Government Standards, Activists, and the Prospects for Self-Regulation*

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Abstract

We develop a game-theoretic model wherein a government establishes a standard for product quality while possessing extremely limited enforcement abilities, and a firm chooses whether to comply with, or exceed, the government quality standard. Following the firm's product choice, an activist decides whether or not to exert costly effort to learn the firm's choice and publicize that choice to the marketplace. Equilibrium results identify when the activist will play this informational role and when the firm will self-regulate in response to the activist's threat. Moreover, we identify complementarities that exist between government standards and activist engagement. Governments lacking enforcement capacity can rely on informative activists, and those activists become more effective when the government advocates a high quality standard.

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The simple act of buying a product or paying for a service follows from a wide range of strategic interactions among multiple actors. Across countless industries, governments around the world establish standards to address market imperfections. Firms may respond to these standards by providing goods of various qualities and prices, which consumers may then choose to purchase. This interaction among firms, governments, and consumers, however, does not take place in a vacuum. A long-standing body of political science scholarship has demonstrated the ways in which government is responsive to organized and unorganized stakeholders (e.g., Schattschneider 1960, Miller and Stokes 1963, Lowi 1979). Furthermore, firm and consumer responses to government standards (or lack thereof) are not conclusive. Various *nonmarket* reactions, such as lawsuits, consumer boycotts, and interest group protests, may occur after firms bring their products to market; and these potential nonmarket reactions might induce governments, as well as firms, to reconsider their initial decisions.[1]

In many cases, whether due to limits on government capacity or on their political will, policymakers lack cannot enforce their desired standards. Instead, they rely on consumer pressure in the market, perhaps coupled with nonmarket activities, to induce firms to self-regulate. How does this system of actors and incentives work together, and what product qualities do firms choose as a result? Such questions arise across numerous industries and policy issues worldwide, ranging from political statements about pollution and global warming to voluntary recalls of unsafe products.

In January 2015, for example, Chipotle Mexican Grill, a burrito retailer with more than $4 billion in annual sales, announced that it was going to remove pork from the menus of approximately 600 of its restaurants because (presumably) some of its pork suppliers were in violation of the company's standards for the raising and handling of swine (Ferdman,

[1]The term "nonmarket" is meant to denote the wide range of political, social, and legal arrangements that firms might have to engage outside of their market environment (i.e., Baron 2010).

2015). As noted on Chipotle's website,[2] the company does not source its swine from "factory farms" where pigs are "kept in small pens that do not allow for freedom of movement" and "given large amounts of subtherapeutic antibiotics." Rather, the company chooses to buy their pork from "farmers who do things differently." This announcement was not the first time that Chipotle had drawn attention to potential problems with its sourcing practices. In 2013, due to shortages of *naturally raised* beef, Chipotle started serving *conventionally raised* beef in its restaurants. Similar to the recent pork event, Chipotle drew public attention to this development, noting that there was simply insufficient supply of naturally-raised beef to satisfy demand. While it modified its policy of only serving antibiotic free beef in its restaurants, Chipotle stated that any subsequent decisions would be widely-publicized to ensure that "consumers can avoid those meats if they choose to do so" (Wong 2013).

These cases are notable for several reasons. First, they involve a company aiming to provide a product that has qualities that go well beyond what is required under extant law (i.e., food retailers are not required to serve naturally-raised meats). Second, these qualities are not easily observable by the average consumer. That is, upon purchasing and eating a burrito, a consumer cannot ascertain whether the meat consumed was naturally-raised. Hence, they are examples of what economists often refer to as "credence goods" (e.g., Feddersen and Gilligan 2001). Third, given that many of these product qualities are not easily verifiable, consumers might have questions as to whether Chipotle is actually doing what it claims to be doing.

In light of this uncertainty, Chipotle's reactions to the pork and beef shortages are quite revealing. In the case of pork, Chipotle sent a clear message to the market that it was committed to its practices, and would rather not sell meat that did not comport with its standards than misrepresent its practices to consumers. (This, in turn, suggests that Chipotle

[2]<<http://www.chipotle.com/en-US/fwi/animals/animals.aspx>> (Accessed 1/20/15.) Chipotle has since altered the content of its website, and now publicizes its recent decision to serve only GMO-free products in its stores; the substantive messages regarding animal raising, however, is the same as what appeared on the website in January 2015.

may likely have been comporting with its self-imposed standards that transcended extant law.) In the case of beef, however, Chipotle sent a clear message that it was not able to comport with its own standards (at times); and it sought to make consumers aware of this fact, even if such notice might lead to decreases in sales and market share. That is, Chipotle was forthcoming about the qualities of their products, even if those qualities did not comport with their self-imposed standards (which, once again, transcended extant law).

A consideration of other instances of corporate conduct and marketing suggests that Chipotle-like outcomes are not always obtained. For example, in response to consumer boycotts in the 1980s, various timber companies started to make claims about the environmental friendliness of their products and harvesting practices (Bartley 2003, 443-444). Upon inspection, however, it appeared that many companies were failing to live up to their purported standards of environmental stewardship. A 1991 report by the World Wildlife Fund-UK demonstrated that several of the firms' claims were, at best, obfuscations of the truth; and, at worst, they were outright lies.[3] Unlike Chipotle, these firms were claiming to provide products of various qualities that transcended any explicit government requirement; yet the firms were, in fact, failing to comply with their professed standards.

In a similar vein, there are many cases in which a firm's practices do not contradict its claims about product quality, per se, but they are still inconsistent with the general public's perception of the firm's business model. As noted by McDonnell and King (2013, 390-391), for example, the Earth Island Institute was able to launch an aggressive boycott and public relations campaign against Starkist tuna in the 1980s by providing images and evidence of dolphin deaths that were directly attributable to Starkist's fishing practices. The inadvertent killing of dolphins was not illegal; and Heinz (the parent company of Starkist) had not made explicit claims about its tuna being dolphin-safe. That said, Starkist's actual fishing practices

[3]Bartley (2003, 444-445) notes how these developments in the early 1990s paved the way for the promulgation of substantively meaningful standards that are employed today for the purposes of certifying various grades of timber.

were clearly at odds with the public image that it was trying to convey as the producer of a healthy and family-friendly product. The Earth Island Institute was able to demonstrate this inconsistency in a convincing manner, with nontrivial market consequences.

What was different about the situations faced by timber companies and Starkist Tuna, in comparison to that of Chipotle? That is, why had timber companies and Starkist either claimed or intimated that they were producing goods with qualities that transcended extant legal standards, when they clearly were not, whereas Chipotle (it appears) chose to produce products that are consistent with the high qualities that it publicizes? Activists clearly played a crucial role in informing the marketplace about the true practices of timber and tuna producers, and perhaps they represented a latent threat in the Chipotle case. These considerations motivate the question: when might activists engage in information-provision, as we have observed in these cases, and how does the threat of activism influence firms' production choices? Moreover, does the government endorsement of a particular standard influence a firm's choices; and how might government actions complement, or compete with, activists' efforts to monitor and publicize firms' activities?

To address these questions, we develop a model of industry self-regulation given the implicit threat of activist reactions. We consider a limited role for government, in which the government can choose to announce a low (i.e., basic) or high quality standard for products, yet the government lacks capacity to enforce anything more stringent than the basic standard. Upon observing the government standard, a firm chooses what quality its products will have (high or low), with direct implications for the prices that it charges (and its subsequent profits). Finally, after the product is brought to market, an activist can potentially intervene in the marketplace, investigating and providing information about the firm's production choices.

Our analysis reveals system-wide conditions that can induce a firm to produce a high-quality product or service. As expected, industries with more zealous activists feature greater nonmarket threats, leading to more self-regulation. But the effectiveness of the activist

community also depends on government standard-setting, with greater ease of inducing self-regulation when the government issues a high standard. Moreover, some firms, such as those with strong brand names or those with skeptical consumers, are more susceptible to activist informational campaigns and are therefore more likely to self-regulate.

Existing Literature and Research

At the heart of our inquiry is an effort to understand the conditions under which firms engage in meaningful self-regulation. While the term "self-regulation" connotes several things in scholarly circles, including the ways in which trade associations facilitate the establishment of industry-wide standards (e.g., Abolafia 1985) and engage in industry monitoring (e.g., DeMarzo, Fishman, and Hagerty 2005), we define self-regulation to be situtions in which firms are producing goods and services with desirable qualities despite not being required to by law (i.e., Lyon and Maxwell, 2002, 2004), or relatedly, that they are following extant standards even though those standards could not plausibly be enforced by government. In other words, we would consider a firm to be engaging in self-regulation if it is exceeding what is required by law, or following the law even though no governmental body could penalize it for infractions.

The extant literature provides a mixed view as to whether firms might be expected to engage in meaningful self-regulation. Prakash and Potoski (2004, 2006), for example, analyze how international trade linkages might faciliate firms' adoption of ISO 14001 (a prominent international voluntary standard); and they also suggest (Potoski and Prakash 2005b) how the *club goods* nature of ISO 14001 certification can facilitate meaningful self-regulation. Moreover, these tendencies should hold even though ISO 14001 has what Potoski and Prakash (2005a) refer to as "weak sword" enforcement provisions, whereby third parties audit firms' compliance with the standards, but such information is not publicly disclosed. In the context of environmental policy (e.g., Borck and Coglianese 2011, Coglianese and Nash 2009, King and Toffel 2009), scholars of self-regulation have explored how the voluntary

adoption of standards can influence both the prospects of subsequent government regulation (e.g., Lutz, Lyon, and Maxwell 2000; Maxwell, Lyon, and Hackett 2000), as well as inducing market segmentation among firms based on their propensity to engage in environmentally sound practices (e.g., Arora and Gangopadhyay 1995).[4] Kagan, Thornton, and Gunningham (2003) and Gunningham, Kagan, and Thornton (2004) have explored how the "social license" afforded to firms (which, essentially, refers to their ties to the surrounding community) can effectively induce firms to self-regulate, and go beyond simply complying with extant regulations.

In contrast to this optimistic view of the prospects for meaningful self-regulation, other scholars have demonstrated how firms that participate in self-regulatory organizations and those that adopt voluntary codes of conduct often fail to achieve the organizations' objectives (e.g., King and Lenox 2000; Locke, Anengual, and Mangla 2009; Locke, Kochan, Romis, and Qin 2007; Rivera, de Leon, and Koerber 2006). Moreover, some scholars (e.g., Lenox and Nash 2003) have argued that viable sanction programs are crucial if self-regulatory trade associations hope to attract *good* performers and avoid otherwise pervasive adverse selection problems. Related to this point, theoretical scholarship by Alberini and Segerson (2002) and Segerson and Micelli (1998) suggests that meaningful self-regulation will *only* be obtained when there is a credible threat of government intervention (either through regulatory or legislative channels) if self-regulation were to fail.[5]

The model that we advance below illustrates the conditions under which self-regulation might flourish; and, unlike Alberini and Segerson (2002) and Segerson and Micelli (1998), we do not assume that there is a viable threat of government intervention standing in the

[4]A related literature (e.g., Babnoli and Watts 2003; Baron 2007, 2008; Besley and Ghatak 2007) also explores the various market forces that influence drivers of corporate social responsibility.

[5]Consistent with this argument, Short and Toffel (2008) demonstrate how firms are more likely to engage in voluntary audits of their environmental compliance efforts if they have been recently subjected to government enforcement measures. More recent work by Toffel, Short, and Ouellet (Forthcoming) illustrates how various firm-specific and environmental factors seem to contribute to firms' adherence to global labor standards, as embodied in their codes of conduct.

background to influence firm decisions. Rather, our results hinge on the presence of a vibrant activist that, through its actions, can induce the firm to self-regulate. We are not the first to analyze the role of activists, or third-parties more generally considered, in self-regulatory efforts. Beginning with Ayres and Braithwaite's (1991) theory of "tripartism," for example, numerous scholars have explored how third parties can induce firms to engage in a form of regulatory compliance that could not plausibly be obtained in traditional firm-regulator interactions. Our perspective deviates significantly from Ayers and Braithwaite (and more recent scholars, such as Omarova (2011-2012) who embrace similar perspectives) in several ways. For example, the activist in our model works entirely independently of government, and hence does not induce government intervention in the marketplace, or possess standing, which could lead to judicial enforcement of extant laws. Even more importantly, the activist in our model does not possess tools, per se, with which to punish firms for their activities. Instead, we assume that an activist can provide information about the practices of a firm, and the provision of said information can have market consequences.

Our perspective on activist intervention is consistent with Bartley's (2003, 2007) illustrations of the ways that activists can faciliate self-regulation through naming and shaming. Likewise, King and Soule's (2007), and King's (2008) findings that protests and corporate boycotts are most influential when they involve stakeholders who can influence the media is also consistent with our model of activist intervention. In the model that we develop below, we do not assume that activist intervention harms the firm directly, but rather it is the information-revelation following from activist engagement (which is likely facilitated by the media) that is potentially harmful to firms. As such, our conception of activist intervention is also consistent with Abbott and Snidal's (2013) recent work that suggests a tripartism model might be ill-suited to contemporary times, given recent trends in globalization. Rather, Abbott and Snidal argue that public interest groups (activists, in our language) might be better able to enforce self-regulation by directly engaging firms.

Broadly stated, then, our paper contributes to the rapidly-developing body of scholar-

ship on "private governance" (i.e., Vandenbergh 2013), also sometimes referred to as "private politics" (e.g., Baron 2001, 2003, 2012; Diermeier 2007; Werner 2012), which analyzes how private interests attempt to influence firms without relying on the force of extant law, or public institutions, such as legislatures, regulatory agencies, or judicial bodies. Recent theoretical works in these literatures have explored the mechanisms by which boycott threats can influence firm production choices in the absence of government regulation (e.g., Innes 2006), as well as how consumer activists can influence firms by strategically providing information about their choices to an otherwise (relatively) uninformed market (e.g., Feddersen and Gilligan 2001).[6] While adding to these literatures, our work differs from previous models in several ways. For example, the government is prominent our model, as we seek to identify the effects of government standards within the context of industry self-regulation and nonmarket threats. Moreover, much of this literature assumes that activist engagement directly harms firms and/or is a costless activity for the activist.[7] In contrast, we assume that activist engagement is costly, and we limit activists to the sole tool of information provision, which allows us to speak to how market conditions might vary as a function of the potential rewards that would be available to the activist from said intervention.

The Baseline Model

Before analyzing the impact of potential activist intervention on the firm's decisions, we begin with a baseline model to identify the strategic concerns that a firm faces when deciding what products to bring to the market. In our baseline model a government sets either a "high" or "low" standard for product quality; and after observing this decision, a firm chooses whether to produce a high- or low-quality product. We assume that the

[6]These topics are advanced further by Baron and Diermeier (2007) who analyze ways in which firms might undermine their potential attractiveness as targets of activist non-governmental organizations.

[7]Recent work by Abito, Besanko, and Diermeier (2014), for example, explores the manner in which activist campaigns can directly harm firms by damaging their corporate reputations.

government cannot enforce anything other than the baseline (low) standard. In other words, the baseline standard represents the most stringent standard that could plausibly be enforced by government, whereas the high standard is any standard greater than the baseline. Hence, one might interpret the high standard to be analogous to a guidance document that is issued by a regulatory agency, which suggests best practices but does not have the force of law. Another interpretation of the high standard is that it represents an extant regulation that the government cannot enforce in the jurisdiction in which the firm is producing goods. (For example, U.S. labor standards, such as a federally-mandated minimum wage, are not enforceable on U.S. firms that are sourcing in Asia.) Finally, the high standard might also represent a broad class of settings in which the government is effectively constrained in its enforcement ability due to political conflicts that might restrict the enforcement activities of regulatory bodies (e.g., MacDonald 2010).[8]

We assume that consumers value high-quality products and that firms are profit-maximizers. When firm production choices are known with certainty, we find that firms will produce consumer-favored high-quality goods unless producing a high-quality good is prohibitively expensive. That said, the range of marginal costs for which a high-quality good is produced is strictly larger when the government issues a high, rather than low, quality standard. This is because consumers value high-quality goods more when the government sets a high-quality standard. In essence, the government's announced but unenforceable high standard is sufficiently persuasive to convince (at least some) consumers that goods and services produced at the high-quality level are preferable. Hence, firms with observable quality products are willing to incur greater costs to produce high-quality goods under these circumstances. When firm choices are not publicly observable, however, we find that the firm will only produce low-quality goods, regardless of the government-issued standard.

Formalization

[8]Our model would also be consistent with situations in which bureaucracies issue regulations but they are ill-equipped, by design (e.g., Moe 1989), to enforce them effectively.

Our baseline model involves a representative firm choosing a low or high quality level ($s_f \in \{0, 1\}$) after the establishment of a low or high government standard ($s_g \in \{0, 1\}$). The firm then accrues profits based on its quantity choice (q) in response to market demand. This simplification to a single firm should not be seen as capturing only monopolistic markets. Rather, markets with a limited number of firms seeking to fill consumer demand and gain profits feature similar incentives to those explored here.[9] We leave to future work the explicit strategic decisions of the government, focusing here instead on how low ($s_g = 0$) or high ($s_g = 1$) government standards influence subsequent market and nonmarket reactions. We assume that the representative firm produces its product in a market where it faces the following inverse demand function:

$$p = \alpha - \beta q \tag{1}$$

where p is the price that the firm charges for its product, and q is the quantity that the firm produces.

We assume that α captures the impact of a firm's quality choice on price, both in how it relates to the government standard, and in how it is valued by society on its own merits. More formally, we assume that:

$$\alpha = \alpha(s) = d + s_{fm}(1 + s_g) \tag{2}$$

where $d > 0$ captures the baseline price that a given firm can charge,[10] $s_g \in \{0, 1\}$ is the quality standard chosen by the government, and $s_{fm} \in [0, 1]$ is the quality standard of the firm's products as perceived in the marketplace.[11] All else equal, products that are

[9]Moreover, industries in which firms differentiate themselves on marketing or other grounds, and therefore face no identical competitors can be characterized by the models presented here. That said, explicit models of industries in which competing firms make individual product quality decisions and activists choose which firms to investigate would be welcome in future research.

[10]One could consider d to be the value of a firm's brand name and/or corporate reputation in the marketplace, in that more well-regarded firms can charge higher prices for their goods (e.g., Abito, Besanko, and Diermeier 2014; Diermeier 2011; Klein and Leffler 1981; Shapiro 1983).

[11]Note that s_{fm} does not necessarily equal s_f and (by assumption) can take any value in between (and including) 0 and 1.

perceived to be high quality ($s_{fm} = 1$), and correspond to a high government standard ($s_g = 1$) command the highest price, whereas the lowest price occurs when the marketplace perceives the firm as producing low-quality goods, regardless of the government standard.

In some ways, then, the government standard serves as an endorsement of the importance of product attributes that consumers should value. Given that most consumers are not particularly well-informed about the relative virtues of different product qualities, such an assumption seems entirely plausible.[12] For example, while all consumers value safe cars, it is less clear how the average consumer would value particular safety features (e.g., airbags) without some sort of authoritative endorsement that might come from the government. Likewise, while consumers might place some innate value on privacy, the underlying virtues of a particular level of online (Internet) privacy protection might be unclear, absent government endorsement. Such considerations were at the heart of a debate within the U.S. Federal Trade Commission in the late 1990s when some members of the Commission argued in favor of new regulatory powers that would allow the Commission to establish clear rules for information management of personally-identifiable information by commercial websites.[13]

We assume that the firm faces a constant marginal cost of production for its products, m, which is a function of the per-unit cost of production and the quality level chosen. More specifically, we assume that:

$$m = c + \eta s_f \tag{3}$$

where $s_f \in \{0, 1\}$ is the actual quality standard chosen by the firm, $\eta \in [0, 2]$ is the added marginal cost of producing a high-quality good, and $(d - c) > 1$.[14]

[12]Of course, it would be interesting to explore the implications of a model where the government mandate did not so starkly improve the value of a product to a consumer, perhaps, for example, because consumers did not entirely trust the efficacy of the government standard. One natural way to investigate these questions in the context of our analysis would be to alter the specification of α as follows: $\alpha = d + s_{fm}(1 + \kappa s_g)$ where $\kappa \in [0, 1]$, and analyze how our results might change for values of $\kappa \neq 1$.

[13]Further details about these matters can be found in the FTC's report to Congress: *Privacy Online: Fair Information Practices in the Electronic Marketplace–A Report to Congress.* May 22, 2000.

[14]The restrictions on d, c, and η were made to ensure that it is always in the firm's interest to produce

Combining the above expressions, the firm's profit can be expressed as:

$$\Pi = pq - mq = (d + s_{fm}(1 + s_g) - \beta q - (c + \eta s_f))q \tag{4}$$

Market Behavior with Observable Choices

We begin our analysis by establishing the outcome that emerges when government standards and firm production choices are perfectly observable, meaning that $s_{fm} = s_f$. In such a model, if the government issues a high-quality standard ($s_g = 1$), the firm could choose either to produce high-quality goods ($s_f = 1$) or to produce low-quality goods ($s_f = 0$). Hence, the profit function described above in Equation 4 corresponds to $\Pi|_{s_g=1,s_{fm}=s_f=1} = (d+2-\beta q - c - \eta)q$ when $s_f = 1$, and $\Pi|_{s_g=1,s_{fm}=s_f=0} = (d - \beta q - c)q$ when $s_f = 0$; and the firm chooses its quantity of production to maximize these profits. Specifically, the equilibrium quantities $q^*|_{s_g=1,s_{fm}=s_f=1} = \frac{d-c+2-\eta}{2\beta}$ and $q^*|_{s_g=1,s_{fm}=s_f=0} = \frac{d-c}{2\beta}$ are produced when the firm chooses to produce high- and low-quality goods, respectively, given $s_g = 1$. These quantities, in turn, yield equilibrium profits of: $\Pi^*|_{s_g=1,s_{fm}=s_f=1} = \frac{(d-c+2-\eta)^2}{4\beta} \geq \frac{(d-c)^2}{4\beta} = \Pi^*|_{s_g=1,s_{fm}=s_f=0}$. Hence, the firm accrues at least as high profits when producing a high-quality good when the government has issued a high-quality standard as if it produces a low-quality good.

Alternatively, suppose the government issues a low-quality standard ($s_g = 0$). Engaging in similar analysis reveals that profits from the high-quality product could be either greater than or less than the profits from choosing a low-quality standard, depending on the added marginal cost of producing high-quality goods, η. For $\eta \in [0, 1]$, the cost of producing high-quality goods is sufficiently low that firms will exceed the government standard so as to generate greater profits than if they simply complied with a low-quality standard. In contrast, for $\eta > 1$, firms will not find it in their interest to produce high-quality products and will rather meet the government's low-quality standard. Taken together, these findings motivate the following proposition.

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some type of product, and thus to allow us to focus on the more substantively interesting cases and results.

Observable Production Proposition: *When government and firm choices are publicly observable, firms produce high-quality goods when the marginal cost of producing such goods is sufficiently low or when the government sets a high-quality standard.*

Proof: Proofs of all propositions are given in the Appendix.

For $\eta \in (1, 2]$, the firm chooses a quality that matches the low government standard. When $\eta \leq 1$, however, the marginal cost of producing high-quality goods is sufficiently low that, regardless of what standard the government chooses, high-quality goods are always produced. In either case, firms make efficient production choices, in that they only produce those goods with the qualities that are demanded by the marketplace. The high government standard here serves to expand the marketplace, by inducing consumers to value high-quality products at a greater level, yielding a sufficiently high price to make their production profitable.

Market Behavior with Unobservable Choices

While this result is both relatively straightforward and normatively attractive, in that we can point to conditions under which firms will voluntarily exceed government standards and produce high-quality goods, it relies on perfect information about the firm's choices. As alluded to above, there are many products for which quality cannot be easily deduced, even after they have been purchased or consumed. If one equates the quality levels modeled here with labor or product sourcing practices, for example, it is unlikely that the average consumer can ascertain whether certain coffee beans are truly "fair trade," or certain athletic shoes were produced without relying on child labor. Given this inherent unobservability, it is worthwhile to explore how firms might produce their products if their choices were unknown.

To analyze this scenario, we consider the same model as above, but now suppose the firm's quality decision is unobservable. As before, the government publicly announces a standard $s_g \in \{0, 1\}$, yet now the firm chooses a quality level $s_f \in \{0, 1\}$ that is unknown to the market. Rather than $s_{fm} = s_f$, we now assume that consumers have an expectation about

product quality, parameterized as $s_c \in [0, 1]$, which they maintain in the absence of further information. For the purposes of our baseline analysis, we assume that no further information is received by consumers, and as a result, the market reacts as if $s_{fm} = s_c$. Consumers do not, for example, glean knowledge about quality from the firm's quantity choice, nor do they believe that all firms lie to them. Hence, we are are setting aside some market-undermining behaviors (e.g., Akerlof 1970) in that we are explicitly assuming that consumers are not fully rational; but we believe that a fairly unsophisticated, or naive, public is plausible for a wide range of market transactions, given the low level of knowledge that most consumers possess about manufacturing and sourcing practices. An alternative interpretation of this assumption is that consumers are rational and could become informed, but the costs of doing so are prohibitively high. Of course, even though we treat s_c as an exogenous variable, it is plausible that consumer expectations would be related to the particulars of the market in which the firm operates.[15]

Given this formalization, if the government sets a high-quality standard ($s_g = 1$) and the firm chooses $s_f = 1$, then the firm's profit is defined by: $\Pi|_{s_g=1,s_f=1} = (d+2s_c-\beta q-c-\eta)q$. In the market stage, the firm chooses its quantity to maximize profits, which yields $q^*|_{s_g=1,s_f=1} = \frac{d-c+2s_c-\eta}{2\beta}$ and profit equal to $\frac{(d-c+2s_c-\eta)^2}{4\beta}$.[16] In contrast, if the firm chooses $s_f = 0$, then $\Pi^*|_{s_g=1,s_f=0} = \frac{(d-c+2s_c)^2}{4\beta}$, which clearly exceeds the profit that follows from producing an unobserved high-quality good. Similar analysis reveals that if the government were to set a low-quality standard ($s_g = 0$), then the firm would still have a strict incentive to produce

[15]For example, one might expect that s_c would be relatively higher in markets where some products are subject to an approval regulatory regime (e.g., Carpenter, Grimmer, and Lomazoff 2010), given that such approval processes can faciliate information about the latent qualities of products in the marketplace, thereby increasing consumer confidence. Further research might seek to explore how endogenizing consumer expectations might influence firm strategies.

[16]Here, and throughout the paper, we make the implicit assumption that firms will not enter the market if they cannot obtain weakly positive profits. (Moreover, we assume that firms cannot produce negative quantities.) As such, we make the necessary assumptions regarding the relative values of s_c and η to allow such conditions to be obtained.

low-quality goods ($s_f = 0$). In other words, when the production processes of the firm are not observable, the firm will always choose a low-quality standard, regardless of the government standard. This analysis motivates the following proposition.[17]

Unobservable Production Proposition: *When firm choices are not observable, firms do not voluntarily exceed government standards, and only meet government standards when the government advocates a low-quality standard.*

Taken together, the above propositions suggest that firms will only produce high-quality products when the market payoff from doing so is substantial. In particular, consumers must be aware of that high quality and must value it (as in the case of the government advocating a high standard) at a level that induces the firm to pay the higher marginal costs.

Activists and Self-Regulation

Building on our analysis above, we consider our baseline model in which a firm's production choices are not observable; yet, after the firm brings its product to market, an activist can engage in investigatory activities that influence the public's perception of the firm's choices. We assume that the more effort the activist exerts the more likely she is to accurately inform the public about the firm's production choices. This assumption is consistent with the goal of inducing the market to reward high-quality firms and to punish those with low-quality goods, as the public's perceptions of the firm's production choices will influence the firm's profits in a subsequent (second) period. As such, activists have an incentive to invest effort in uncovering the true quality of goods and revealing this information to the marketplace.

Consistent with our baseline analysis, below we find that a firm has a strong incentive to produce low-quality goods given that its first-period (and possibly second-period) profits

[17]This finding is consistent with several other models that analyze production choices under incomplete information, and most notably Feddersen and Gilligan's Proposition 3 (2001, p. 158), in their model of information-providing activists.

are based on its unobservable quality choices. Yet, despite this incentive, a firm will produce high-quality goods depending on the nature of the activist. When the truthful revelation of the firm's choice is very important, the activist (unsurprisingly) will exert significant effort to inform the public about the firm's choice. As a result, the firm will choose to produce a high-quality product in the first period. When the potential rewards from correctly informing the public are small, however, the activist will not exert sufficient effort to reveal the firm's true production choice to the public; and hence, the firm will choose to produce low-quality products. Finally, when the activist's potential rewards are moderate, we find that a firm will sometimes produce a high-quality good and sometimes produce a low-quality good, and the activist will exert just enough effort to keep the firm from strictly preferring one of these strategies over the other.

In sum, in industries facing highly motivated activists, such as those in which market failures and externalities are substantial, self-regulation is likely more common due to the nonmarket threats posed by activists. Moreover, we find that activists are able to induce the firm to adopt a high-quality standard with a lower level of effort when the government chooses a high-quality, rather than low-quality, standard. Thus governments lacking enforcement capabilities and activists with solely informational tactics serve complementary roles in facilitating firm self-regulation.

Formally, as illustrated in Figure 1, following the first-period market behavior, an activist (A) chooses a level of effort (e) with which to investigate and report the firm's quality choice, which can influence the firm's second-period profits.[18] We assume that more effort produces more credible evidence, turning consumers away from their naive expectations about the firm's product quality, s_c, and towards a belief based on the activist's evidence. Moreover, higher activist effort is also more likely to reveal the true product quality.

[18]We model the firm's quality decision to be made only in the first period, essentially capturing the idea that changing the quality of goods and services, as well as business practices, is costly.

[Insert Figure 1 about here]

Many functional forms are consistent with these assumptions. For simplicity, we assume that the following is true of consumers' second-period beliefs. With probability $\frac{1}{e}$, consumers' beliefs do not deviate from their prior expectations ($s_{fm} = s_c$); with probability $\frac{1}{2e}$, the market believes what the activist reports, yet the activist is wrong (i.e., $s_{fm} = 1 - s_f$); and with the remaining probability ($\frac{2e-3}{2e}$), the market believes what the activist reports and the activist is correct (i.e., $s_{fm} = s_f$). We also assume $e \geq 2$; at the lowest effort level ($e = 2$), with probability $\frac{1}{2}$ consumer beliefs are static across the two periods, with probability $\frac{1}{4}$ the activist is believed but wrong, and $\frac{1}{4}$ of the time the activist is believed and correct. As e increases, the probability of the activist being both believed and correct increases, while the other probabilities diminish.

Regarding the activist's utility, we assume that the activist values rewarding high-quality firms and punishing low-quality firms.[19] Although the activist does not have the resources to punish and reward firms directly, the information revealed to consumers serves this role quite well.[20] However, it is costly to exert the effort needed to influence the market in this way, and we assume that the activist's utility can be represented by the following form:

$$U_A = -Z|s_{fm} - s_f| - e \tag{5}$$

In other words, the activist is happiest when the market learns the firm's actual quality choice after the first period, and is increasingly unhappy by a factor of $Z > 0$ the further the market's perception of the firm's choice deviates from reality. One might interpret Z as how zealous the activist is, or as the salience that an activist attaches to truthfully

[19]Their motives for doing so may vary in reality. Expanding the market share of firms with similar values to their own may be sufficient; but uncovering egregious practices also may help with the fund-raising needed to continue their activities into the future, for example.

[20]A model of activist-led boycotts could be advanced in a similar manner to what we offer here.

informing the market about a firm's production practices. We assume that the activist is fully informed and rational, such that she knows the firm's profit function, and therefore understands the incentives that the firm faces in choosing a level of quality, and bringing a product to market. Hence, the activist's choice of effort maximizes her expected utility by affecting the information uncovered and revealed to the marketplace, and possibly by influencing the firm's *ex ante* product-quality standards. For the purposes of our analysis below, we confine our attention to those cases where $s_c \geq 0.5$.[21]

The first step in deriving the equilibrium involves finding the optimal level of effort for each possible case of the firm's quality choice and the government's standards. First, if the firm chooses to produce high-quality goods ($s_f = 1$), the activist wishes, in equilibrium, to exert effort equal to $e^*|_{s_f=1} = \frac{\sqrt{2}\sqrt{Z(3-2s_c)}}{2}$. Note that this effort level is nonzero because the public's perception of the firm's choice in the second period will be determined by s_c unless the activist sinks some minimal level of effort into investigating and publicizing the firm's true production choices. Matching this intuition, $e^*|_{s_f=1}$ is decreasing in s_c. In other words, the more predisposed consumers are towards believing that the firm produces high-quality goods, the less effort the activist is willing to exert, in equilibrium, to convince consumers that their perceptions are accurate. In essence, the activist's role here is to offer a seal of approval, which is less necessary the closer consumer perceptions are to a firm's actual choice. This case holds for sufficiently large Z (for $Z \geq Z_H^*$, defined in the Appendix). For lower levels of Z, however, the activist's low effort level is insufficient to induce the firm to choose to produce a high-quality product.

In the case where the firm chooses to produce low-quality goods, the activist has an

[21]Confining our attention to $s_c \geq 0.5$ ensures that we are focusing on those cases in which the firm is guaranteed to secure nonnegative profits by entering the market. When $s_c < 0.5$ we find that the results of the model are quite similar to what we present here, the exception being for intermediate values of Z, where analysis reveals that there are multiple pure strategy equilibria–one involving the firm producing high-quality goods, and the other involving the firm producing low-quality goods.

incentive to exert sufficient effort to produce convincing evidence that the firm has chosen $s_f = 0$. That equilibrium value is $e^*|_{s_f=0} = \frac{\sqrt{2}\sqrt{Z(1+2s_c)}}{2}$. While higher than $e^*|_{s_f=1}$ (for $s_c > 0.5$), this effort level is insufficient to bring about a high-quality choice by the firm. This is because this situation only arises (in equilibrium) for low values of Z (for $Z \leq Z_L^*$, defined in the Appendix). Note that unlike $e^*|_{s_f=1}$, $e^*|_{s_f=0}$ is *increasing* in s_c. In other words, an activist is more willing to exert effort to influence market perceptions when the firm has chosen to produce low-quality goods despite consumer beliefs that the firm has chosen a high-quality standard. That said, in this region the activist does not have a strong enough incentive to dedicate sufficient effort to alter the firm's quality choice, and the best that the activist can hope for is to expose the firm's choice to the market, which will influence its second-period quantity and profits.

[Insert Figure 2 about here]

In between Z_L^* and Z_H^*, as shown in Figure 2, the equilibrium involves mixed strategies, as is common in this sort of monitoring game. The logic is as follows. If the firm were to adopt a high standard, the activist would want to exert a low level of effort. But a low effort level gives the firm the incentive to actually select a low quality level. This, in turn, would induce a high level of activist effort, bringing about a high-quality product choice by the firm. And so the logic continues in a cycle, without an equilibrium in pure strategies. In the mixed strategy equilibrium, the activist chooses a level of effort e_{mix}^* (as defined in the Appendix), which makes the firm indifferent between producing a low- or high-quality product. The firm adopts a high standard with a certain probability, such that e_{mix}^* is the activist's optimal level of effort; and the equilibrium probability of adopting a high quality standard increases monotonically in Z from Z_L^* to Z_H^*.

Activist Monitoring Proposition: *In equilibrium, a firm facing a zealous activist produces high-quality goods, allowing the activist to exert relatively low effort. A firm facing*

a relatively low-reward activist produces low-quality goods, inducing higher activist efforts. Finally, an activist with moderate interest in revealing the firm's choice exerts a moderate effort, leaving the firm with equal expected utility from selecting a low- or high-quality level.

Because the activist values truthful revelation of firm quality, rather than whether or not the firm meets or exceeds the government standard, the equilibrium effort levels $e^*|_{s_f=1}$ and $e^*|_{s_f=0}$ do not depend on the government standard. Nevertheless, as in the baseline case, the government standard may influence the firm's behavior when there is some probability of detection. Specifically, the cutpoints Z_L^* and Z_H^* differ depending on what standard the government adopts;[22] and in the mixed strategy part of the equilibrium, e_{mix}^* also differs across these two cases. The following proposition notes the relative value of e_{mix}^* between the high and low government standard cases.

Regulatory-Activist Complements Proposition: *The level of effort that induces a firm to randomize between producing high- and low-quality goods, e_{mix}^*, is strictly lower when the government selects a high quality standard ($s_g = 1$) than when the government selects a low quality standard ($s_g = 0$).*

This proposition states that an activist is able to induce the firm's indifference in choosing a high-quality standard with a lower level of effort given a high government standard. Although the activist has no specific interest in the government standard, this finding illustrates complementarities between the government's and activist's choices. The intuition behind this finding is that the market value of producing high-quality goods is greater if the government has set a high standard than if the government has set a low standard. Hence, the revelation of not meeting the high standard is more costly to profits than the revelation of only meeting (and not exceeding) the government's low standard. As such, the activist is able to make the firm indifferent between producing a high-quality and low-quality product with less effort when the government sets a high standard, as the firm has more to lose.

[22]The order of these cutpoints between the cases of high and low government standards depends on values taken by key model parameters.

In addition to the ordering of these optimal effort levels across cases of high and low government standards, comparative statics over this level of effort (e^*_{mix}) differ somewhat depending on the government standard, as characterized in the following proposition.[23]

Susceptibility to Activism Proposition: *Activists are able to be more effective with less effort when firms have a powerful brand name, when they value the future more heavily, and when consumers believe that the firm is producing low-quality goods, especially when the government has set a high standard.*

The greater the firm values the future, the more it is concerned about its low quality level being uncovered by the activist. Therefore, with even a modest level of effort, the activist can make the firm indifferent between a high- and a low-quality choice. Our result also suggests that firms with valuable brand names are particularly hurt by activist revelations of low-quality products, and therefore are induced to produce high-quality goods even with a lower level of activist effort. This relationship holds generally when the government chooses a high-quality standard; but it only holds when high-quality goods are relatively cheap to produce in the case of a low-quality government standard. Put simply, firms with more valuable brand names are more susceptible to activism than are firms with less valuable brand names, and are thus induced to produce higher quality goods with lower activist efforts.[24]

The exception to this regularity is when the benefits of producing the high-quality good are low ($s_g = 0$) and costs (η) are high. Here, firms with more valuable brand names see their greatest profit opportunity arising from the difference in perception ($s_c > 0$) and reality ($s_f = 0$) in the first period, and must therefore be disciplined by a high level of activist effort to produce the high-quality good. Finally, firms that benefit from favorable

[23]Effectiveness in the proposition refers to inducing the firm's mixed strategy choice. For a low government standard, the comparative statics of the proposition hold if η is sufficiently low.

[24]This result is consistent with King and McDonnell (2015, 438) who argue that the "public expects more from reputable companies and will react more negatively to exposed faults" in comparison to when they are alerted to the shortcomings of poorly-known companies, or those with poor reputations.

consumer expectations regarding their product quality require greater levels of activist effort to produce high-quality goods, because as consumer trust in the firm's quality choice (s_c) increases, the firm is more tempted to exploit consumers' naivete. This relationship always holds when government chooses a high-quality standard, but is again conditional on the costs of production when the government chooses a low-quality standard.

In sum, high government standards present firms with a greater profit opportunity due to expanded consumer demand for high-quality goods and services. Such a potential reward allows activists to induce firms to behave well with less activist effort, lest the firms be revealed to produce low-quality goods and miss out on the enhanced market opportunities. Such complementarities are especially prevalent for firms with well-established brand names.

Implications and Conclusion

One key role of government regulation in the marketplace is found in addressing externalities or other market failures. Yet governments do not always have the capacity to enforce the regulations or high standards they wish to advance. We find that, under certain circumstances, even the mere act of raising issues or setting informal standards can have a noticeable effect on firm behavior. In particular, if consumers can observe the actions of firms, firms have an incentive to self-regulate to the high government standard. However, when their behavior is unobservable, firms have incentives to undercut those standards. In such a case, there is a significant role for private politics, such as for information provision by activists. Yet, the efficacy of such a system of government policymakers, managers within firms, consumers, and activist leaders depends on the actions and incentives of all of these actors, often in complementary ways.

We have argued in this essay that features of the activist environment clearly contribute to the prospects for self-regulation. While a large body of scholarship has pointed to how activists (or public interest groups, more broadly considered) can induce self-regulation by

imposing direct costs on firms, or that they can complement the efforts of government regulators by being brought into the enforcement process (i.e., tripartism), we have provided a new rationale for how activists can facilitate self regulation. Our theory does not rely on the activist having access to any public institution (such as the courts), or on imposing costs directly on the firm. Rather, we argue that by engaging in costly investigatory and publicity activities, an activist can uncover the true production choices and practices of firms, and inform the market, with important consequences for the firm. These market consequences can, in turn, induce firms to engage in self-regulation. Our model is particularly relevant to markets with credence goods, wherein product qualities are not clearly observable at the time of purchase or consumption.

Returning to the examples from the introduction, our model sheds some light on why Chipotle engaged in self-regulation regarding its ingredients whereas timber companies were less forthcoming (and even misleading) about the sourcing of their materials. Chipotle has a significant brand name, serves young consumers who are increasingly interested in food quality, and faces latent activist threats from organizations such as the Center for Food Safety. In combination, these market and nonmarket factors offer compelling reasons for Chipotle's self-regulation, in line with the results of our model. In contrast, the timber companies did not have well-known brands, nor were their biggest customers (often builders) highly focused on their sourcing practices. As such, it is unsurprising that many such firms did not live up to their purported standards.

Beyond their practical applications, the results that we explicate in this paper point to many avenues for future research. First, and most notable, one might be interested in expanding the role of government in our model. One obvious direction is to assume that the government is a strategic actor with its own preferences. Having explored what will occur if government established high quality standards in markets that are subject to potential activist intervention, a natural extension is to identify what actions government is most

likely to take if it is motivated by broad social welfare considerations, by more parochial constituency concerns, and/or by factors such as interest group pressures. Building on this point, it would be interesting to identify how various market and nonmarket actors can influence the government's regulatory standard decisions through lobbying, campaign contributions, or other nonmarket strategies, prior to the game that we have modeled here. Such analyses can help us assess how firms' lobbying efforts interact with their propensities for self-regulation.

A second theoretical extension involving government is to expand the scope of its enforcement power beyond what is modeled here. While our model establishes a clear baseline for what can occur when government is not able to (meaningfully) enforce anything above a de minimis standard, in reality we can point to a variety of circumstances in which government is not so constrained. Indeed, many scholars have explored the efficacy of regulatory policy when government can engage in probabilistic enforcement (e.g., Kaplow and Shavell 1994), or when relatively weak formal powers can be reinforced through a variety of complementary regulatory tools (see, for example, Carpenter's 2010 study of the FDA). Moreover, even if government lacks meaningful enforcement power, the ability to issue product safety alerts and/or to engage in investigations (e.g., Shipan 2004, Shotts and Wiseman 2010) might provide information to the marketplace similar to the activist role in our model. Building on our model to allow for the possibility of such government activities can help to further clarify the complementarities between activists and government institutions.

A third theoretical extension that is worthy of consideration is to incorporate other nonmarket reactions to firm activities into the model, beyond activist information campaigns, such as the role of litigation. As envisioned by Ayers and Braithwaite and others, one way that activists can influence regulatory policy is to be granted standing, such that they can sue firms for perceived (or actual) regulatory infractions. A wide body of literature (e.g., Daughety and Reinganum 1995, 2005; Diamond 1974; Polinsky and Rogerson 1983; Polinsky

and Rubinfeld 1988; Simon 1981, Viscusi 2002) has considered the ways in which private litigants can influence firm decisions through judicial institutions. By incorporating the possibility of a product-induced disaster (which is correlated with the firm's production choices) that leads to a lawsuit, one could compare the efficacy of judicial intervention to activist engagement as different tools for inducing self-regulation.

Finally, our theory points to many directions for potential empirical exploration. While the case studies that we explore illustrate the potential impacts of activists on the marketplace, more systematic analyses are needed to move beyond these early foundations. A first step would be to analyze whether self-regulation is most common in industries that are characterized by high levels of interest group activity, as such an environment would likely ensure that activists are readily willing (and able) to provide valuable information to the market regarding firm production choices. Further empirical explorations could test whether the responses to such nonmarket pressures differ systematically across different types of firms and different government standards, as predicted here.

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Appendix

Proof of the Observable Production Proposition

Suppose government and firm choices are perfectly observable by the public, and the government sets a high-quality standard ($s_g = 1$). As noted in the text, if $s_f = 1$, $\Pi|_{s_g=1,s_{fm}=s_f=1} = (d+2-\beta q-c-\eta)q$. Differentiating this expression with respect to q yields: $\frac{\partial \Pi|_{s_g=1,s_{fm}=s_f=1}}{\partial q} = -2\beta q+d+2-c-\eta \Rightarrow q^* = \frac{d+2-c-\eta}{2\beta}$. Hence, $\Pi^*|_{s_g=1,s_{fm}=s_f=1} = \frac{(d+2-c-\eta)^2}{4\beta}$. Alternatively, if $s_f = 0$, as noted in the text, $\Pi|_{s_g=1,s_{fm}=s_f=0} = (d-\beta q-c)q$. Differentiating this expression with respect to q yields: $\frac{\partial \Pi|_{s_g=1,s_{fm}=s_f=0}}{\partial q} = -2\beta q+d-c \Rightarrow q^* = \frac{d-c}{2\beta}$. Hence, $\Pi^*|_{s_g=1,s_{fm}=s_f=0} = \frac{(d-c)^2}{4\beta}$. Given that $(d-c) > 1$, and $\eta \leq 2$ by assumption, it must be true that $\Pi^*|_{s_g=1,s_{fm}=s_f=1} = \frac{(d+2-c-\eta)^2}{4\beta} > \frac{(d-c)^2}{4\beta} = \Pi^*|_{s_g=1,s_{fm}=s_f=0}$. Hence, the firm will always choose a high quality standard when it is chosen by the government.

Suppose, however, that the government sets a low-quality standard ($s_g = 0$). Consistent with Equation (4) in the text, if $s_f = 1$, $\Pi|_{s_g=0,s_{fm}=s_f=1} = (d+1-\beta q-c-\eta)q$. Differentiating this expression with respect to q yields: $\frac{\partial \Pi|_{s_g=0,s_{fm}=s_f=1}}{\partial q} = -2\beta q+d+1-c-\eta \Rightarrow q^* = \frac{d+1-c-\eta}{2\beta}$. Hence, $\Pi^*|_{s_g=0,s_{fm}=s_f=1} = \frac{(d+1-c-\eta)^2}{4\beta}$.

Alternatively, if $s_f = 0$, $\Pi|_{s_g=0,s_{fm}=s_f=0} = (d-\beta q-c)q$. Differentiating this expression with respect to q yields: $\frac{\partial \Pi|_{s_g=0,s_{fm}=s_f=0}}{\partial q} = -2\beta q+d-c \Rightarrow q^* = \frac{d-c}{2\beta}$.

Hence, $\Pi^*|_{s_g=0,s_{fm}=s_f=0} = \frac{(d-c)^2}{4\beta}$, and we see that $\Pi^*|_{s_g=0,s_{fm}=s_f=0} < \Pi^*|_{s_g=0,s_{fm}=s_f=1}$ iff $\eta \in [0,1)$.

Proof of the Unobservable Production Proposition

Suppose government and firm choices are not perfectly observable by the public, and government chooses a high quality standard ($s_g = 1$). If $s_f = 1$, then the firm's profit is defined by $\Pi|_{s_g=1,s_f=1} = (d+2s_c-\beta q-c-\eta)q$. Differentiating this expression with respect to q yields $q^*|_{s_g=1,s_f=1} = \frac{d+2s_c-c-\eta}{2\beta}$ and profit equal to $\Pi^*|_{s_g=1,s_f=1} = \frac{(d+2s_c-c-\eta)^2}{4\beta}$. In contrast, if the firm chooses $s_f = 0$, then the firm's profit is defined by:$\Pi|_{s_g=1,s_f=0} = (d+2s_c-\beta q-c)q$. Differentiating this expression with respect to q yields: $\frac{\partial \Pi|_{s_g=1,s_f=0}}{\partial q} = -2\beta q+d+2s_c-c \Rightarrow q^* = \frac{d+2s_c-c}{2\beta}$. Hence, $\Pi^*|_{s_g=1,s_f=0} = \frac{(d+2s_c-c)^2}{4\beta}$, which is clearly greater than $\Pi^*|_{s_g=1,s_f=1}$, implying that whenever the government sets a high standard the firm will choose $s_f = 0$.

In the event that the government sets a low standard ($s_g = 0$), if $s_f = 1$, the firm's profit is defined by $\Pi|_{s_g=0,s_f=1} = (d+s_c-\beta q-c-\eta)q$. Differentiating this expression with respect to q yields: $\frac{\partial \Pi|_{s_g=0,s_f=1}}{\partial q} = -2\beta q+d+s_c-c-\eta \Rightarrow q^* = \frac{d+s_c-c-\eta}{2\beta}$. Hence, $\Pi^*|_{s_g=0,s_f=1} = \frac{(d+s_c-c-\eta)^2}{4\beta}$. In contrast, if $s_f = 0$, then the firm's profit is defined by $\Pi|_{s_g=0,s_f=0} = (d+s_c-\beta q-c)q$. Differentiating this expression with respect to q yields: $\frac{\partial \Pi|_{s_g=0,s_f=0}}{\partial q} = -2\beta q+d-s_c-c \Rightarrow q^* = \frac{d+s_c-c}{2\beta}$. Hence, $\Pi^*|_{s_g=0,s_f=0} = \frac{(d+s_c-c)^2}{4\beta}$, which is clearly greater than $\Pi^*|_{s_g=0,s_f=1} \forall \eta \in (0,2]$. Hence, regardless of what government standard is chosen, the firm will always choose $s_f = 0$.

Proof of the Activist Monitoring Proposition

To prove this proposition, we begin by identifying the optimal effort level (e^*) that the activist would exert if it knew the firm's quality choice with certainty. Suppose the government sets a high standard, and the firm chooses a high standard (i.e., $s_g = 1, s_f = 1$). In that scenario, the expected utility of the activist (based on Equation 7) can be characterized as follows:

$$EU_A|_{s_g=1,s_f=1} = -Z(\frac{3-2s_c}{2e}) - e,$$

where e is the effort level exerted by the activist, and Z is the weight that she places on the difference between the market's perception of the firm's production choice and its actual choice in the second period (where the market's perception does not deviate from its prior, s_c, with probability $\frac{1}{e}$, and the activist facilitates the correct realization of the firm's production choice with probability $\frac{2e-3}{2e}$). Differentiating this expression with respect to e yields:

$$\frac{\partial EU_A|_{s_g=1,s_f=1}}{\partial e} = \frac{Z(3-2s_c)}{2e^2} - 1 \Rightarrow e^*|_{s_g=1,s_f=1} = \frac{\sqrt{2}\sqrt{Z(3-2s_c)}}{2}.$$

Alternatively, suppose that the firm chooses a low standard (i.e., $s_g = 1, s_f = 0$), the expected utility of the activist from exerting effort can be characterized as:

$$EU_A|_{s_g=1,s_f=0} = -Z(\frac{2s_c+1}{2e}) - e.$$

Engaging in similar analysis to above, we see that

$$\frac{\partial EU_A|_{s_g=1,s_f=0}}{\partial e} = \frac{Z(2s_c+1)}{2e^2} - 1 \Rightarrow e^*|_{s_g=1,s_f=0} = \frac{\sqrt{2}\sqrt{Z(2s_c+1)}}{2},$$

which implies that the activist would be willing to exert more effort if it knew that the firm were producing low-quality goods, and the public was predisposed towards expecting the firm to produce high-quality goods (i.e., $s_c > \frac{1}{2}$). Given these optimal activist effort levels, we can calculate the firm's expected utility for choosing $s_f = 1$ as follows:

$$E\Pi^*|_{s_g=1,s_f=1} = \frac{(d-c-\eta+2s_c)^2}{4\beta} + \delta[\frac{1}{e^*|_{s_g=1,s_f=1}}(\frac{(d-c-\eta+2s_c)^2}{4\beta})$$
$$+\frac{1}{2e^*|_{s_g=1,s_f=1}}(\frac{(d-c-\eta)^2}{4\beta}) + (\frac{2e^*|_{s_g=1,s_f=1}-3}{2e^*|_{s_g=1,s_f=1}})(\frac{(d-c-\eta+2)^2}{4\beta})],$$

where the first term represents the firm's first-period profit from choosing $s_f = 1$, given that consumers have expectations s_c about the firm's actually choice, and the second (discounted) term represents the firm's expected second-period profit, given that with probability $\frac{1}{e^*|_{s_g=1,s_f=1}}$ the market's prior beliefs will not change; with probability $\frac{1}{2e^*|_{s_g=1,s_f=1}}$ the activist

will induce a misperception so that the market will think that $s_f = 0$, yielding firm profits equal to $\Pi^*|_{s_g=1,s_f=1,s_{fm}=0}$; and with probability $\frac{2e^*|_{s_g=1,s_f=1}-3}{2e^*|_{s_g=1,s_f=1}}$ the activist will induce a correct revelation of the firm's choice, yielding firm profits equal to $\Pi^*|_{s_g=1,s_f=1,s_{fm}=1}$. By the same logic, the firm's expected profits from choosing $s_f = 0$ is as follows:

$$E\Pi^*|_{s_g=1,s_f=0} = \frac{(d-c+2s_c)^2}{4\beta} + \delta[\frac{1}{e^*|_{s_g=1,s_f=0}}(\frac{(d-c+2s_c)^2}{4\beta}) + \frac{1}{2e^*|_{s_g=1,s_f=0}}(\frac{(d-c+2)^2}{4\beta}) + (\frac{2e^*|_{s_g=1,s_f=0}-3}{2e^*|_{s_g=1,s_f=0}})(\frac{(d-c)^2}{4\beta})].$$

In considering these quantities, the relevant question to ask is, for what value of Z (which supports an optimal e^*) would the firm choose to deviate from the assumed strategy? The first point to establish is whether the firm is content to choose $s_f = 0$ given that the activist is exerting effort level $e^*|_{s_g=1,s_f=0} = \frac{\sqrt{2}\sqrt{Z(2s_c+1)}}{2}$, or would it prefer to deviate to choosing $s_f = 1$. We characterize the firm's expected profit if it deviates to $s_f = 1$ from $s_f = 0$ as:

$$E\Pi^*|_{deviate(s_g=1,s_f=0)} = \frac{(d-c-\eta+2s_c)^2}{4\beta} + \delta[\frac{1}{e^*|_{s_g=1,s_f=0}}(\frac{(d-c-\eta+2s_c)^2}{4\beta}) + \frac{1}{2e^*|_{s_g=1,s_f=0}}(\frac{(d-c-\eta)^2}{4\beta}) + (\frac{2e^*|_{s_g=1,s_f=0}-3}{2e^*|_{s_g=1,s_f=0}})(\frac{(d-c-\eta+2)^2}{4\beta})].$$

Setting $E\Pi^*|_{s_g=1,s_f=0} = E\Pi^*|_{deviate(s_g=1,s_f=0)}$ allows us to obtain the $Z_L^*|_{s_g=1}$ such that the firm is indifferent between these two options. Similarly, we also seek to identify for what value of Z (which supports an optimal e^*) would the firm choose quality level $s_f = 1$ rather than deviating to $s_f = 0$, given that the activist is exerting effort level $e^*|_{s_g=1,s_f=1} = \frac{\sqrt{2}\sqrt{Z(3-2s_c)}}{2}$. We characterize the firm's expected profit if it engages in such a deviation as:

$$E\Pi^*|_{deviate(s_g=1,s_f=1)} = \frac{(d-c+2s_c)^2}{4\beta} + \delta[\frac{1}{e^*|_{s_g=1,s_f=1}}(\frac{(d-c+2s_c)^2}{4\beta}) + \frac{1}{2e^*|_{s_g=1,s_f=1}}(\frac{(d-c+2)^2}{4\beta}) + (\frac{2e^*|_{s_g=1,s_f=1}-3}{2e^*|_{s_g=1,s_f=1}})(\frac{(d-c)^2}{4\beta})].$$

Setting $E\Pi^*|_{s_g=1,s_f=1} = E\Pi^*|_{deviate(s_g=1,s_f=1)}$ allows us to obtain the $Z_H^*|_{s_g=1}$ such that the firm is indifferent between the two options. Hence, we establish the partitions in the activist salience space such that for $Z \leq Z_L^*|_{s_g=1}$, the firm chooses a low standard, for $Z \geq Z_H^*|_{s_g=1}$ the firm chooses a high standard, and for $Z \in (Z_L^*|_{s_g=1}, Z_H^*|_{s_g=1})$ the firm mixes between actually choosing a high standard and choosing a low standard.

To identify the probability distribution that supports this mixed strategy equilibrium when $Z \in (Z_L^*|_{s_g=1}, Z_H^*|_{s_g=1})$, we begin by identifying the crucial level of effort that the activist must exert to make the firm indifferent between playing $s_f = 1$ and $s_f = 0$. That is,

we are solving for $e_{mix}|_{s_g=1}$ that satisfies the following equation:

$$E\Pi^*|_{s_g=1,s_f=1,e^*_{mix}} = E\Pi^*|_{s_g=1,s_f=0,e^*_{mix}}.$$

Upon identifying $e^*_{mix}|_{s_g=1}$, we then identify the probability that the firm plays $s_f = 1$ (i.e., $x^*|_{s_g=1}$) that supports this effort level. To do this, we begin by identifying the optimal effort level that the activist would exert if the firm were mixing with any generic probability, x. We can characterize the expected utility of the activist in this scenario as:

$$EU_A|_{s_g=1,mix} = x(\frac{-Z(3-2s_c)}{2e} - e) + (1-x)(\frac{-Z(2s_c+1)}{2e} - e).$$

Differentiating this expression with respect to e and solving for e^* yields the optimal effort level that the activist would exert for any generic probability, $x : e^*|_{s_g=1,x} = \frac{\sqrt{2Z(2x-4xs_c+2s_c+1)}}{2}$. Setting this quantity equal to the $e^*_{mix}|_{s_g=1}$ that supports the firm's mixed strategy above yields the optimal probability distribution $x^*|_{s_g=1}$ that supports the mixed strategy equilibrium when $Z \in (Z^*_L|_{s_g=1}, Z^*_H|_{s_g=1})$. Due to space considerations, these optimal closed-form $e^*_{mix}|_{s_g=1}$ and $x^*|_{s_g=1}$ equations are omitted. Similar analysis is conducted to derive the equilibrium for the case where $s_g = 0$, which we omit from the text for space considerations (but which are available from the authors upon request).

Discussion of the Regulatory-Activist Complements Proposition and the Susceptibility to Activism Proposition

To prove the Regulatory-Activist Complements Proposition, one must compare the magnitudes of $e^*_{mix}|_{s_g=1}$ and $e^*_{mix}|_{s_g=0}$. After taking the difference of these quantities, inspection reveals that $e^*_{mix}|_{s_g=1} < e^*_{mix}|_{s_g=0}$. We omit closed-form characterizations of these quantities due to space considerations, yet they are available from the authors upon request.

Similarly, to prove the Susceptibility to Activism Proposition, one must differentiate $e^*_{mix}|_{s_g=1}$ and $e^*_{mix}|_{s_g=0}$ with respect to $\delta, d,$ ands_c, and identify whether the quantities are positively or negatively signed. While these calculations are straightforward, they are quite cumbersome to present, and hence, are omitted for space considerations, yet are available from the authors upon request.

Figure 1: Activist-Intervention Game

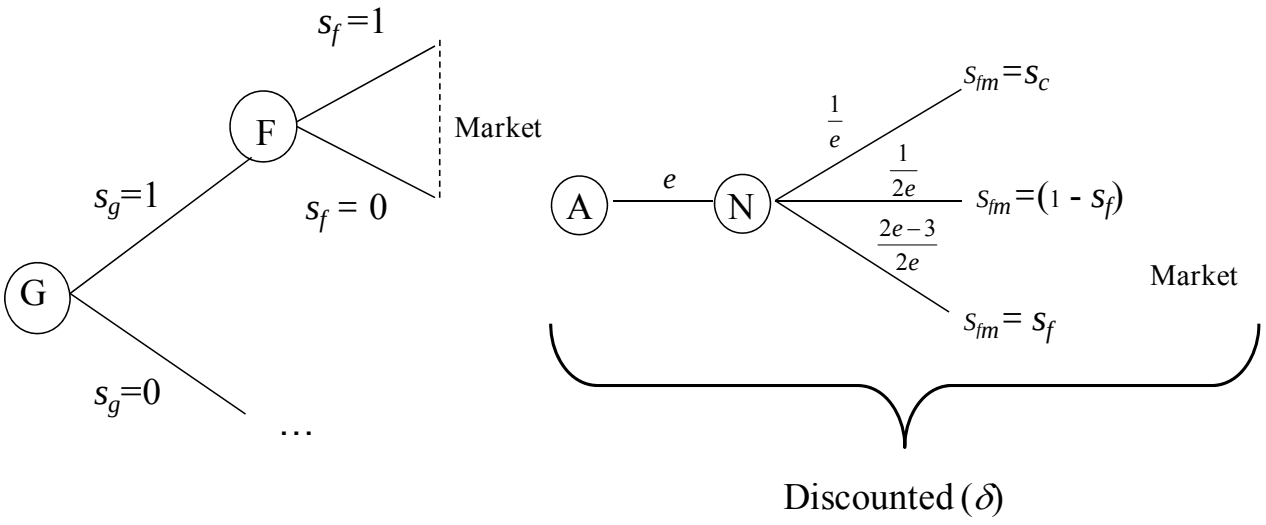

Figure 2: Equilibrium Self-Regulation Induced by Activists