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Toward a Positive Theory of Disclosure Regulation: In Search of Institutional Foundations

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ABSTRACT: This article develops a theory of standard-setting in which accounting standards emerge endogenously from an institutional bargaining process. It provides a unified framework with investment and voluntary disclosure to examine the links between regulatory institutions and accounting choice. We show that disclosure rules tend to be more comprehensive when controlled by a self-regulated professional organization than when they are under the direct oversight of elected politicians. These institutions may not implement standards desirable to diversified investors and, when voluntary disclosures are possible, allowing choice between competing standards increases market value over a single uniform standard. Several new testable hypotheses are also offered to explain differences in accounting regulations.

Keywords: *theory*; *capital market*; *disclosures*; *accounting standards*; *standard-setting*.

JEL Classifications: *C78*; *D02*; *D04*; *D71*; *D72*; *D79*; *G28*; *L51*; *M41*; *M48*.

> The accounting academic world also seems to attract those of a more cautious predisposition. Certainly, we are witnessing the effects of some quite strong intellectual biases and prejudices that are consistent with this. Keep away from politics, even the political science of standard-setting, seems to be one.
> —Anthony G. Hopwood (1944–2010)
> presidential address to the American Accounting Association (2007, 1372)

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> If I have any criticism of FASB, and I would note that I do, it is that they seem to have a political tin ear and to make a lot of powerful enemies.
> —Rep. John Dingell (2000)

I. INTRODUCTION

Financial reporting is arguably one of the most heavily regulated areas of business activity. In theory, accounting standards should seek to promote socially desirable levels of disclosure. From a practical perspective, however, setting new accounting standards is a challenging task that, if there is no single accounting system that would be desirable to all, must resolve pervasive disagreements about the measurement of social welfare. Any such disagreements imply that an implicit or explicit collective bargaining process exists deep within the standard-setting institution that cannot be simply ignored by the standard-setters. Indeed, a complete theory of accounting regulation should recognize that accounting standards emerge from institutions and should carefully examine the tensions faced by these institutions. Does the decision process within the regulatory institution matter? What characteristics of the institution can explain differences in observed regulations? Are certain institutional designs better than others, and in what sense? Clear answers to these questions may not be obvious, but they call for more explicit foundations for the existing body of research on mandatory disclosure.[1]

This article develops an analysis of the determinants of accounting choice. Developing a better understanding of standard-setting institutions is of primary importance for several reasons. First, a deeper knowledge of the institution can help us answer difficult questions about the appropriate scope of government at times when the structure and due process of standard-setting bodies is rapidly evolving. Second, taking the institution as a starting point can provide new empirical insights as to why capital markets functioning in regions with different institutions may have chosen different measurement rules, or why structural changes in the institution were followed by evolutions in the standards. Third, since many private choices are a function of existing regulations, a complete analysis of firm behavior in a changing environment should incorporate how the regulations themselves adapt to that environment.

We analyze institutions that differ in terms of the involvement of issuers in the standard-setting process. These institutions follow classic paradigms in the literature that allow us to emphasize three central players in observed standard-setting, i.e., politicians, security issuers (and undiversified investors), and independent standard-setting bodies.[2] From a conceptual standpoint, we develop the argument by moving to increasingly decentralized and participatory institutional environments, beginning with an institution in which the agenda is entirely controlled by politicians and then extending the argument to an institution in which issuers originate new standard proposals. We then compare these institutions to a market-based solution in which issuers have discretion to

[1] The relative absence of research in this area has been noted in a few recent studies, e.g., "[T]here is, presently, no received theory on mandatory disclosures in accounting, in no small part because there has been very little published analytical research on accounting standards over the last two decades. In view of the overwhelming importance of mandatory disclosures in accounting practice, this is unfortunate and something accounting researchers should strive to rectify" (Dye 2002) and "[A]ccounting is a regulated activity in the real world, and it has been so for nearly 80 years. A positive theory of accounting and financial reporting would ideally incorporate this into its arguments to a greater extent" (Lambert 2010).

[2] For simplicity, we have left aside the issue of regulatory choice by the auditing profession, since such questions cannot be addressed without a more complete institutional description of the role and liability of the auditor. In the U.S., for example, auditors have their own standards (U.S. Generally Accepted Auditing Standards) and regulatory body (PCAOB). Likewise, we do not consider the important issue of the agency relationship between regulators and firms if, for example, firms can lobby the regulator in favor of or against certain regulations (Friedman and Heinle 2012).

adopt their preferred standard and standard-setters compete to achieve a broader adoption of their standard.

We first consider an institutional environment in which standard-setting issues are primarily resolved by elected politicians. In this environment, politicians compete for votes and, thus, favor proposals that appear to be popular. In the U.S., for example, Congress and the Securities and Exchange Commission have exercised oversight over accounting choice since the Securities Exchange Act of 1934 (SEC Act). The Financial Accounting Standards Board (FASB) regularly participates in Congressional hearings, which have often led the FASB to delay or abandon disclosure requirements it originally favored (Beresford 2001; Zeff 2005; Tweedie 2009). In the model, we establish that electoral competition is likely to induce the more popular politicians to push for very low levels of disclosure (i.e., no disclosure requirement). This is because the most popular regulations are those that encourage wealth transfers from issuers with more favorable information toward issuers whose market value may decrease if their information were disclosed. These regulations are not necessarily desirable to diversified investors because, while a majority of issuers could find no disclosure requirement advantageous, the investment inefficiencies borne by a minority of issuers can be significant.

This directional prediction is broadly consistent with frequent instances in which Congress either allowed greater reporting discretion or toned down proposed mandatory disclosures by reducing their visibility.[3] Political interference has been commonplace since the creation of the FASB in 1973.

Several existing studies provide detailed evidence of political pressures in the due process in the U.S. (Sunder 1988; Zeff 2002). A well-known example is the political struggle over stock option expensing in SFAS 123 and SFAS 123R (Farber et al. 2007). As a second example, the FASB's project on derivatives in 1998 (SFAS 133) resulted in bills being introduced both in the House and Senate that would have imposed particular accounting rules and nullified new proposals from the FASB. Other controversial examples include accounting for the oil and gas industry, inflation accounting, business combinations, and fair-value measurements.[4]

The principal caveat of regulation by elected politicians is that politicians do not have a stake in the firms they regulate and do not directly bear the cost and benefits of regulations. Consequently, we next examine an alternative environment in which the private sector directly participates in the standard-setting process by originating new standard proposals. Following the classic model of Baron and Ferejohn (1989), we model self-regulation as an institution in which the firms being regulated directly bargain over accounting standards. Although self-regulation declined in the U.S.

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[3] Interventions by Congress have been far less one-sided over issues related to enforcement and managerial monitoring (fraud, compensation, insider trading, etc.) rather than public disclosure of information; see, recently, the Private Securities Litigation Reform Act of 1995, the Sarbanes-Oxley Act of 2002, or the Dodd-Frank of 2010. We conjecture that Congressional committees tend to favor private disclosure to designated regulatory bodies over public disclosures that may be misused by unsophisticated investors. A somewhat intermediate case is that of the expansion of the provisions SEC Act of 1934 to securities trading on the Over-The-Counter Bulletin Board (OTCBB) by June 2000 (Bushee and Leuz 2005), since the SEC Act involves a large number of enforcement provisions and, in practice, most of these firms were providing financial information under generally accepted accounting standards.

[4] The political history of these events presents some important realities about the process of standard-setting. For example, during 2000, there were several tumultuous congressional hearings on the FASB's proposals on business combinations (FAS 141), which ultimately led the FASB to compromise by not requiring amortization of goodwill, an option it originally favored. After the standard passed, 13 percent of U.S. senators sent a letter to the FASB urging it to postpone requiring implementation of the proposed standard. Second, in the wake of the 2008 financial crisis, the U.S. Congress House Financial Services Subcommittee asked the FASB chairman, Robert Herz, to ease standards on fair-value measurements and other than temporary impairment. Representative Paul Kanjorski, chairman of the Subcommittee on Capital Markets, Insurance and Government Sponsored Enterprises, declared, "If the regulators and standard setters do not act now to improve the standards, the Congress will have no other option than to act itself" (Norris 2009).

after the SEC Act, it has not entirely disappeared. For example, standard-setting organizations are responsible to their constituency and board members are chosen by trustees. New agenda items are often selected at the request of the institution's advisory board and based on interactions among staff members and the private sector. Many examples of pure self-regulation remain today, including entire subsets of industry-specific standards (Jamal et al. 2005). The Baron and Ferejohn (1989) model can also be interpreted as a model of bargaining in a congressional committee when some of its members are closely tied to particular private interest groups (e.g., campaign contributors or large firms in the constituency).

While self-regulation encourages active participation by issuers, it induces strategic manipulation of new agenda items. Under the assumption that all issuers participate in this process, self-regulation shifts the political power toward issuers whose interest to disclose lies exactly at the center. The regulation preferred by the center is not, in general, the regulation that would maximize the expected market price. On the one hand, the center does not internalize the potential benefits of disclosing very favorable information, even though disclosing such information could lead to more efficient investments. On the other hand, the center is unlikely to be subject to disclosure requirements over adverse events and does not fully internalize the social costs of making such disclosures. Self-regulation is not always desirable to diversified investors and, relative to regulation by politicians, implements socially excessive disclosure requirements when disclosure costs are large or credible voluntary disclosure can be made.

These preliminary results suggest a nuanced view of political intervention in standard-setting, particularly when political bodies oppose views supported by professional organizations. When tasked to draft uniform standards, professional organizations themselves act as political bodies since they pass legislation that is ultimately imposed on issuers. As such, the pressures borne by standard-setters within such an organization are conceptually related to the lobbying activities that occur in Congress and may themselves cause a number of distortions to accounting choices. This aspect needs to be emphasized as part of a complete theory of standard-setting, given that pressures exerted within self-regulated bodies are more subtle and less prone to media attention.

A political body preparing a uniform standard creates an opportunity for regulatory capture, in that the interest group favored by the political process can impose regulations that would not have been chosen by other issuers. A natural solution to this challenge is to move toward an institutional environment in which no single standard-setting body imposes a regulation, by allowing choice by individual issuers over which standards to adopt (Dye and Sunder 2001). A less well recognized benefit of this arrangement is that it gives standard-setters a disciplining market measure of performance through the adoption of their standard, i.e., by revealed preference of issuers.

In practice, competition existed implicitly before the imposition of a unique set of standards in the U.S. because practitioners and preparers could choose their preferred principle (Sunder 2005; Basu and Waymire 2008). Over the recent decades, competition has become more predominant due to the increased globalization and competition among regional capital markets. A large fraction of traded firms now report under either U.S. accounting standards or IFRS International Financial Reporting Standards, and the U.S. has been gradually moving toward a model in which issuers would be given the option to adopt only international accounting standards. While, in theory, most countries still require adoption of their domestic standards, issuers may select the country and stock exchange where their securities are traded partially in response to particular disclosure requirements (Huddart et al. 1999).

A potential criticism of this design is that certain firms may seek low-quality standards to hide potentially unfavorable information, thus leading to a decrease in information quality in the capital market. However, a formal analysis of this problem reveals that the opposite might also be true. Allowing two standard-setters to compete makes it possible for certain firms to convey favorable information by choosing the standard that features more expansive disclosures over other adverse or

less favorable events. For example, by bonding its financial statements to a legislation with greater levels of monitoring and public disclosure, a firm can signal more favorable information (Coffee 2002; Berger et al. 2011). Unlike in the case of a uniform standard, this new informational channel operates when a firm decides to adopt a new standard, even before the firm makes any further disclosures according to that standard.

Competition also disciplines standard-setters to cater to different groups and thus encourages the revelation of information through standard adoptions. In the presence of voluntary disclosure, competition between standard-setters implies higher expected market prices than any institution with a uniform standard, of which regulation by politicians and self-regulation are special cases. This property is more ambiguous absent credible voluntary disclosure because market prices respond more favorably to the adoption of the more informative standard, in turn leading to a wider adoption and encouraging standard-setters to implement high disclosure requirements. Even then, we do not find support for the idea that competition would lead to uninformative standards. Rather, we show that competition is desirable to diversified investors if disclosure costs are not too large.

Literature Review

The theoretical research in the area of accounting standards is relatively well developed. Since Demski's (1973) seminal question, "Are economically efficient standards possible?" the normative literature has proposed various maps linking the environment to the provision of public information. Early contributions such as those of Kanodia (1980) and Ohlson and Buckman (1981), to cite a few examples, have described how the value of information will be a function of the productive environment and the market mechanism. This research area is still active today and continues to provide fundamental insights about the suitability of various financial disclosure rules (Liang 2004; Ewert and Wagenhofer 2005; Demski et al. 2008; Plantin et al. 2008; Beyer and Guttman 2010; Gao 2010; Caskey and Hughes 2012; Stecher and Suijs 2012).

The normative paradigm answers Demski's question only partially. Although it provides guidance for economically efficient disclosure rules, it does not explain whether and how the regulatory institution should implement these prescriptions, given that the choices of the institution are a function of the preferences of those it regulates (Stigler 1971). While it is fairly unexplored in accounting models, regulatory capture is not new to the broader accounting literature. The classic early texts of Horngren (1973), Zeff (1978), and Watts and Zimmerman (1978) outlined many of the problems posed by regulatory capture. A recent stream of studies is now emerging and takes a more topical approach to political interference during some of the more recent accounting debates (Lo 2003; Farber et al. 2007; Ramanna 2008; Hochberg et al. 2009; Allen and Ramanna 2012). One objective of this study is to develop a framework to further guide empirical research in this area.

Few theoretical studies have examined the process of standard-setting formally. Amershi et al. (1982) and Fields and King (1996) develop game-theoretic models to capture elements of the process of institutional decision-making. These studies focus on a more abstract setting than ours and focus primarily on the decision process rather than the resulting regulations. A different approach is used in Newman (1981) in which the political influence of various groups is measured using solution concepts from cooperative game theory. Bertomeu and Magee (2011) discuss how an institution subject to electoral motives responds to industry- or economy-wide shocks that change the distribution of firms' private information between different time periods, causing mandatory disclosure to change as the economy moves through periods of economic booms and busts. Carlin and Davies (2011) and Koenigsgruber (2012) focus on information communication between the private sector and the regulator, when the latter is imperfectly informed about which regulations would be socially desirable. Friedman and Heinle (2012) develop a model in which firms can lobby against the enforcement effort of the regulator and show that institutions with a single uniform

standard offset incentives to lobby. Questions of institutional design and their consequences have been more atypical, although a few recent studies have opened new questions about the nature of the institution (Dye and Sunder 2001; Sunder 2009; Ray 2010).

II. THE MODEL

We develop first a simple non-technical overview of the model. There is an economy populated with a set of owners-managers (hereafter, the owners) who are endowed with private information about a firm issuing securities in the capital market. Here, by owners, we mean economic agents who are stakeholders or insiders in the corporation (e.g., entrepreneurs, management, large shareholders, or employees) whose welfare is related to the firm's market value. The regulator can implement a policy that may mandate a disclosure over certain unfavorable economic events. Owners cannot commit to a policy before receiving their information and, given that they may have received different information, do not necessarily agree on a common disclosure regulation. To resolve this disagreement, a public institution aggregates individual preferences and selects a regulation to enforce. In this study, we examine three types of institutions: electoral competition, in which politicians propose regulations; self-regulation, in which the owners design and propose new policies; and, last, competition between standard-setters, in which issuers can choose which standard best fits their needs.

To incorporate into the model a role for early disclosure, we assume that owners have a horizon shorter than the firm's terminal cash flows, and must sell the firm's securities in the capital market. In this respect, disclosure may cause wealth transfers to the extent that it may increase the market value of certain firms while reducing the market value of others. Further, we assume that the disclosure can affect the efficiency of investment decisions. Before the sale, firms make a public investment decision that, absent disclosure, is set to maximize the current market price rather than the terminal cash flow. In this environment, there is an underlying trade-off between the investment value of disclosure and the proprietary or verification costs that such disclosures may entail.

We formally derive the standard selected by each institution. Key to the analysis, owners are strategic when they exert influences on accounting choice. They understand the proprietary costs, the investment decisions, and, ultimately, the market price induced by a regulation and, based on this knowledge, have a preference over the set of possible standards. Naturally, owners also understand the strategic nature of the institution and act optimally to push toward their most favored alternative. The solution to this game is intended to illustrate which regulations are favored in different institutional settings and their consequences on the capital market.

We present next the formal model and notations. There is a set of firms that will produce, at some unspecified date in the future, an expected terminal cash flow $\tilde{F}$. Each firm has a risk-neutral owner who puts the firm for sale in a competitive financial market. The expected cash flow takes the form $\tilde{F} = \tilde{v}I - \frac{I^2}{2}$, where I represents a publicly observable investment decision that must be made prior to the sale and $\tilde{v}$ is a signal on the productivity of the investment, drawn from a uniform distribution with support over [0, 1] and observed only by the owner.[5] All variables represent current expectations and both the realized cash flow and productivity at the terminal date may be noisy with no changes to the analysis.

Prior to the sale, there is a disclosure regulation that requires a public disclosure over certain economic events. Our initial focus is on mandatory requirements to disclose events deemed to be relatively unfavorable or adverse. This can be more narrowly defined as impairment accounting,

[5] To ensure that the terminal cash flow is positive, one may assume that the actual cash flow is $\tilde{F} + \mu$ where μ is a sufficiently large positive constant, with no change to the results. Further, the main results are very similar if we allow owners to liquidate the project early if they expect low future cash flows.

such as, for example, the reduction in the value of long-term assets or inventories, the early recognition of a loss-making transaction, the reclassification of other-than-temporary losses, and, more generally, reflects prudent or conservative disclosures. While such forms of disclosure rules seem widespread in practice, this restriction is a limitation of our study.[6]

In formal terms, we assume that the regulation takes the form of a threshold $A \in [0, 1]$ such that all events $v < A$ must be disclosed. We assume that disclosures are truthful, i.e., that there exists an enforcement mechanism (such as the SEC or shareholder lawsuits) that prevents firms from misreporting its future cash flows or failing to report information that must be disclosed.[7] If, for example, no impairment test is performed on an asset that is later revealed to have little value, then the SEC might demand whether that information was known in advance and the asset should have been impaired.

In the environment with mandatory disclosure only, we assume that there is no other competing channel through which firms may disclose information. This environment may reflect events that may not be credibly disclosed in a voluntary manner.[8] In the environment with voluntary disclosure, an owner with $v \geq A$ can disclose voluntarily even if a disclosure of the event is not required by law. We assume that there is an exogenous cost when disclosing that reduces the firm's terminal cash flow by $c > 0$. Further, the parameter c represents the cost of the technology that can be used to truthfully disclose information and is not a function of whether the disclosure is mandatory or voluntary. For brevity, we develop the analysis under the baseline assumption that c is not too large (i.e., c is weakly less than 1/12), which avoids corner solutions. This assumption is not critical for the results and, for completeness, the proofs in the Appendix also include analysis with greater values of c. Importantly, given that the support of $\tilde{v}$ is normalized to [0, 1], the cost c should be more generally understood as being expressed per unit of variance of final cash flows; in particular, an increase in the variance of cash flows is equivalent to a decrease in the relative cost of disclosure (Verrecchia 1990).[9]

At date $t = 0$, each owner privately observes the signal $\tilde{v}$ about the individual investment's quality. At date $t = 1$, an institution, whose structure is defined in later sections, selects an accounting standard A. At date $t = 2$, owners that observed $v < A$ must disclose their information so that sufficiently unfavorable information is subject to a mandatory disclosure requirement. If voluntary disclosures are possible, owners who observed $v \geq A$ may choose to disclose their information. Voluntary disclosure is only desirable for firms that have sufficiently favorable

[6] In practice, we are not aware of any accounting rule such that, for two events that are exactly identical except for future cash flows, the accounting rule would mandate disclosure of only the higher cash flows. This also opens the interesting question as to whether such a feature could be recovered as an endogenous outcome of the institution. Recently, Goex and Wagenhofer (2009) show that such impairment rules can be optimal in an environment where a firm's assets can be pledged as collateral to debt contracts.

[7] While not the primary focus here, Dye (2002) develops a model in which the manager can manipulate the report for a personal cost to attain a disclosure threshold. As he shows, the effect of manipulation is to alter the definition of the "effective" non-disclosure threshold to incorporate firms that fall below the threshold but manipulate to reach the threshold.

[8] It is theoretically possible that a regulator would choose to enforce the monitoring of voluntary disclosures as strictly as the monitoring of mandatory ones. In our framework, this would correspond to assuming that a truthful voluntary disclosure is always possible. Indeed, regulators sometimes scrutinize firms that make deceptive public statements to their investors, although, in practice, misleading voluntary disclosures rarely occur in isolation of actual GAAP violations. However, there seems to be greater enforcement over mandatory disclosure so that an economic event that is not disclosed as part of financial statements may be less credible than an economic event that is part of financial statements. There are many possible reasons for this, such as the nature of an auditor's liability, the format of voluntary disclosures that makes them difficult to verify in a court of law (Gao 2011), and the practical difficulties involved in monitoring all voluntary disclosures.

[9] For example, if we assumed that $\tilde{v}' = a\tilde{v}'$ where $a > 0$ and $\tilde{v}' \sim U[0, 1]$, a von Neumann-Morgenstern transformation of the model would imply that disclosure thresholds would be identical to the baseline model after rescaling the cost to c/a.

information to disclose and we denote $\tau(A)$ as the threshold such that v is voluntarily disclosed if and only if $v \geq \tau(A)$ and set $\tau(A) = 1$ in the treatment without voluntary disclosure. At date $t = 3$, the owner makes a public investment decision. Conditional on a disclosure, the investment decision is made to maximize the future cash flow $\tilde{F}$. This implies that the market price $P(v)$ of a disclosing firm is given by:

$$P(v) = \max_I vI - \frac{I^2}{2} - c = \frac{v^2}{2} - c. \tag{1}$$

Similarly, the investment is made to maximize the market price $P_{ND}(A)$ of a non-disclosing firm:

$$P_{ND}(A) = \max_I \mathbb{E}\left(\tilde{v}I - \frac{I^2}{2}|ND\right) = \frac{\left(A + \min\left(1, \tau(A)\right)\right)^2}{8}. \tag{2}$$

At date $t = 4$, the firm is sold in a competitive market for $P(v)$ if a disclosure has been made or $P_{ND}(A)$ otherwise. The game ends at some date in the future and the cash flow is received by the new investors.[10]

III. THE REGULATION PREFERRED BY DIVERSIFIED INVESTORS

A relevant benchmark for the study of disclosure is the regulation that would maximize the expected market price and would be preferred by perfectly diversified investors. For further reference, we denote it the *ex ante* preferred regulation given that it may also correspond to a measurement of an owner's expected utility prior to receiving private information (Christensen et al. 2010). The expected market price can be written as follows:

$$\sigma(A) = \underbrace{\int_0^A \left(\frac{v^2}{2} - c\right) dv}_{\text{Mandatory disclosers}} + \underbrace{\int_A^{min\left(1,\tau(A)\right)} P_{ND}(A) dv}_{\text{Non-disclosers}} + \underbrace{\int_{min(1,\tau(A))}^1 \left(\frac{v^2}{2} - c\right) dv}_{\text{Voluntary disclosers}}. \tag{3}$$

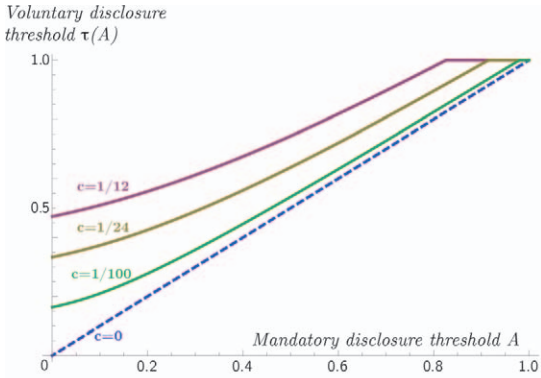
Equation (3) states that a regulated firm can be in one of the following three cases, as a function of the private information it receives: unfavorable information subject to a mandatory disclosure, moderate or favorable information that is not disclosed, or whenever voluntary disclosures are possible, sufficiently favorable information that is voluntarily disclosed. As is intuitive, the next proposition establishes that the *ex ante* preferred level of mandatory disclosure should be lower when the disclosure cost increases.

Proposition 1: Under pure mandatory disclosure, the expected market price is single-peaked in A with a unique maximum at $A^m = 1 - 2\sqrt{2c}$.

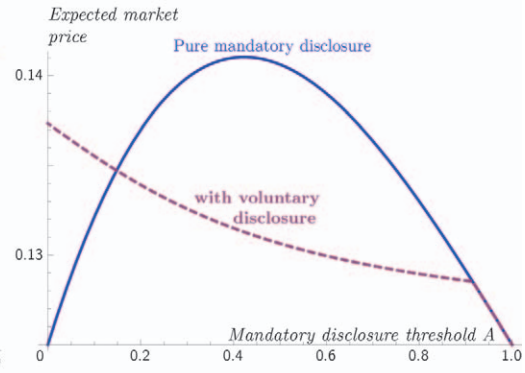
We next consider the model with voluntary disclosure. As in Jovanovic (1982) and (Verrecchia 1983), the voluntary disclosure threshold $\tau(A)$ is given by the point at which an owner is indifferent between disclosing and not disclosing, i.e., $P_{ND}(A) = P(\tau(A))$. Solving this equation for $\tau(A)$:

[10] It is clear that the owner would be better off committing to set I as a function of v in the non-disclosure region. However, since v is not observable and the owner maximizes the selling price of the firm, such an investment strategy would not be incentive-compatible in the sense that all owners would choose the investment $I(v)$ that maximizes $\tilde{F}$. Indeed, an incentive-compatible investment strategy must be such that the non-disclosure market price is not a function of the investment chosen. By choosing $P_{ND}(A) = max_I \mathbb{E}(\tilde{v}|ND)I - \frac{I^2}{2}$ we implicitly select the investment strategy that maximizes the non-disclosure market price. Equivalently, one may assume that the investment is made by the new investors *and* the owner cannot credibly communicate the private signal after selling the firm.

FIGURE 1
Average Market Price for Different Regulatory Choices



Voluntary disclosure threshold as a function of an existing disclosure requirement A



Ex-ante market price in regimes with or without voluntary disclosure (c=1/24)

$$\tau(A) = \frac{1}{3}(A + 2\sqrt{A^2 + 6c}). \tag{4}$$

The voluntary disclosure threshold $\tau(A)$ is increasing in A as more mandatory disclosure tends to increase the non-disclosure market price and reduces the need for further voluntary disclosures. If A is sufficiently large, the threshold $\tau(A)$ will be greater than 1, reflecting the fact that there will be no further need for any voluntary disclosure.

Proposition 2: In the regime with voluntary disclosure, the expected market price $\sigma(A)$ is strictly decreasing in A and the *ex ante* preferred regulation, $A^v = 0$, does not impose mandatory disclosure. In addition, a regulation requiring all firms with $v < A$ to disclose Pareto dominates any other regulation requiring firms with $v < A$ and (at least) one firm with $v \in (A, \tau(A))$ to disclose as well.

Proposition 2 establishes that an entirely deregulated economy is *ex ante* preferred if firms can make voluntary disclosures. The reason for this, as illustrated in Figure 1, is that even absent any mandatory disclosure requirements, firms tend to provision excessive disclosures to signal their type, relative to the productive benefits of information (Shavell 1994). Even if there are no productive uses of information, some firms will make some voluntary disclosures to separate themselves from other firms in the financial market. Since the level of disclosure is already excessive in an unregulated environment, an increase in mandatory disclosure tends to increase the probability of disclosure even further, causing the expected market price to decrease.[11]

[11] One might note that owners should agree *ex ante* not to regulate. However, whether such an *ex ante* state of ignorance actually exists is not certain (in fact, creating mechanisms that rely on a state of ignorance would solve many problems of information asymmetries). Furthermore, even if owners were to *ex ante* agree not to regulate, maintaining this policy after information is received would require an ability to socially commit (which is sometimes problematic) (Kydland and Prescott 1977). For example, while all institutions considered here have no mandatory disclosure as a feasible alternative, this may not be the policy selected by the institution.

Increasing mandatory disclosure can reduce excessive voluntary disclosure (increasing $\tau(A)$) but, in doing so, does not reduce the total expected disclosure cost since it turns voluntary disclosures into mandatory ones. In fact, mandatory disclosure reduces the expected market price because the marginal benefit of disclosure is greatest when there is a higher payoff per unit of investment, i.e., when v is high. In the second part of the proposition, we develop this intuition further to show that, in the environment with voluntary disclosures, all firms prefer an asymmetric impairment-like standard in which unfavorable events are disclosed and, therefore, the restriction to mandatory disclosure of unfavorable events is without loss of generality.

Would society implement choices that coincide with the *ex ante* preferred regulation? This question has been a recurrent theme within the political economy literature (Stigler 1971; Kothari et al. 2010) and is discussed here in the context of mandatory disclosure. Private information changes preferences for public disclosure by providing advance knowledge of whether public disclosures would be favorable or unfavorable. Thus, the regulatory institution must resolve a bargaining process between parties with different interest; in the following sections, we examine in more detail how characteristics of this process shape accounting choices.

IV. ELECTORAL COMPETITION

We introduce first a version of Downs' model of electoral competition (Downs 1957) that has been adapted to our environment to capture the effect of a political resolution of accounting matters. There are two politicians, whom we label as candidates 1 and 2. The candidates compete to win office and to do so, make a policy proposal A_i, where A_i denotes the proposal of candidate $i = 1, 2$. The candidates make their proposals sequentially and, without loss of generality, we denote candidate 1 as the candidate making the first proposal.[12] Which candidate wins depends on the total votes for the proposal. Owners support the proposal that most increases their market value. In addition, owners who are indifferent vote for either candidate with equal probability (or, equivalently, do not vote). In the rest of the analysis, denote $L(A_i, A_{-i})$ as the percentage of votes in support of candidate i proposing A_i when the other candidate proposes A_{-i}.

To avoid a knife-edge case of indifference if candidates are certain to win or lose the election, we shall assume that there is a small amount of residual uncertainty about the final outcome of the election. This uncertainty can relate to noise in voting behavior, candidates' other policy issues, or whether the campaign has been has been conducted well. Then, the candidates' dominant strategy is to propose the regulation that maximizes the percentage of votes $L(A_i, A_{-i})$ they expect to receive. For the purpose of interpretation, we assume later on that the uncertainty in the election is small so that the candidate receiving the most votes is almost certain to be elected.[13]

[12] There is no pure-strategy simultaneous-move equilibrium in this game because a candidate is always strictly better off adapting her proposal to the proposal made by the other candidate. The results only require a candidate to know whether a proposal has been made by the other candidate but do not require common knowledge of the order of proposers. For example, a more complete description of the game may involve an attrition game in which the two candidates propose over time, (1a) choosing to propose at rate λ (so that every candidate has a probability of proposing λdt for a small time period dt) if the other candidate did not propose yet, (2) proposing immediately once the other candidate made a proposal, (3) discounting at rate βdt if there is a time period dt such that no proposal has been made over dt. We do not develop this attrition game further here because it would feature the same proposal strategies as those we derive here.

[13] To be more formal, one may assume that the actual percentage of votes received by candidate i is given by $L(A_i, A_{-i}) + \alpha\tilde{\epsilon}_i$ where α is a non-zero number and $\tilde{\epsilon}_i$ is drawn from a distribution with zero mean and full support over the real line.

We begin by solving the model in the environment without voluntary disclosure. The proposal game is a zero-sum game in which the prize (winning the election) can be obtained by either the first or the second candidate. Hence, the optimal strategy of the first candidate is to minimize the support received by the second candidate. As the model is solved by backward induction, the first step of the analysis is to derive the second candidate's optimal proposal if the first candidate 1 makes a proposal A_1 (i.e., such that events v below A_1 must be disclosed.)

There are two possible strategies to successfully counter a proposal A_1. The first strategy is to campaign to reduce disclosure requirements. A proposal $A_2 < A_1$ has two potential benefits for owners with $v \in (A_2, A_1)$ in that (1) it spares these owners the cost of the disclosure under A_1 and (2) it attains a potentially higher non-disclosure price by pooling with other firms with $v \geq A_2$. In order to maximize the fraction of such firms that would disclose under A_1 but are not required to disclose under A_2, the second candidate thus proposes no disclosure ($A_2 = 0$). Note that this strategy is more effective when there are more disclosers under the first candidate's proposal, i.e., when A_1 is large.

Example: While these statements are shown formally in Appendix A, an extended numerical example can be used to illustrate this argument (we shall continue this example as we move through other environments). Assume that the disclosure cost is equal to $c = 1/12$ and let us examine the support for a standard A_2 strictly lower than A_1. Owners with $v \in (A_2, A_1)$ support A_2 if the non-disclosure price under A_2 is greater than the disclosure price if A_1 is implemented, i.e., $(A_2 + 1)^2/8 > v^2/2 - 1/12$. Rewriting this condition as a function of v, an owner supports A_2 when $v < \min(A_1, k)$ where $k = \sqrt{5/3 + A_2(2 + A_2)}/2$. This bound corresponds to the threshold realization of v beyond which a firm is better off disclosing. The percentage of owners $L(A_2, A_1)$ supporting A_2 over A_1 is given by (1) all owners whose realization of v lies between A_2 and $\min(k, A_1)$ and (2) half of the indifferent owners with $v < A_2$ who must disclose under both standards. This implies that, over all proposals $A_2 < A_1$, the percentage $L(A_2, A_1)$ is maximal when proposing no disclosure, i.e., $A_2 = 0$, and achieves a support $L(0, A_1) = \min(A_1, k_0)$ where $k_0 = \sqrt{5/3}/2$ is the threshold k evaluated at no-disclosure.

The second strategy is to campaign to increase disclosure requirements by proposing $A_2 > A_1$. This proposal is supported by non-disclosers under both standard proposals because a regulatory environment with more comprehensive disclosures leads to a greater non-disclosure price. It thus follows that the second candidate's preferred proposal is to maximize the fraction of non-disclosers by making a proposal with slightly more disclosure than under the first candidate's proposal. This strategy is supported by almost all firms with $v > A_1$ and is more effective when there are more non-disclosers under the first candidate's proposal, i.e., when A_1 is small.

Example: Consider next a proposal involving an increase in mandatory disclosure. Note that $L(A_2, A_1) = 1 - L(A_1, A_2)$ is decreasing in A_2 and is strictly less than $1 - A_1/2$ for any $A_2 > A_1$. Comparing this to no-disclosure, if $L(0, A_1) = \min(A_1, k_0) < 1 - A_1/2$, there exists an increase in mandatory disclosure that receives more support than no disclosure. On the other hand, if $\min(A_1, k_0) \geq 1 - A_1/2$, no disclosure achieves strictly more support than any proposal with $A_2 > A_1$. Solving for the threshold K^m such that $\min(K^m, k_0) = 1 - K^m/2$, no-disclosure is preferred by the second candidate if and only if $A_1 \geq K^m = 2 - \sqrt{5/3}$.

The next Lemma establishes more generally that the second candidate proposes no disclosure requirement when the first candidate proposes sufficiently high disclosure requirements and, otherwise, is better-off increasing disclosure requirements.

Lemma 1: Suppose candidate 1 proposes A_1. Then, there exists $K^m = 2 - \sqrt{1 + 8c}$ such that (i) if $A_1 \geq K^m$, candidate 2 makes a proposal $A_2 = 0$ that features no mandatory disclosure, and, otherwise, (ii) there exists a proposal $A_2 > A_1$ such that candidate 2 achieves more support than under any decrease in mandatory disclosure. For any A_1, candidate 2 can achieve a support strictly greater than 50 percent.

A key fact about electoral competition is that the popularity of one proposal relative to another does not necessarily conform with the *ex ante* desirability of the proposal. To illustrate this, note that even if candidate 1 were to propose the *ex ante* preferred regulation A^m, this regulation would be defeated by another proposal made by candidate 2. This is because the regulation that maximizes the expected market price is not equally desirable to all informed owners and, thus, it may not be the most popular. In the example discussed above, non-disclosers under A^m would prefer a greater level of mandatory disclosure than A^m because they do not internalize the disclosure costs but benefit from the higher non-disclosure market price. Then, the *ex ante* preferred mandatory disclosure level is $A^m \approx 0.18$ (at $c = 1/12$). But, if this regulation were proposed by the first candidate and the second candidate were to propose $A_2 = 0.19$, 81 percent of all owners would support A_2 over A_1.

Having characterized the second candidate's preference, we examine the optimal proposal of candidate 1. If this proposal features too little disclosure, candidate 2 will propose more disclosure and collect the support from nearly all non-disclosers. Increasing mandatory disclosure (i.e., increasing A_1) thus reduces the fraction of such non-disclosers and benefits candidate 1. This argument further implies that electoral competition induces the first candidate to propose a high level of mandatory disclosure $A_1 \geq K^m$. Indeed, this threshold is always strictly greater than the *ex ante* preferred regulation A^m.

This property might suggest that electoral competition would lead the first candidate to successfully implement high levels of mandatory disclosure. However, this does not occur here, considering that the second candidate has an informational advantage over first candidate (that of knowing that candidate's proposal) and can make a more popular proposal. As shown in Lemma 1, the second candidate responds to the high mandatory disclosure proposal made by the first candidate by proposing no disclosure. If there is little uncertainty in the election, no disclosure is almost certainly implemented.

Proposition 3: In the environment without voluntary disclosure, candidate 1 proposes a standard $A_1 \in [K^m, 1]$ and candidate 2 proposes no-disclosure ($A_2 = 0$). As the residual uncertainty about the outcome of the election becomes small, no-disclosure is implemented with probability 1.

To interpret this result further, Proposition 3 suggests a particular timing of political intervention in which some initial demands for high levels of mandatory disclosure should be soon followed by politically more successful proposals for less regulation. We are not aware of any empirical analysis of political timing but at least some anecdotal evidence about observed standard-setting appears consistent with this result. As an example, over the mid-1970s, Congress passed a law to determine whether the successful-efforts or full-cost method of accounting should be required for the oil and gas industry. The FASB responded by issuing Statement No. 19, requiring the successful-efforts method. Later on, facing intense political pressure, the SEC overrode the FASB's position, allowing both methods to be used. Even in the case of the stock option expensing debates over the mid-1990s, the actions of the FASB were preceded by bills in Congress encouraging greater disclosure of certain stock option expenses. As another example, a bill introduced in Congress in 1991 urged the SEC to require firms to "specify the method for estimating the present value of stock options ... paid to the directors or senior executives" and

"require the issuer to reduce its earnings, as reflected in its earnings statements to its security holders, by the estimated present value of such compensation" (H.R. 2522, 1st Session of the 102nd Congress).

Example: We illustrate the proposition by showing it formally in the context of the example. Recall that the first candidate minimizes the fraction of votes received by the second candidate. If $A_1 \geq 2 - \sqrt{5/3}$, the second candidate achieves $L(0, A_1) = k_0$. If $A_1 < 2 - \sqrt{5/3}$, the second candidate can achieve a support $1 - A_2/2$, which is strictly greater than k_0 for A_2 sufficiently close to A_1. It follows that the first candidate can propose any $A_1 \geq 2 - \sqrt{5/3}$ and the second candidate always proposes no-disclosure.

Consider next the environment in which firms can voluntarily disclose their information. There are two main differences with the previous regime. First, firms with sufficiently favorable information disclose on their own and no longer support the regulation with the greatest non-disclosure price; this tends to reduce the support for more disclosure by truncating very favorable economic events (the upper tail of $\tilde{v}$). Relative to the environment without voluntary disclosure (in which all firms with $v > A_i$ support A_i), the support for A_i is thus reduced. Second, because disclosure requirements take away discretion, a firm always weakly prefers an environment in which it is not subject to a mandatory disclosure (strictly if that firm prefers not to disclose). This also tends to result in less disclosure. Overall, while the main result is similar to the previous environment, the effect of voluntary disclosure is thus to reduce the equilibrium level of mandatory disclosure.

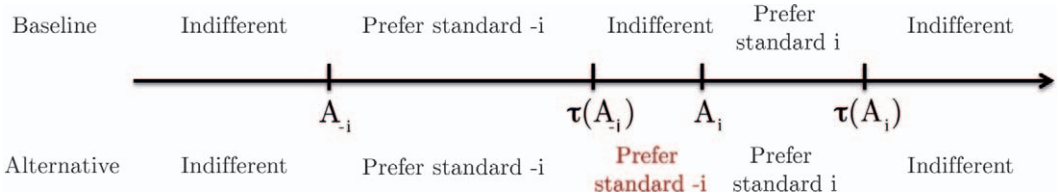
Proposition 4: In the environment with voluntary disclosure, candidate 1 proposes a standard $A_1 = K^v = \frac{3}{2}\sqrt{\frac{3c}{2}} < K^m$ and candidate 2 proposes no-disclosure ($A_2 = 0$). As the residual uncertainty about the outcome of the election becomes small, no-disclosure is implemented with probability 1.

The main result is identical to the model without voluntary disclosure: as voluntary disclosure tends to lead to less mandatory disclosure, electoral competition still favors no disclosure. Yet, in contrast to the previous environment, electoral competition is now desirable to the extent that political intervention causes a form of complete deregulation that is attractive to diversified investors. Note, however, that the first candidate still finds it undesirable to propose the level of disclosure that is *ex ante* preferred, in this case no disclosure or $A^v = 0$. If this candidate were to do so, the second candidate could propose a small increase in mandatory disclosure and obtain up to $\tau(0) + 0.5(1 - \tau(0))$, or about 74 percent in the baseline example with $c = 1/12$.

Example: In the environment with voluntary disclosure, a proposal $A_2 < A_1$ is supported by all firms that do not choose to voluntarily disclose, i.e., whose realization of v is below min $(A_1, \tau(A_2))$. Because $\tau(A_2) - A_2$ is decreasing in A_2 (the probability of non-disclosure is decreasing conditional on more mandatory disclosure), the second candidate still proposes $A_2 = 0$ over any other $A_2 < A_1$. *Vice versa*, proposing $A_2 > A_1$ is supported by firms whose realization of v lies between A_2 and $\tau(A_2)$. Comparing this to $L(0, A_1)$, the second candidate prefers to propose no disclosure when $A_1 \geq 3/(4\sqrt{2})$. The first candidate proposes $A_1 = 3/(4\sqrt{2})$ to minimize the support received by the second candidate, and the second candidate proposes $A_2 = 0$.

A seemingly counter-intuitive property of the model is that the first candidate makes a proposal for more mandatory disclosure in the presence of greater disclosure costs and, as we shall see later on, this property will be apparent as well within other institutions. Here, the first candidate optimally increases the mandatory disclosure level to shrink the percentage of non-disclosers (who

FIGURE 2
Average Market Price for Different Regulatory Choices



would support $A_2 > A_1$) and to induce the second candidate to propose no-disclosure. Therefore, the greater the disclosure cost, the greater the proportion of non-disclosers under any proposal A_1, and the more A_1 must be increased. Put differently, an increase in the disclosure cost implies that voluntary communication channels reveal less information and, thus, the first candidate has more incentives to impose more mandatory disclosure.

A maintained assumption throughout this study is that disclosers are indifferent to the format of the disclosure, e.g., whether the disclosure is included in the financial statements or provided voluntarily as part of other communication channels (conversations with analysts, press releases, or an outside certification). On some occasions, however, issuers that voluntarily provided some information have lobbied against a mandatory disclosure of this same information. As an example, prior to 2004, many firms disclosed information in their footnotes that would be sufficient to estimate stock option expenses. Some of these firms lobbied Congress against the implementation of mandatory stock option expensing under U.S. GAAP, leading to delays to its implementation and greater discretion over valuation methods (Farber et at. 2007).

The effect of this alternative assumption within our model is briefly illustrated in Figure 2. A preference for voluntary disclosers will cause firms to support the regulation in which they are not subject to a mandatory disclosure, thus causing a collective bias toward less disclosure. In turn, this will imply that the first candidate would propose even lower levels of mandatory disclosure, while the second candidate would still propose no-disclosure.[14]

Before we examine other institutional designs, it is of interest to revisit whether these results may inform current debates about the proper due process in standard-setting. Political intervention has often been sharply criticized in accounting circles on the grounds that (1) political bodies may have insufficient professional expertise to understand complex accounting issues, and that (2) accounting choices that are popular may not be those desirable to society as a whole (Zeff 1978; Sunder 1988; Beresford 2001; Tweedie 2009). Point (1) is an empirical issue, but our model does give some support to the idea that political pressures can distort accounting choice. Indeed, a large body of historical evidence reveals that the efforts of the FASB in proposing more informative disclosure have been frequently held back by political bodies (Zeff 2002). But this general perspective must be nuanced from the fact that, if disclosure costs were negligible, there would be no need for regulation—as unraveling would predict that all firms would disclose. If disclosure costs are not negligible, one may easily envision situations in which mandatory disclosures could be socially excessive and thus political forces might have a role to play in reducing such costs. But this bears a second natural

[14] This claim can be established formally. As in Proposition 4, candidate 1 minimizes the percentage of support that can be achieved by the second candidate, by choosing $A_1 = K$ such that $L(0,K) = 0.5K + min(\tau(K),1))$. Solving for K, $K = min(2/3, 4\sqrt{2c/11})$, i.e., under the baseline assumption that $c < 1/12, K = 4\sqrt{2c/11} < K^v$.

question: Why would such political oversight be necessary in the first place? Said differently, why would a professional organization subject to an oversight by its members propose levels of mandatory disclosures that are excessive? Answering these questions, we shall establish formally in the next section that a professional organization might itself distort accounting choice.

IV. SELF-REGULATED PROFESSIONAL ORGANIZATIONS

This section establishes the building blocks of professional organizations in which members actively participate in the process of designing accounting standards. To develop this idea formally, we adapt the widely used Baron and Ferejohn (1989; hereafter BF) model of self-regulation to our environment. BF introduce a multi-person bargaining model as an abstract representation of the deliberations that occur deep within a regulatory body when interest groups directly influence the agenda-setting process.

There are certainly aspects of accounting regulation that are indicative of self-regulation. In the U.S., accounting questions are often discussed in congressional subcommittees with direct or indirect interests in the questions being discussed (one application of the BF model). The standard-setting institutions themselves are non-governmental institutions that are accountable to their constituency. New agenda items are brought to the attention of standard-setting boards through the submission of open agenda comment letters, often by private interest groups, and from the institution's advisory boards where preparers form the largest group. The actual level of self-regulation appears to have decreased in the U.S. over the twentieth century. With the exception of a few state requirements, accounting was mostly self-regulated prior to the SEC Act of 1934 (Basu and Waymire 2008). In the decades that followed, the U.S. Congress and the SEC exercised a more direct control over accounting matters, which led, for example, to the dissolution of the predominantly industry-controlled Accounting Principles Board.

In the model, the regulatory choice takes place over $T \geq 1$ regulatory rounds. In each round, a proposer or agenda-setter is randomly chosen. The proposer strategically chooses a reporting regime $A \in [0, 1]$.[15] This proposal is approved or defeated based on a vote by all owners. In what follows, we denote t as the number of rounds left, i.e., $t = T$ for the first round and $t = 1$ for the last round. Define the net support for a proposal at round t as $L_t(A)$, calculated as the fraction of owners who strictly favor A minus the fraction of owners who strictly oppose A. An agreement must be approved by a strict majority. That is, A passes if and only if $L_t(A) \geq \alpha$ where $\alpha > 0$ is a small positive number.[16] If the net support for the proposal is greater than α, the proposal is adopted and the game ends. Otherwise, the proposal is rejected and the next regulatory round begins with a new proposer being randomly selected. In the special case in which an owner is indifferent between supporting or opposing the proposal, we assume that she does not participate in the vote. Similarly, to avoid situations in which the proposer is entirely indifferent, we assume that the proposer is selected from among owners who would strictly benefit from being able to make a proposal.[17]

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[15] Equivalently, we could assume that all agents make proposals and a proposal, instead of the proposer, is randomly selected. Furthermore, the assumption that proposers are equally likely to be chosen is not important provided the following conditions hold: (1) any proposer may propose with positive probability, (2) the probability that a proposer is chosen does not depend on the bargaining round.

[16] We use α to impose a strict majority requirement but, for obvious reasons, α should not be too large or else no standard can ever pass. Indeed, our analysis requires that: $\alpha < 2\sqrt{2c/3}$.

[17] In the pure mandatory disclosure regime, all owners strictly benefit from being able to make a proposal. However, under voluntary disclosure, there are always some owners with value v sufficiently large so that they will always voluntarily disclose and, thus, we assume that these owners do not participate in the proposal game. The results are unchanged if we instead assume that indifferent proposers make a random proposal or if the current regulatory round fails when an indifferent proposer is selected.

Aware of the strategic behavior within the game, owners are forward-looking when deciding whether to support or oppose a particular proposal. At the voting stage, owners support a proposal if their firm's price conditional on the proposed regulation is greater than their firm's expected price if the current regulatory round fails and a new proposal (which they do not know yet) is made in the next round. To make these forward-looking concerns explicit, we define $V_t(x)$ as the expected price for a firm with $v = x$ when there are t remaining rounds prior to the new proposer being selected. If the proposal fails in the last round, no disclosure regulation is implemented, i.e., $A = 0$ and non-disclosing firms are priced at $P_{ND}(0)$.[18]

Beginning with the environment with pure mandatory disclosure, we solve the model by backward induction, starting from the final stage of the game. In the last round, any proposal that is collectively preferred over no disclosure may pass. Owners who are better off not disclosing would always oppose a regulation in which they have to disclose and, as a result, a regulation that forces all below-median issuers to disclose cannot pass. This implies that the set of standards that may pass cannot impose too much mandatory disclosure and must be such that $A < b$, where b is strictly less than the median.

Lemma 2: In the last round, A will pass if and only if $A \in (0, b]$, where $b \equiv 0.5 - 0.5\alpha$.

Consider next the optimal proposal strategy for the proposer in the last round. The proposer can propose and implement any policy in (0, b], or make a proposal that fails, which would lead to no-disclosure being implemented. The optimal strategy is for the proposer to achieve the maximal feasible market price, i.e., maximizing the non-disclosure price by choosing $A = \min(v, b)$.

Example: This paragraph further illustrates this basic intuition in the case of the example with $c = 1/12$ discussed at length in the electoral competition model. Recall from the previous analysis that owners with $v > k_0 = \sqrt{5/3}/2$ prefer to disclose over a no-disclosure standard. Therefore, in the last round of the game, the net fraction of issuers favoring $A > 0$ is given by $L_1(A) = 1 - 2\min(A, k_0)$. Given that $1 - 2k_0 < 0$, it follows that, to pass, $L_1(A) = 1 - 2A \leq \alpha$, or $A \leq 0.5 - 0.5\alpha$. Note that the surplus achieved by the proposer in this final stage is not a function of the disclosure cost.

Lemma 3: In the last round, an owner with terminal cash flow v proposes $A = \min(v, b)$ and the proposed policy is accepted with probability 1.

Turning to the analysis of earlier rounds, note that $A = b$ is the maximal level of mandatory disclosure that could pass in the final round and achieves just enough support to overcome the disclosers with v below b. The same argument holds true in earlier rounds since the same firms with $v > b$ (resp., $v < b$) support (resp., oppose) b regardless of the number of rounds left.

Lemma 4: The policy $A = b$ can pass at any round and no $A > b$ may pass.

We next establish that $A = b$ is almost certain to be implemented if there is a large number of rounds left. To show this, note that $V_t(v) = V_t(b)$ is constant for any $v \geq b$ since these firms are certain not to disclose and thus achieve the same expected market price regardless of their signal. Furthermore, these firms form a strict majority $1 - b$ that can reject any proposed policy where $V_{t-1}(b) > P_{ND}(A)$. This implies that the group of firms at the upper tail of the distribution, with $v > b$, form a single voting bloc that can veto any standard that decreases the expected non-disclosure price. Formally, a standard will pass if and only if $V_{t-1}(b) \geq P_{ND}(A)$. It follows that the set of

[18] This assumption appears natural in our setting given that assuming anything different would leave open the question as to how any extra disclosures rules would have been approved if the regulatory process failed.

standards that will pass is an interval with the form $S_t = [a_t, b]$ where $a_t = P_{ND}^{-1}(V_{t-1}(b))$. Note that the minimum policy a_t that may pass is strictly increasing in $V_{t-1}(b)$ because owners who expect a lower price in future rounds are more willing to accept lower non-disclosure prices in the current period.

Lemma 5: Suppose $t \in [1, T]$ regulatory rounds are left. Then, the set of policies that can pass is given by $[a_t, b] \subseteq [0, b]$ where $a_t = P_{ND}^{-1}(V_{t-1}(b))$. A proposer with value $v \geq a_t$ proposes and passes $A = \min(v, b)$ and proposers with value $v < a_t$ make a proposal that does not pass and the next regulatory round begins. If $t = 1$, the game ends and $A = 0$ is implemented.

Lemma 5 generalizes the analysis of Lemma 4 to earlier rounds. Intuitively, firms have more rounds left to agree on a particular regulation when $t > 1$ and therefore tend to push for higher disclosure requirements, i.e., $a_t > a_1 = 0$. Firms whose value is too low to be in the non-disclosure region are better off preventing any agreement that could be reached in the current round in order to reach later bargaining rounds in which a wider set of standards may pass.

Example: We illustrate this property by showing analytically how the set of standards that may pass shrinks at $t = 2$ relative to the last round. As noted earlier, a standard $A < b$ can pass if and only if it is supported by owners with $v \geq b$ (since these firms form a majority). These owners consider the surplus achieved under A versus the surplus achieved if the current regulatory round fails and the final round is attained. The former option implies a surplus $(A + 1)^2/8$ (non-disclosure with a standard A). The latter option implies that the last round will be attained at which point the new proposer will propose $\min(v, b)$. Denoting the surplus of owners with $v \geq b$ if round 2 fails as $V_1(b)$, we may explicitly obtain that:

$$V_1(b) = \int \Big(\min(b, v) + 1\Big)^2 dv/8 = (-2b^3 + 6b + 3)/24.$$

It follows that $V_1(b) > 1/8$ and, therefore, standards close to no-disclosure may no longer pass at $t = 2$.

Returning to the general model, the expected market price at the beginning of the current round, before the new proposer is chosen, can be derived by Bayesian updating as follows:

$$V_t(b) = a_t V_{t-1}(b) + \int_{a_t}^{b} P_{ND}(x)dx + (1 - b)P_{ND}(b). \tag{5}$$

In Equation (5), $V_t(b)$ represents the value to firms with $v \geq b$ prior to the new proposer being selected. On the right-hand side, the term $a_t V_{t-1}(b)$ represents the probability that the new proposer is such that $v < a_t$ and prevents an agreement from occurring. The second term, $\int_{a_t}^{b} P_{ND}(x)dx$, represents the probability that a firm with $v \in [a_t, b]$ proposes and implements its preferred standard $A = v$. The third term, $(1 - b)P_{ND}(b)$, represents the probability that a firm with $v > b$ proposes and implements $A = b$. Using the fact that $a_t = P_{ND}^{-1}(V_{t-1}(b))$, Equation (5) can be rewritten to offer a recursive characterization of $\{a_t\}$:

$$P_{ND}(a_{t+1}) = a_t P_{ND}(a_t) + \int_{a_t}^{b} P_{ND}(x)dx + (1 - b)P_{ND}(b). \tag{6}$$

Proposition 5: The sequence $\{a_t\}$ is strictly increasing in t, i.e., fewer policies can be passed

when more rounds are left, such that a_t converges to b. In particular, the probability that $A = b$ passes converges to 1 as T becomes large.

While all members are treated equally in the institution, in that they have the same vote or probability to propose, the rules of the institution ultimately favor some interest groups over others. The self-regulated institution transfers control over the voting process toward the median firm. This median firm does not fully internalize the cost of disclosure for lower value firms with $v < b$ or the productive benefits of disclosure for firms with $v > 0.5$. Therefore, the chosen standard under self-regulation typically does not coincide with the *ex ante* preferred policy: the standard will impose too little mandatory disclosure if disclosure costs are small and too much mandatory disclosure if disclosure costs are large.

Compare this property of self-regulation to electoral competition. As shown in Section III, electoral competition features a race-to-the-bottom as one candidate chases for the support of low-value firms forced to disclose. Under self-regulation, the proposer does not have such an incentive to acquire a large majority. Instead, the proposer may be able to pass standards in which she does not disclose and, as a result, becomes insensitive to disclosure costs when setting the agenda. This property biases the self-regulated institution toward requiring more disclosure than electoral competition. One practical area in which these conclusions seem to be frequently observed is through the conflicts between the U.S. Congress and the FASB where in a relative sense, the former reflects forces present in an electoral model, while the latter has more in common with the self-regulated model. In well-known examples such as inflation accounting, exploration costs, or stock option expensing, the FASB came to a tentative standard requiring more disclosure, only to back down under significant opposition from Congress.[19]

We extend next the main result to the environment with voluntary disclosure. As before, we proceed by backward induction and solve for the set of regulations that may pass at round T. As noted earlier, firms with $v \geq \tau(A)$ may now disclose voluntarily, which decreases the net support for a new standard by decreasing the fraction of non-disclosers that support greater non-disclosure market prices.

Lemma 6: In the regime with voluntary disclosure, a policy A may pass in the last round T if and only if $A < b$ where: $b = \frac{1}{7}(2\sqrt{\alpha^2 + 14c} - 5\alpha)$.[20] Owners with value $v \leq b$ propose $A = v$ and the legislation is accepted. Owners with value $v \in (b, \tau(b)]$ propose $A = b$.

Let us now consider earlier rounds of regulation $T - 1$, $T - 2$, etc. Denote now a_t (resp., b_t) as the minimal policy that may pass when t rounds are left.

Lemma 7: At any round t, $b_t = b$, i.e., the maximum policy that can pass is the policy b that can pass in the final round.

As in the environment with pure mandatory disclosure, owners with $v > b$ are still more willing to oppose low policies if there are more rounds left and, therefore, the range of policies that can pass shrinks as t becomes large.

[19] There are cases, such as the Sarbanes-Oxley Act or campaign financing reforms, in which the U.S. Congress increased disclosure requirements, but these tend to be related to issues that are more complex and not simply financial or disclosure-related and for which we have no comparable proposal made by a self-regulated institution.

[20] The assumption that the cost of disclosure is very small ($c < 1/12$) ensures that $\tau(b) < 1$ so that there is always some voluntary disclosure. If c is sufficiently large so that $\tau(b) = 1$, the model will be very similar to the model with pure mandatory disclosure.

Proposition 6: As T becomes large, the probability that b is implemented converges to 1.

Voluntary disclosure does not alter the overall convergence of the policy to a level that is indeed higher than the level that would be *ex ante* preferred by owners. Yet, voluntary disclosure does act to reduce the level of mandatory disclosure because it creates a separate channel through which firms with $v > b$ no longer need the existence of disclosure requirements to convey their information.

Example: Assuming that $\alpha \approx 0$ and $c = 1/12$, a standard passes in the last round if and only if there are more non-disclosers than firms required to disclose, i.e., $\tau(A) - A = (\sqrt{2 + 4A^2} - 2A)/3 > A$. This implies that the maximal standard that can pass is $b = \sqrt{2/21} < 0.5$, i.e., strictly less than in the regime without voluntary disclosure. As noted earlier, owners of firms with $v = b$ are a pivotal group in the institution. Consider the type of regulations that are acceptable to these owners in round $t = 2$. By accepting $A < b$, the firm will achieve a market price $(A + \tau(A))^2/8$. By contrast, when the last round is reached, this firm will achieve an expected market price $V_1(b)$ given by:

$$V_1(b) = \int \Big(\min(v, b) + 1\Big)^2 dv/8 \approx 0.09 > \Big(0 + \tau(0)\Big)^2/8.$$

At round $t = 2$, disclosures thresholds close to non-disclosure may no longer pass.

The fact that the pivotal group is not the median in the presence of voluntary disclosure is easily understood by considering the behavior of firms with sufficiently high cash flows. The possibility of voluntary disclosure truncates the upper tail of the distribution since firms with $v \geq \tau(b)$ will voluntarily disclose and have no further direct interest in the regulatory process. As a result, the standard $A = b$ corresponds to a median firm for the truncated distribution $\tilde{v}|\tilde{v} \leq \tau(b)$, having removed from the distribution firms that disclose with probability 1. We also find that the level of mandatory disclosure b is increasing in the cost of disclosure c, as for the first candidate's proposal under electoral competition. The intuition is similar: greater access to voluntary disclosure when the cost is small tends to reduce collective demands to increase the non-disclosure market price.

To conclude, note that a pure self-regulated institution tends to set standards $b < \tau(0)$ in which no information that could have been voluntarily disclosed is subject to a mandatory disclosure. This property implies that, in a variation of the model in which firms prefer to voluntarily disclose, the results would be entirely unchanged. More generally, the effect of a lower voluntary disclosure cost would be to increase the fraction of firms that voluntarily disclose with probability 1 (with $v \geq \tau(b)$ for any b) and thus will tend to reduce the level of mandatory disclosure.

V. COMPETITION BETWEEN STANDARD-SETTERS

The two institutions that we examined until this point share a few common traits, in that they implement a single uniform standard, indirectly rely on self-interested owners to make judgments about the desirability of standards, and provide little recourse to avoid regulations in which disclosure is either insufficient for investment purposes or excessively costly. In terms of economic outcomes, both institutions are prone to a regulatory capture by a pivotal interest group and the regulations that emerge, while they maximize wealth transfers to that group, may be damaging to other groups. One might further conjecture that these traits pose, more generally, fundamental challenges when regulating within a centralized standard-setting body.

The search for better institutions may begin by revisiting these challenges by considering institutions that do not have these three traits. Removing one of these traits in isolation of the others

is, however, likely to be theoretically or practically problematic. Consider for example having two (or more) standards if the same owners evaluate the desirability of both standards and must either adopt both standards or have no discretion over which one to adopt. Then, one would likely expect owners to have the same preference for each of these standards and, thus, to implement converging or identical standards. A second possibility would be to allow the choice, say, not to adopt all disclosure requirements for public firms. The problem with this option is that it is a stark solution that does not explain why no-disclosure may dominate other possible alternative standards. Furthermore, absent an institutional process to validate no-disclosure, the institutions drafting the main standard would likely push to remove this option.

Last, a remedy to the self-interested behavior observed in political bodies may be to transfer the regulatory decision to a regulator that is not prone to socially adverse incentives. Yet, the solution of a benevolent regulator is primarily an academic one given that, practically, there would be no simple means to identify and monitor such a person. Somewhat related to this idea, a more realistic solution might be to transfer the decision to a representative group whose interest is more closely tied to social objectives. Indeed, the current conceptual statements of the U.S. and international standard-setting bodies have placed the emphasis on investors as primary users of accounting information. It is unlikely, however, that this solution would completely resolve standard-setting issues. That accounting choices should maximize market value is itself a debatable assumption, but even if one were to make this assumption, most large investors are imperfectly diversified and the more diversified investors seem to be either price-protected or too disseminated to play the main role in actual standard-setting.[21]

We examine next a decentralized solution to the problem of regulating financial disclosures that involves removing all three of these traits, i.e., an institution in which no single uniform standard is imposed, standard-setters do not require opinions about social desirability (although they may still respond to private choices), and firms have some recourse if they do not approve of a particular standard. This is the object of this section in which we allow firms to choose which standard to adopt and derive standard choices from competition by standard-setters for a wider adoption of their own standard.

Apart from the special case of a new issuer or that of a firm that can easily move its assets between regulatory zones, this particular type of competition between standards does not represent the current regulatory environment. In the U.S., for example, domestic issuers must produce financial statements according to U.S. GAAP and cannot, instead, adopt only international accounting standards. However, foreign issuers in the U.S. are not required (but can voluntarily choose) to adopt U.S. GAAP only if they produce IFRS financial statements in their home country (SEC 2008). A foreign issuer adopting U.S. GAAP may still be required to produce financial statements in accordance with his home country regulation.[22] Having noted this, a system in which issuers could choose which accounting standards to follow has been part of current discussions about the future of U.S. accounting standards and some recent proposals would allow domestic U.S. firms to use only international accounting standards although there has been no discussion about a mutual recognition in IFRS countries. Another good example of a competing standard-setters regime is the German New Market in which firms could freely choose between IFRS (then IAS) and U.S. GAAP; the German New Market, however, was closed in 2003. Studies exploring the benefits of competing standards include Dye and Sunder (2001) and Ray (2010). However, others have

[21] This seems to be consistent with the distribution of comment letters over new standard proposals: most comment letters are written by accounting professionals or preparers affected by the new standard.

[22] Few countries, like Israel for example, allow the issuers not to produce IFRS financial statements if they adopt U.S. GAAP.

argued that competition would lead to ineffective standard-setting and, without a rigorous analysis of these questions, the debate is unlikely to be fully settled.[23]

What could be the economic consequences of allowing competition between standard-setting bodies? One possibility is that competing standard-setters would optimally choose to converge and pass the same standard, *de facto* defeating the idea of choice. Another possibility would be that standard-setters would cater to firms of different quality, thereby revealing some private information simply by the act of the adoption of one disclosure rule over another (Dye 1985; Levine 1996; Chen and Deng 2012). One last possibility, which is not quite exclusive to the previous two, is that competition could imply a race-to-the-top as standard-setters pass higher standards to offset the self-selection of firms toward higher requirements. Alternatively, competition could produce a race-to-the-bottom to attract lower quality issuers that would indeed lead to policies that feature insufficient disclosure. A complete answer to these questions is not obvious, and we next provide some intuition in a highly stylized environment.

Assume that there are two regulatory bodies, which we label as standard-setter 1 and standard-setter 2. Standard-setters implement their standards A_1 and A_2 sequentially and, without loss of generality, the first proposer is labeled standard-setter 1.[24] Once A_1 and A_2 are in place, owners optimally adopt the policy that maximizes their market price. Further, we assume that a firm that is indifferent between both policies (for example, if the firm would disclose under both policies) will choose either policy with probability 0.5 and restrict the analysis to equilibria in which $P_{ND}(A_2) \geq P_{ND}(A_1)$ if $A_2 \geq A_1$.[25]

We endow standard-setters with a preference that is intended to represent the universal vocation of an accounting standard as well as, possibly, the career concerns and prestige of the standard-setters themselves.[26] Specifically, we assume that standard-setters attempt to maximize the adoption of their standard. The timeline of the game is as follows. First, the first standard-setter designs a standard and then the second standard-setter designs another standard. Second, markets determine non-disclosure prices conditional on the adoption of either standard, i.e., $P_{ND}(A_1)$ and $P_{ND}(A_2)$. Third, owners observe both market prices and can choose to adopt A_1 or A_2. Trades occur and the game ends with standard-setters being evaluated on the fraction of firms that adopted their standard.

Proposition 7: Suppose that there are two implemented standards A' and A where $A' > A$. Then, $P_{ND}(A') > P_{ND}(A)$ and (i) all firms with $v \geq \min(\tau(A),A')$ adopt the

[23] Perhaps one of the main opponents of competition has been the standard-setters themselves. In his speech at the AAA Annual Meeting, Sir David Tweedie (2009) argued that, after the 2008 financial crisis, the IASB had been forced to accept reclassifications of loss-making financial instruments because this had already been passed by the FASB for U.S. banks (possibly giving an unfair "accounting" advantage to U.S. institutions). One might argue, however, that such a decision was made by the IASB not because of competition but rather as a result of direct political pressures.

[24] As under electoral competition, there is no simultaneous-move equilibrium in this game. One might interpret the timing as exogenously related to historical country-specific events (e.g., U.S. GAAP was formed before IAS and IFRS) or, alternatively, as the result of an attrition game in which any of the two standard-setters may end up writing the standard first.

[25] The assumption that an indifferent firm should be equally likely to adopt either standard is made to be comparable to the other two institutions in which, by assumption, an indifferent voter does not favor any one proposal over another. The fact that $A_2 \geq A_1$ should imply $P_{ND}(A_2) \geq P_{ND}(A_1)$ is also very natural in our setting given that $v \geq A_2$ should be viewed as more favorable information than $v \geq A_1$. This equilibrium restriction is used to avoid equilibria in which $P_{ND}(A_1) > P_{ND}(A_2)$ because no firm adopts A_2 and (for this to be self-fulfilling) markets assign an overly pessimistic belief to any firm adopting A_2.

[26] In addition, standard-setters partly rely on the sale of publications and private funds, which are both likely to be higher given a wider acceptance. As also noted by Kotramski et al. (2010), "[A] more tangible option is for standard setters to compete on both personal prestige and on funding from constituents. Both the FASB and the IASB have at some point in their existence relied on voluntary funding to maintain their operations."

standard $A' > A$, (ii) all firms with $v \in (A, \min(\tau(A), A'))$ adopt the standard $A < A'$.

Given two existing standards, the standard that requires more mandatory disclosure tends to induce a greater non-disclosure price. As a result, it tends to attract firms with more favorable future cash flows. Note that (while we examine here the model with mandatory disclosure only) the threshold at which the standard $A' > A$ is preferred is indeed the voluntary disclosure threshold because, for firms with v in the region $[A, A']$, adopting the standard A' is equivalent to making a voluntary disclosure.

We turn next to the analysis of the policy proposed by the standard-setters. Since all firms must adopt one policy or the other, the first standard-setter intends to offer the policy that would minimize the market share of the second standard-setter.

Proposition 8: In equilibrium, standard-setter 1 proposes $A_1 = \frac{1}{3}(2 + \sqrt{1 - 6c})$ and standard-setter 2 proposes $A_2 = \tau^{-1}(A_1)$. Further, the looser policy $A_2 < A_1$ always achieves a greater market share.

The second standard-setter always proposes lower disclosure requirements than the first standard-setter and, in doing so, receives the support of some firms. Unlike under electoral competition, the standard designed by the standard-setter need not be one that features no regulation. Firms may now self-select toward the stricter standard proposed by the first standard-setter, which then disciplines the standard-setter to make higher proposals.

Example: To illustrate this, consider the example with $c = 1/12$ and let A_1 be the standard proposed by the first standard-setter. The second standard-setter can propose $A_2 < A_1$ and achieve a percentage of adoption given by $L(A_2, A_1) = A_2/2 + \min(A_1, \tau(A_2)) - A_2$. This is a convex function that is maximal at either $\tau(A_2) = A_1$ or $A_2 = 0$. Further, if $A_1 < 0.5$, $A_2 = 0$ cannot be optimal because the second standard-setter achieves less than 50 percent and would rather set $A_2 = A_1$ and, if $A_1 \geq 0.5$, $A_2 = \tau^{-1}(A_1)$ achieves more adoption than $A_2 = 0$. The second strategy is to set $A_2 > A_1$, which can achieve an adoption up to $1 - A_1 + A_1/2$ if A_2 is chosen slightly above A_1. It follows that $A_2 = \tau^{-1}(A_1)$ if and only if A_1 is large enough such that $A_1 - \tau^{-1}(A_1) + \tau^{-1}(A_1)/2 \geq 1 - A_1/2$. Solving this equation, $A_2 = \tau^{-1}(A_1)$ is chosen if and only if $A_1 \geq (4 + \sqrt{2})/6 \approx 0.90$. To minimize expected adoption by the second candidate, the first candidate proposes $A_1 = (4 + \sqrt{2})/6$ while the second candidate proposes $A_2 = \tau^{-1}\left((4 + \sqrt{2})/6\right) = 1/\sqrt{2} \approx 0.71$.

The example illustrates a more general observation about competition when voluntary disclosures are not possible. Namely, standard-setters are induced to pass stricter disclosure requirements to make adoption of their standards a positive market signal through self-selection into the more demanding standard. When the cost of disclosure is large, this self-selection can cause excessive disclosure costs as both standard-setters choose high levels of mandatory disclosure.

Let us now consider the environment with voluntary disclosure. When voluntary disclosure is feasible, there is a close connection between how owners vote under electoral competition and how owners adopt a policy under standard-setting competition. Firms vote for a policy under electoral competition if and only if they would have adopted it if it had been available under standard-setting competition. Therefore, in equilibrium, the standard-setters choose exactly the same policies as they would have if they had been under electoral competition.

Proposition 9: If firms can make voluntary disclosures, standard-setter 1 proposes $A_1 = \frac{3}{2}\sqrt{\frac{3c}{2}}$ and standard-setter 2 proposes $A_2 = 0$.

Environments with electoral competition and competition between standard-setters yield the same standard proposals. In fact, this property also holds true in the variation of the model where firms strictly prefer voluntary disclosure (in Figure 2). Having noted this, the two institutions imply very different outcomes to the extent that, under competition between standard-setters, the two standards will be available as a choice.

To further emphasize the potential benefit of standard-setting competition, we compare the outcome of this institutional design to electoral competition. Electoral competition delivers (at best) the level that would be *ex ante* preferred in an economy with a single standard, i.e., $A = 0$. Under standard-setting competition, this policy is also available (since it is proposed by the second standard-setter), but in conjunction with another standard $A_1 > 0$. As shown next, such choice makes standard-setting competition preferable to other institutional formats.

Proposition 10: An economy in which $A_1 > 0$ and $A_2 = 0$ are available is always *ex ante* preferred (i.e., leads to a greater expected market price) to any economy with a single uniform standard. In particular, it is *ex ante* preferred to both electoral competition and self-regulation.

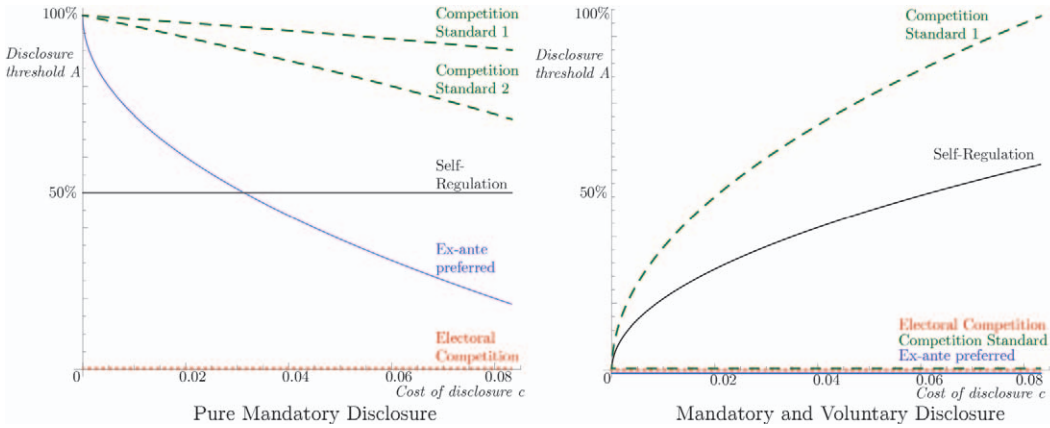
Under a single policy, the only channel through which information can be conveyed to the market is through a (costly) mandatory disclosure. By contrast, in the presence of multiple standards, the choice made by firms to adopt a policy reveals, on its own, information at no extra cost even if the firm discloses. When choosing $A_2 = 0$ and not disclosing, the firm not only reveals that $A > 0$, but also that $A < A_1$. Similarly, firms with $v > A_1$ can reveal some of their information solely by the adoption of A_1 over $A_2 = 0$, thus both decreasing investment inefficiencies and the need for other costly voluntary disclosures.

An important assumption used to obtain this result is that adopting a standard does not imply any additional costs if adoption does not lead to an actual disclosure, e.g., the costs may represent proprietary costs when making certain disclosures required by the law. However, there are other potential costs that could be incurred by adopters of a standard, tied to the implementation of more complete information systems; as an example, Berger et al. (2011) provide evidence that cross-listed companies exhibited some additional costs following the Sarbanes-Oxley Act of 2004. A mild variation on the model toward this direction can lead to observations similar to those obtained here. Assume here that a firm adopting a standard A incurs a cost that is possibly non-zero but less than the cost c that would be incurred if a disclosure were made. Under this alternative assumption, given two standards $A < A'$, firms with $v \geq A'$ would still adopt A', thus leading to a solution of the model under competing standard-setters very similar to the baseline model. Furthermore, although a formal answer to this question cannot be obtained without a more complete model of adoption costs, one should note that the same economic force that favors two standards over a uniform standard will be present in this environment. That is, a firm that adopts a standard $A > 0$ and chooses not to make a voluntary disclosure must be better-off adopting that standard, thus increasing value to diversified investors. As an area for further work, our conjecture is that, as long as the costs of adoption are not greater than the costs of disclosing the information voluntarily, there would likely be value in allowing multiple accounting standards.

VI. COMPARING INSTITUTIONS

This section summarizes the differences among the institutions and quantifies the level and *ex ante* desirability to capital providers of a mandatory disclosure as costs change. We examine the main predictions of each model by considering, (1) under electoral competition, the standard that is almost certain to pass when there is nearly no noise in the election, i.e., $A = 0$, (2) under self-regulation, the standard that would pass when a policy is adopted with a strict majority (with

FIGURE 3
Standards Implemented under Each Institution



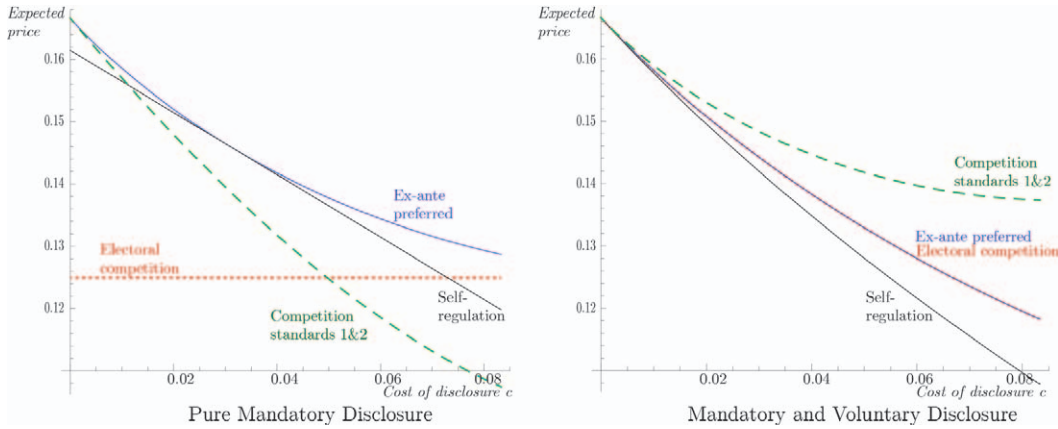
$\alpha \to 0$ and $T \to +\infty$), and (3) under standard-setting competition, the two standards that occur in equilibrium and the outcome in terms of expected market price.

We develop and illustrate in Figure 3 some of the implications of the model. The level of mandatory disclosure is always lowest under electoral competition and greatest under (at least) one of the two standards present under standard-setting competition, while self-regulation exhibits intermediate levels of mandatory disclosure. This implies that environments in which accounting is more directly regulated by politicians (such as countries and time periods in which accounting rules are under the control of political bodies) should feature lower levels of mandatory disclosure and environments where accounting rules are written by an independent private body should feature higher levels of mandatory disclosure. Last, an evolution toward greater competition between standards, such as the current move toward having both U.S. GAAP and IFRS, may lead to an increase in the disclosure requirements under one or both standards.

Each institution differs in terms of its *ex ante* desirability to capital markets, as illustrated in Figure 4. Under pure mandatory disclosure, all institutions achieve an expected market price that is less than the *ex ante* preferred mandatory disclosure. Standard-setting competition tends to exhibit more mandatory disclosure than *ex ante* desirable and is, therefore, *ex ante* preferred to electoral competition and self-regulation when the cost is low. By contrast, electoral competition tends to feature low levels of disclosure and is *ex ante* preferred when the cost is high. For intermediate levels of the disclosure cost, the maximal expected market price is attained under self-regulation.

In the presence of voluntary disclosure, the *ex ante* preferred regulation is to set no mandatory disclosure that is also the regulation selected under electoral competition. In other words, capital markets as a whole are always better off forfeiting standard-setting to political bodies over a self-regulated environment in which preparers directly participate to the agenda-setting process. Yet, standard-setting competition yields a higher market price than in any environment with a single standard. In the right-hand side of Figure 3, the advantage of standard-setting competition becomes greater when disclosure costs are large because, then, voluntary adoptions convey information more efficiently to the market.

FIGURE 4
Expected Market Price under Each Institution



VII. CONCLUDING REMARKS

That uniform accounting regulations should be drafted within centralized standard-setting bodies and imposed on public issuers has become a widely accepted idea in the practice. Recent trends have seen efforts to place many domestic standards under the common umbrella of international accounting standards and, in the U.S., encouraging common rules for U.S. GAAP and international accounting standards. If this trend is to continue further, capital markets across the world will be regulated by a single body and a single set of disclosure rules.

In this study, we emphasize that, while the benefits of convergence are many, a complete theory of standard-setting should more fully appreciate the political economy of regulation and its interaction with other market-driven mechanisms to communicate information. A worldwide capital market system that gives the central task of regulating information flows to one body is a dangerous proposition. Institutions are primarily a reflection of the demands of their members and, unless all members are entirely benevolent, it is possible that the political process within the institutions would lead to decisions that favor wealth transfers across firms over the efficient allocation of capital. Accounting is also unique in its push for global coordination of standard-setting: almost for no other public policy has regulation seen this level of coordination, as matters of international trade, foreign aid, bank regulations, and environment, among other examples, feature much more diverse regional choices. Further, centralized regulation of capital markets will provide no recourse to avoid regulations that some firms may view as undesirable except through a collective bargaining process.

We offer here a more nuanced discussion of the costs and benefits of single uniform standards, and the pressures that bodies drafting these standards may experience. The decision process within such an institution plays a central role and has important consequences on which types of standards will be imposed on issuers. While the models are intended as stylized descriptions of reality, they offer simple observations that are broadly consistent with observed aspects of standard-setting. These observations are briefly summarized next. Intervention by elected politicians encourage regulations in which the most popular proposals are implemented. By taking value away from firms that have unfavorable information to disclose, or removing managerial discretion, proposals for more disclosure are comparatively unpopular and, thus, the most popular politicians tend to oppose increasing disclosure requirements, even if such disclosure requirements were to increase

investment efficiency. By contrast, a professional self-regulated organization gives issuers greater control over which new standards to pass. In doing so, it reflects the preference of the median firm in the organization that may not fully internalize the costs of disclosure or investment inefficiencies borne by other issuers. In the U.S., the current model of regulation is a mixed one, where Congress can overrule standards proposed by the FASB; indeed, these findings suggest that fundamental disagreements are to be expected between politicians and professional organizations even if issuers exert pressures in both institutions.

From the perspective of capital markets, a comparison of the desirability of these institutions is ambiguous and will depend on characteristics of the economy. If credible voluntary disclosures are not possible and disclosure costs are low, the low levels of disclosure under pure electoral competition are problematic and a self-regulated institution may be beneficial to diversified investors. On the other hand, if voluntary disclosure already conveys information in a cost-efficient manner or disclosure costs are high, the deregulation favored by electoral competition may be more desirable. Indeed, one concern in the latter setting is that a professional organization may insufficiently weight the potential costs of disclosing information and enact socially excessive levels of disclosure.

Allowing a decentralized market-driven approach to standard-setting could offer a partial remedy to the challenges faced by a single standard-setting body and, ultimately, help standard-setters by better shielding them from corporate pressures. As a related example, rating agencies also provide information to the market, but they face political pressures that are less intense than those borne by standard-setting bodies; the reason for this might be that firms that do not like a particular rating agency can simply use a different rating agency instead of having to debate it within the institution. A similar market solution can be considered in the context of standard-setting where firms could be given the opportunity to choose which standards fit their needs. An even more ambitious solution, which partly occurs now through the sale of publications, would be to allow standard-setters to protect their intellectual capital and finance themselves through a participation fee from issuers choosing to adopt their standard.

We establish clear benefits of such a decentralized approach when voluntary communication channels are also possible. A comparison of alternative institutions is more ambiguous when only mandatory disclosures can be made because competition encourages standard-setters to pass excessive disclosure requirements. The reason for this is that, when a standard-setter passes more complete disclosure rules, adoption of that standard will induce a positive market reaction, encouraging a wider adoption. Because of this effect, competition between standard-setters can be socially costly when disclosure costs are too high. Indeed, uniform standard-setting within a centralized body should be used mainly as a mechanism to reduce private incentives to disclose too much information.

The results contribute to a nascent literature on the comparative benefits of alternative forms for standard-setting (Dye and Sunder 2001; Bertomeu and Magee 2011; Friedman and Heinle 2012). At a conceptual level, we propose shifting the research debate from accounting standards toward the institutions that create the accounting standards. This approach is complementary to the ongoing normative search for better accounting standards in that a sound discussion of the institutional determinant of accounting is required for the normative agenda to be successful. *Vice versa*, deficient institutions give us a causal explanation as to why and how policy-making may not lead to desirable outcomes.

The research also leaves a number of important questions open: How/when institutions might evolve and do they converge over time? Do institutions in different economic zones influence each other? How do markets and comment letters channel information to standard-setters? How do accounting institutions interact with other institutions such as bank regulations or enforcement? How do accounting institutions affect parties other than capital providers? We hope that further

research in this area can further explore the connection between accounting regulations and the underlying economic environment in which they take place.

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APPENDIX A

Proof of Proposition 1

Under pure mandatory disclosure, we set $\tau(A) = 1$, therefore:

$$\sigma(A) = \int_0^A \left(\frac{v^2}{2} - c\right) dv + \int_A^1 P_{ND}(A) dv$$

$$\begin{aligned}\sigma'(A) &= \frac{A^2}{2} - c - P_{ND}(A) + (1-A)P'_{ND'}(A) \\ &= \frac{A^2}{2} - c - \frac{(A+1)^2}{8} + (1-A)\frac{A+1}{4} \\ &= \frac{1}{8}(1-A)^2 - c\end{aligned}$$

Therefore, $\sigma(A)$ has a unique maximum at A^* given by $A^* = \max(0, 1 - 2\sqrt{2c})$. Under our baseline assumption that $c < 1/12, A^* = 1 - 2\sqrt{2c}$ is interior. ■

Proof of Proposition 2 As we state all proofs for any c, we need to consider two cases.

Case 1

Suppose that $c \geq 3/8$. Then, $\tau(0) = 2/3\sqrt{6c} \geq 1$, which implies that the cost is too large for any voluntary disclosure to occur and therefore $\sigma(A)$ is identical to the pure mandatory disclosure case. From Proposition 1, this implies that $A^v = A^m = \max(0, 1 - 2\sqrt{2c}) = 0$.

Case 2

Suppose that $c < 3/8$ and let us denote $A_2 = 2\sqrt{1-2c} - 1 > 0$ as the threshold such that $\tau(A_2) = 1$. First, consider the expected market price on the region $[A_2, 1]$. Note that $A_2 - A^m > 0$ if $A^m = 0$ otherwise:

$$A_2 - A^m = 2(\sqrt{1-2c} + \sqrt{2c} - 1) > 0$$

If $A > A_2$, there is no voluntary disclosure so that the expected market price $\sigma(A)$ is the same as under mandatory disclosure. In addition, because $A_2 > A^m$, $\sigma(A)$ will be strictly decreasing in A on $[A_2, 1]$.

Second, consider the expected market price on the region $[0, A_2]$. Then, the expected market price is given by:

$$\sigma(A) = \int_0^A \left(\frac{v^2}{2} - c\right)dv + \int_A^{\tau(A)} P_{ND}(A)dv + \int_{\tau(A)}^1 \left(\frac{v^2}{2} - c\right)dv$$

$$\sigma'(A) = \frac{A^2}{2} - c + \Big(\tau'(A) - 1\Big)P_{ND}\Big(\tau(A)\Big) + \Big(\tau(A) - A\Big)P'_{ND'}(A) - \tau'(A)\left(\frac{\tau(A)^2}{2} - c\right)$$

Replacing $P_{ND}(.)$ and $\tau(.)$ by their respective expressions, this Equation simplifies to:

$$\sigma'(A) = \frac{1}{162}\left(24A^2 - 72c - \frac{8A^3}{\sqrt{A^2+6c}} + \frac{96Ac}{\sqrt{A^2+6c}} - 16A\sqrt{A^2+6c}\right)$$

$$\frac{\partial \sigma'(A)}{\partial c} = \frac{4}{9}\left(\frac{A^3}{(A^2+6c)^{3/2}} - 1\right) < 0$$

Noting that $\sigma'(A) = 0$ when $c = 0$, this implies that $\sigma'(A) < 0$ for all $A \in [0, A_2]$.

We prove next the second part of the Proposition and show that an alternative form of standard Γ in which $v \in (A, A')$ where $A' < \min(1, \tau(A))$ cannot be Pareto-optimal. To show this, consider an alternative standard Γ' in which all events with $v \geq A$ need not be disclosed, so that the non-disclosure region is $[A,\tau(A))$. Firms with $v \leq A$ or $v \geq \tau(A)$ disclosed and achieve the same market price under both standards. Let $\tau_2 < \tau(A)$ denote the (new) voluntary disclosure under Γ (we set it equal to A' if no firm voluntary discloses). Firms with $v \in (A, A')$ achieve a strictly lower market price $\max(v^2/2, (A'^2 + \tau_2)^2/8)$ under Γ than under Γ' (in which they achieve $(A' + \tau(A))^2/8 > v^2/2 - c$. Firms with $v \in (A', \tau(A))$ would achieve $v^2/2 - c$ under Γ, which is strictly less than $(A + \tau(A))^2/8$ under Γ'. This implies that all firms prefer Γ' (strictly for some). ■

Proof of Lemma 1

Suppose candidate 1 proposes A_1.

Step 1

We consider the two proposal options discussed in the text, (a) $A_2 < A_1$ or (b) $A_2 > A_1$.

(a) This option implies that candidate 2 can collect support from the lower-value firms $v \in [A_2, A_1)$ disclosing *and* bearing the disclosure costs under A_1. The firm in $[A_2, A_1)$ that is indifferent between the two proposals must satisfy $v = k$ as given by $(A_2 + 1)^2/8 = k^2/2 - c$, or $k = 0.5\sqrt{(1 + A_2)^2 + 8c}$. Noting that $k > A_2$, the fraction of votes received by candidate 2 proposing A_2 is given by, for any $A_2 < A_1$, $\psi(A_2, A_1) = 0.5A_2 + \min(k - A_2, A_1 - A_2)$. The function $\psi(.,.)$ is decreasing in A_2, which, in turn, implies that $A_2 = 0$, or no-disclosure, is the most preferred decrease in disclosure. Because of the disclosure costs, increasing the fraction of firms that are no longer required to disclose increases the support for the proposal. Note that $\psi(0, A_1)$ is increasing in A_1; that is, the support for no-disclosure increases if candidate 1 proposes more disclosure. For further use, note that $\psi(0, A_1) = \min(k, A_1) = \min(0.5\sqrt{1 + 8c}, A_1)$.

(b) The second option is to slightly increase disclosure, which allows the candidate to collect the support from (nearly all) of the firms with $v > A_1$. When the candidate proposes arbitrarily close to A_1, the support for such a proposal is arbitrarily close to (though strictly less than) the following expression: $\psi(A_1, A_1) \equiv 0.5A_1 + 1 - A_1 = 1 - 0.5A_1$. Note that the support received by campaigning for more disclosure is decreasing in A_1.

Step 2

Define $\phi(A_1) \equiv \max(\psi(0, A_1), \psi(A_1, A_1))$, the supremum of the fraction of votes received by candidate 2 against A_1. Note that $\psi(A_1, A_1)$ is strictly decreasing in A_1 and $\psi(0, A_1)$ is weakly decreasing in A_1, with $\psi(A_1, A_1) > \psi(0, A_1)$ (resp. $\psi(A_1, A_1) < \psi(0, A_1)$) at $A_1 = 0$ (resp. $A_1 = 1$). Therefore, the two functions intersect once at some threshold K such that for $A_1 > K^m$, candidate 2 chooses option (a), i.e., $A_2 < A_1$, and for $A_1 < K^m$, candidate chooses option (b), i.e., $A_2 > A_1$.

Case 1

Suppose that $c \leq 7/72$, then, $\psi(0, K) = \psi(K, K)$ implies that $1 - 0.5K^m = 0.5\sqrt{1 + 8c}$ and, therefore, $K^m = 2 - \sqrt{1 + 8c}$.

Case 2

Suppose that $c > 7/72$, then $\psi(0, K^m) = \psi(K^m, K^m)$ implies that $\psi(0, K^m) = K^m$. Solving for $1 - 0.5K^m = K^m$, we have that $K^m = 2/3$. In summary, we have that $K^m = \max(2 - \sqrt{1 + 8c}, 2/3) > A^m$. The baseline case of $c < 1/12$ implies that $K^m = 2 - \sqrt{1 + 8c}$. ■

Proof of Proposition 3

As in Lemma 1, we consider the case of low c and high c separately.

Case 1

Suppose that $c \leq 7/72$. Then, as shown in Lemma 1, the fraction of votes received by candidate 2 (at the optimal proposal) is strictly decreasing when A_1 varies from 0 to K^m, and then constant when A_1 varies from K^m to 1. It follows that candidate 1 should choose $A_1 \in [K^m, 1]$. But, then, the best response of candidate 2 is to choose $A_2 = 0$.

Case 2

Suppose that $c > 7/72$. Then, again from Lemma 1, the fraction of votes received by candidate 2 is strictly decreasing when A_1 varies from 0 to K^m, and then strictly greater than at K^m for any $A_1 > K^m$. It follows that candidate 1 should choose $A_1 = K^m = 2/3$. Against this proposal, candidate 2 will achieve exactly 2/3 votes by proposing $A_2 = 0$ and strictly less than 2/3 by proposing $A_2 > A_1$. Thus, proposing $A_2 = 0$ is optimal. When the uncertainty in the election outcome becomes small, the probability that the proposal with more support wins converges to 1 and thus the probability that $A_2 = 0$ is implemented converges to 1. ■

Proof of Proposition 4

Let us decompose the proof in three steps:

Step 1

We consider the two proposal options, (a) $A_2 < A_1$ or (b) $A_2 > A_1$.

(a) This option implies that candidate 2 can collect support from the lower-value firms $v \in [A_2, \min(A_1, \tau(A_2)))$ and receives a net support given by:
$\psi_2(A_2, A_1) = \min\Big(A_1 - A_2, \tau(A_2) - A_2\Big) - \min\Big(1 - A_1, \tau(A_1) - A_1\Big)$.
The function $\psi_2(.,.)$ can be verified to be decreasing in A_2, which implies that $A_2 = 0$ is the optimal choice.

(b) The second option available is to slightly increase disclosure, which allows the candidate to collect the support from the firms with $v \in (A_1, \min(\tau(A_1), 1))$. The net support for this proposal is: $\psi_2(A_1, A_1) = \min(\tau(A_1) - A_1, 1 - A_1)$.

Step 2

Define $\phi(A_1) \equiv \max(\psi_2(0, A_1), \psi_2(A_1, A_1))$, the supremum of the net fraction of votes received by candidate 2. Note that $\psi_2(A_1, A_1)$ is strictly decreasing in A_1 and $\psi_2(0, A_1)$ is decreasing in A_1, with $\psi_2(A_1, A_1) > \psi_2(0, A_1)$ (resp. $\psi_2(A_1, A_1) < \psi_2(0, A_1)$) at $A_1 = 0$ (resp. $A_1 = 1$). Therefore, the two functions intersect once at some threshold K^v such that for $A_1 > K^v$, candidate 2 chooses option (a), i.e., $A_2 < A_1$, and for $A_1 < K^v$, candidate chooses option (b), i.e., $A_2 > A_1$. There are three cases to examine

Case 1

Suppose that $c < 24/169$, then, $\psi_2(0, K^v) = \psi_2(K^v, K^v)$ implies that $\psi(0, K^v) = \tau(0) - \tau(K^v) + K^v$ and $\psi_2(K^v, K^v) = \tau(K^v) - K^v$. Solving this equality leads to $K^v = \frac{3}{2}\sqrt{\frac{3c}{2}}$.

Case 2

Suppose that $24/169 < c < 1/6$, then $\psi_2(0, K^v) = \psi_2(K^v, K^v)$ implies that $\psi_2(0, K^v) = \tau(0) - 1 + K^v$ and $\psi_2(K^v, K^v) = 1 - K^v$. Solving for this equality we obtain $K^v = 1 - \sqrt{\frac{2c}{3}}$.

Case 3

Suppose that c $> 1/6$, then $\psi_2(0, K^v) = \psi_2(K^v, K^v)$ implies that $\psi(0, K^v) = K^v - 1 + K^v$ and $\psi_2(K^v, K^v) = 1 - K^v$. Solving this equality leads to $K^v = 2/3$.

Step 3

Now we determine the best response of each candidate.

Case 1

Suppose that $c < 24/169$. Then, the fraction of votes received by candidate 2 (at the optimal proposal) is strictly decreasing when A_1 varies from 0 to K^v, and then increasing when A_1 varies from K^v to 1. It follows that candidate 1 should choose $A_1 = K^v$. But, then, the best response of candidate 2 is to choose $A_2 = 0$.

Case 2

Suppose that $24/169 < c < 1/6$. Then, the fraction of votes received by candidate 2 is strictly decreasing when A_1 varies from 0 to K^v, and then strictly greater than at K^v for any $A_1 > K^v$. It follows that candidate 1 should choose $A_1 = K^v = 1 - \sqrt{\frac{2c}{3}}$. Against this proposal, the best response of candidate 2 is to choose $A_2 = 0$.

Case 3

Suppose that $c > 1/6$. Then, the fraction of votes received by candidate 2 is strictly decreasing when A_1 varies from 0 to K^v, and then strictly greater than at K^v for any $A_1 > K^v$. It follows that candidate 1 should choose $A_1 = K_v = 2/3$. Against this proposal, the best response of candidate 2 is to choose $A_2 = 0$. To complete the proof, note that, as the uncertainty in the election outcome becomes small, the probability that candidate 1's proposal is implemented converges to 0. Therefore no-disclosure is implemented with a probability that converges to 1. ■

Proof of Lemma 2

Define $\bar{v}_1$ as the threshold such that a firm with $v > \bar{v}_1$ would prefer no mandatory disclosure over disclosure or $P_{ND}(0) = P(\bar{v}_1)$. Owners who are required to disclose, i.e., with $v < A$, support A if $P(v) \geq P_{ND}(0)$, i.e., if and only if $A \leq \bar{v}_1$ where $\bar{v}_1 > 0.5$ is defined by $P(\bar{v}_1) = P_{ND}(0)$. It then follows that for any proposed policy $A < 0.5$, owners with $v < A$ will oppose while owners with $v \geq A$ will support the policy, implying a net support for A given by $L_1(A) = 1 - 2A$ which must be greater than α for A to pass. ■

Proof of Lemma 4

Note that no policy with $A \geq \bar{v}_1$ (where $\bar{v}_1$ is given in Lemma 2) would pass at any round since it would be opposed by all owners with $v < \bar{v}_1$ (a strict majority) and who are better-off not disclosing. The same holds true for policies with $A \in (b, \bar{v}_1)$ since they are opposed by all disclosers $v < A$ and would receive a net support $L_t(A) \leq 1 - 2A < 1 - 2b = \alpha$. If $A = b$ is proposed at any round, firms with $v > b$ will attain their maximal feasible price $P_{ND}(b)$ and thus will favor the policy. This implies that $L_t(b) = 1 - 2b = \alpha$ for any t and $A = b$ may indeed pass not only at round T, but also at any other round. ■

Proof of Lemma 6

Note that if $A \geq \tau(0)$, all owners with $v \in [0, \tau(0)]$ will oppose A and all owners with $v \in [A, \tau(A)]$ will support A. This implies that the net support for A would be negative. It then follows that A can pass only if $A < \tau(0)$. Suppose next that $A < \tau(0)$. The net support for A will be: $L_T(A) = \tau(A) - A - A$. This implies that A can pass if and only if: $\tau(A) - 2A \geq \alpha$, that is, if $\tau(A) \leq 1$:

$$A \leq \frac{1}{7}(-5\alpha + 2\sqrt{\alpha^2 + 14c}).$$

This last term is strictly positive when α is sufficiently small (if this is not the case, no policy may pass at any round). Under the baseline $c < 1/12$, $\tau(\frac{1}{7}(-5\alpha + 2\sqrt{\alpha^2 + 14c})) < 1$ so that the maximal standard that may pass is given by: $b = \frac{1}{7}(-5\alpha + 2\sqrt{\alpha^2 + 14c})$. Note that if $\tau(\frac{1}{7}(-5\alpha + 2\sqrt{\alpha^2 + 14c})) \geq 1$ (c is large enough), there will be no voluntary disclosure at b so that b will be similar to the case with pure mandatory disclosure, i.e., $b = 0.5 - 0.5\alpha$. ■

Proof of Proposition 6

Let $V_t(b)$ be defined as the expected price of an owner with $v = b$ when there are t rounds left and a_t be defined as the minimal policy that may pass when there are t rounds left. Then:

$$V_t(b) \geq \frac{\tau(b) - b}{\tau(b)} P_{ND}(b) + \theta_t P_{ND}(a_t) + \left(1 - \theta_t - \frac{\tau(b) - b}{\tau(b)}\right) V_{t-1}(b),$$

where θ_{t+1} is the probability that a policy that is strictly less than b passes at this round.

Note that policy a_t may only pass if $v = b$ supports the policy (since, otherwise, $\tau(b) - b > b$ will oppose). This implies that $P_{ND}(a_t) \geq V_{t-1}(b)$ and, therefore:

$$V_t(b) \geq \frac{\tau(b) - b}{\tau(b)} P_{ND}(b) + \left(1 - \frac{\tau(b) - b}{\tau(b)}\right) V_{t-1}(b).$$

It follows that as t becomes large, $V_t(b)$ must be bounded from below by $P_{ND}(b)$ which, by steps 1 and 2, implies that a_t must converge to b. ■

Proof of Proposition 7

Let us assume, by contradiction, that $P_{ND}(A') = P_{ND}(A)$. It must be the case that $P_{ND}(A) \geq P_{ND}(A') \geq (A')^2/2$, so that all firms with $v \in [A, A')$ would adopt A and not disclose. If $P_{ND}(A) = P_{ND}(A')$, all owners with $v > A'$ would choose A and A' with equal probability, which would contradict $P_{ND}(A) = P_{ND}(A')$. It then follows that all firms with $v > A'$ or $v > \tau(A)$ adopt A'. All firms with $v \leq A$ are indifferent and adopt either policy and all other firms adopt A. ■

Proof of Proposition 8

We prove the result in two steps.

Step 1

We show that if A_1 is the policy offered by standard-setter 1, standard-setter 2 chooses A_2 as follows: (i) if $A_1 < \frac{1}{3}(2 + \sqrt{1 - 6c})$, A_2 is set slightly higher A_1 and standard-setter achieves a market share $1 - 0.5\, A_1$; (ii) otherwise, $A_2 = 2\sqrt{A_1^2 - 2c} - A_1$ and the standard-setter 2 achieves a market share $2A_1 - \sqrt{A_1^2 - 2c}$.

We derive first the optimal policy choice over $A_2 < A_1$. By choosing $A_2 = 0$, standard-setter 2 achieves a market share equal to $\min(\tau(0), A_1)$. This is clearly the best $A_2 < A_1$ if $A_1 \leq \tau(0)$ since, in this case, the market share is given by A_1. If $A_1 > \tau(0)$, standard-setter 2 can choose $A_2 \leq A_1$ to achieve $\min(A_1, \tau(A_2) - A_2)) + 0.5A_2$. It is clear that it is optimal to choose $\tau(A_2) \leq A_1$, i.e., $A_2 \leq \tau^{-1}(A_1)$. Further, $\tau(A_2) - 0.5A_2$ is convex and thus it maximized at either $A_2 = 0$ (as before) or $A_2 = \tau^{-1}(A_1)$. This latter choice implies a market share equal to $A_1 - 0.5\tau^{-1}(A_1)$, which is preferred to $A_2 = 0$ if and only if $A_1 - 0.5\tau^{-1}(A_1) \geq \tau(0)$, i.e., $A_1 \geq 14/5\sqrt{2c/3} = d_1$.

We compare next this solution to $A_2 > A_1$ in which case the standard-setter can achieve a market share (nearly) equal to $1 - 0.5A_1$. There are three cases to consider.

Case 1

Assume that $c > 1/6$. Then, $A_1 \geq \tau(0)$ implies that $1 - 0.5A_1 < \tau(0)$, so that for any $A_1 \geq \tau(0)$, the policy $A_2 > A_1$ is not optimal. For $A_1 < \tau(0)$, the indifference threshold is given by $d_2 = 1 - 0.5d_2$.

Case 2

Assume that $c \in (75/578, 1/6]$. In this case, for any $A_1 \geq 14/5\sqrt{2c/3}, 1 - 0.5A_1 \leq \tau(0)$ so that $A_2 < A_1$ is not optimal. As before, we solve for the indifference point d_2 such that $A_2 > A_1$ is preferred to $A_2 = 0$. The main difference with Case 1 is that the market share at the indifference point d_2 is now given by $\tau(0)$ instead of A_1, which implies that: $\tau(0) = 1 - 0.5d_2$. It follows that $d_2 = 2(1 - \tau(0)) = 2(1 - 2\sqrt{2c/3})$.

Case 3

Assume that $c \leq 75/578$. We now have that d_2 is located above $d_1 = 14/5\sqrt{2c/3}$, which implies that it is given by $d_2 - 0.5\tau^{-1}(d_2) = 1 - 0.5d_2$. Solving for d_2, we then have that: $d_2 = \frac{1}{3}(2 + \sqrt{1 - 6c})$. In Cases 1–3, $A_2 > A_1$ is chosen for any $A_1 < d_2$. Otherwise, $A_2 = 0$ is chosen for $A_1 < d_1$ and $A_2 = \tau^{-1}(A_1)$ *for* $A_1 \geq d_1$.

Step 2

We use the thresholds d_1 and d_2 defined in Step 1.

Case 1

Suppose that $c \leq 75/578$. The standard-setter chooses $A_2 > A_1$ for any $A_1 < d_2 = \frac{1}{3}(2 + \sqrt{1 - 6c})$ and $A_2 = \tau^{-1}(A_1)$ for any $A_1 > d_2$. It follows that standard-setter 2's market share is minimized at $A_1 = d_2$.

Case 2

Suppose that $c \in (75/578, 1/6]$. In this case, the standard-setter chooses $A_2 > A_1$ for any $A_1 < d_2 = 2(1 - 2\sqrt{2c/3})$ and $A_2 = 0$, for a market share equal to $\tau(0)$ from $A_1 = d_2$ to $A_1 = d_1$. For $A_1 > d_1$, the standard-setter chooses $A_2 = \tau^{-1}(A_1)$ and the market share is again increasing in A_1. It then follows that standard-setter 2's market share is minimized on $[d_2, d_1]$ (indeed the market share is constant on this interval and equal to $\tau(0)$). The best response to A_1 in this interval is always $A_2 = 0$.

Case 3

Suppose that $c > 1/6$. Then, $d_2 = 2/3$ and $A_2 > A_1$ is chosen for $A_1 < 2/3$ while $A_1 < A_2$ is chosen for $d_2 > 2/3$. Since the market share of standard-setter 2 is equal to A_1 at $A_1 = 2/3$ and is strictly increasing for A_1 close to d_2 and then it is (weakly) increasing on $[d_2, 1]$, it must be that $A_1 = d_2 = 2/3$ minimizes the market share of standard-setter 2. ■

Proof of Proposition 9

Suppose that $A' > A$ and let us assume, by contradiction, that $P_{ND}(A') = P_{ND}(A)$. It must be the case that $P_{ND}(A) \geq P_{ND}(A') \geq (A')^2/2$, so that all firms with $v \in [A, A')$ would adopt A and not disclose. If $P_{ND}(A) = P_{ND}(A')$, all owners with $v > A'$ would choose A and A' with equal probability, which would contradict $P_{ND}(A) = P_{ND}(A')$. It then follows that all firms with $v > A'$ or $v > \tau(A)$ adopt A'. All firms with $v \leq A$ are indifferent and adopt either policy and all other firms adopt A. This implies that the adoption of a standard corresponds to the vote of firm under electoral competition and, therefore, (A_1, A_2) is identical to electoral competition. ■

Proof of Proposition 10

From Proposition 2, an economy with a single policy achieves a surplus that is less or equal than $\sigma(0)$. If $\tau(0) < 1$, i.e., $c < 3/8$:

$$\sigma(0) = \int_0^{\tau(0)} P_{ND}(0)dv + \int_{\tau(0)}^1 \left(\frac{v^2}{2} - c\right)dv = \frac{1}{54}(32\sqrt{6}c^{3/2} - 54c + 9).$$

Consider next an economy in which the standards $A_1 > 0$ and $A_2 = 0$ are available and suppose first that $A_1 \geq \tau(0)$. Note that the market price will be identical to a single policy with $A = 0$ as long

as $v \leq A_1$. If $v > A_1$, all firms voluntarily disclose with a single standard, i.e., receiving a price $v^2/2 - c$, while some firms do not disclose when they can choose A_1, so that it must be that these firms achieve a price greater than $v^2/2 - c$, and thus having access to $A_1 \geq \tau(0)$ leads to, on average, a higher market price.

Suppose next that $A_1 < \tau(0)$. There are two more cases to consider. First, assume that $\tau(A_1) \geq 1$, i.e., $A_1 \geq \tau^{-1}(1)$. This can only occur if $c \geq \frac{3}{64}(7 - \sqrt{13})$. Then, the expected surplus is given by:

$$\sigma_2 = \int_0^{A_1} A_1^2/8dv + \int_{A_1}^1 (1 + A_1)^2/8dv = \frac{1}{8}(1 + A_1 - A_1^2).$$

This function is minimal at $A_1 = \tau(0)$ and so that: $\sigma_2 \geq \frac{1}{24}(3 + 2\sqrt{6c} - 8c)$. This last term is always greater than $\sigma(0)$ for $c \in [\frac{3}{64}(7 - \sqrt{13}), 3/8]$.

Second, assume that $\tau(A_1) < 1$, i.e., $A_1 < \tau^{-1}(1)$. If $c \geq \frac{3}{64}(7 - \sqrt{13})$, this condition is implied by $A_1 < \tau(0)$, and otherwise, this condition implies that $A_1 < \tau(0)$. Then, note that market prices are the same as in the single standard scenario when $v > \tau(A_1)$. We also know that the model with two standards achieves more surplus when $v > \tau(0)$ since firms disclose in the single standard economy but may choose not to in the economy with two standards. To conclude, we thus only need to compare market prices when $v < \tau(0)$. In the model with a single standard, the surplus achieved by firms with $v < \tau(0)$ is given by $f_1 = \int_0^{\tau(0)} P_{ND}(0)dv = (\frac{2}{3}c)^{3/2}$. In the model with two standards, the surplus is given by:

$$f_2 = \int_0^{A_1} \frac{A_1^2}{8}dv + \int_{A_1}^{\tau(0)} \frac{\left(A_1 + \tau(A_1)\right)^2}{8}dv = \frac{1}{8}\left(A^3 - \frac{4}{27}(3A - 2\sqrt{6c})(2A + \sqrt{A^2 + 6c})^2\right).$$

This last term is always less than f_1, which in turn implies that the economy with two standards achieves a higher surplus than the economy with a single standard $A = 0$. This concludes the proof for the case $\tau(0) < 1$. Finally, for the case $\tau(0) > 1$, there is no longer any voluntary disclosure in the economy and no firm incurs disclosures costs. It then follows that the economy with two standards that features more precise information, also features greater surplus. ■