more weight to consumer surplus than the benevolent Congress does.[6] In their recent work on how much discretion should be left to regulators, Hiriart and Martimort (2012) assume that both Congress and its supervisory agency are biased in favor of consumers while the latter is less so compared with the former. In this paper, we go further than Hiriart and Martimort (2012): we extend the conventional setup of the new economics of regulation to the case of absolute pro-industry supervisors.

Hiriart and Martimort also took into account that delegation is never complete (Epstein and O'Halloran, 1999, Page 74). As a matter of fact, legislatures – more generally societies as a whole – partly compensate their lack of control on agencies with systems of rewards and punishments to curb the incentives of the latter (McCubbins, Noll and Weingast, 1987 and 1989). Firms not only obey regulatory orders from the agency, but also respond to other policy-induced incentives. Such incentives proceed from public resources that are socially costly. We find that the optimal regulatory distortion does not simply arise because of the social cost of public policies or of the pro-industry bias of the regulator, but as a result of their combination.

This paper assumes that externality-generating activities are supervised by a pro-industry-biased public agency and asks the following question. From the viewpoint of a benevolent legislature, is it desirable to allow and to encourage actions by private activists? To answer this question, we take into account the limitations of private politics as a means to resolve inefficient situations.[7]

Activists mainly target firms directly, on the part of stakeholders who bear some external costs of firms' projects, with the view to mitigating those costs. Thus private politics has an

[6] Heyes and Maxwell (2004) followed Lewis' (1996) representation where public environmental regulation is sensitive to the industry's efforts to resist regulation. Unlike Baron and Myerson (1982), they assume that industry resistance endogenously depends of the industry's stake.

[7] In general, how activism affects equilibrium welfare obviously depends on the costs associated with activism. See Heyes and Kapur (2012) for a related example where firms' behavior simultaneously depends on taxation and on stakeholders' hostility.

evident Coasian bargaining dimension.[8] As such, its potential to improve Pareto-inefficient situations depends on transaction costs: were transaction costs associated with private politics too high, this potential would not be realized. The vast positive literature on boycotts has recently paid a considerable amount of attention to such side costs of activism: instances include the cost of mobilizing the public (Kollman, 1998); that of coordinating individual participants (Baron, 2003); the effort made by all individual participants (John and Klein, 2003); the cost of acquiring information on targeted firms (Baron, 2003)...

Coasian bargaining processes have another limitation. Their appeal relies on the assumption that involved agents are conventional rational maximizers, whether of their own surplus or of other stakeholders. For ideological, behavioral or reputational motives, activist groups are committed to reject any compromise (Baron, 2003).[9] Activists are not like conventional economic agents. Beyond some tolerance threshold, they feel entrusted with the mission of inducing their preferred outcome. No finite monetary transfer exists that may compensate them for resigning. In other words, their preferences are of a lexicographic type.[10] Baron's remark has an important implication for our purpose: unlike economic agents in the realm of traditional mechanism design, there is no way to contract upon the behavior of activists.

Finally, asymmetries of information are central to the analyses of both public regulation and private politics, in very different fashions though. In Congress-agency regulatory frameworks, Congress ex ante sets down the law and commits to it, under a veil of ignorance about future projects. In contrast, the agency which is delegated the supervision of contemporary projects is endowed with expertise, resources and legal prerogative to evaluate them. Actvists can also rely on some expertise for that, but have no such favorable access

[8]Externalities arise because of ill-defined property rights; private politics may be interpreted as the private protection of the property rights (Dixit, 2004, Chapter 15) which, if enforced, would restore efficiency.

[9]As Baron put it, it may be "that the players are ideologues or behavioral types that simply refuse to change their positions. A theory of private politics should allow for the possibility that the activists (...) may be intransigent behavioral or reputational types." (2003, Page 39).

[10]Samuelson and Swinkels (2003) pointed out that lexicographic preferences arise as a limiting case for more conventional preferences that exhibit continuous trade-offs across various objectives, with some objectives much more important than others. In our context, lexicographic preferences clearly provide the most meaningful formal representation. The view offered by Samuelson and Swinkels further enhances the relevance of lexicographic preferences as a modeling device.

to projects as regulators do. As will be further justified, regulatory agencies have better information than do activists.

The problem we address is reminiscent of Kofman and Lawarrée's (1993) famous dual-auditor optimal contracting issue. Their setup assumes that uninformed shareholders contract with an informed manager by relying on internal, well-informed and efficient auditors. They show that such shareholders can improve their surplus by further involving external, less-efficient, less-well-informed auditors. Random external audits help shareholders deter possible collusion between the manager and internal auditors. In contrast with Kofman and Lawarée's auditors, activists are insensitive to monetary transfers so that their behavior is not contractible upon: from the perspective of a mechanism designer, the difference is fundamental.

The absence of regulatory order can be interpreted as a regulatory decision in itself. Thus all examples of activism show the confrontation of private politics with public regulation. For the sake of concreteness, we shall refer all along this article to one particularly illustrative case study: the 1995 Greenpeace-Shell conflict over the dismantlement of the Brent Spar platform. In brief, the conflict arose from the regulatory decision to follow the company's best dismantlement option while activists had a diverging assessment. The approval by the UK Government Department of Trade and Industry of Shell's plan to decommission the platform has been given on the ground of Shell's own low estimate of the quantity of crude oil on the platform (50 tonnes); estimate and proposal also substantiated by several external studies by independent organizations. Incorrectly-collected samples while Greenpeace members were temporarily occupying the platform led the association to wrongly assess that there were 5,500 tonnes of oil on the spar. As a result of the dispute, Greenpeace called for the boycott of Shell's products and services, whose widespread success led the firm to voluntarily adopt the activist's preferred dismantlement project.

In this paper, the motivation for intervention is that some indivisible project to be undertaken by a single firm may have a positive social value that exceeds its private value. The

firm's decision only consists in undertaking or not the project, either following the enacted regulation if any, or following its own interest in its conflict with the activist. Section 2 sets up our regulation model where Congress can only rely on a pro-industry-biased agency. Symmetrically, Section 3 introduces activism in isolation. In either case, Congress may or not decide to encourage adoption by other costly policy means. Section 4 combines public regulation with private politics. Section 5, with some details in the Appendix, discusses various extensions as for instance to Bayesian activists.

2. A Model of Pro-Industry Regulation

Consider an indivisible project – say, dismantling an obsolete oil platform – with a non-negative gross social value $v \geq 0$. A single firm – say, the platform's holder – can implement the project, at a cost $c > 0$ but for no private benefit.[11] Absent any external intervention, the firm will never undertake the dismantlement of the platform, even when the net social value $v - c$ of the project is positive.

This section exclusively focuses on public regulatory interventions. Assume that there is a Congress that sets the law in such a way as to maximize social welfare. Were the value of the project v as well as its cost c perfectly observable, the benevolent Congress would legislate that the platform must be dismantled whenever v exceeds c.[12]

When v is not directly observable to Congress, the above rule cannot be applied. Assume now that there is a single regulatory agency which has resources and expertise to perfectly observe the project's value. Congress must delegate the regulatory task to this agency. The obtained two-tiered regulatory structure follows for instance Laffont and Tirole (1993, Chapter 11) and Hiriart and Martimort (2012). It introduces a useful distinction between the objectives of Congress and of the agency. On the one hand, the Congress is benevolent

[11] The example of the indivisible project of dismantling an oil platform is taken for the sake of concreteness. The following analysis generally applies to every indivisible unit of any divisible project that is privately undertaken and whose social value exceeds its private value.

[12] All along, we assume that the revenue generated by the firm's other activities covers the dismantlement cost c. Thus limited liability of the firm's shareholders is not violated.

so that its decisions reflect the desirability of the regulatory outcome. This fits well our normative purpose. On the other hand, the regulatory agency may be captured by the industry.

In the sequel, let π be the firm's profit and $\mathcal{U}$ be the surplus of the rest of society. Then the social-surplus objective of Congress is

$$\mathcal{W} = \mathcal{U} + \pi, \tag{1}$$

where the two surplus components are given the same weight. Like Baron and Myerson (1982), Baron and Besanko (1984) and Hiriart and Martimort (2012), we assume that the regulatory agency is biased. Specifically, its objective is

$$\mathcal{V} = \mathcal{U} + \alpha\pi. \tag{2}$$

Unlike them however, we assume that the agency's bias is in favor of the industry rather than in favor of consumers, that is

$$\alpha \geq 1. \tag{3}$$

When $\alpha = 1$, there is no conflict of interest between the Congress and the agency. In that case, it is optimal for the Congress to give full discretion to the agency in spite of the informational asymmetry. In fact, complete delegation makes the informational issue vanish since the Congress and the agency are at one with each other. Thus the model with $\alpha = 1$ becomes the archetypical one of benevolent regulation under perfect information.[13] Regulation in that context obviously implements the first-best outcome. Let's denote a compulsory dismantlement decision with the indicator variable D_c taking value 1 and the absence of such order with D_c being 0. Then, total surplus is $(v-c)D_c$, which is maximized by the first-best rule that $D_c = \mathbb{1}_{v \geq c}$.

Things are not so with $\alpha > 1$. When the Congress has to rely on a pro-industry regulator, any hope that full delegation would be optimal becomes illusory. Dismantling brings the

[13]For instance, when Baron and Myerson's (1982) single regulator gives an equal weight to consumer and to producer surpluses, their analysis reduces to Loeb and Magat's (1979) first-best-inducing regulation policy.

rest of society a surplus $\mathcal{U} = v$ and makes the firm incur the cost c: $\pi = -c$. By (2), the regulator would only order to dismantle when $v \geq \alpha c$. Total welfare in that context still writes $(v - c)D_c$, but with $D_c = \mathbb{1}_{v \geq \alpha c}$, unlike in the first-best. From the benevolent legislature's viewpoint, not enough platforms are dismantled.

As a matter of fact, legislatures compensate their lack of control on agencies; systems of rewards and punishments are implemented to curb the incentives of the latter (e.g. McCubbins et al., 1987 and 1989). It is more generally true that, by other legal, political or commercial means, the legislature or even society as a whole, may encourage potentially valuable actions such as dismantling obsolete oil platforms, even under ex ante lack of information on each specific project. We borrow Hiriart and Martimort's (2012) modeling of the rewards system by which Congress limits the agency's discretion.

When dismantling is ordered by the regulator, the law may provide for a transfer $t_c \geq 0$ to the firm. Such transfer, as a modeling device, should be interpreted in a broader fashion than a mere monetary transfer, as for instance any sort of reward, encouragement or support from society. Whatever its actual form, it must proceed from the rest of society's resources. We complete the conventional picture of the new economics of regulation (e.g. Baron and Myerson, 1982; Baron and Besanko, 1984; Hiriart and Martimort, 2012) with a unit cost of public funds $\lambda > 0$. The cost of t_c to society is $(1 + \lambda)t_c$.[14] In line with our normative approach, the amount of transfer t_c is assumed to be controlled by the benevolent Congress.

Such transfers to dismantle indirectly affects the regulator. In case of dismantlement, the firm's profit integrates the transfer t_c: it becomes $\pi = t_c - c$. The rest of society's surplus should be reduced by the transfer's cost: $\mathcal{U} = v - (1 + \lambda)t_c$. By (2), the agency's objective becomes

$$\mathcal{V} = (v - \alpha c + (\alpha - \lambda - 1)t_c)D_c. \tag{4}$$

Indeed, the regulator's biased valuation of the transfer to the firm is partly adjusted to take account of its social cost. Assuming that the agency is absolutely biased in favor of the firm

[14] Laffont and Tirole (1993, Page 477) provided a complete justification for the cost of public funds and the general inefficiencies that are associated with transfers.

further requires

$$\alpha > 1 + \lambda, \tag{5}$$

which we shall assume all along. Although the transfer t_c may be used to manipulate the biased regulator, the social cost of public funds generally renders illusionary any hope to fully restore efficiency. Congress now faces the second-best problem of making the best of a necessarily distortionary regulation.

According to (4), the regulator orders to dismantle if and only if

$$v \geq \alpha c - (\alpha - \lambda - 1)t_c \equiv \bar{v}, \tag{6}$$

that is that $D_c = \mathbb{1}_{v \geq \bar{v}}$. For any given project's value $v \geq 0$, social surplus equals $(v - c - \lambda t_c)\mathbb{1}_{v \geq \bar{v}}$.

Unlike the expert regulator, Congress is unable to observe the project value v which is drawn from a common-knowledge distribution $h(.)$ over $v \geq 0$. As is usual, we assume that $h(.)$ is log-concave (Bagnoli and Bergstrom, 2005).[15] Congress' objective thus writes $\int_0^\infty (v - c - \lambda t_c)\mathbb{1}_{v \geq \bar{v}}\, dH(v)$, or equivalently

$$\mathcal{W} = \int_{\bar{v}}^{\infty} (v - c - \lambda t_c)\, dH(v), \tag{7}$$

which is to be maximized by choice of $t_c \geq 0$, taking into account that the supervisor's threshold $\bar{v}$ negatively depends on t_c as per (6).

Intuition suggests a trade-off faced by Congress between inducing more dismantlements by lowering the regulator's intervention threshold, and the cost of supporting dismantlements to this effect. This is the message delivered by the first-order condition for an interior solution to the choice of t_c,

$$\lambda\big(1 - H(\bar{v})\big) = -\frac{d\bar{v}}{dt_c}(\bar{v} - c - \lambda t_c)h(\bar{v}). \tag{8}$$

The left-hand side is the marginal cost of transfer in case of dismantlement, i.e. when $v \geq \bar{v}$, and the right-hand side is the social surplus accruing from the marginal dismantled project.

[15] In this paper, all functions are assumed to be differentiable to the relevant order.

Taking into account the relation (6) and its consequence that $d\bar{v}/dt_c = -(\alpha - \lambda - 1)$, the first-order condition yields a characterization of the optimum level of the induced threshold $\bar{v}$ in the context of this section (denoted with the superscript R for "regulator"):

$$\bar{v}^R - \frac{\lambda}{\alpha - 1} \frac{\big(1 - H(\bar{v}^R)\big)}{h(\bar{v}^R)} = c(1 + \lambda). \tag{9}$$

The following proposition summarizes the findings of this section (its proof is in Appendix A).

Proposition 1. *When Congress can only rely on an agency with a pro-industry bias as per (5), then*

1. *encouraging dismantlements by means of a transfer $t_c^R > 0$ to the firm is socially desirable as soon as the supervisor is sufficiently biased, i.e. if $\alpha > \tilde{\alpha}$, with $\tilde{\alpha}$ characterized in (A.1); in that case, $\bar{v}^R < \alpha c$ so that Congress optimally induces more projects to be undertaken;*

2. *the transfer t_c^R should never exceed the cost c of dismantling;*

3. *the first-best regulatory outcome is never attainable by the Congress, unless the cost λ of public funds is nil.*

As previously anticipated, if Congress could rely on an unbiased agency ($\alpha = 1$), the first-best regulation would naturally arise from the full delegation of the regulatory task; that is, Congress would not need to use any support to dismantling. Thus the first-best would be restored independently of the cost of public funds.

Symmetrically, the third point of Proposition 1 tells that absent any cost of public funds (i.e. if $\lambda = 0$), the first-best threshold $\bar{v} = c$ is implemented in spite of the pro-industry bias. For that, it is sufficient for Congress to fully cover the cost of dismantling with $t_c = c$, which does not imply any social cost.

It is thus remarkable that the second-best regulatory distortion does not simply stem from the pro-industry bias of the agency or from the social cost of public funds, but only arises as a result of their combination.

The following section introduces activism. For simplicity we start with the case without regulator, so that Congress can only rely on activists' intervention.

3. Modeling Activism

This section introduces private activism in isolation. Thus there is no regulator in charge of ordering to dismantle. Congress can exclusively rely on activists' efforts for that.

Activism always raises the issue of collective actions. The intensity of activists' actions essentially depends on the number of individuals participating into the action and on the level of their personal sacrifice. Individuals' coordination and sacrifice have multiple facets, which make collective action a socially costly bargaining device. For our analysis, it is sufficient to follow Laffont and Tirole (1993, Chapter 11) by assuming a single activist entity, which should be viewed as a group of concerned and perfectly coordinated individuals. As should be clear further below, our setting still takes account of the transaction costs that are inseparable from the intensity of collective actions.

Activist groups are likely not to have as good information as do regulators. In his analysis of activist-firm conflicts, Baron (2003) pointed at the asymmetry of information between activists and the firms they target. Once it is reminded that, by law, supervisors have better control on the project than do activists, Baron's remark immediately extends from the context of activist-firm conflicts to the activist-regulator framework.[16]

Thus, unlike the regulatory agency of Section 2, the activist cannot directly observe the project's value v. The activist has rely on its own assessment. Specifically, it observes a noisy signal s of v:

$$s = v + \sigma\varepsilon, \tag{10}$$

[16]The example of Greenpeace-Shell conflict over the dismantlement of the Brent Spar is particularly illustrative as the dispute mainly arose from divergent estimates. The approval by the UK Government Department of Trade and Industry of Shell's plan to decommission the platform had been given on the ground of Shell's low estimate of the quantity of crude oil on the platform (50 tonnes); estimate and proposal also substantiated by several external studies by independent organizations. Incorrectly-collected samples while Greenpeace activists were temporarily occupying the platform led the association to wrongly assess that there were 5,500 tonnes of oil on the platform. Later independent audit concluded to a 75 to 100 tonnes oil content.

where ε is a noise drawn from the log-concave, common-knowledge distribution $F(.)$ and σ measures the precision of the signal.

Activists do not seem like conventional agents in the realm of classical economics. Their raison d'être is not to maximize an economic objective that entails trade off. For ideological, behavioral or reputational motives, activist groups are committed to reject any compromise. As Baron put it about private politics interactions, it may be "that the players are ideologues or behavioral types that simply refuse to change their positions. A theory of private politics should allow for the possibility that the activists (...) may be intransigent behavioral or reputational types." (2003, Page 39). We keep in mind Baron's (2003) remark on rigid behaviors in private politics. Accordingly, we assume that the activist's preferences are of a lexicographic, as they should be when agents feel entrusted with a mission. Specifically, we assume that the activist is *ready to make every effort* as soon as its estimate s of the project's value exceeds a given tolerance threshold $\bar{s} \geq 0$.[17]

For any given value of v, the activist thus decides to undertake an action whenever the signal s exceeds the threshold $\bar{s}$. The event occurs with the conditional probability $P(s \geq \bar{s} \mid v)$. From the definition (10), it follows that the probability of an action is given by

$$P(s \geq \bar{s} \mid v) = 1 - F\big(\frac{\bar{s} - v}{\sigma}\big), \tag{11}$$

which is increasing in the social value v and decreasing in the tolerance threshold $\bar{s}$.

No unified picture exists that exhaustively describes all the means used by activists to deteriorate firms' situations. The following representation is a simple way to encompass all of them. When an action takes place, it is meant to reverse the firm's decision not to

[17]Indeed, John and Klein (2003) underlined the paradoxical nature of the observed sacrifice of some small individuals for the sake of collective interest. They argue that such puzzles can only be resolved by departing from regular economic modeling. Moreover, Baron and Diermeier (2007) argued (Page 611) and Lenox and Eesley (2009) showed that activists select targeted projects on the basis of how much is at stake. Beyond a project's social value, a multitude of other relevant aspects of activists' selection has also been identified, which have to do with characteristics of firms. They may account for why the tolerance level $\bar{s}$ varies with the type of firms, of sectors, of projects. In the present paper, the activist is not concerned with these aspects as, for other purposes, our framework assumes a single firm.

dismantle. It thus takes the form of a threat posed to the firm. The activist chooses the intensity $x \geq 0$ of its action, that we measure as the dead-weight loss incurred by the firm if no dismantling was decided and the threat was carried out.

The credibility of activists' threats strongly relies on their already-initiated and observable mobilization. Regardless of whether the activist's threat has to be carried out or if the firm pro-actively decides to dismantle, collective actions entail coordination and individual costs.[18] Whether they are exclusively borne by the activist or partly by the rest of society, social costs associated with actions of conflict may depend on those actions' intensity. We assume that an intensity of activism x causes a reduction of social welfare by γx, with $\gamma > 0$.

Absent any public intervention, any action of intensity greater than the cost of dismantling surely induces the firm to grant the activist's request, and so to dismantle on a basis we shall term "voluntary" (as opposed to "compulsory" in Section 2). Such scenario will be denoted with the indicator variable D_v taking value 1, where v stands for "voluntary". Otherwise, the firm does not dismantle and $D_v = 0$. We assume that the activist chooses the minimum intensity that meets its objective: $\tilde{x} = c$.

Unlike regular economic agents in the realm of classical mechanism design,[19] activists cannot be directly influenced by monetary transfers. We have assumed that the activist has lexicographic preferences giving a very high priority to dismantlement if its tolerance threshold is exceeded. There is no finite amount of transfer that may compensate it. Hence, there is no way for Congress to directly influence activism, but maybe by supporting the voluntary dismantlements it induces. Symmetrically to Section 2, we assume that the law may provide for a possible transfer $t_v \geq 0$ to the firm when $D_v = 1$. Then, the cost to the firm of its voluntary dismantlement becomes, instead of c, $c - t_v$. Accordingly, the intensity

[18]For instance, the boycott literature (e.g. Baron, 2003, Pages 59-61) has emphasized the dynamic process through which activists and targeted firms respectively discover the required intensity to reverse firms' decisions and activists' level of intransigence. The present paper takes a long-term perspective over which these informational issues are resolved. Hence we represent the activist-firm conflict without incomplete information on the players' types so as to focus on the regulator-activist asymmetry of information regarding the projets' value.

[19]For instance, Myerson's (1982) general setting assumes that all agents are "utility maximizers", whose behavior is responsive to monetary transfers.

of activism that is sufficient to induce the firm to dismantle, instead of $\tilde{x} = c$, now negatively depends on t_v:

$$\tilde{x} = c - t_v. \tag{12}$$

Let's now turn to the optimal choice of t_v by the benevolent Congress. From an ex ante perspective, social welfare depends on the realization of v. Dismantlement may only take place if the activist induces it: $D_v = 1$ when $s \geq \bar{s}$. In such cases, the net value of the project $v - c$ is reduced by the social cost of the transfer λt_v as well as by the social cost of activism $\gamma\tilde{x}$: $\int_0^\infty (v - c - \lambda t_v - \gamma\tilde{x}) \mathbb{1}_{s \geq \bar{s}} \, dH(v)$. For any given v, $s \geq \bar{s}$ with probability (11). Moreover, the intensity of activism is given by (12). We obtain

$$\mathcal{W} = \int_0^\infty P(s \geq \bar{s} \mid v) \big(v - (1+\gamma)c - (\lambda - \gamma)t_v\big) \, dH(v). \tag{13}$$

In this expression, the negative effect of the private cost c is magnified by a coefficient γ to reflect its contribution to the intensity of activism $\tilde{x}$. Indeed, as (12) shows, the higher the cost of dismantling, the higher the minimum intensity that induces the firm to dismantle. For the symmetric reason that by (12) the transfer t_v mitigates the intensity of activism $\tilde{x}$, the negative effect λt_v of t_v is corrected by the coefficient γ.

The objective of Congress turns out to be linear in t_v. Indeed, the marginal cost of encouraging voluntary dismantlements via t_v is the difference between the unit cost of public funds λ and the unit social cost γ. If γ exceeded λ, the marginal cost of encouraging voluntary dismantlements would be negative thus rendering activism extraordinarily attractive as a regulation device. Congress would then fully rely on private politics and would set t_v so as to completely cover the cost c of dismantling. That way, $t_v = c$ would make the social cost $\gamma\tilde{x}$ of activism vanish.

For our purpose, the case where activism happens to be an extraordinarily attractive regulatory device is uninteresting. In order to rule out such situations in the rest of the paper, we make the assumption that encouraging the firm to grant the activist's request has a positive net marginal cost:

$$\gamma < \lambda. \tag{14}$$

Then, it is never desirable to encourage voluntary dismantling and $t_v^A = 0$ is optimal; superscript A stands for "activism" and refers to the context of this section. Thus, social welfare becomes

$$\mathcal{W} = \int_0^\infty P(s \geq \bar{s} \mid v)\big(v - (1+\gamma)c\big)\, dH(v). \tag{15}$$

Although actions on the part of the activist should not be supported, the introduction of private politics may positively contribute to social welfare. Suppose that activism could be forbidden by law at no cost. Whether it is desirable or not to allow activism depends on the sign of $\mathcal{W}$ as expressed in (15).

The following proposition summarizes the findings of this section.

Proposition 2. *When Congress can only rely on costly actions on the part of a non-influenceable, imperfectly-informed activist, then*

1. *encouraging the firm to voluntarily dismantle is not socially desirable when the marginal cost of activism γ is lower than the marginal cost of public funds λ; then, $t_v^A = 0$;*

2. *yet, allowing activism may improve welfare, as when $\mathcal{W}$ is positive in (15).*

The examination of (15) yields the following implications of the second point of Proposition 2 (see Appendix B). Allowing activism improves social welfare if $\imath$) the cost of private politics γ is sufficiently low, or if $\imath\imath$) the activist's tolerance threshold $\bar{s}$ is not too distant from the total cost of voluntarily dismantling $(1+\gamma)c$ while the activist is well enough informed, i.e. as σ is sufficiently low.

4. Optimal Regulation with Activism

The coexistence of private politics with public regulation raises a number of issues. One crucial aspect concerns the possibility of direct interactions between the activist and the regulatory agency. The activist is not influenceable. However, it may try to lobby the agency. As Baron put it, "The strategy of the activists to achieve changes in the firm's practices may involve government, as in the case of regulation" (Baron, 2003, Page 34).

Unlike the conventional multiple-interest-group setting of Laffont and Tirole (1993, Chapter 11), activists seem to have given up on the lobby side. Baron continued: "The choice between public and private politics is strategic, and activists may increasingly be choosing private politics", also quoting Paul Gilding (former head of Greenpeace) on that point.[20] On this ground, we assume away the possibility that the activist can, or find attractive to, lobby the regulatory agency.

Hence, interactions between the activist and the agency are indirect and arise through their respective influence on the firm. The second issue thus concerns the structure of these strategic interactions. On the one hand, regulators always have the opportunity to pro-actively make a decision. On the other hand, "The activist challenge to the firm begins with the identification of the issue." (Baron, 2003, Page 55). The regulatory agency thus is a natural Stackelberg leader.

Finally, another issue is communication between the activist and the agency. Communication is unavoidable here because any decision or absence of decision on the part of the informed regulator conveys information to the activist on the project's value. For simplicity, we will first assume this possibility away. For that, we assume in this section that the activist is myopic. As a matter of fact, information acquisition is essential to activists' long-run reputation and efficiency. Although less informed than regulators for reasons already explained, activists may combine all available sources of information. In the discussion of Section 5, with details in the Appendix, we consider the case of a Bayesian activist and draw the normative implications of this extension.

Those basic clarifications being made, much of the models' structure of Sections 2 and 3

[20] To *The New York Times* (June 2, 2001), he said:

> The smart activists are now saying, "O.K., you want to play markets–let's play." [Lobbying government] takes forever and can easily be counter-lobbied by corporations. No, no, no. They start with consumers at the pump, get them to pressure the gas stations, get the station owners to pressure the companies and the companies to pressure governments. After all, consumers do have choices where they buy their gas, and there are differences now. Shell and BP Amoco (which is also the world's biggest solar company) both withdrew from the oil industry lobby that has been dismissing climate change.

can be combined without any further modification.

Consider a given project with value $v \geq 0$. If the regulator orders the firm a compulsory dismantlement ($D_c = 1$), the activist never undertakes any action ($D_v = 0$). Otherwise, that is absent any regulatory intervention ($D_c = 0$), the probability that the activist will induce the firm to dismantle voluntarily remains (11). When activism occurs ($D_v = 1$), its intensity is still of the minimum sufficient level $\tilde{x}$ that induces the firm to dismantle. This level is given by (12).

The regulator's choice is affected by the possibility of activism. Like in Section 2, in case of compulsory dismantlement, its objective is still given by (2) with $D_c = 1$, that is that it takes the value $\mathcal{V} = v - \alpha c + (\alpha - \lambda - 1)t_c$. Otherwise, i.e. when $D_c = 0$, its objective is zero as in Section 2 only when the firm does not dismantle on a voluntary basis ($D_v = 0$). Indeed, with the positive probability (11), the firm is induced to voluntarily dismantle. This outcome ($D_v = 1$) brings the regulator a surplus $\mathcal{V} = v - (\alpha + \gamma)c + (\alpha - \lambda - 1 + \gamma)t_v$.

Appendix C shows in details how the introduction of activism affects the regulatory decisions of the agency. A standard single-crossing assumption is sufficient to characterize the intervention threshold $\bar{v}$. In a way similar to Section 2, the regulator orders the firm a compulsory dismantlement ($D_c = 1$) if and only if the observed project's value v is lower than $\bar{v}$. In the context of this section, the choice of the regulator integrates the possibility of voluntary dismantlement. Thus, unlike Section 2, the threshold $\bar{v}$ not only depends on Congress' support to compulsory dismantlements t_c but also on its support to voluntary dismantlements t_v: $\bar{v} \equiv \bar{v}(t_c, t_v)$.

The coexistence of two rewards for dismantling respectively in two distinct contexts, further raises an issue of incentive compatibility. With transfers t_c and t_v, Congress can encourage dismantlements that are compulsory in the sense that they follow the regulator's order and dismantlements that are voluntary. Unlike Section 2, it is thus possible for the firm to act on a voluntary basis so as to escape the consequence of public ordering. The firm would find attractive to do so as soon as voluntary dismantlements were more encour-

aged than compulsory ones. In such a case, the bite that encouragements t_c to compulsory dismantlements had in Section 2 would completely vanish. Without loss of generality, we assume that Congress restricts his choice to incentive-compatible schemes that satisfy

$$t_c \geq t_v. \tag{16}$$

Under the incentive-compatibility constraint (16), we find that the introduction of activism strictly lowers the intervention threshold of the regulator, i.e. for any given t_c and $t_v \leq t_c$, $\bar{v} < \bar{v}^R$. Indeed, the agency internalizes that in absence of regulation, activism may arise. Activism affects the firm negatively for two reasons. First, the firm is harmed by the intensity $\tilde{x}$ of activism directly. Second, it is less compensated than when the dismantlement is compulsory. Ordering the firm to compulsorily dismantle for a larger range of projects mitigates losses to the firm due to activism.

Let us now turn to the optimal choice of $t_c \geq 0$ and $t_v \geq 0$. When $v \geq \bar{v}$, the agency orders a dismantlement and social surplus is the same as in Section 2. When $v < \bar{v}$, there is a non-zero probability (11) of voluntary dismantlement. In such a case, social surplus is $v - c - \lambda t_v - \gamma \tilde{x}$, where $\tilde{x} = c - t_v$. Hence, social surplus in this context writes

$$\mathcal{W} = \int_{\bar{v}}^{\infty} (v - c\lambda t_c)\, dH(v) + \int_{0}^{\bar{v}} P(s \geq \bar{s} \mid v)\big(v - (1+\gamma)c - (\lambda - \gamma)t_v\big)\, dH(v) \tag{17}$$

to be maximized by Congress with respect to $t_c \geq 0$ and $t_v \geq 0$.

In that context, we find the following lemma.

Lemma 1. *If Congress can simultaneously rely on a pro-industry-biased agency and on costly actions on the part of a non-influenceable, imperfectly-informed activist, then it is never desirable to simultaneously encourage both compulsory dismantlements ordered by the agency and voluntary dismantlements induced by the activist.*

Supporting compulsory dismantlements rather than voluntary ones turns out to be more efficient for Congress. Denoting with a superscript $*$ the optimum values in the context of this section, we have

$$t_v^* = 0 \text{ and } t_c^* > 0. \tag{18}$$

Quite surprisingly, the result applies independently of the incentive-compatibility constraint (16) of the relation (14) between the cost of activism γ and that of public funds λ.

Then, social welfare becomes a function of only two control variables: the threshold $\bar{v}$ and the transfer t_c. These two variables are dependent of each other as in Section 2 as is clear from the definition of $\bar{v}$ in (C.4) taken with $t_v = 0$. Congress never finds it attractive to manipulate the regulatory threshold $\bar{v}$ by means of encouragements t_v to voluntary dismantlements. As in Section 2 where there was no activism, it only uses encouragements t_c to compulsory dismantlements. From Congress' perspective, the choice of t_c is still equivalent to the choice of $\bar{v}$ it is meant to induce. In that context, we find that social welfare may be rewritten as a function of $\bar{v}$ only in the following way, which shows its relation with its level in absence of activism as in Section 2:

$$\begin{aligned} \mathcal{W}(\bar{v}) = \mathcal{W}^R(\bar{v}) \quad &+ \quad \frac{\lambda}{\alpha - \lambda - 1}\big((\alpha+\gamma)c - \bar{v}\big)P(s \geq \bar{s} \mid \bar{v})\big(1 - H(\bar{v})\big) \\ &+ \quad \int_0^{\bar{v}} P(s \geq \bar{s} \mid v)\big((v - (1+\gamma)c\big)\, dH(v), \end{aligned} \tag{19}$$

where $\mathcal{W}^R$ is social welfare in the context of Section 2. Indeed, taking (7) of Section 2 with (6) yields $\mathcal{W}^R$ as a function of $\bar{v}$ only.

That way, the social benefit of allowing activism is clearly reflected by the last two terms on the right-hand side of (19). Whether activism improves welfare depends on whether $\mathcal{W}$ at its maximizing argument $\bar{v}^*$ is greater or not than the maximum value of $\mathcal{W}^R$ at $\bar{v}^R$.

In (19), $\mathcal{W}^R$ and the term next to it represent the surplus accruing from compulsory dismantlements. Hence, the latter term isolates out the benefit of activism via public regulatory interventions. Appendix C shows that this surplus is positive at the optimum threshold of Section 2 $\bar{v}^R$. This reflects that public regulation with a biased agency is more efficient with activism than without. As already mentioned, for a given transfer t_c, the mere presence of activism contributes to lower $\bar{v}$. As lowering $\bar{v}$ by means of encouragements to compulsory dismantlements with t_c is costly, activism can also be interpreted as reducing the social cost of relying on biased regulators.

The third term on the right-hand side of (19) turns out to be identical to the benefit of voluntary dismantling in Section 3, except that in the context of the present section, such outcomes can only occur when the regulator has not ordered anything, i.e. $v < \bar{v}$.

The following proposition summarizes the findings of this section.

Proposition 3. *When Congress can simultaneously rely on a pro-industry-biased agency and on costly actions on the part of a non-influenceable, imperfectly-informed activist, then*

1. *only compulsory dismantlements ordered by the agency should be encouraged so that* $t_v^* = 0$ *and* $t_c > 0$*;*

2. *yet, the introduction of activism contributes to discipline the regulator: everything else being equal, more compulsory dismantlements are ordered;*

3. *even if activism may lead to inappropriate voluntary dismantlements, it may still improve social welfare if the third term on the right-hand side of (19) is not too low.*

In spite of the difference between the benefit of voluntary dismantlements with public regulation (Section 3) and without it (this section), the analysis of social welfare in Section 3 resembles that of the third term of (19). It follows from the third point of Proposition 3 that allowing activism improves social welfare if *ı*) the cost of private politics γ is sufficiently low, or if *ıı*) the activist's tolerance threshold $\bar{s}$ is not too distant from the total cost of voluntarily dismantling $(1+\gamma)c$ while the activist is well enough informed, i.e. as σ in (10) is sufficiently low.

5. Discussion

The parsimonious model of Section 4 illustrates that activism may improve distortive regulatory systems, in spite of the social costs inherent in private politics. Indeed, activism disciplines biased regulators.

To induce firms to change their practices, activists can pose several sorts of threats. Our modeling aims to encompass all of them in an abstract fashion. However, one of them may

involve an additional agent. Indeed, one common way by which activists can deteriorate the firm's situation is to file a lawsuit against it and so to involve a court. On the one hand, interactions between both parties through attorneys and experts are not unlike other forms of private politics. On the other hand, judges have legal prerogatives to make parties reveal more information than they would do outside the court. The intervention of a judge, or the effective threat of such intervention, is tantamount to that of a safeguard, which limits the occurrence of inappropriate "voluntary" dismantlements.

The influence of the industry on regulatory bodies certainly results from complex collusion processes. Those processes are out of the scope of this paper. Yet, the bias of regulators in favor of the industries they supervise can be considered endogenous. Heyes and Maxwell (2004) did so using Lewis' (1996) assumption that public regulation is more successful when the industry's stake is lower.[21] In the context of their study, they pointed out that the coexistence of activism with public regulation may soften industry resistance to public regulation.

The assumption that the activist's behavior is insensitive to the regulator's decision is a simplifying assumption. Activists may not only rely on their experts and may instead combine several available sources of information. Appendix D extends Section 4 to the case of a Bayesian activist that rationally induces information from the regulator's decision. A Bayesian activist estimates the project's value not only on the ground of its private imperfect signal, but also taking into account what the regulator's decision reveals. The extension brings up a simple but important insight: the activist may only intervene when the regulator does not; the absence of regulatory order to dismantle always affects the activist's estimate downward; hence, Bayesian activists provide a less powerful disciplining device than do myopic activists.

Empirical evidence shows that activists' behavior is very rigid (e.g. Baron, 2003). Activists have been modeled accordingly. As soon as activists' preferred option is to reverse

[21] Heyes and Maxwell (2004) examined the case where a sector's practices are simultaneously affected by a world environmental organization (public regulator) that sets standards and by an environmental NGO (activist) that improves consumers' information.

the firm's decision, no finite monetary transfer exists that may compensate them for not doing so. Activists differ from conventional economic agents in the realm of coordination mechanisms (e.g. Myerson, 1982). Our assumption makes it impossible for a principal to contract with such agents as activists. Our paper calls for further investigation of mechanism design in that context. As far as activism and regulatory capture are concerned, one issue is the potential benefit from communication between Congress, informed regulators and uninformed activists. As Dequiedt and Martimort (2007) suggested, the communication structure is crucial to the design of mechanisms.

Yet for example, many NGO have been accused of corruption. The possibility that activist groups may be manipulated provides an argument for limiting their nuisance potential. For instance, in most developed countries, the legal status of calls for boycotts is ambiguous because such practices can be interpreted as a violation of anti-discrimination laws. The possible ways by which activist associations can be selected or certified deserve specific attention in future research.

When industrial decisions generate unavoidable externalities, it has been advocated that stakeholders' interests should be systematically incorporated into the objective of companies (Quinzii, Magill and Rochet, 2013). The present paper deals with situations where such institutional reforms of the existing economic system are not achievable. In that context, we show that stakeholders' interests may still be protected from industrial interests. The last decades have brought substantial technological improvements in the circulation of information. For activist groups, the cost of acquiring information has drastically fallen. It is to be hoped that in this new context societies will be able to exploit the activism resources.

APPENDICES

A Proof of Proposition 1

$\tilde{\alpha}$ is such that

$$\tilde{\alpha}c - \frac{\lambda}{\tilde{\alpha}-1}\frac{\big(1-H(\tilde{\alpha}c)\big)}{h(\tilde{\alpha}c)} = c(1+\lambda), \tag{A.1}$$

where left-hand side increasing in $\tilde{\alpha}$ and so $\tilde{\alpha} > 1+\lambda$.

B Proof of Proposition 2

$\mathcal{W} > 0$ when $\gamma = 0$; by continuity, there is $\tilde{\gamma} >$ such that $\mathcal{W} > 0$ for any $\gamma < \tilde{\gamma}$.

If σ is 0 with $\bar{s} \geq (1+\gamma)c$, the probability that an action takes place for any $v < (1+\gamma)c$ will be 0 and $\mathcal{W} > 0$.

In particular, if $\sigma > 0$ with $\bar{s} = (1+\gamma)c$, then $\mathcal{W} > 0$. This remains true as $\bar{s}$ is sufficiently close to $(1+\gamma)c$ and σ is sufficiently small. Continuity again.

To be completed. Something elegant might further be said about conditional expectation of actions' cost/benefit over $v < (1+\gamma)c$ and $v > (1+\gamma)c$.

C Proof of Proposition 3

It immediately follows from the main text of Section 4 that the objective of the agency writes

$$\mathcal{V} = \big(v - \alpha c + (\alpha - \lambda - 1)t_c\big)D_c + \big(v - (\alpha+\gamma)c + (\alpha - \lambda - 1 + \gamma)t_v\big)D_v. \tag{C.1}$$

The agency seeks to maximize this objective by choice of the decision to order dismantlement $D_c \in \{0,1\}$, taking into account that if no dismantlement takes place ($D_c = 0$), a voluntary one ($D_v = 1$) may occur with a probability given by (11).

Hence, the regulator decides to order a compulsory dismantlement if and only if

$$v - \alpha c + (\alpha - \lambda - 1)t_c \geq P(s \geq \bar{s} \mid v)\big(v - (\alpha+\gamma)c + (\alpha - \lambda - 1 + \gamma)t_v\big). \tag{C.2}$$

Given that incentive compatibility requires $t_c \geq t_v$ by (**??**), the two sides of (C.2) may cross at least once over the range of admissible projects' values $v \geq 0$. For instance, assume for simplicity that no action is ever undertaken when the project has a zero value: $P(s \geq \bar{s} \mid v) = 1 - F\big(\frac{\bar{s}-v}{\sigma}\big) = 0$ when $v = 0$; this amounts to assume that the support of the noise distribution is bounded above by $\frac{\bar{s}}{\sigma}$. Then, the two sides cross at least once.

For simplicity, let us make the assumption that the two sides cross only once, at a value we again denote $\bar{v}$; from this single-crossing assumption, it follows that the regulator chooses a compulsory dismantlement whenever

$$v \geq \bar{v}, \tag{C.3}$$

where the threshold $\bar{v}$, instead of being defined by $\bar{v} - \alpha c + (\alpha - \lambda - 1)t_c = 0$ as per (6) in Section 2, now satisfies

$$\bar{v} - \alpha c + (\alpha - \lambda - 1)t_c = P(s \geq \bar{s} \mid \bar{v})(\bar{v} - (\alpha+\gamma)c + (\alpha - \lambda - 1 + \gamma)t_v\big), \tag{C.4}$$

which is negative.

Equivalently, for a given t_c, and for any t_v satisfying the incentive compatibility condition (16), the threshold $\bar{v}$ of the supervisor is lower under the possibility that the activist reverses its decision than in Section 2.

As in Section 2, $\bar{v}$ is decreasing in t_c; here, moreover, it is increasing in t_v. Let us define $\bar{v}$ as a function $\bar{v} \equiv \bar{v}(t_c, t_v)$.

The analysis can now turn to the choice by the benevolent legislature of transfers $t_c \geq 0$ and $t_v \geq 0$ respectively provided for in case of compulsory and voluntary dismantlements. Social surplus consists of two components. Either $v \geq \bar{v}$ and the regulatory agency orders a dismantlement, in which case social surplus is $(v - c - \lambda t_c)$, or $v < \bar{v}$ and with probability $P(s \geq \bar{s} \mid v)$, the activist induces dismantlement. In the latter case, social surplus is $v - c - \lambda t_v - \gamma \tilde{x}$, where $\tilde{x} = c - t_v$. Hence, social surplus in this context writes as in (17), which is to be maximized by Congress with respect to $t_c \geq 0$ and $t_v \geq 0$.

Denoting by

$$B(\bar{v}, t_c, t_v) \equiv \big[-(\bar{v} - c - \lambda t_c) + P(s \geq \bar{s} \mid \bar{v})\big(\bar{v} - (1+\gamma)c - (\lambda - \gamma)t_v\big)\big] h(\bar{v}) \tag{C.5}$$

the gross marginal benefit of a reduction in the threshold $\bar{v}$, the first-order condition to the choice of t_c writes

$$\frac{d\bar{v}}{dt_c} B(\bar{v}, t_c, t_v) \leq \lambda\big(1 - H(\bar{v})\big), \tag{C.6}$$

satisfied with equality when the choice is an interior one with $t_c > 0$. In (C.6), the left-hand side is the gross marginal benefit of lowering $\bar{v}$ by increasing the encouragement t_c to compulsory dismantlements while the right-hand side is the positive marginal cost of doing so.

Using the same notations, the first-order condition to the choice of t_c writes

$$\frac{d\bar{v}}{dt_v} B(\bar{v}, t_c, t_v) \leq (\lambda - \gamma) \int_0^{\bar{v}} P(s \geq \bar{s} \mid v) h(v)\, dv, \tag{C.7}$$

which is satisfied with equality for any interior solution $t_v > 0$. In this expression, the left-hand side is the gross marginal benefit of increasing $\bar{v}$ by increasing the encouragement to voluntary dismantlements while the right-hand side is the net marginal cost of doing so. As in Section 3, the assumption $\lambda > \gamma$ guarantees that the net marginal cost of relying on encouragements to grant the activist's request is positive.

The intervention of the gross marginal benefit $B(\bar{v}, t_c, t_v)$ into both (C.6) and (C.7) shows that the two first-order conditions are linearly dependent. Once it is reminded that, from the agency's indifference condition (C.4), $d\bar{v}/dt_c < 0$ as in Section 2 while $d\bar{v}/dt_v > 0$, it turns out that Congress will never find it desirable to simultaneously rely on encouragements to the two sorts of dismantlements. The result is independent of (14). In optimum, either $t_c = 0$ or $t_v = 0$. In fact, integrating the regulator's indifference condition (C.4) in expression (C.5), the benefit of lowering $\bar{v}$ becomes

$$B(\bar{v}, t_c, t_v) = (\alpha - 1)\big(t_c - c - P(s \geq \bar{s} \mid \bar{v})(t_v - c)\big) h(\bar{v}). \tag{C.8}$$

The benefit of increasing $\bar{v}$ is negative when t_c is nil, excluding the possibility that a costly increase in t_v with the view to increasing $\bar{v}$ could be desirable. Hence, $t_v^* = 0$ and $t_c^* > 0$.

The other results are shown in the main text of Section 4.

The second term on the right-hand side of (19) is positive at $\bar{v}^R$ since $\bar{v}^R \leq \alpha c$.

To show that the maximum value of $\mathcal{W}$ can be greater than the maximum value of $\mathcal{W}^R$, it is sufficient to show that $\mathcal{W}$ is greater than $\mathcal{W}^R$ at the maximizing level of its argument $\bar{v}^R$. Then, the analysis of Section 3 applies to the third term on the right-hand side of (19).

D Extension to Bayesian Activism

When the activist is Bayesian, its information on projects' values is not restricted to its imperfect signal s. Hence, the condition for private actions against the firm is no longer that the signal s exceeds the exogenous threshold $\bar{s}$. Instead, the activist induces the expected value of v not only on the ground of its signal but also taking into account the decision by the supervisor not to order dismantlement. An action on the part of the activist is undertaken if and only if

$$E(v \mid s, D_C = 0) \geq \bar{s}. \tag{D.1}$$

Now $D_c = 0$ is equivalent to $v < \bar{v}$ so that $E(v \mid s, D_C = 0) = s - \sigma E\big(\varepsilon \mid \varepsilon \geq \frac{s-\bar{v}}{\sigma}\big)$. Since $E\big(\varepsilon \mid \varepsilon \geq \frac{s-\bar{v}}{\sigma}\big)$ is an increasing function of its argument $(s-\bar{v})/\sigma$ whose slope is always lower than unity[22], the decision rule (D.1) can be simply rewritten as

$$s \geq \bar{\bar{s}}(\bar{v}), \tag{D.2}$$

with $\bar{\bar{s}}$ defined by

$$\bar{\bar{s}}(\bar{v}) - \sigma E\big(\varepsilon \mid \varepsilon \geq \frac{\bar{\bar{s}}(\bar{v}) - \bar{v}}{\sigma}\big) = \bar{s}. \tag{D.3}$$

It is immediate from its definition that $\bar{\bar{s}} \geq \bar{s}$, implying that the Bayesian activist induces less voluntary dismantlements that its independent counterpart. Indeed, on the ground that no dismantlement has been ordered by the supervisor, the Bayesian activist revises its estimation of v downward.

Moreover, $\bar{\bar{s}}$ is a strictly decreasing function of $\bar{v}$ over $(0, +\infty)$ because the higher the threshold $\bar{v}$ the less informative the absence of compulsory dismantlement. Were $\bar{v}$ infinitely high, no dismantlement would not bring any further information to the activist. Then, $\bar{\bar{s}} = \bar{s}$. When $\bar{v} = 0$ and there is no dismantlement, it must be that $v = 0$. Then, there does not exist any report s so as to induce the activist to undertake an action.

Hence, the probability of voluntary dismantlement writes in a way that is similar to (11) except that the relevant threshold is now $\bar{\bar{s}}$:

$$P(s \geq \bar{\bar{s}} \mid v) = 1 - F\big(\frac{\bar{\bar{s}} - v}{\sigma}\big), \tag{D.4}$$

while the intensity of actions remains the same, given by (12).

[22] Appendix E shows that this property of conditional expectation operators is satisfied for any log-concave distribution.

The supervisor's problem is identical to that of the previous section, except that the probability of voluntary dismantlement now depends on the endogenous variable $\bar{\bar{s}}$ as per (D.4). $\bar{v}$ should be expressed as a function, not only of transfers t_c and t_v as in Section 4, but also of $\bar{\bar{s}}$:

$$\bar{v} \equiv \bar{v}(t_c, t_v, \bar{\bar{s}}), \tag{D.5}$$

which is respectively decreasing and increasing in t_c and t_v as before, while it is increasing in $\bar{\bar{s}}$. When $\bar{\bar{s}}$ is infinitely high, the probability of action by the activist becomes nil, so that $\bar{v}$ is defined as in absence activist (Section 2).

Unlike in Section 4 where the activist's tolerance threshold $\bar{s}$ is exogenously given and immediately determines the supervisor's threshold $\bar{v}$, they now arise as a fixed point and are jointly determined by (D.3) and (D.5). A simple functional analysis shows that such fixed point exists and is uniquely determined.

The rest of the analysis is similar to that of Section 4. The expression of social welfare (C.1) should only be modified to the extent that $\bar{s}$ should be replaced by $\bar{\bar{s}}(\bar{v})$. The first-order conditions to the choice by Congress of t_c and t_v are respectively identical to their expressions in Section 4 (C.6) and (C.7) once $B(\bar{v}, t_c, t_v)$ is replaced by its counterpart in this section:

$$\begin{aligned} B(\bar{v}, t_c, t_v) \;\equiv\; & \big[-(\bar{v} - c - \lambda t_c) + P(s \geq \bar{\bar{s}}(\bar{v}) \mid \bar{v}) \big(\bar{v} - (1+\gamma)c - (\lambda - \gamma)t_v\big)\big] h(\bar{v}) \\ - \;\; & \bar{\bar{s}}'(\bar{v}) \int_0^{\bar{v}} f\big(\bar{\bar{s}}(\bar{v})\big) h(v) \big(v - (1+\gamma)c - (\lambda - \gamma)t_v\big)\, dv, \end{aligned} \tag{D.6}$$

where the last term now arises because transfers t_c and t_v affect $\bar{\bar{s}}$.

Thus, it remains true that the two first-order conditions are linearly dependent, also implying that it is never desirable to simultaneously use the two types of encouragements. The incentive compatibility condition (**??**) immediately rule out cases where the encouragement to be used by Congress is that in favor of voluntary dismantlements. Hence, again, $t_v^{**} = 0$, and social surplus can be rewritten as in (19) with $\bar{\bar{s}}$ instead of $\bar{s}$. Its analysis in Section 4 applies here in a similar fashion and thus yields the same conclusion as in Proposition 3.

E Conditional Expectation's Derivative

This appendix demonstrates a property used in Appendix D that conditional expectation operators satisfy when distributions are log-concave: precisely, the conditional expectation $E(\varepsilon \mid \varepsilon \geq \bar{\varepsilon})$, that we introduce in Appendix D with $\bar{\varepsilon} = (s - \bar{v})/\sigma$ is increasing in $\bar{\varepsilon}$ with a slope lower than unity.

$E(\varepsilon \mid \varepsilon \geq \bar{\varepsilon}) = \int_{-\infty}^{+\infty} \varepsilon P(\varepsilon \mid \varepsilon \geq \bar{\varepsilon})\, d\varepsilon = \int_{-\infty}^{+\infty} \varepsilon \frac{P(\varepsilon, \varepsilon \geq \bar{\varepsilon})}{P(\varepsilon \geq \bar{\varepsilon})}\, d\varepsilon = \int_{\bar{\varepsilon}}^{+\infty} \varepsilon \frac{P(\varepsilon)}{P(\varepsilon \geq \bar{\varepsilon})}\, d\varepsilon$, where the probability $P(\varepsilon)$ that the noise takes the value ε is given by $f(\varepsilon)$ and the probability $P(\varepsilon \geq \bar{\varepsilon})$ that it takes a value greater than $\bar{\varepsilon}$ is given by $1 - F(\bar{\varepsilon})$. Thus,

$$E(\varepsilon \mid \varepsilon \geq \bar{\varepsilon}) = \frac{\int_{\bar{\varepsilon}}^{+\infty} \varepsilon f(\varepsilon)\, d\varepsilon}{1 - F(\bar{\varepsilon})}. \tag{E.1}$$

The derivative of $E(\varepsilon \mid \varepsilon \geq \bar{\varepsilon})$ with respect to $\bar{\varepsilon}$ is

$$\frac{dE(\varepsilon \mid \varepsilon \geq \bar{\varepsilon})}{d\bar{\varepsilon}} = \frac{-\bar{\varepsilon} f(\bar{\varepsilon})\big(1 - F(\bar{\varepsilon})\big) + \int_{\bar{\varepsilon}}^{+\infty} \varepsilon f(\varepsilon)\, d\varepsilon f(\bar{\varepsilon})}{\big(1 - F(\bar{\varepsilon})\big)^2}. \tag{E.2}$$

i) Since $f(\varepsilon) \geq 0$,

$$\int_{\bar{\varepsilon}}^{+\infty} \varepsilon f(\varepsilon)\, d\varepsilon \geq \bar{\varepsilon} \int_{\bar{\varepsilon}}^{+\infty} f(\varepsilon)\, d\varepsilon = \bar{\varepsilon}\big(1 - F(\bar{\varepsilon})\big);$$

substituting into (E.2) immediately implies

$$\frac{dE(\varepsilon \mid \varepsilon \geq \bar{\varepsilon})}{d\bar{\varepsilon}} \geq 0.$$

ii) Let us now show that $\frac{dE(\varepsilon|\varepsilon \geq \bar{\varepsilon})}{d\bar{\varepsilon}} \leq 1$.

Using that $-\big(1 - F(\varepsilon)\big)$ is an anti-derivative function of $f(\varepsilon)$ and integrating by parts, yield $\int_{\bar{\varepsilon}}^{+\infty} \varepsilon f(\varepsilon)\, d\varepsilon = \big[-\varepsilon\big(1 - F(\varepsilon)\big)\big]_{\bar{\varepsilon}}^{+\infty} + \int_{\bar{\varepsilon}}^{+\infty} \big(1 - F(\varepsilon)\big)\, d\varepsilon$, where the assumption that ε is bounded above implies that the first term on the right-hand side reduces to $\bar{\varepsilon}\big(1 - F(\bar{\varepsilon})\big)$. Hence, $\int_{\bar{\varepsilon}}^{+\infty} \varepsilon f(\varepsilon)\, d\varepsilon = \bar{\varepsilon}\big(1 - F(\bar{\varepsilon})\big) + \int_{\bar{\varepsilon}}^{+\infty} \big(1 - F(\varepsilon)\big)\, d\varepsilon$

Substituting into (E.2) and rearranging give the following expression.

$$\frac{dE(\varepsilon \mid \varepsilon \geq \bar{\varepsilon})}{d\bar{\varepsilon}} = \frac{\int_{\bar{\varepsilon}}^{+\infty} \big(1 - F(\varepsilon)\big)\, d\varepsilon}{1 - F(\bar{\varepsilon})} \frac{f(\bar{\varepsilon})}{\int_{\bar{\varepsilon}}^{+\infty} f(\varepsilon)\, d\varepsilon}, \tag{E.3}$$

implying that the proposition $\frac{dE(\varepsilon|\varepsilon \geq \bar{\varepsilon})}{d\bar{\varepsilon}} \leq 1$ is equivalent to the inequality

$$\frac{f(\bar{\varepsilon})}{\int_{\bar{\varepsilon}}^{+\infty} f(\varepsilon)\, d\varepsilon} \leq \frac{1 - F(\bar{\varepsilon})}{\int_{\bar{\varepsilon}}^{+\infty} \big(1 - F(\varepsilon)\big)\, d\varepsilon}.$$

Once it is noticed that the two terms of this inequality are rates of increase with respect to $\bar{\varepsilon}$, it follows that $\frac{dE(\varepsilon|\varepsilon \geq \bar{\varepsilon})}{d\bar{\varepsilon}} \leq 1$ is also equivalent to the proposition that

$$\frac{\int_{\bar{\varepsilon}}^{+\infty} f(\varepsilon)\, d\varepsilon}{\int_{\bar{\varepsilon}}^{+\infty} \big(1 - F(\varepsilon)\big)\, d\varepsilon} \text{ is increasing in } \bar{\varepsilon}. \tag{E.4}$$

In the sequel, we show that this proposition is satisfied as a result of the property that the density function $f(\varepsilon)$ is log-concave. Indeed, the log-concavity of $f(\varepsilon)$ implies the log-concavity of $\big(1 - F(\varepsilon)\big)$, which in turn implies that its right-hand integral $\int_{\bar{\varepsilon}}^{+\infty} \big(1 - F(\varepsilon)\big)\, d\varepsilon$ is also log-concave (Bagnoli and Bersgtrom, 2005). Thus, the log-differentiation of $\int_{\bar{\varepsilon}}^{+\infty} \big(1 - F(\varepsilon)\big)\, d\varepsilon$ is decreasing, which also implies that $\frac{1-F(\bar{\varepsilon})}{\int_{\bar{\varepsilon}}^{+\infty} \big(1-F(\varepsilon)\big)\, d\varepsilon}$ is increasing in $\bar{\varepsilon}$, which is also (E.4).

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