MANDATORY DISCLOSURE AND THE ASYMMETRY IN FINANCIAL REPORTING

JEREMY BERTOMEU* ROBERT P. MAGEE†

Abstract

This article develops a theory of endogenously-determined mandatory disclosure. In the model, the equilibrium disclosure policy is a function of the collective demands in favor or against new regulations. Under fairly mild conditions, financial reporting requirements are asymmetric and mandate disclosures over unfavorable or adverse events. These requirements tend to be more comprehensive when the information is less costly to verify, when prices are more responsive to information or when there is more uncertainty. The policy does not fully internalize the externalities of disclosure and a small reduction in mandatory disclosure increases the average market price. The theory is consistent with a variety of stylized facts about mandatory disclosure and provides a causal framework to analyze regulatory innovation. Further results are developed in the context of productive actions, early liquidations and voluntary disclosures.

Keywords: political; certification; financial accounting; mandatory; policy.

Considerable debate exists on the preferred design of financial reporting rules to ensure the well-functioning capital markets. Prior literature in accounting has informed this debate by identifying links between regulatory choices and their economic consequences on various interest groups in the market. Given that consequences shape individual preferences for regulatory change, this line of research points to a causal model of regulations drawing directly from the demands of those being regulated.[1] Yet, although there exists a large accumulated body of evidence documenting individual influences on regulatory actions, this evidence has not yet matured into a positive theoretical framework for regulatory choice.

This article develops a facet of this broad research question within the context of disclosure requirements in the capital market. From a practical standpoint, the theory shall apply to mandatory disclosures

*Stan Ross Department of Accountancy, Baruch College, City University of New York, 55 Lexington Avenue, New York, NY 10010.

†Department of Accounting Information and Management, Kellogg School of Business, Northwestern University, 2001 Sheridan Road, Evanston, IL 60208-2001. Current version: February 1^{st} 2011.

[1] Interestingly, the analysis of the determinants of regulations was present at the onset of the positive accounting paradigm (Stigler (1964), Watts (1977), Watts and Zimmerman (1978), Watts and Zimmerman (1979)).

required by law, such as generally-accepted accounting standards (e.g., when and how to impair an asset), supplementary regulatory filings (e.g., mandatory disclosure requirements imposed by the Securities and Exchange Commission) or auditing standards (e.g., what events trigger a qualified or adverse audit opinion). The common aspect of these disclosures is that (1) they are potentially relevant to the firm's future cash flows, (2) they are primarily decided as part of a regulatory process, and (3) they are (in principle) not at the discretion of the firm's management.[2]

In the model, a set of economic agents are endowed with different signals about their future cash flows (e.g., an economic event or a transaction) which may be the object of a disclosure requirement. Because, absent a disclosure, capital markets are uninformed about which signal has been observed, agents have different preferences about which disclosures should be regulated. The potential disagreement is resolved by majoritarian choice, i.e., the (condorcet) equilibrium is the policy preferred by a majority of all agents over any other policy.[3] For expositional purposes, the model is interpreted in terms of informed owner-managers ("sellers") selling their firm in the capital market; however, more generally, the environment is meant to capture the sale of a good or service by an informed party in a competitive market.[4]

The primary result of the analysis is that, when it exists, the condorcet equilibrium is asymmetric and mandates full-disclosure over sufficiently unfavorable events but non-disclosure of all favorable events. The intuition for this finding stems from the bias of majoritarian choices toward sellers with median information, which tend to be pivotal voters over many policy comparisons. In the context of disclosure regulations, such median sellers support policies in which only sellers with (below median) unfavorable information must disclose in order to maximize their own market price. This prediction holds under relatively mild assumptions about the potential uses of information or the costs of disclosure, and in particular even if this form of disclosure does not maximize the average market price. In fact, because the median seller does not

[2]The model presented does not discuss special issues related to the sale of a voluntary certification by a for-profit intermediary (e.g., the certitication of an asset by a rating agency, a auditor or an issuer). These different forms of disclosure, which do not satisfy (2) and (3), are not mandatory or necessarily regulated, and have already been the object of a large preexisting literature, e.g., Lizzeri (1999), Beyer and Sridhar (2006), Lerner and Tirole (2006).

[3]The condorcet criterion is the subject of an extensive literature (Austen-Smith (1983), Dixit (2001), Bertomeu and Magee (2011)) and has a very natural application in environments in which policy choices can be imposed or influenced by elected officials. By construction, the condorcet equilibrium coincides to the coalition-proof solution (the core) in a cooperative game where a majority can renegotiate an existing policy. Further, a condorcet equilibrium is the Nash equilibrium in a game where politicians propose policies and compete to win office (Downs (1957)).

[4]This could represent, for example, the sale of a new drug by a pharmaceutical company, the sponsor of an investment fund, the sale of specialized labor (e.g., doctor, lawyer, audit) subject to mandatory certification or, even, the sale of services with potential quality concerns (e.g., grade certification for a restaurant).

internalize the consequences of a disclosure of unfavorable information, the equilibrium does *not* select the policy that maximizes market prices and a small reduction in disclosure requirements would increase the average market price in the economy.

The analysis also identifies environments in which a condorcet equilibrium does not exist. Specifically, condorcet "instability" occurs when the costs of disclosure are sufficiently low. In these environments, median sellers would push for excessively high levels of mandatory disclosure to maximize their market price, beyond the level at which they control enough votes to stop further changes to an alternative policy. This unexpected property of disclosure regulations would suggest that a simple institutional process, such as the one described here, is likely to function when the information being regulated is sufficiently costly to verify but, otherwise, a majoritarian agreement may fail (e.g., condorcet cycles).[5]

The analysis offers several additional implications as to how policy changes may be a function of the environment in which they take place. When the costs of disclosure are higher (e.g., less verifiable information or weaker auditing institutions), the level of mandatory disclosure decreases. If markets are more responsive to information, the level of mandatory disclosure increases. In the special case of normally-distributed economic shocks, an increase in volatility increases the level of mandatory disclosure and an increase in expected cash flows increases the level of mandatory disclosure if the level of mandatory disclosure is high or the productive uses of information are small, but decreases it otherwise.

Lastly, the model is extended to accommodate alternative decisions that would change the net disclosure costs and benefits borne by the firm such as, for example, remaining private or going dark, liquidating early or making voluntary disclosures. Under mild conditions, the implemented policy still features the same type of asymmetric reporting, although no longer necessarily at the target level preferred by the median seller. The case of liquidations and voluntary disclosures are developed in greater detail. In the case of early liquidations (e.g., the seller can liquidate for a fixed return), the equilibrium always exists when the liquidation payoff is sufficiently large but, perhaps more surprisingly, the equilibrium disclosure threshold is not a function of the liquidation despite its informational role on efficient liquidations. By contrast, in the case of voluntary disclosures, the equilibrium features coexisting mandatory disclosure for unfavorable

[5]See Bertomeu and Magee (2012) for a development of the dynamics of condorcet cycles when a condorcet equilibrium does not exist. In this model, a specific agenda-setting process organized the order through which policy proposals are compared, and condorcet cycles occur along which small increases in disclosure regulation are followed by sharp decreases.

events and voluntary ones for favorable events. The implemented policy is never set at the level that would induce full-disclosure.

Related Literature. The political aspect of security regulation traces its origins at least as far back as Stigler's theory of regulatory capture (e.g., Stigler (1964, 1971)). Stigler observed that many normative policy prescriptions do not seem to be descriptive of observed policies as we see them ("(1) it is possible to study the effects of public policies, and not merely to assume that they exist and are beneficial, and (2) grave doubts exist whether an account is taken of costs of regulation," Stigler (1964), p.124). Over the years, this paradigm led to a large stream of research articles discussing the consequences of "politically-determined" security regulations (see Kothari, Ramanna and Skinner (2010) for a recent survey).

There is a small prior theoretical literature on "endogenous" regulatory choice. A related study is Demski's well-known impossibility results (Demski (1973, 1974)); however, his perspective is quite different from ours. Demski takes a normative approach and seeks a ranking among policies by which a superior policy would solve *any* decision problem and (thus) would be unanimously preferable. Our study differs in that we do not seek to satisfy such normative unanimous requirement but only require "democratic" majority agreements; this allows us to derive a clear solution to the policy choice problem and, also, to analyze which firms gain the most from this majoritarian policy and what other productive distortions the implemented policy may entail. Several recent studies examine the process of social choice within the firm, given that some of the firm's decisions are approved through a shareholder vote (Demarzo (1993), Baranchuk and Dybvig (2006), Fischer (2010)). There are few studies examining political processes in disclosure regulation. Bertomeu and Magee (2011) who focus on the dependence of regulations on economy-wide systematic movements. Also related to this study, Bertomeu and Magee (2012) focus on strategic agenda-setting and the regulatory cycles that such agenda-setting may create. The main focus of these papers is, however, on intertemporal changes to regulations but not on explaining the asymmetry in financial reporting. Lastly, Friedman and Heinle (2012) develop a model in which management can lobby against the implementation of (socially-desirable) disclosure requirements. They show that, as compared to specific regulation, one-size-fits-all regulations create a free-rider problem that reduces the total amount of lobbying, reducing the social costs of such lobbying activities. This model is different from theirs in that the focus here is on predicting which events should be disclosed.

There is also an extensive literature on majoritarian social choice and, without attempting to review it in its entirety, it is useful to quickly place our results in its context. For choice problems that are one-dimensional (e.g., "choose a tax rate" or "choose where to locate a bridge on a river"), the condorcet equilibrium will be the policy preferred by the median voter (Black (1948), Downs (1957)). On the other hand, prior literature also shows that, in a wide class of problems, a condorcet policy fails to exist (e.g., Plott (1967)). Similar to these studies, the disclosure problem studied here is one that is multi-dimensional ("what information should be disclosed"). However, prior studies focus on spatial preferences (where each agents value policies as the distance from a preferred policy) so the underlying environment is quite different. In one dimension, their approach is more ambitious than this study, because they focus on an abstract representation of the choice process. However, along other dimensions, choices over disclosure rules present some unique characteristics such as the nature of preferences for disclosure (which cannot be represented as spatial preferences) or, from an applied perspective, can offer a more detailed prediction about the form of a disclosure policy. An additional contribution of this paper to this area is to show that choices over disclosure policies can have a condorcet equilibrium (when disclosure costs are not too small) while this is extremely rare under spatial preferences.

The positive analysis developed here complements an existing (normative) literature discussing the type of accounting rules have desirable ex-ante welfare properties. A long-standing puzzle in this literature is that accounting measurement, while prompt to release adverse events, seemingly delays the disclosure of favorable events (Guay and Verrecchia (2006)). The most closely related papers to this one and which directly speak to this puzzle are Goex and Wagenhofer (2008) and Beyer (2012). As in this paper, these studies compare impairment-like rules relative to other possible rules (e.g., full-disclosure or fair value accounting). An important difference with the current study is that the focus is on rules that maximize ex-ante surplus, rather than rules that survive a political process. Recently, Gao (2012) focuses on the production and verification of information and shows that, in the presence of earnings management incentives, an asymmetric verification increases contracting efficiency. As noted early on by Demski (1973), the optimality of one measurement system will be the function of the environment it intends to measure and existing results in the area provide a nuanced picture in which the desirability of an asymmetry is context-specific. In comparison, it is shown here that, while not necessarily ex-ante desirable, a political resolution of disclosure regulation predicts asymmetric disclosure policies in a wide class of environments. In this respect, the current model emphasizes the differences between social desirability and the outcome of the political institution.

1 The Model

The economy is populated by a continuum of firms with total mass normalized to one. Each firm has one owner-manager who privately observes in advance an economic event $\tilde{x}$, drawn from a distribution $F(.)$ with finite first moment, a density $f(.) > 0$, median m and full support over an interval X where $\inf X = \underline{x}$ and $\sup X = \overline{x}$, where $-\infty \leq \underline{x} < \overline{x} \leq +\infty$. Prior to the public realization of this economic event, an owner-manager must sell the firm to uninformed investors, the owner-manager is denoted the "seller" in the analysis below. In this context, the seller may represent an entrepreneur prior to an initial public offering, a manager interested in increasing the stock price or an undiversified short-term investor who owns some shares in the firm.[6]

A1. *A disclosure policy is defined as $\Delta \in \Omega$, where $\Omega = \{(y, z) : y, z \in X, y \leq z)$ is a set of feasible policies. The firm does not disclose when $x \in \Delta$ and must disclose when $x \notin \Delta$.*

To provide information to outside investors, a mandatory disclosure policy may be implemented, which makes some information publicly available. Assumption A1 defines a policy as a set of outcomes that *must* be disclosed and, given that the primary focus is not on discretionary reporting, the underlying assumption is that the law provides the means to credibly enforce such disclosures. Although the assumption will be relaxed later on, the baseline model is stated in terms of reporting requirements in which the non-disclosure region is a connected set (an interval). Assumption A1 accommodates several possible examples, such as no-disclosure (i.e., $\Delta = X$), full-disclosure (i.e., $\Delta = \emptyset$ when $y = z$), asymmetric disclosures of adverse events (i.e., $\Delta = (y, \overline{x})$ when $z = \overline{x}$) as well as, possibly, disclosures of favorable events or interior non-disclosure regions such that only "extreme" values must be disclosed.

A2. *Conditional on a disclosure, the market price is denoted $P(x)$. Conditional on a non-disclosure and*

[6] It may be possible to apply some aspects of the analysis more generally to disclosure in the product market (such as a quality label) and, in this respect, the early literature on voluntary disclosure does not always make a clear distinction between product markets and capital markets (Jovanovic (1982)). There are however two caveats to this interpretation. First, the assumptions represent only vertically-differentiated characteristic (such as quality) and rule out other cases of horizontal differentiation (such as, for example, a movie age rating) or disclosure about the match to a particular group of customers. Second, we develop the baseline model with a liquidation option, which does not perfectly fit a model in which two parties with different consumption values trade (as in Akerlof's lemon's model) or if a product is put for sale to buyers with different willingness to purchase.

a policy $\Delta = (y, z)$, the market price is denoted $P(y, z)$ and assumed to be differentiable in both arguments and non-decreasing in z. In short-hand, define $\overline{P}(x) = P(x, \overline{x})$.

As is usual in financial reporting models, the focus here is on economic events that may be ranked in terms of their information about future cash flows. Assumption A2 nests various plausible assumptions about the relationship between information and market prices. For instance, in a pure-exchange economy in which $\tilde{x}$ represents future cash flows, the price function can written as $P(y, z) = \mathbb{E}(\tilde{x}|\tilde{x} \in (y, z))$ or, more generally, $P(y, z) = CE(\tilde{x}|\tilde{x} \in (y, z))$, where $CE(.)$ is a representative investor's certainty equivalent (if investors are risk-averse.)

More generally, information may also have social value because of production decisions if $P(y, z) \geq \mathbb{E}(P(x)|x \in (y, z))$. Consider for example an economy in which the expected final cash flow is $\pi(d, \tilde{x})$, where $\pi_x > 0$ and d is a public decision made by the manager prior to the sale to maximize the stock price (or, after the sale, by the new uninformed investors). Then, $P(y, z) = \max_d \mathbb{E}(\pi(d, \tilde{x})|\tilde{x} \in (y, z))$ will be weakly less than $\mathbb{E}(\max_d \pi(d, \tilde{x})|\tilde{x} \in (y, z))$ since with more information the decision can be better adapted to the realization of $\tilde{x}$. A variety of other environments are consistent with the assumption, as the next two (brief) examples show. Assume that sellers have the option not to sell the firm and, specifically, observe a random shock $\tilde{\alpha}$ after the policy is implemented such that $\tilde{\alpha}x$ represent the personal utility received deciding not to sell. In such an environment, the market price would price-protect against the lemons problem, as $P(y, z) = \mathbb{E}(\tilde{x}|\tilde{x} \in (y, z), \tilde{\alpha}\tilde{x} \geq P(y, z))$, implying (under mild regularity conditions) a price function that is non-decreasing in y and z. Lastly, the formulation accommodates environments in which there are *ex-post* proprietary or verification costs incurred by the firm making a particular disclosure such, as for example, $P(y, z) = \mathbb{E}(\tilde{x}|\tilde{x} \in (y, z)) - \mathcal{C}(y, z)$ where $\mathcal{C}(.)$, a function increasing in y and decreasing in z, is greater when the disclosure is more precise. This last example could (potentially) feature a decreasing price function $P(x)$ if the additional ex-post costs dominate the more favorable information that is disclosed.

A3. *For any policy $\Delta = (y, z)$, an ex-ante cost $C(y, z) \geq 0$ is incurred by all firms and is such that: (i) $C(y, z)$ is differentiable in both arguments and satisfies $C_y > 0$ and $C_z < 0$, and (ii) $C(\underline{x}, \overline{x}) = 0$.*[7]

Assumption A3 states that there is an ex-ante verification cost paid by the firm to guarantee that each disclosure is truthful and in accordance with the law. This cost may represent a non-contingent audit fee or,

[7] In the case of an unbounded support, continuity is defined with respect to the distance $d(y, z) = Prob(\tilde{x} \in (\min(y, z), \max(y, z)))$. This implies that the disclosure cost must become small as the probability of disclosure becomes small.

more generally, the cost of an internal control system which identifies particular economic events that should be disclosed. Also, recall that any additional disclosure cost that is a function of the actual disclosure, if any, would be already included in $P(y, z)$ and $P(x)$.[8] Condition (i) states that the cost increases in the precision of the reporting system and condition (ii) states that the cost of no-disclosure is normalized to zero.[9] With a slight abuse of language, the notations $C(\Delta) = C((y, z)) \equiv C(y, z)$ and $P(\Delta) = P((y, z)) \equiv P(y, z)$ are used interchangeably in the rest of the analysis.

Let $\mathcal{U}(\Delta; x)$ represent the seller's utility when the reporting policy is Δ and the observed outcome is x; this utility is increasing in the net market price (the price received from the buyer minus cost incurred for the reporting requirement). The solution concept for the model is the condorcet equilibrium, defined as a policy that is preferred by a majority over any other alternative policy.

Definition 1.1. *A policy Δ^* is a (condorcet) equilibrium if, for any other Δ',*

$$Prob(\mathcal{U}(\Delta^*; \tilde{x}) > \mathcal{U}(\Delta'; \tilde{x})) \geq Prob(\mathcal{U}(\Delta^*; \tilde{x}) < \mathcal{U}(\Delta'; \tilde{x})) \quad (1.1)$$

where $Prob(.)$ stands for the probability of an event.[10]

Although it is an admittedly abstract representation, the condorcet equilibrium intends to capture an aggregation of individual preferences within a democratic regulatory environment. This feature is a distinctive property of disclosure regulation in many countries with well-developped financial market and in which political bodies retain legislative authority over disclosure standards. In the US, for example, the drafting of new standards is delegated to the (non-governmental) Financial Accounting Standard Board but Congress and the Securities and Exchange Commission retain the authority to implement an exposure draft. Similarly, in countries adopting international reporting standards, the interpretation and enforcement of reporting standards (or whether to keep using international reporting standards) is controlled by domestic regulators and political bodies.

[8] For notational purposes, it is more practical to state the price function gross of ex-ante costs. The results would be of course entirely unchanged if the price were directly defined net of the ex-ante cost.

[9] The differentiability of the cost function is not essential for most of the results and is used here to simplify the exposition.

[10] Although the model is solved with a single vote per firm, the proofs/results are very similar if sellers are endowed with voting weights correlated to the realization of $\tilde{x}$.

2 The Nature of Mandatory Disclosure

This section develops a formal characterization of an equilibrium policy in this environment. The equilibrium must feature a policy that is preferred by a sufficiently large fraction of sellers; to test whether a policy is an equilibrium, therefore, proper consideration must be given of the willingness of various groups of sellers to alter disclosure requirements. This argument is developped in greater detail next.

Consider sellers of firms disclosing their information. These sellers are better-off, across all other policies in which they must also disclose, if the implemented policy features less mandatory disclosure (over other firms) because it would be less costly to implement. As a voting group, disclosers thus support some reductions in disclosure requirements - in fact, disclosers under an existing policy would almost unanimously support a small reduction in requirements since it would change the disclosure for a very small fraction of disclosers while reducing costs for all other disclosers. Continuing this logic somewhat further, equilibrium disclosure requirements cannot require disclosures from the majority of sellers since, as noted earlier, the majority would immediately push to reduce disclosure requirements.

Consider next sellers whose economic event lies in the non-disclosure region. Because a seller is either in the disclosure or non-disclosure region and, as noted in the previous paragraph, the disclosure region cannot include the majority of all sellers, the non-disclosers must, vice-versa, form the majority of sellers. Hence, non-disclosers are able to alter, as a group, an existing policy toward their most preferred and, for this reason, an equilibrium policy must be one that is preferred by non-disclosers.

To put this last argument at work, consider a non-disclosure region $\Delta = (y, z)$ in which $y < z < \overline{x}$ and some favorable events must be disclosed. Clearly, increasing z by a small amount would increase the non-disclosure market price (since better types are pooled in the non-disclosure region) and reduce the ex-post cost (since fewer events are disclosed). It follows that all non-disclosers under Δ, a majority, would support the increase, and such a choice of Δ would never be an equilibrium. In summary, the equilibrium must feature a majority of non-disclosers and non-disclosure of all sufficiently favorable economic events. In particular, there exists a threshold, located below the median economic event, below which an event must be disclosed.[11]

[11]The Lemma is partly remindful of a property of disclosure models with pure cheap talk. In these models, the signal is voluntarily revealed by an expert. The cheap talk setting often implies that coarser information is revealed for disclosures that, if they were believed, would be more favorable to the sender (e.g., Fischer and Stocken (2001), Marinovic (2010)). The economic driver

Lemma 2.1. *If Δ^* is an equilibrium, then $(m, \overline{x}) \subseteq \Delta^*$. That is, an equilibrium policy features non-disclosure of (at least) all favorable events that are above-median.*

This type of asymmetric reporting requirement is broadly consistent with a number of widespread measurement practices, many of which are required under generally-accepted accounting standards (see discussions in Moonitz (1951), Watts (2002)). As noted by Beyer (2012), asset impairments are the archetype of various accounting rules in which an asset's loss of value must be recognized immediately in the income statement. There are, in practice, many examples of applications of this principle, including goodwill impairments, inventory valuation, impairment of securities held-for-sale, loss recognition in long-term contracts, accounting rules for exchanges of assets that lack economic substance or advance recognition of reasonably certain liabilities. In most of these cases, there is no symmetric treatment when the event is favorable and for which accounting disclosures are delayed until realized.[12]

The argument developed so far implies that an equilibrium will have the form $\Delta^* = (y^*, \overline{x})$, where y^* is the threshold below which events must be disclosed. In addition, non-disclosers achieve the same utility in equilibrium and jointly support further increases in the net non-disclosure market price. As a result, the equilibrium always maximizes the net non-disclosure market price $P(\Delta) - C(\Delta)$ subject to non-disclosers retaining a majority of all votes.

Lemma 2.2. *Define $\Lambda = \{y : y \in argmax_{y \leq m} \overline{P}(y) - C(y)\}$ as the set of thresholds that maximize the non-disclosure market price (net of costs). Then, an equilibrium reporting policy must have the form $\Delta^* = (y^*, \overline{x})$, where y^* is uniquely defined as $y^* = \min \Lambda$.*

Of note, when it exists, the equilibrium is unique even if the net non-disclosure market price $P(\Delta) - C(\Delta)$ has more than one local or global maximum. Even though non-disclosers might be indifferent to two policies that yield the same net non-disclosure price, other sellers that might disclose under one policy

for the result is, however, one that is very different in that, in cheap talk, coarseness is used as a signalling mechanism to credibly convey information.

[12]This type of disclosure regulation has been the object of a recent literature, which describes situations in which more precise timely disclosures of potentially adverse signals are preferred to disclosures of potentially favorable ones, as for example in Chen, Hemmer and Zhang (2007), Goex and Wagenhofer (2008), Kirschenheiter and Ramakrishnan (2009), Gigler, Kanodia, Sapra and Venugopalan (2009) or Beyer (2012). The current model differs from these perspective in that it does not focus on the maximization of an ex-ante surplus.

are better-off under the policy that features less mandatory disclosure because this policy exhibits lower disclosure costs as well as, possibly, a higher set of sellers that achieve the (maximal) non-disclosure price.

While Lemma 2.2 characterizes the only candidate for an equilibrium, some special consideration must be given as to whether an equilibrium exists. For example, if $\overline{P}(y) - C(y)$ is strictly increasing in y (which occurs if $C'(.)$ is small), the set Λ contains only $y = m$ which, by Lemma 2.1, cannot be an equilibrium. As shown next, the candidate equilibrium threshold y^* must feature a sufficiently large fraction of non-disclosers.

Proposition 2.1. *Let $\Delta^* = (y^*, \overline{x})$ be defined as in Lemma 2.2, and define $\mathcal{I} = \{x : x > y^*, P(x) - C(\underline{x}, x) \geq \overline{P}(y^*) - C(y^*)\}$. If $F(y^*) + Prob(\mathcal{I}) < .5$, then Δ^* is the unique equilibrium policy.*

One implication of this analysis is that when an equilibrium reporting policy exists, it will exhibit lower-tailed disclosure. That is, "bad news" will be disclosed before the actual outcomes occur, whereas "good news" will not. Another implication of this analysis is that there may be many circumstances in which an equilibrium reporting policy might not exist, particularly if the costs of information are low. Under such conditions, striving to achieve some sort of ongoing consensus among the reporting entities would be fruitless. No matter what the status quo reporting policy, there is an alternative policy that would be preferred by more than half the reporting firms.

Formally, the candidate policy Δ^* defined in Lemma 2.2 always defeats any alternative policy that has the form $\Delta = (y, \overline{x})$; however, whenever the sufficiency condition of Proposition 2.1 is not satisfied, it may be defeated by policies $\Delta = (y', z)$ in which $y' < z < \overline{x}$ in which some non-disclosers under Δ^* are better-off disclosing while some disclosers under Δ^* benefit from either reduced disclosure costs or, whenever $x \in (y', y)$, from a higher non-disclosure price. To guarantee the existence of an equilibrium, a sufficient condition is to assume that these two groups do not form a majority.

To interpret the sufficiency condition further, assume that $P(m) - C(\underline{x}, m) < \overline{P}(y^*) - C(y^*)$. This restriction is economically plausible given that it is satisfied for many common distributions (e.g., Exponential distribution, lognormal distribution, Pareto distribution, etc.) or environments in which a symmetric distribution is truncated due to limited liability (e.g., a truncated Normal). Under this additional restriction, a seller with $\tilde{x} = m$ will strictly prefer Δ^* over any other policy, implying that Δ^* will maximize the net market price of some firms strictly above the median firm. Correspondingly, the policy will also maximize the net market price for all firms with x located between y^* and (some level strictly above) the median, and thefefore, the threshold y^* will be an equilibrium as long as y^* is sufficiently small, i.e., as long as the cost of disclosure is sufficiently convex.

The analysis is illustrated with a simple numerical example. Consider a pure-exchange economy in which $P(y, z) = \mathbb{E}(\tilde{x}|\tilde{x} \in (y, z))$, and where $\tilde{x}$ is Normally distributed with mean zero and variance normalized to one. Let the ex-ante cost be given by a function $C(y, z) = c/Prob(\tilde{x} \in (y, z)) - c$ where $c > 0$. This parametrization captures an environment in which full-disclosure would be arbitrarily costly to implement. The parameter c should be interpreted as the cost per unit of variance (higher when the cost increases and lower when the variance increases). Under these assumptions, an equilibrium exists if and only if $c \geq \tau \approx .9$. The disclosure threshold is always located below the median (zero in this example) and changes from half of a standard deviation below the median to nearly no-disclosure (three standard deviations below the median) when the cost is large.

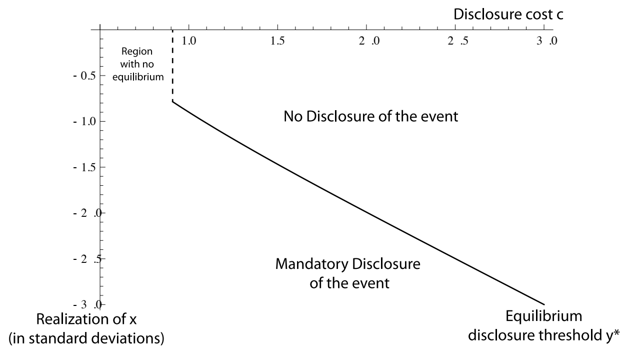

Figure 1. Equilibrium in a Normally-distributed pure-exchange environment.

3 Comparative Statics and Economic Efficiency

The key prediction of the model is that the policy that emerges from the political choice is a function of the economic environment in which it takes place. Specifically, the implemented policy is a function of characteristics of the market pricing function, the distribution of the economic event $\tilde{x}$ as well as the shape of the cost function. To elaborate more on this, several comparative statics are described next.

Corollary 3.1. *If, in addition to the above conditions for an equilibrium, the function* $\overline{P}(y) - C(y)$ *is single-peaked with a single interior maximum,* y^* *satisfies:*

$$\overline{P}'(y^*) = C'(y^*) \tag{3.1}$$

A uniform increase in $\overline{P}'(.)$ *increases* y^* *and a uniform increase in* $C'(.)$ *increases* y^**.*

The cost-benefit determination of y^* has a simple connection to two widespread concepts in accounting theory. When the price function increases more steeply, i.e., a more precise signal is more relevant to price the firm, the model with a steeper price implies more mandatory disclosure. If, for example, $\overline{P}'(y)$ is constant in y, the information does not affect market prices and the equilibrium will be $y_* = \underline{x}$ or no-disclosure. Compared to a policy in which $\overline{P}'(y)$ is increasing, the disclosure threshold will be greater. Similarly, when the cost function increases more steeply, i.e., a more precise signal is more difficult to verify, the level of mandatory disclosure will be lower. In summary, this comparative static shows that the threshold y^* solves a trade-off between relevance (or the effect of information on market prices) and verifiability (or the cost to verify a piece of information).

To develop additional comparative statics that link the market price to the distribution $\tilde{x}$, the following assumption is made.

Condition S. There exists a twice-differentiable function $V(.)$ that is either (a) linear or (b) strictly convex, such that for any y and z, $P(y,z) = V(\mathbb{E}(\tilde{x}|\tilde{x} \in [y,z]))$ and $V'(.) > 0$.

Condition S is useful to capture the social value of information in parsimonious manner without requiring too much detail on production technologies (which is not our focus here). For example, when $V(x) = x$, the price $P(y,z)$ will be equal to $\mathbb{E}(\tilde{x}|\tilde{x} \in [y,z])$ which corresponds to a pure-exchange environment in which information is purely redistributive (gross of disclosure costs). When $V(.)$ is strictly convex, $P(y,z) = V(\mathbb{E}(\tilde{x}|\tilde{x} \in [y,z])) < \mathbb{E}(V(\tilde{x})|\tilde{x} \in [y,z]) = \mathbb{E}(P(\tilde{x})|\tilde{x} \in [y,z])$ and an economy in which more information is disclosed will lead to a higher expected price. Note that Condition S is somewhat restrictive not because of the convexity but rather because it requires prices to form as a function of the first moment.

Assume that Condition S holds and consider the special case in which $\tilde{x}$ is Normally distributed with mean μ and variance σ^2. Then, the expectation conditional on non-disclosure is given by:

$$\mathbb{E}(\tilde{x}|\tilde{x} \geq y) = \mu + \sigma\lambda(\frac{y-\mu}{\sigma})$$

where $\lambda(x) = f(x)/(1-F(x))$ denotes the inverse Mills ratio and such that $\lambda'' > 0$ (Hayashi (2000), p.513). If Condition S holds,

$$\overline{P}'(y) = \lambda'(\frac{y-\mu}{\sigma})V'(\mathbb{E}(\tilde{x}|\tilde{x} \geq y)) \tag{3.2}$$

Applying Corollary 3.1, all other things being equal, an increase in $\frac{\partial \overline{P}(y)}{\partial y}$ for all y implies an increase in y^*. Because $y^* \leq \mu$, an increase in σ^2 will increase $\lambda'(\frac{y-\mu}{\sigma})$ and $V(\mathbb{E}(\tilde{x}|\tilde{x} \geq y))$, thus leading to an increase in mandatory disclosure, i.e., a lower value of y^*. This aspect follows from the fact that the price consequences of pooling with firms with less favorable information are magnified in more volatile environments and thus non-disclosers demand more disclosure.

The effect of a change in the mean μ is more ambiguous. When $y^* = \mu$ so that non-disclosers cannot increase the threshold above μ even though doing so would increase the market price, then an increase in μ always increases y^* because it increases the fraction of owners with more favorable information. This force also dominates when $y^* < \mu$ but the social value of information is sufficiently large, i.e., $V''(.)$ is sufficiently large, because an increase in μ increases $\mathbb{E}(\tilde{x}|\tilde{x} \geq y)$. These two forces are not unique to this paper and are the primary focus of Bertomeu and Magee (2011) (in the case of a binary distribution of outcomes) where a change in the fraction of firms with favorable events raises the demand for mandatory disclosure.

A novel result here is that this comparative static may reversed when the productive uses of information are not too large and $y^* < \mu$. Then an increase in μ will decrease $\lambda'(\frac{y-\mu}{\sigma})$ leading to a decrease in the non-disclosure threshold y^*. While this may seem surprising at first sight, this is mostly driven by the cost-benefit trade-off faced by firms. As the mean μ of the unconditional distribution increases, the additional information about future cash flows from truncating the distribution decreases (i.e., more of the mass of the distribution is in the upper tail). It follows that there is less value for non-disclosers to impose more mandatory disclosure and thus the non-disclosure region expands. This aspect is different from Bertomeu and Magee (2011) because, in the latter study, mandatory disclosure is not costly. These observations are summarized in the next Corollary.[13]

Corollary 3.2. *Suppose that $\tilde{x} \sim N(\mu, \sigma^2)$, Condition S is satisfied, and an equilibrium exists. An increase in the variance σ^2 implies an increase in mandatory disclosure y^*. An increase in the mean μ implies an increase (decrease) in mandatory disclosure y^* if $y^* = \mu$ or $V''(.)$ is sufficiently small (if $y^* < \mu$ and $V''(.)$ is sufficiently large).*

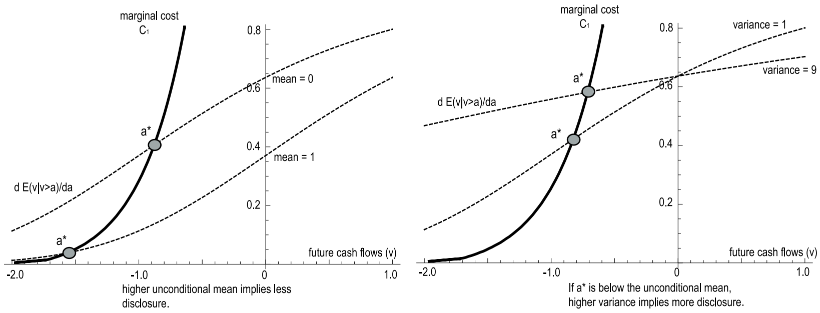

Figure 2. Threshold y^* if $\tilde{x}$ is Normally-distributed.

The comparative statics are illustrated further in Figure 3 in the case of the pure-exchange economy discussed earlier. The marginal cost of verifying that $x \geq y$ is plotted as a bold curve and the marginal benefit of truncating lower values of $\tilde{x}$ is plotted as dotted lines for different distributions. As argued in Corollary 3.2, the threshold decreases if the unconditional mean increases and the threshold increases if the variance increases.

Having described how the threshold y^* varies as a function of the environment, the welfare consequences of this policy are now further explored. A key consequences of the asymmetry in the reporting process is that the equilibrium policy does not weigth equally the welfare of various sellers. Specifically, the policy is biased to maximize the non-disclosure price. The results that follow explore this asymmetric welfare implication in greater details.

Definition 3.1. *A policy Δ Pareto-dominates another policy Δ' if, for all x, $\mathcal{U}(\Delta; x) \geq \mathcal{U}(\Delta'; x)$, strictly at least for one x. A policy Δ is Pareto-efficient if it is not Pareto-dominated by any other policy.*

[13] As for any such comparative statics exercises (which are entirely common in voluntary disclosure studies), the results must be interpreted with great care. Such comparative statics only hold everything else being equal, i.e. taking as a given the disclosure friction. In some cases, one could expect the disclosure friction to change with changes in the distribution and understanding this would require a model in which the friction emerges endogenously from the model (which is not our objective here).

Note that the equilibrium reporting policy must be Pareto-efficient since, otherwise, another policy would be unanimously preferred to it. Vice-versa, however, Pareto-dominance is a criterion that is too weak to rank most feasible policies (an observation also made in Demski (1973, 1974). In this environment, for example, the seller of a disclosing firm, i.e., with $x < y^*$, would always achieve strictly more surplus with a policy $\Delta' = (x, \overline{x})$ over Δ^* since this alternative policy would increase the market price and reduce disclosure costs. Having noted this, one may characterize the equilibrium policy within the Pareto frontier.

Proposition 3.1. *Suppose that $\overline{P}(y) - C(y)$ attains its global maximum on $[\underline{x}, m]$ and that maximum meets the conditions for existence of an equilibrium. Then, the equilibrium policy is Pareto-efficient and features a minimal non-disclosure set (in the sense of the inclusion) among all Pareto-efficient policies. On the other hand, if $\overline{P}(y) - C(y)$ attains its maximum on $(m, \overline{x}]$, there are Pareto-efficient policies that feature less mandatory disclosure than Δ^*.*

When the reporting cost is sufficiently large that non-disclosers demand moderate amounts of disclosure, the equilibrium policy features a minimal disclosure set. In this case, the political choice is biased to benefit sellers with more favorable information to disclose, but may induce excessive costs on sellers with unfavorable information.

To further discuss the desirability of the implemented policy, a second concept of efficiency is introduced which can provide a more consistent ranking over alternative policies.

Definition 3.2. *A policy Δ is said to yield a higher average market price than another policy Δ' if:*

$$\mathbb{E}(\mathcal{U}(\Delta; \tilde{x})) > \mathbb{E}(\mathcal{U}(\Delta'; \tilde{x}))$$

The average market price is a criterion that is theoretically and practically easier to examine than Pareto-optimality (for example, by examining the stock response to an unexpected regulatory shock) and is therefore of general interest. Strictly speaking, however, the average market price will represent ex-ante welfare only if sellers are risk-neutral and sells the firm with probability one.

Proposition 3.2. *Suppose that y^* is strictly greater than $\underline{x}$. Then, there exists a policy Δ where $\Delta^* \subset \Delta$ that is ex-ante preferred to Δ^*. In particular, the equilibrium policy does not maximize the average market* *price. If $y^* = \underline{x}$, the equilibrium maximizes the average market price.*

Proposition 3.2 states that the political choice does not select policies that maximize the market price and, in fact, market prices would decrease following an exogenous decrease in the level of mandatory disclosure. The reason for this effect is that the political choice selects a policy that is preferred by non-disclosers who do not internalize the disclosure costs incurred by disclosers but weight the separation benefit of imposing additional disclosures to increase the non-disclosure price.

4 Condorcet instability

While the primary focus of the analysis presented is to examine situations in which an equilibrium exists (and what it would be like), most of the prior literature on spatial preferences has focused on characterizing settings in which an equilibrium does not exist. In the classic case of multi-dimensional spatial preferences, prior research has shown that a condorcet equilibrium nearly always fails (Plott (1967), Austen-Smith (1983)). In this respect, while also a multi-dimensional choice problem, the selection of a mandatory disclosure studied here is less likely to feature instability.

That being said, instability is of some interest per se, as both a practical and theoretical matter. An unstable policy choice problem, i.e., in which an equilibrium does not exist, would not feature a generally-accepted policy over time unless some strong restrictions are placed on the agenda-setting proces or acceptable institutional changes. Without such institutional restraints, an unstable environment would feature regulatory cycles as various majorities impose their preferred alternative to an existing status-quo leading to (what many would seem undesirable) apparently inconsistent and time-varying policies. Such policy dynamics are explored in Bertomeu and Magee (2012), where it is assumed that a strategic standard-setter has partial control over the agenda, but they are not the main focus here. Rather, the objective of this Section is to provide more general necessary or sufficient conditions under which instability becomes a key property of the model. This is intended as a complement to the situations discussed earlier in which the equilibrium exists and, thus, by the nature of the condorcet criterion, the policy would settle on this equilibrium and no longer change.

It is readily seen from Lemma 2.1 that $y^* = m$ cannot be an equilibrium so that if $\overline{P}(m) - C(m)$ is the unique maximum of $\overline{P}(x) - C(x)$ on $x \leq m$, the model will have no equilibrium. Indeed, $\overline{P}(x) - C(x)$ will be strictly increasing in x if the cost of disclosure is very flat.

Proposition 4.1. *If $\overline{P}(m) - C(m) > \overline{P}(x) - C(x)$ for all $x < m$, then an equilibrium policy does not exist.*

In general, there is no simple necessary and sufficient condition to guarantee the existence or inexistence of a solution, because the existence of a solution is a global property of the entire distribution of $\tilde{x}$, rather than local properties of the density function. However, a simpler characterization of existence can be developed by considering only local existence conditions, as defined next.

Definition 4.1. *A policy $\Delta^* = (y^*, z^*)$ is locally stable if there exists an $\epsilon > 0$ such that for every $\Delta = (y, z)$ such that $|y^* - y| < \epsilon$ if $y \neq y^*$ and $|z^* - z| < \epsilon$ if $z \neq z^*$, it is true that:*

$$Prob(\mathcal{U}(\Delta^*; \tilde{x}) > \mathcal{U}(\Delta; \tilde{x})) \geq Prob(\mathcal{U}(\Delta^*; \tilde{x}) < \mathcal{U}(\Delta; \tilde{x})) \tag{4.1}$$

Definition 4.1 proposes a local reconsideration of stability, by imposing stability over policies that are relatively similar. Technically, this concept is useful to reduce the size of the policy space against which stability might be tested. From a practical standpoint, this weaker definition may be appropriate if the regulatory process requires small incremental changes to an existing policy so that regulation is changed in a continuous manner.

Proposition 4.2. *Suppose that $\overline{P}(x) - C(x)$ is single-peaked on $[\underline{x}, m]$. Then, $\Delta^* = (y^*, \overline{x})$, as defined in Lemma 2.2, is locally stable if and only if $y^* < m$. In this case, it is unique.*

Using a local definition of stability, a simple necessary and sufficient condition can be derived that requires testing whether the candidate for stability is located at the median. The median is not locally stable because a small fraction of high x non-disclosers could pass a policy in which they disclose. By contrast, when y^* is located below the median, the locally stable policy maximizes the non-disclosure price and (nearly) all non-disclosers oppose a change away from y^*.

5 Expanded Policy Space

The baseline environment is extended here to a setting in which the non-disclosure region may be formed of more than a single interval. There are several possible assumptions about the nature of the disclosure costs that might be reasonable, so the argument is developed here starting from a more restrictive assumption and progressively extending the insights to more general conditions.

A1'. *A disclosure policy is defined as $\Delta \in \Omega_n$ for some $n > 0$, where $\Omega_n = \{\bigcup_{i=1}^{n}(y_i, z_i) : y_i, z_i \in X\}$ is a set of feasible policies. The firm does not disclose when $x \in \Delta$ and discloses when $x \notin \Delta$. For practicality, the intervals $\{(y_i, z_i)\}_{i=1}^{n}$ are assumed to be non-overlapping and arranged in decreasing order.*

A2'. *Conditional on a disclosure, the market price is denoted $P(x)$. Conditional on a non-disclosure and a policy $\Delta \in \Omega_n$, the market price is denoted $P(\Delta)$ and $P(\Delta) > P(\Delta')$ if $\tilde{x}|\tilde{x} \in \Delta$ first-order stochastically dominates $\tilde{x}|\tilde{x} \in \Delta'$.*

A3'. *For any policy Δ, there is an ex-ante cost $C(\Delta) = \phi(Prob(\tilde{x} \notin \Delta))$ incurred by all firms, where $\phi(.)$ is a strictly increasing, differentiable function satisfying $\phi(0) = 0$.*

These assumptions are more restrictive than those made in the baseline model. In assumption $A1'$, the analysis is restricted to non-disclosure regions that feature at most n disconnected open intervals (if $\Delta = (y, z)$ is a single interval, one may define $y_i = z_i$ for any $i > 1$), which avoids non-trivial measure-theoretic questions that would be emerge if Ω_∞ were examined. Assumption $A2'$ extends the idea of prices increasing in response to more favorable beliefs about $\tilde{x}$. Of note, it is slightly more restrictive than the baseline assumption given that, unlike A2, the assumption requires the price to increase even if the report is more precise (which may not be the case if there are some additional proprietary costs).

Lastly, assumption A3 places a stronger restriction on the cost function: that is, the cost is not a function of the type of information that is disclosed but solely on the occurrence of a disclosure. This broad type of assumption is commonly-used in the voluntary disclosure literature (e.g., Jovanovic (1982), Verrecchia (1983)), in which the proprietary cost incurred is not a function of the value disclosed and greatly simplifies the analysis in the current context. However, since it is with significant loss of generality relative to A3, it will be generalized later on.

Lemma 5.1. *Suppose that A1'-A3' hold. If* Δ^* *is an equilibrium, then* $Prob(\tilde{x} \in \Delta^*) \geq .5$ *and* Δ^* *must contain a non-empty interval with the form* $(y_1^*, \overline{x})$ *(i.e., sufficiently favorable events are not disclosed).*

The intuition for this result is identical to that for Lemma 2.1 in the baseline model. There is no equilibrium policy in which all favorable events are disclosed because such disclosures do not minimize disclosure costs, nor do they maximize the net non-disclosure market price. In this respect, the equilibrium policy features at least one pooling region over sufficiently favorable events.

Proposition 5.1. *Suppose that A1'-A3' hold. Let* $\Delta^* = (y^*, \overline{x})$ *be defined as in Lemma 2.2, and define* $\mathcal{I}' = \{y : y > y^*, P(y) \geq P(\Delta^*) - C(\Delta^*)\}$. *If* $F(y^*) + Prob(\mathcal{I}') < .5$, *then* Δ^* *is the unique equilibrium policy.*

Proposition 5.1 demonstrates that the characterization of the equilibrium policy obtained in the baseline is unchanged as long as A1'-A3' hold. This property is, for the most part, a consequence of A3'. Since the cost of disclosure is not a function of the nature of the event disclosed, the policy that maximizes the net market price is one in which the pooling non-disclosure region is located over the upper-tail of the distribution, leading to the same form of asymmetric reporting. Note that, because the set of available policies that may defeat Δ^* is now larger and would (potentially) allow some firms to disclose at a lower cost, a more demanding existence condition is now required (specifically, $\mathcal{I}' \subseteq \mathcal{I}$).

Although assumption A3' is somewhat restrictive, it may be slightly generalized to (plausible) situations in which unfavorable events are, on average, easier to reliably verify. As a simple example, the future resale value of current inventory is likely to be difficult to estimate, let alone to properly audit. At the other extreme, obsolete inventory may be immediately observed by observing a sharp drop in current sales or characteristics that are not on par with the industry.

A3". *For any policy* Δ, *there is an ex-ante cost* $C(\Delta) = \phi(\int_{X \setminus \Delta} f(x)h(x)dx)$ *where* $\phi(.)$ *is a strictly increasing, differentiable function with* $\phi(0) = 0$, *and* $h(x)$ *is nondecreasing in* x.

Assumption $A3''$ contains $A3'$ in the special case of $h(x)$ constant but more generally incorporates cases in which favorable realizations of $\tilde{x}$ would be more costly to verify.

Proposition 5.2. *Suppose that A1'-A2' and A3" hold. Then,* Δ^* *is the unique equilibrium policy under the same conditions as in Proposition 5.1.*

The analysis is extended next to the fully-general version of A3 in which no further condition is imposed on the nature of the cost function. One important difference with the baseline model is that there may be some value in incorporating lower realizations of $\tilde{x}$ into the non-disclosure region if such events were very costly to verify.

A3"'. *For any policy Δ, there is an ex-ante cost $C(.)$ such that C($\Delta) < C(\Delta') if \Delta \subset \Delta'$, and such that $C(X) = 0$ and $C(.)$ is continuous in the metric space Ω_n endowed with the Hausdorff distance.*

Noting that only the conditions of A3"' were used to derive Lemma 5.1, it is readily verified that there must be a pooling region over favorable events, as stated next.

Lemma 5.2. *If A1'-A2' and A3"' hold, the properties stated in Lemma 5.1 hold.*

Under $A3'''$, the equilibrium policy may include more than a single pooling region located in the upper tail of the distribution, as a manner to reduce disclosure costs, and thus imposing disclosure over intermediate events. Although including these intermediate events would further reduce the disclosure costs, it would also dilute the more favorable events already included in the non-disclosure region which, in turn, may not increase the net non-disclosure market. The next result follows readily.

Proposition 5.3. *Suppose that A1', A2' and A3"' hold. Define $\Lambda = \{\Delta : \Delta \in argmax_{Prob(\tilde{x} \in \Delta') \geq .5} P(\Delta') - C(\Delta')\}$. Then, $\Delta^* \in argmax_{\Delta \in \Lambda} Prob(\tilde{x} \in \Delta)$. If $Prob(\tilde{x} \notin \Delta^*) + Prob(\tilde{x} \in \Delta, P(\Delta^*) - C(\Delta^*) > P(\tilde{x})) < .5$, then Δ^* is an equilibrium policy.*

Proposition 5.3 is a natural extension of the baseline result. The equilibrium policy maximizes the net non-disclosure price and, across all policies that do so, must be the one that features the highest probability of non-disclosure. This property also applies in the context of Ω_1 although, in this case, the policy that maximizes the net non-disclosure price is simply $\min \Lambda$. Note that while there are some settings in which a solution might not be unique, these reflect mostly pathological environments. That is, such situations would only occur if the non-disclosure price to have multiple global maxima (a non-generic characteristic) *and* that two or more of these global maxima would feature the same probability of non-disclosure.

Corollary 5.1. *Suppose that the price function $P(.)$ satisfies, for any Δ_1 and Δ_2 in Ω_n, $\min(P(\Delta_1), P(\Delta_2)) \leq P(\Delta_1 \cup \Delta_2) \leq \max(P(\Delta_1), P(\Delta_2))$. Then, Δ^* must contain $(m, \overline{x})$ (and above-median events are not disclosed).*

With a slightly stronger condition on market prices, one of the features of the baseline model carries over to this setting. Specifically, the condition assumed here is that if an event pools two different events, it should fall in-between the price for each of these events taken separately. Then, it can be shown that the non-disclosure region must contain all above-median events. The reason for this is that these events tend to indicate more favorable events that those contained in Δ^* and non-disclosing them would further reduce the disclosure cost.

6 Avoidable Costs, Liquidations and Voluntary Disclosure

Preliminaries

An important assumption maintained throughout the baseline model is that the seller has no discretion to "avoid" incurring the cost of disclosure. This aspect is partly definitional in the sense that it corresponds to an entirely ex-ante cost, incurred prior to any real decisions. However, a number of plausible economic problems would be consistent with some sellers opting for an alternative course of action in which the ex-ante costs is partially or entirely avoided. To further illustrate what might be envisioned as the "alternative decision", several examples are given below.

Example 1: The seller can choose to liquidate the firm for a fixed immediate payoff. Conditional on a liquidation, the seller does not need to sell the firm or implement additional mandatory disclosure. Only sellers that are better-off continuing the firm incur the disclosure costs.

Example 2: The seller can make a credible voluntary disclosure which reveals the private information for a cost. The policy prescribes which events should be disclosed but not necessarily how. In particular, a seller making a voluntary disclosure provides (weakly) more information than required by the policy and only incurs the cost of such voluntary disclosure.

Example 3: The seller can remain private (or go dark), in which case the firm is no longer subject to the policy. Such a decision may reduce the firm's expected cash flow but does not require any further mandatory disclosure.

In these examples, the seller opts out of the non-disclosure region and, as a result, the non-disclosure price is a function of beliefs about which types in the non-disclosure set Δ do not choose the alternative action.

A0. *For any open interval* (y, z), *define* $P_0(y, z)$ *as the market price conditional on a market belief that* $\tilde{x} \in (y, z)$, *and satisfies that* $P_0(.)$ *is increasing in* y *and non-decreasing in* z. *For any policy* Δ *which implies a market belief* $(y', z') \subseteq \Delta$ *that only types* (y', z') *do not disclose, the market price is defined as* $P(\Delta) = P_0(y', z')$. *The market price conditional on a disclosure* x *is denoted* $P(x) = P_0(x)$.

The price $P_0(.)$ differs from $P(.)$ to the extent that it captures market expectations about the strategy adopted by sellers. In the special case in which the there is no alternative decision, it is clear that $P(\Delta) = P_0(\Delta)$ since expectations will coincide with the set mandated by the law. More generally, when firms can opt for the alternative decision, the set (y', z') reflect the types that choose the non-disclosure option and the set $\Delta \backslash (y', z')$ reflects the types that choose the alternative decision.[14]

A4. *For any policy* Δ, *the seller may make an alternative decision which delivers a net cash flow* $G(x)$, *continuous and weakly increasing in* x. *Then, no further ex-ante disclosure cost is incurred. Further, there exists* Δ *and* $x \in \Delta$ *such that* $G(x) < P(\Delta) - C(\Delta)$.

Assumption A4 states that the value of the alternative decision is not a function of the regulation in place. For example, $G(x) = P(x) - C^v(x)$ may the price conditional on making a voluntary disclosure minus the cost of such a voluntary disclosure. Or, $G(x) = \mu$ constant may represent the cost of financing the project or the value obtained when liquidating/salvaging the assets of the firm. Although these two interpretations will be discussed later in more detail, the analysis is obtained for now for general forms of $G(x)$. Two additional assumptions are made in A4, which are fairly natural in this type of environment. First, it is assumed that the value of the alternative decision is increasing, i.e., $G(x)$ weakly increasing, which means that larger realizations of x are favorable whether or not the alternative decision is made. Second, to avoid a trivial solution in which always implementing the alternative decision Pareto-dominates any other policy, it is assumed that the alternative decision may not be optimal for some (though not all) policies and for some (though not all) types.

Lastly, the utility of the seller is increasing in the maximum of the net market price and the alternative decision. Expressed in utils, the seller utility is given by: $\mathcal{U}(\Delta; x) = \phi(\max(G(x), 1_{x\in\Delta}P(\Delta) + 1_{x\notin\Delta}P(x) - C(\Delta))$ where $\phi(.)$ is a strictly increasing function.

[14]Note that the set is restricted to an interval (y', z'); this restriction is used for expositional purposes but is (as long as A4 holds) without loss of generality.

The beliefs used in $A0$ must be consistent with Bayes rule, i.e., must be derived from sellers optimal decisions whether or not to choose the alternative decision. The set of consistent beliefs is formally defined next.

Definition 6.1. *For any $\Delta = (y, z)$, let $d(\Delta)$ be defined as the set of all open intervals $(y', z') \subseteq \Delta$ such that $y \leq y' \leq z' \leq z$ and $G(x) < P_0(y', z') - C(y, z)$ for any $x \in \Delta$.*[15]

One problem with the set $d(\Delta)$ is that it may not contain a unique element, which would imply the existence of multiple market equilibria for a given policy. This feature is very common in signalling games but, fortunately, is easily resolved in the present environment by selecting the Pareto-dominant equilibrium. Without elaborating more as to whether Pareto-efficiency is the most suitable selection criterion, the criterion has the conceptual benefit of ruling out interesting but somewhat different issues relating to coordination failure. Further, Pareto-efficiency can be recovered using several commonly-used refinements (e.g., Grossman and Perry (1986) perfect sequential equilibrium or Mailath, Okuno-Fujiwara and Postlewaite (1993) undefeated equilibrium).[16]

Lemma 6.1. *Suppose that A0 and A1 hold and let $\Delta = (y, z)$. Then, there exists a function $\eta(y, z) \in [y, \overline{x}]$ such that $(y, \eta(y, z))$ is the maximal element of $d(\Delta)$ and Pareto-dominates all other elements of $d(\Delta)$. The function $\eta(y, z)$ is increasing in z (strictly if $\eta(y, z) > y$).*

Lemma 6.1 states that the Pareto-dominant equilibrium features the maximal (feasible) non-disclosure region. The reason for this is that, since non-disclosure occurs for lower types, increasing the size of the non-disclosure region increases the non-disclosure net market price. Since all firms have the option to achieve this market price and the alternative payoff is not a function of the non-disclosure market price, the equilibrium with the highest non-disclosure market price is Pareto-dominant. Of note, Lemma 6.1 implies

[15]Two additional technical remarks are in order. First, the definition imposes an off-equilibrium belief $P(\Delta) \geq P(y)$ even if all sellers adopt the alternative option; this restriction is slightly more demanding than perfect bayesian Nash equilibrium but is implied by Kreps and Wilson's sequential equilibrium (**?**). Second, the definition implies that $\emptyset = (y, y)$ is an element of $d(\Delta)$ if and only if $G(x) < P_0(y) - C(y, z)$ for any $x \in (y, z)$ since, as a result of the first point, $P_0(y)$ is the most unfavorable possible belief conditional on non-disclosure. Third, the non-disclosure set is defined in terms of sellers having a strict benefit not to disclose; this is entirely for expositional purposes given that non-disclosure sets have been defined as open intervals earlier.

[16]Refining equilibria in signalling games is usually more problematic if equilibria are not Pareto-ranked, so that the Pareto criterion should be viewed as one that is relatively mild as compared to other criteria.

that $P(y,z) = P_0(y, \eta(y,z))$ is non-decreasing in z; however, A2 cannot be assumed because the function $\eta(y,z)$ is, in general, non-differentiable in z.[17]

Importantly, this observation is not new in the truthful disclosure literature. In Jovanovic (1982), for example, some distributions might imply the existence of multiple equilibria. Similarly, in Verrecchia (1983), there is always a corner equilibrium in which all sellers disclose and the market belief is the infimum of the support if a firm does not disclose. While, in these prior studies, multiplicity can be ruled out technically (assuming bounded beliefs or support, or logconcavity of the distribution function), the Pareto criterion offers an alternative solution concept that can be used in the general environment considered here.

Definition 6.2. *A policy Δ^* is an equilibrium if, for any other Δ',*

$$Prob(\mathcal{U}(\Delta^*;\tilde{x}) > \mathcal{U}(\Delta';\tilde{x})) \geq Prob(\mathcal{U}(\Delta^*;\tilde{x}) < \mathcal{U}(\Delta';\tilde{x})) \tag{6.1}$$

where, for any $\Delta = (y,z)$, (i) $\mathcal{U}(\Delta;x) = \phi(\max(G(x), 1_{x\in\Delta}P(\Delta) + 1_{x\notin\Delta}P(x) - C(\Delta))$, (ii) $P(\Delta) = P_0(y,\eta(y,z))$ and (iii) $\eta(y,z)$ is the greatest k such that $G(k) \leq P_0(y,k) - C(y)$.

Definition 6.2 extends the equilibrium concepts to the extended model. Part (i) states that sellers measure their utility as the maximum between the net market price and the alternative decision payoff. Part (ii) states that market prices form rationally based on the anticipated set of types that should not choose the alternative decision. Part (iii), finally, states that sellers select the Pareto-dominant equilibrium (by Lemma 6.1).

Lemma 6.2. *Suppose that A0-A1 and A3-A4 hold. If $\Delta^* = (y^*, z^*)$ is an equilibrium, then $z^* = \overline{x}$ and $\eta(y^*, \overline{x}) > y^*$. That is, an equilibrium features non-disclosure over a non-empty set of favorable events.*

The analysis shows that, as in the baseline, the policy prescribes no mandatory disclosure requirements for events that are sufficiently favorable. Furthermore, while some policies (if they had been implemented), would have led sellers to unravel to adopt the alternative decision, the equilibrium always features some types that do not disclose. Some caution is, however, necessary to interpret this non-disclosure result. Unlike in the baseline, sellers with sufficiently favorable information would adopt the alternative decision rather than apply the rule.

[17]The reason for this is that, if z is small, $\eta(y,z)$ may be equal to z whose derivative with respect to z is one. However, as z increases, there will be a point at which $\eta(y,z)$ becomes interior and satisfies $G(\eta(y,z)) = P(y,\eta(y,z)) - C(y,z)$ whose derivative may be different from one.

Early Liquidations

Consider an environment in which the seller can liquidate the firm early for a fixed payment $G(x) = \mu \in (\underline{x}, \overline{x})$ where μ might represent the resale value of the assets in use. When the firm is liquidated, no further disclosure is made (since such disclosures are no longer necessary) and the seller receives a cash flow μ.[18] Another interpretation of this environment is that it corresponds to the extreme case in assumption A4 in which the alternative payoff $G(x)$ is flat.

A4'. *For any x, $G(x) = \mu \in (P(\underline{x}), P(\overline{x}))$. There exists Δ and $x \in \Delta$ such that $\mu < P(\Delta) - C(\Delta)$.*

Noting that the second part of Lemma 6.2 applies to this setting, an equilibrium must feature a set of firms that continue and do not disclose. In turn, because all non-disclosers would achieve the same surplus by liquidating, it must be that all disclosers choose to continue and therefore (in equilibrium) $P(\Delta^*) = P_0(\Delta)$. Put differently, only firms that are required to disclose (i.e., with $x < y^*$) might liquidate early.

Proposition 6.1. *Suppose that A0-A1 and A3-A4' hold. If $\Delta^* = (y^*, \overline{x})$ is an equilibrium, then $\eta(y^*, \overline{x}) = \overline{x}$ and $P(\Delta^*) = P_0(\Delta^*)$.*

A corollary of this result is that the policy that maximizes the non-disclosure price, because it is focused on the market price of continuing firms, is unrelated to the liquidation option. For this reason, if the non-disclosure market price admits its global maximum below the median, the implemented policy is not a function of the liquidation and is set at the level that maximizes the non-disclosure price.

Corollary 6.1. *Suppose that $P(x, \overline{x}) - C(x, \overline{x})$ admits a global maximum at $x < m$ and let y^* be the threshold determined in Proposition 2.1 (the lowest global maximizer of this function). Then, the equilibrium policy must be $\Delta^* = (y^*, \overline{x})$ and is not a function of μ. The equilibrium exists under the same sufficient conditions in Proposition 2.1. In addition, if $P(\Delta^*) - C(\Delta^*) > P(m') - C(\underline{x}, m')$ for m' defined as $F(m') - F(y^*) = .5(1 - F(y^*))$, an equilibrium always exists when μ is sufficiently large.*

The seemingly counter-intuitive aspect of these statements is that the policy is not a function of uses of information that do not directly afffect the market price. A closer inspection of the analysis, however, makes this observation very intuitive to the extent that liquidating firms self-select out of the regulatory process

[18] For simplicity, it is assumed that the liquidation payoff μ is deterministic and not correlated to the value of the assets in use. The more general case in which liquidation expected payoffs are a function of x would correspond to the case described earlier.

and, thus, the regulatory choice (over) represents firms that continue. A second implication of the analysis is that the presence of liquidations implies that the equilibrium is more likely to exist because it removes from the regulatory process some disclosing firms that tend to push to reduce disclosure in Δ^*. In particular, as stated formally in Corollary 6.1, the policy Δ^* becomees an equilibrium as long as fewer than half of the firms in the non-disclosure region are better-off non-disclosing.

These arguments can be extended to the case in which $P(x,\overline{x}) - C(x,\overline{x})$ does not have its global maximum on $x < m$. For expositional purposes, the discussion developped here assumes that this function is single-peaked with a maximum at $y^* \in [m,\overline{x}]$.[19] The next result is a straightforward extension of the baseline to liquidations.

Proposition 6.2. *If $\Delta^{**} = (y,\overline{x})$ is an equilibrium, it is unique and such that $y = y^*$. In addition, $P(\Delta^{**}) - C(\Delta^{**}) > P(m') - C(\underline{x},m')$ for m' defined as $F(m') - F(y^*) = .5(1 - F(y^*))$, an equilibrium always exists when μ is sufficiently large. Further, defining l as the continuation threshold (i.e., the minimal x such that $P(x) - C(\Delta^{**}) \geq \mu$, $1 - F(y^*) \geq F(y^*) - F(l)$.*

Unlike in the baseline model, liquidations could imply that some disclosure thresholds $y^* > m$ (above the median) are sustained in equilibrium, whenever most disclosers choose to liquidate their firm. For practical purposes, it is worth noting, however, that only the cash flows from disclosing firms is likely to be observable so that it must still be the case that the disclosure threshold is above the median of continuing firms.

Voluntary Disclosure

A second application of the extended model is an environment in which firms can make disclosures voluntarily. To give some further detail, the working assumptions here is that (a) the voluntary disclosure technology is (at least) as effective as the mandatory disclosure technology, (b) a firm may always make a voluntary disclosure and, given that all information is disclosed, it is always viewed in accordance with the law. Condition (b) is important for this part but seems reasonable to the extent that a firm that immediately discloses all of its information is likely to be viewed in accordance with the law. In the current setting, the

[19] An extension to multiple peaks is notationally cumbersome but does not present any technical or conceptual difficulties since it would be then necessary (as in the baseline) to choose the minimal global maximizer of the function.

condition also rules double-counting in which the firm incurs the cost of a voluntary disclosure and then the cost of an additional mandatory disclosure that serves no incremental purpose.

Formally, conditional on a voluntary disclosure, the firm achieves a payoff $G(x) = P(x) - C^v(x)$ where $C^v(x)$ represents the cost of a truthful/credible voluntary disclosure. As noted earlier, there is no need to incur other costs once this voluntary disclosure is made.[20]

A5. *For any x, $C^v(x) \leq \min(C(\underline{x}, x), C(x, \overline{x}))$.*[21]

This assumption is very natural if the seller can replicate the implementation costs of a particular regulation voluntarily. In the special case of $C^v(x) = \min(C(\underline{x}, x), C(x, \overline{x}))$, the seller can disclose voluntarily by implementing the cheapest available information system that induces a disclosure of x. More generally, a case might be made that firms make unregulated voluntary disclosure more efficiently, implying that $C^v(x)$ is strictly below $\min(C(\underline{x}, x), C(x, \overline{x}))$.

An important implication of A5 is that sellers that must disclose achieve the same surplus as if they do so in a voluntary manner (although only strictly if $C^v(x)$ is strictly less than the cost of the mandatory disclosure).[22] Equivalently, the notion of voluntary disclosure used here should be thought of broadly in terms of flexibility as to how to disclose when a disclosure is required and whether to do so when a disclosure is not required.

Lemma 6.3. *Suppose that A0-A1 and A3-A5 hold. Consider two policies $\Delta = (y, z)$ and $\Delta' = (y', z')$ with voluntary disclosure thresholds $\eta(y, z)$ and $\eta(y', z')$, and a seller with $x \in [\underline{x}, \overline{x}]$. Then,*

(i) If the seller discloses under one policy and does not disclose under the other, i.e., $x \in ((y, \eta(y, z)) \cap (y', \eta(y', z'))^c) \cup ((y, \eta(y, z))^c \cap (y', \eta(y', z'))$, then the seller prefers the policy in which she chooses not to disclose.

[20] While condition (b) seems to be the more plausible (and challenging) setting, the analysis is very similar to the baseline model if voluntary disclosure costs are incurred incrementally to the mandatory costs (available on demand from the authors). In this case, the non-disclosure price should simply be adjusted for the self-selection of voluntary disclosers but the preferences of both mandatory disclosers and non-disclosers would be entirely unchanged.

[21] With this assumption, there is always an "unravelling" equilibrium all firms in the non-disclosure region voluntarily disclosure and the price for a non-discloser is $P(\inf \Delta)$. This unravelling outcome need not be equal to $\eta(y, z)$, if there exists k such that $P(y, k) - C(y) > y - \min(C((\underline{x}, x)), C((x, \overline{x})))$ for any $x \in [y, k]$. In fact, as shown earlier, in those cases the unravelling outcome would be Pareto-dominated.

[22] If the cost of voluntary and mandatory disclosure are identical, however, disclosing firms would be indifferent between mandatory and voluntary disclosures. It is likely, then, that firms would simply adopt the mandatory disclosure format which (for reasons unmodelled in this paper) would likely be more salient and stardized from the perspective of investors and regulators.

(ii) If the seller does not disclose under both policies, i.e., $x \in (y, \eta(y,z)) \cap (y, \eta(y,z'))$*, the seller prefers the policy that yields the maximal net non-disclosure market price.*

Otherwise, when the seller discloses under both policies, the seller is indifferent between Δ *and* Δ'*.*

The Lemma builds on a prior result proved in Bertomeu and Magee (2011) in the context of a more narrow set of assumptions. The intuition for this is clear. Since the seller always has the option to disclose voluntarily, which gives a guaranteed payoff, passing this option in favor of non-disclosure must means that non-disclosure is preferred to any policy that would induce a voluntary or mandatory disclosure (part (i)). If a seller is not disclosing under two policies, then the seller should prefer the policy featuring the highest net non-disclosure price.

Lemma 6.4. *A policy* $\Delta = (y, \overline{x})$ *in which* $\eta(y, \overline{x}) > y$ *Pareto-dominates any policy* $\Delta' = (y', z')$ *such that* $\eta(y', z') = y'$*, as well as any policy with the form* $\Delta' = (y, z)$ *such that* $z < \overline{x}$*. In particular, if a policy is defeated by* $\Delta' = (y, z)$*, then it is also defeated by* $\Delta = (y, \overline{x})$*.*

The intuition for Lemma 6.4 is straightforward. Whenever voluntary disclosures are possible, sellers that have favorable information to disclose may always do so voluntarily, and therefore there is no social need to impose such disclosures. For the purpose of this Section, the result implies that the analysis can be restricted to policies with the form $\Delta = (y, \overline{x})$ with no further loss of generality (unlike in the baseline in which some other type of policies may defeat the candidate equilibrium). This dramatically simplifies the overall analysis to a single-dimensional problem, i.e., choosing the collectively-preferred threshold y such that events below y must be disclosed.

Lemma 6.5. *For any* $\Delta = (y, \overline{x})$ *and* $\Delta' = (y', \overline{x})$ *such that* $y' < y$ *and non-disclosure has non-zero probability, the following holds:*

(i) If $P(\Delta') - C(\Delta') \geq P(\Delta) - C(\Delta)$*,* Δ' *Pareto-dominates* Δ*.*

(ii) If $P(\Delta') - C(\Delta') < P(\Delta) - C(\Delta)$*,* $\Delta' = (y', \overline{x})$ *defeats* $\Delta = (y, \overline{x})$ *if and only if* $F(y) - F(y') > F(\eta(y, \overline{x})) - F(y)$ *and* $\eta(y', \overline{x}) > \eta(y, \overline{x})$*.*

The Lemma offers a criterion to obtain which of two policies wins in a runoff vote. The criterion is "simple" because it can be applied using only knowledge of the distribution and the voluntary disclosure threshold $\eta(.)$. A policy defeats any other policy with weakly lower net non-disclosure price and with a higher mandatory disclosure threshold (in fact, it unanimously defeats these other policies since it Pareto-dominates them). The analysis is slightly more complex when comparing a policy to another policy with a lower mandatory disclosure (case (ii)), since the latter may be supported by new non-disclosers and may be collectively preferred even if it features a lower non-disclosure price. For this to occur, there must be enough new non-disclosers, i.e., $F(y')$ must be sufficiently small so that enough sellers are no longer required to disclose and $\eta(y', \overline{x})$ must be sufficiently large so that enough of these sellers that have the option not to disclose optimally choose to do so and support the new threshold y'.

Lemma 6.6. *Suppose A0-A1 and A3-A5 hold. Then, if $\Delta^* = (y^*, \overline{x})$ is an equilibrium, y^* must be a local maximum of $P(y, \overline{x}) - C(y, \overline{x})$.*

For expositional purposes, we first derive the equilibrium with a (plausible) regularity condition in the problem, given below.

R. *$P(y, \overline{x})) - C(y, \overline{x})$ is single-peaked with maximum y_0 and $F(\eta(y, \overline{x})) - F(y)$ is decreasing in y.*

Condition R means that there is a unique maximum y_0 to the non-disclosure price and that imposing more mandatory disclosure decreases the probability of a non-disclosure (even accounting for the effect on voluntary disclosures). As will be shown later, this condition is not critical but simplifies the analysis by allowing a local characterization of the equilibrium.

Proposition 6.3. *Suppose that A0-A1, A3-A4 and condition R hold. An equilibrium exists if and only if $F(\eta(y_0, \overline{x})) - F(y_0) \geq F(y_0)$. In this case, the equilibrium is unique and given by $\Delta^* = (y_0, \overline{x})$. In particular y_0 is lesser or equal than the median of $\tilde{x}$.*

As long as condition R. holds, there is a unique candidate equilibrium in the model, and it is the global maximum of the net non-disclosure market price. Also, similar to the baseline, the equilibrium features non-disclosure of all sufficiently favorable economic events. One advantage of the voluntary disclosure technology is that a necessary and sufficient condition can be obtained to characterize the existence of an equilibrium. Specifically, an equilibrium must feature more non-disclosers than disclosers. This also implies that the non-disclosure threshold must be below the median (although no longer necessarily strictly so).

Relaxing condition R. makes the exposition more cumbersome but does not change these overall results, as noted next.

Proposition 6.4. *Suppose that A0-A1 and A3-A4 hold. An equilibrium exists if and only if there exists* y_0 *satisfying:*

(i) For any $y' < y_0$, $P(y_0, \overline{x})) - C(y_0, \overline{x}) > P(y', \overline{x})) - C(y', \overline{x})$ *and* $F(\eta(y_0, \overline{x}) - F(y_0) \geq F(\min(y_0, \eta(y', \overline{x})) - F(y')$.

(ii) For any $y' > y_0$, *either* $P(y_0, \overline{x})) - C(y_0, \overline{x}) > P(y', \overline{x})) - C(y', \overline{x})$ *or* $F(\min(y', \eta(y_0, \overline{x})) - F(y_0) \geq F(\eta(y', \overline{x})) - F(y')$.

In this case, an equilibrium has the form $\Delta = (y_0, \overline{x})$. *As long as there does not exist two local maxima* $y' < y''$ *of* $P(y, \overline{x})) - C(y, \overline{x})$ *such that (a)* $P(y'', \overline{x})) - C(y'', \overline{x}) > P(y', \overline{x})) - C(y', \overline{x})$, *and (b)* $F(\min(y'', \eta(y', \overline{x}))) - F(y') = F(\eta(y'', \overline{x})) - F(y'')$, *then the equilibrium is unique.*

Proposition extends the necessary and sufficient condition given in Proposition 6.3. As before, the equilibrium policy must feature a sufficiently large fraction of non-disclosers and, for example, a situation in which the non-disclosure price is strictly increasing in y implies that there is no equilibrium. The condition required for uniqueness is very mild (i.e., it is generic) and requires two local optima of the net non-disclosure price to be located at a distance different from the critical distance at which there are exactly the same numbers of supporters for each policy.

7 Concluding Remarks

A large number of financial disclosures are closely regulated by law. Corporations that issue securities to the general public are required to produce financial statements that comply with generally-accepted accounting standards, file special supplementary disclosures with regulatory bodies and employ an auditor to issue an opinion in compliance with generally-accepted auditing standards. These are some of many examples of highly-regulated disclosures in which the corporation must present its information in a particular format and selectively disclose some pieces of information. Yet, to our knowledge, there is no theory that explains what drives mandatory disclosure. Our study intends to develop some preliminary insights into the political determination of mandatory disclosure. We examine whether there exists a disclosure policies that satisfy some stability criterion, i.e. should be preferred to other available by some minimum majority. Our main finding is that mandatory disclosure tends to be asymmetric in two respects: first, it favors disclosure over unfavorable pieces of information and, second, it overweights the private interest of groups with relatively favorable information even when requiring disclosure of less favorable information serves no direct productive purpose.

Financial market regulations play a fundamental role in modern economies, and examining the determination of these regulations presents a rich paradigm for future work. In this study, we have left aside several aspects of firm's decisions that may interact with mandatory disclosure, such as, among many examples, incentives, strategic trading, capital structure, systematic shocks or product market competition. We also point out that the stability criterion, while simple, rules out many interesting elements that are likely to play an additional role, such as strategic manipulations of the agenda, direct donations to regulators, or non-truthful voting. These questions offer additional layers of complexity that should be fully discussed before one obtains a complete theory of mandatory disclosure.

Appendix: Omitted Proofs

Proof of Lemma 2.1: Let $\Delta^* = (y^*, z^*)$ denote an equilibrium. Suppose that $Prob(\tilde{x} \in \Delta^*) < .5$. By continuity, there exists Δ' such that $\Delta \subset \Delta'$ and $Prob(\tilde{x} \in \Delta') < .5$. Note that $C(\Delta') < C(\Delta^*)$ which implies that $P(x) - C(\Delta') > P(x) - C(\Delta^*)$ for any $x \notin \Delta'$. Therefore, for any $x \notin \Delta', \mathcal{U}(x, \Delta') > \mathcal{U}(x, \Delta^*)$, and $Prob(\mathcal{U}(x, \Delta') > \mathcal{U}(x, \Delta^*)) > .5$, a contradiction to Δ^* being an equilibrium.

Next, suppose that $z^* = \max \Delta^* < \overline{x}$. Let $\epsilon > 0$ be a positive number such that $z^* + \epsilon < \underline{x}$. By step 1, $F(z^*+\epsilon) - F(z^*) < .5$. Define $\Delta' = \Delta^* \cup [y^*, z^* + \epsilon)$. For all firms with $x \notin \Delta'$,

$$\mathcal{U}(\Delta'', x) = P(x) - C(\Delta'') > P(x) - C(\Delta^*) = \mathcal{U}(\Delta^*, x)$$

For all firms with $x \in \Delta^*$,

$$\mathcal{U}(\Delta'', x) = P(\Delta'') - C(\Delta'') > P(\Delta^*) - C(\Delta^*) = \mathcal{U}(\Delta^*, x)$$

It follows that $Prob(\mathcal{U}(\Delta'', \tilde{x}) > \mathcal{U}(\Delta^*, \tilde{x})) \geq F(z^*) + 1 - F(z^* + \epsilon) > .5$. This is contradiction to Δ^* being an equilibrium.$\square$

Proof of Lemma 2.2: By continuity, $\overline{P}(y) - C(y)$ attains a maximum on $y \leq m$ and therefore Λ is non-empty. Then, define $M^* = \max \overline{P}(y) - C(y)$. Note that for any sequence $\{y_i^*\}$ of Λ that converges to $y^* = \inf \Lambda$, $\overline{P}(y_i^*) - C(y_i^*)$ converges to $\overline{P}(y^*) - C(y^*)$, implying that $y^* = \min \Lambda$.

Next, assume that by contradiction that $\Delta = (y, \overline{x})$ is an equilibrium where $y < m$ and $y \neq y^*$. First, assume that $\overline{P}(y) - C(y) < M^*$, i.e., y does not maximize the non-disclosure price. Then, all owners with $v > y^*$ prefer Δ^*. By Lemma **??**, $1 - F(y^*) > .5$ which implies that Δ is not an equilibrium. Second, assume that $\overline{P}(y) - C(y) = M^*$ which, by definition of y^*, implies that $y \in (y^*, m)$. Sellers with $x > y$ are indifferent since they achieve M^*. Sellers with $x < y^*$ strictly prefer Δ^* because $P(x) - C(y^*) > P(x) - C(y)$. Finally, sellers with $x \in (y^*, y)$ achieve $\overline{P}(y^*) - C(y^*)$ under Δ^* and $P(x) - C(y)$ under Δ. To compare both terms, note that $P(x) - C(y) < \overline{P}(x) - C(x) \leq \overline{P}(y^*) - C(y^*)$. It follows that Δ is Pareto-dominated by Δ^* and cannot an equilibrium.$\square$

Proof of Proposition 2.1: Let $\Delta = (y, z)$ be an alternative policy. First, suppose that (y, z) is such that $y > y^*$. Then $C(y, z) > C(y^*)$ and thus all firms with $x < y^*$ support Δ^*. Then, for all firms with $x \in (y^*, min(m, y))$,

$$P(x) - C(y, z) < \overline{P}(x) - C(x) \leq \overline{P}(y^*) - C(y^*)$$

This implies that for these firms Δ^* is preferred to Δ. There is therefore at least half of all firms that prefer Δ^*.

Second, suppose that $\Delta = (y, z)$ is such that $y \leq y^*$. Then, $\overline{P}(y, z) - C(y, z) < \overline{P}(y^*) - C(y^*)$. Therefore, all owners with $x \in (y^*, z)$ prefer Δ^*. Further, for all firms with $x \notin \mathcal{I}$,

$$P(y) - C(z, y) < \overline{P}(y^*) - C(y^*)$$

It follows that no more than $F(y^*) + Prob(\tilde{x} \in \mathcal{I}) < .5$ of all owners prefer Δ over Δ^*.$\square$

Proof of Proposition 3.1: Suppose first that $\overline{P}(y) - C(y)$ attains its global maximum on $[\underline{x}, m]$ and let $\Delta \subset \Delta^*$. Then, $y^* = argmax\overline{P}(y) - C(y)$. Note that $C(\Delta) > C(\Delta^*)$ therefore all firms with $x < y^*$ are strictly better-off under Δ. Next, $P(y,z) - C(y,z) \leq \overline{P}(y) - C(y) \leq \overline{P}(y^*) - C(y^*)$ (with one inequality strict) so that non-disclosers under both policies are strictly better-off under Δ^*. Lastly, if $x \geq z$, $P(x) - C(z) < \overline{P}(x) - C(x) \leq \overline{P}(y^*) - C(y^*)$ so that these firms are also better-off under Δ^*. It follows that $\Delta \subset \Delta^*$ is not Pareto-efficient and therefore Δ^* is minimal in the set of Pareto-efficient policies. The case when $\overline{P}(y) - C(y)$ attains its global maximum on $[m, \overline{x}]$ is immediate since, then, the policy $\Delta = (y_0, \overline{x}) \subset \Delta^*$ defined by $y_0 \in argmax_y \overline{P}(y) - C(y)$ is Pareto-efficient.□

Proof of Corollary 3.2: Denote Γ as follows:

$$\Gamma = \lambda'(\frac{a^* - m}{\sigma}) - C_1(a^*, \overline{v})$$

The fact that a^* is an interior local maximum of P_{nd} implies that $\partial\Gamma/\partial a^* < 0$. Applying the implicit function theorem.

$$Sign(\frac{\partial a^*}{\partial m}) = Sign(\frac{\partial \Gamma}{\partial m}) = Sign(-\frac{1}{\sigma}\lambda''(\frac{a^* - m}{\sigma})) < 0$$
$$Sign(\frac{\partial a^*}{\partial \sigma}) = Sign(\frac{\partial \Gamma}{\partial \sigma}) = Sign(-\frac{a^* - m}{\sigma^2}\lambda''(\frac{a^* - m}{\sigma}))$$

This implies the statements made in the Corollary.□

Proof of Proposition 3.2: Conditional on a policy $\Delta = (y, \overline{x})$, the ex-ante surplus is given by:

$$\begin{aligned}
W(y) &= \int_{\underline{x}}^{y} P(x)f(x)dx + (1 - F(y))\overline{P}(y) - C(y) \\
W'(y) &= P(y)f(y) - f(y)\overline{P}(y) + (1 - F(y))\overline{P}'(y) - C'(y) \\
W'(y^*) &= P(y^*)f(y^*) - f(y^*)\overline{P}(y^*) + (1 - F(y^*))\overline{P}'(y^*) - C'(y^*) \\
&= P(y^*)f(y^*) - f(y^*)\overline{P}(y^*) + (1 - F(y^*))\overline{P}'(y^*) - \overline{P}'(y^*) \\
&= f(y^*)(P(y^*) - \overline{P}(y^*)) - F(y^*)\overline{P}'(y^*) < 0
\end{aligned}$$

where the fourth Equation follows from the fact that $\overline{P}'(y^*) = C'(y^*) > 0$ since y^* is an interior maximum of $\overline{P}(y) - C(y)$ and the last inequality is satisfied strictly because $y^* > \underline{x}$. This implies that there exists $y < y^*$ such that $W(y) < W(y^*)$ and Δ is ex-ante preferred to Δ^*. The case of $y^* = \underline{x}$ follows readily from Proposition 3.1 since then $\Delta = X$ is the unique Pareto-efficient policy.□

Proof of Proposition 3.2: Since Lemma 2.1 was established using a neighborhood of Δ^*, it is clear that a locally-stable policy must satisfy $\Delta^* = (y^*, \overline{x})$ and $y^* < m$. In addition, the proof of Lemma 2.2 is valid locally which implies that $y^* = max\overline{P}(y) - C(y)$. It remains to be shown that Δ^* is locally-stable. It was shown in Proposition 2.1 that Δ^* achieves a higher non-disclosure price (net of costs) that any other policy that may defeat Δ. It follows that all non-disclosers under both Δ^* and Δ support Δ^*.

Defining $\Delta = (y, z)$ where $|y^* - y| < \epsilon$ and either $z = z^*$ or $|z - z^*| < \epsilon$, it is clear that, as ϵ converges to zero, $Prob(\tilde{x} \in \Delta)$ converges to $Prob(\tilde{x} \in \Delta^*) > .5$. This implies that Δ^* is locally stable.□

Proof of Lemma 5.1: The proof is very similar to the proof of Lemma 2.1. Assume first that $Prob(\tilde{x} \in \Delta^*) < .5$. Clearly, there exists $\Delta' \in \Omega_n$ such that $\Delta^* \subset \Delta'$ and $Prob(\tilde{x} \in \Delta') < .5$. Further, all owners with $x \notin \Delta'$ achieve a higher net market price under Δ' which implies that Δ^* would not be an equilibrium. Second, assume that $z_1^* = \sup \Delta^* < \overline{x}$, and let ϵ be a positive number such that $0 < F(z_1^* + \epsilon) - F(z_1^*) < F(z_1^*) - F(y_1^*)$. Define $\Delta' = \Delta \cup [z_1^*, z_1^* + \epsilon) \in \Omega_n$. Since $P(\Delta') \geq P(\Delta)$ and $C(\Delta') < C(\Delta)$, all owners with $\tilde{x} \notin \Delta' \backslash \Delta$ prefer Δ' which implies that Δ^* cannot be an equilibrium.□

Proof of Proposition 5.1: Suppose by contradiction that $y_2^* < z_2^*$, i.e., the non-disclosure set contains more than a single interval. For any $\epsilon > 0$ sufficiently small, there exists $z_2' < z_2^*$ and $y_1' < y_1^*$ such that:

$$F(z_2^*) - F(z_2') = F(y_1^*) - F(y_1') = \epsilon$$

Define $\Delta' = \Delta^* \backslash [z_2', z_2^*) \cup (y_1', y_1^*]$. By A3', $C(\Delta') \leq C(\Delta^*)$. Further, $\tilde{x}|\tilde{x} \in \Delta'$ first-order stochastically dominates $\tilde{x}|\tilde{x} \in \Delta^*$, which implies that $P(\Delta') > P(\Delta^*)$. Therefore, all owners with $x \in K_0 = \Delta' \cup \Delta^*$ prefer Δ', all firms with $x \in K_1 = (z_2', z_2^*) \cup (y_1', y_1^*)$ may prefer Δ while all other firms are indifferent. Therefore, the total mass of owners preferring Δ^* is bounded from above by 2ϵ while the total mass of owners preferring Δ' is bounded from below by $Prob([y_2^*, z_2^*) \cup (y_1^*, z_1^*)) - 2\epsilon$. If ϵ is sufficiently small, Δ' is always preferred to Δ^*. The proof that Δ^* is an equilibrium follows from the fact that only non-disclosers $P(y) \geq \overline{P}(y^*) - C(y^*)$ could be better-off with a different policy.□

Proof of Proposition 5.2: This proof is a special case of the proof of Proposition 5.1 given that the arguments given remain true when $A3''$ holds instead of $A3'$.□

Proof of Corollary 5.1: The random variable $\tilde{x}|\tilde{x} \in (m, \overline{x})$ first-order stochastically dominates $\tilde{x}|\tilde{x} \in \Delta^*$, thus $P(m, \overline{x}) > P(\Delta^*)$. Further, because Δ^* must contain an event $(y, \overline{x})$ (by Lemma 5.2), $\Delta' = \Delta^* \cup (m, \overline{x}) \in \Omega_n)$ is a feasible policy. It follows that:

$$P(\Delta') - C(\Delta') \geq P(\Delta^*) - C(\Delta^*)$$

with a strict inequality if $\Delta' \neq \Delta^*$. Because Δ^* maximizes $P(\Delta') - C(\Delta')$ subject to $Prob(\tilde{x} \in \Delta') \geq .5$, it must therefore be the case that $\Delta' = \Delta^*$ and thus Δ^* contains $(m, \overline{x})$.□

Proof of Lemma 6.1: Let $\Delta = (y, z)$.

Step 1. Let $X_0 \in d(\Delta)$. For any $x \in X_0$,

$$G(y) \leq G(x) < P_0(X_0) - C(\Delta)$$

It follows that either $X_0 = \emptyset$ or $\inf X_0 = y$. Therefore any $X_0 \in d(\Delta)$ can be written as (y, k) where $k \in [y, z]$.

Step 2. It is shown next that $d(\Delta)$ has at least one element. This is clearly the case if $\emptyset \in d(\Delta)$. Otherwise, $\emptyset \notin d(\Delta)$ implies that $G(x) \geq P_0(y) - C(y,z)$ for some x. This implies that either $G(z) \geq P_0(y,z) - C(y,z)$ in which case $(y,z) \in d(\Delta)$ or $G(k) = P_0(y,k) - C(y,z)$ for some k, in which case $(y,k) \in d(\Delta)$.

Step 3. Suppose that (y,k) and (y,k') are elements of $d(\Delta)$ such that $k < k'$. Sellers with $x \leq y$ or $x \geq k'$ achieve a surplus $\max(G(x), P(x) - C(y,z))$ and are indifferent between both thresholds. Sellers with $x \in (y,k)$ achieve a surplus $P_0(y,k) - C(y,z)$ under k and $P_0(y,k') - C(y,z)$ under k' and thus strictly prefer the threshold k'. Sellers with $x \in (k,k')$ achieve a surplus $G(x)$ under k and $P_0(y,k') - C(y,z) > G(x)$ under k'. Since $k' > k$, there exists a set of types that are strictly better-off under k' while all other types are weakly better-off. Therefore, the threshold k' Pareto-dominates the threshold k.

Step 4. If $(y,z) \in d(\Delta)$, it follows from Step 3 that $\eta(y,z) = z$ Pareto-dominates all other elements of $d(\Delta)$. Otherwise, let $k^* = \sup \bigcup_{X' \in d(\Delta)} X'$ and define $\{k_i\}_{i=0}^{+\infty}$ as an increasing sequence that converges to k^* such that, for any $i \geq 0$, $(y,k_i) \in d(\Delta)$. This implies that, for any $i \geq 1$,

$$G(k_i) = P_0(y,k_i) - C(y,k_i)$$

By continuity, $G(k^*) = P_0(y,k^*) - C(y,k^*)$ and therefore (y,k^*) is in $d(\Delta)$. It follows that $\eta(y,z) = k^*$ Pareto-dominates any other element of $d(\Delta)$.

Step 5. Consider $\Delta' = (y,z')$ such that $z' > z$. There are three cases to consider. Case 1. If $\eta(y,z) = y$, then, $\eta(y,z') \geq y = \eta(y,z)$. Case 2. If $\eta(y,z) \in (y,z)$, then the threshold $\eta(y,z)$ must satisfy the following indifference condition:

$$G(\eta(y,z)) = P_0(y,\eta(y,z)) - C(\Delta) < P_0(y,\eta(y,z)) - C(\Delta')$$

By continuity, it must either be that (a) $G(k) < P_0((y,k)) - C(\Delta')$ for any $k \in [\eta(y,z), z')$, in which case $\eta(y,z') = z' > z > \eta(y,z)$, or (b) (a) $G(k') = P_0(y,k') - C(\Delta')$ for some $k' \in [\eta(y,z), z')$, in which case $\eta(y,z') \geq k' > z > \eta(y,z)$. Case 3. Suppose that $\eta(y,z) = z$. Then, for any $k \in (y,z)$,

$$G(z) < G(k) \leq P_0(y,k) - C(\Delta)$$

The fact that $\eta(y,z') > z$ then follows from the same argument as in Case 2.□

Proof of Lemma 6.2: Let $\Delta^* = (y^*, z^*)$ denote an equilibrium. Suppose that $\eta(y^*, z^*) = y^*$. There are several cases to consider. Case 1. Suppose that either $y^* > \underline{x}$ or $z^* < \overline{x}$. Suppose first that there exists a set M with non-zero probability such that sellers do not choose the alternative decision (since $\eta(y^*, z^*) = y^*$, $\sup M \leq y^*$). For any $\epsilon > 0$ and $\Delta = (y^* - \epsilon, \overline{x})$, sellers with $x \in M \cap [\underline{x}, y^* - \epsilon)$ will be better-off under Δ while sellers with $x > y^*$ are indifferent (if they still choose the alternative decision) or prefer Δ (if they choose do not choose the alternative decision under Δ). This implies that if ϵ is small enough, Δ will be preferred to Δ^*. It then follows that sellers with $x < y^*$ must choose the alternative decision with probability one. But this is again a contradiction because, then, the policy in Assumption A4 would be preferred Δ^* since some sellers achieve strictly more than $G(x)$ under this alternative policy. Case 2. Suppose that $\Delta^* = (\underline{x}, \overline{x})$. Then, $\eta(y^*, z^*) = y^*$ implies that all sellers choose the alternative decision. The contradiction follows from the same argument as Case 2.

Suppose next that $\eta(y^*, z^*) > y^*$ and $z^* < \overline{x}$. As before, let $\Delta = (y^*, z^* + \epsilon)$, where ϵ is chosen small enough so that $F(z^* + \epsilon) - F(z^*) < F(\eta(y^*, z^*)) - F(y^*)$. All sellers with $x \leq y^*$ or $x \geq z^* + \epsilon$ weakly prefer Δ while all sellers with $x \in (y^*, \eta(y^*, z^*))$ strictly prefer Δ. This implies that Δ is preferred to Δ^*, a contradiction to Δ^* being an equilibrium.□

Proof of Proposition ??: Suppose that some sellers with $x > y^*$ liquidate. This implies that $\mu = P(\Delta^*) - C(\Delta^*)$. By Lemma 6.2, $y^* < \overline{x}$. There are several cases to consider. Case 1. Suppose that firms with $x < y^*$ liquidate almost surely (or, as a special case, $\Delta^* = X$). Then, consider the policy Δ in Assumption A4 and note that this policy Pareto-dominates Δ^* since (a) for disclosers, $\mu \leq \max(\mu, P(x) - C(\Delta))$ and (b) for non-disclosers, $\mu = P(\Delta^*) - C(\Delta^*) < P(\Delta) - C(\Delta)$. It follows that Δ^* is not an equilibrium. Case 2. Suppose that there exists a set of disclosing firms S with non-zero probability that do not liquidate. Then, for any $x \in S$, $P(x) - C(\Delta^*) \geq \mu$. Define $\Delta' = (y^* - \epsilon, \overline{x})$ with $\epsilon < y^* - \underline{x}$. Then, all firms with $x \in S \cap (\underline{x}, y^* - \epsilon)$ strictly prefer Δ', and firms with $x > y^*$ (weakly) prefer Δ' since they were choosing μ under Δ^*. It follows that, for ϵ sufficiently small,

$$Prob(\mathcal{U}(\Delta'; \tilde{x}) > \mathcal{U}(\Delta^*; \tilde{x})) \geq \int_{x \in S \cap (\underline{x}, y^* - \epsilon)} f(x)dx > \int_{x \in (y^* - \epsilon, y^*)} f(x)dx = Prob(\mathcal{U}(\Delta'; \tilde{x}) < \mathcal{U}(\Delta^*; \tilde{x}))$$

This contradicts that Δ^* is an equilibrium.□

Proof of Corollary 6.1: In Proposition 2.1, the threshold y^* must be given by the minimal global maximizer of $P(x, \overline{x}) - C(x, \overline{x})$. Note also that, given that non-disclosers do not liquidate and the threshold y^* is entirely determined by the preference of the non-disclosers, the necessary condition for an equilibrium still applies in the case of liquidations and the equilibrium (when it exists) must be that $\Delta^* = (y^*, \overline{x})$. The sufficiency condition also implies that the there are fewer than half of all firms that would be better-off with a different policy.

A different sufficiency condition can be obtained by letting μ become large. Let $\mu \to P(y^*) - C(y^*, \overline{x}) = \gamma_0$. There exists a threshold $\tau(\mu)$ that converges to y^* as μ converges to γ_0 such that all firms with $x < \tau(\mu)$ are better-off liquidating over any other policy. It follows that for any $\Delta' \neq \Delta^*$ the probability that a discloser under Δ^* would be strictly better-off under Δ' converges to zero as μ converges to γ_0. Consider next non-disclosers under Δ^*. A non-disclosing seller always prefer Δ^* over Δ' when not disclosing under both policies. In addition, a non-disclosing seller under Δ^* would strictly prefer Δ' if $P(x) - C(\Delta') < P(\Delta^*) - C(\Delta^*)$. From the condition in Corollary 6.1, there are fewer of such non-disclosers that prefer to disclose than disclosers that prefer not to disclos.□

Proof of Proposition 6.2 The proof is identical to that of Corollary 6.1. For the last part of the proposition, notice that if this condition is violated, a small reduction in mandatory disclosure to $\Delta' = (y^* - \epsilon, x)$ would be preferred by almost all continuing disclosers.□

Proof of Lemma 7: Part (i) is by definition. For part (ii), note that a seller not disclosing under Δ would achieve: $P(\Delta) - C(\Delta) > P(x) - \min(C((\underline{x}, x)), C((\underline{x}, x)))$. The latter is the price achieved by the seller under any policy Δ' in which the voluntary disclosure option is chosen. Part (iii) is immediate since the seller achieves $G(x)$ under both policies.□

Proof of Lemma 6.4: The first part of the Lemma is immediate. If a policy $\Delta' = (y', z')$ is such that $\eta(y', z') = y'$, then all sellers achieve a net sale price $P(x) - C^v(x)$ under Δ'. For any other policy $\Delta = (y, z)$ such that $\eta(y, z) > y$, sellers achieve at least $P(x) - C^v(x)$ and $P(\Delta) - C(\Delta) > P(x) - C^v(x)$ if $x \in (y, \eta(y, z)$.

For the second part of the Lemma, define $\Delta = (y, \overline{x})$ and $\Delta' = (y, z)$ where $x < \overline{x}$. By Lemma 6.1, $\eta(y, \overline{x}) \geq \eta(y, z)$ and, thus, $P(\Delta) - C(\Delta) > P(\Delta') - C(\Delta')$. It follows that all sellers with $x \in (y, \eta(y, \overline{x}))$ are strictly better-off under Δ. All sellers with $x \notin (y, \eta(y, \overline{x}))$ achieve the payoff $P(x) - C^v(x)$ under both Δ and Δ'. Therefore, Δ Pareto-dominates Δ'.□

Proof of Lemma 6.5: Let $\Delta = (y, \overline{x})$ and $\Delta' = (y', \overline{x})$ satisfy condition (i). If $P(\Delta') - C(\Delta') \geq P(\Delta) - C(\Delta), \eta(y', \overline{x}) \geq \eta(y, \overline{x})$. Therefore, all sellers with $x \in (y', \eta(y', \overline{x}))$ are better-off under Δ' while all sellers with $x \notin (y', \eta(y', \overline{x}))$ achieve the same surplus under Δ and Δ', i.e., $P(x) - C^v(x)$. Thus, Δ' Pareto-dominates Δ.

Suppose now that Δ and Δ' are such that $P(\Delta') - C(\Delta') < P(\Delta) - C(\Delta)$. Then, all sellers with $x \in (y, \eta(y, \overline{x}))$ are better-off under Δ while all sellers with $x \in (y, \min(y', \eta(y, \overline{x})))$ are better-off under Δ'. This implies part (ii) of the Lemma.□

Proof of Lemma 7: Suppose not, and let $\epsilon \neq 0$ be a small positive or negative number such that $P(\Delta) - C(\Delta) > P((y^*, \overline{x})) - C((y^*, \overline{x}))$, where $\Delta = (y + \epsilon, \overline{x})$. Then, all sellers with $x \in \Delta \cap \Delta^*$ that do not disclose under Δ^* would not disclose under Δ either and are better-off under Δ. When ϵ is small, this implies that Δ is preferred to Δ^*.□

Proof of Proposition 6.3: By Lemma 7, an equilibrium (when it exists) must be $\Delta^* = (y_0, \overline{x})$. By Lemma 6.5, part (i), Δ^* defeats any policy with $\Delta = (y, \overline{x})$ where $y > y_0$ and, thus, by Lemma 6.4, also defeats any policy $\Delta(y, z)$. By Lemma 7, Δ^* us not defeated by any policy $\Delta = (y, \overline{x})$ with $y < y_0$ if and only if $F(\eta(y_0, \overline{x})) - F(y_0) \geq F(\min(y_0, \eta(y, \overline{x}))) - F(y)$. By condition R, the right-hand side of this inequality is maximal at $y = \underline{x}$. There are three cases to consider. Case 1. If $\eta(\underline{x}, \overline{x}) < y_0$, condition R implies that $F(\eta(\underline{x}, \overline{x})) > F(\eta(y_0, \overline{x})) - F(y_0)$ and therefore full non-disclosure defeats Δ^*. Case 2. If $\eta(\underline{x}, \overline{x}) \geq y_0$, $\Delta = (\underline{x}, \overline{x})$ defeats Δ^* if and only if $F(\eta(y_0, \overline{x})) - F(y_0) < F(y_0)$. Whenever $F(\eta(y_0, \overline{x})) - F(y_0) \geq F(y_0)$, this also implies by Lemma 6.4 that Δ^* defeats any policy $\Delta = (y, z)$ such that $y < y_0$.□

Proof of Proposition 6.4: The fact that (i) and (ii) are necessary and sufficient conditions for an equilibrium are a direct application of Lemmas -. To show uniqueness, consider $y' < y''$ that satisfy these conditions. Condition (i) also implies that $P(y'', \overline{x})) - C(y'', \overline{x}) > P(y', \overline{x})) - C(y', \overline{x})$. Then, by Lemma 6.5, $\Delta' = (y', \overline{x})$ defeats $\Delta'' = (y'', \overline{x})$ if $F(\min(y'', \eta(y', \overline{x}))) - F(y') > F(\eta(y'', \overline{x})) - F(y'')$ and is defeated by Δ'' if $F(\min(y'', \eta(y', \overline{x}))) - F(y') < F(\eta(y'', \overline{x})) - F(y'')$. □

Bibliography

Austen-Smith, David, "The spatial theory of electoral competition: instability, institutions, and information," *Environment and Planning C: Government and Policy*, 1983, *1* (4), 439–459.

Baranchuk, Nina and Philip H. Dybvig, "Consensus in Diverse Corporate Boards," *Review of Financial Studies*, 2006, *22* (2), 715–747.

Bertomeu, Jeremy and Robert P. Magee, "From Low-Quality Reporting to Financial Crises: Politics of Disclosure Regulation along the Economic Cycle," 2011. forthcoming, Journal of Accounting and Economics.

—— **and** —— , "Political Pressures and the Evolution of Disclosure Regulation," 2012. Northwestern University Working Paper.

Beyer, Anne, "Conservatism and Aggregation: The Effect on Cost of Equity Capital and the Efficiency of Debt Contracts," 2012.

—— **and Sri S. Sridhar**, "Effects of Multiple Clients on the Reliability of Audit Reports," *Journal of Accounting Research*, 2006, *44* (1), 29–51.

Black, Duncan, "On the Rationale of Group Decision-making," *Journal of Political Economy*, 1948, *56* (1), 23–34.

Chen, Qi, Thomas Hemmer, and Yun Zhang, "On the Relation Between Conservatism in Accounting Standards and Incentives for Earnings Management," *Journal of Accounting Research*, 2007, *45* (2), 541–565.

Demarzo, Peter M., "Majority Voting and Corporate Control: The Rule of the Dominant Shareholder," *Review of Economic Studies*, 1993, *60* (3), 713–734.

Demski, Joel S., "The General Impossibility of Normative Accounting Standards," *Accounting Review*, 1973, *48* (4), 718–723.

—— , "Choice among Financial Reporting Alternatives," *Accounting Review*, 1974, *49* (2), 221–232.

Dixit, Avinash, "Games of monetary and fiscal interactions in the EMU," *European Economic Review*, 2001, *45*, 589–613.

Downs, Anthony, "An Economic Theory of Political Action in a Democracy," *Journal of Political Economy*, 1957, *65* (2), 135–150.

Fischer, Paul E., "Shareholder Voting, Share Prices, and Investor Disagreement," *Chicago-Minnesota Accounting Theory Conference*, 2010.

—— **and Phillip C. Stocken**, "Imperfect Information and Credible Communication," *Journal of Accounting Research*, 2001, *39* (1), 119–134.

Friedman, Henry and Mirko Heinle, "Interactions between corporate and national governance: The merits of one-size-ts-all securities regulation," 2012. University of Pennsylvania Working Paper.

Gao, Pingyang, "A Measurement Approach to Conservatism and Earnings Management," 2012. University of Chicago Working Paper.

Gigler, Frank, Chandra S. Kanodia, Haresh Sapra, and Raghu Venugopalan, "Accounting Conservatism and the Efficiency of Debt Contracts," *Journal of Accounting Research*, 2009, *47* (3), 767–797.

Goex, Robert F. and Alfred Wagenhofer, "Optimal impairment rules," *Journal of Accounting and Economics*, 2008, *48* (1), 2–16.

Grossman, Sanford J. and Motty Perry, “Perfect sequential equilibrium ?,” *Journal of Economic Theory*, 1986, *39* (1), 97–119.

Guay, Wayne and Robert Verrecchia, “Discussion of an economic framework for conservative accounting and Bushman and Piotroski,” *Journal of Accounting and Economics*, 2006, *42* (1-2), 149–165.

Hayashi, Fumio, *Econometrics*, Princeton University Press, 2000.

Jovanovic, Boyan, “Truthful Disclosure of Information,” *Bell Journal of Economics*, 1982, *13* (1), 36–44.

Kirschenheiter, Michael T. and Ram Ramakrishnan, “Prudence Demands Conservatism,” 2009. UIC Working Paper.

Kothari, S.P., Karthik Ramanna, and Douglas J. Skinner, “Implications for GAAP from an analysis of positive research in accounting,” *Journal of Accounting and Economics*, 2010, *50* (2-3).

Lerner, Josh and Jean Tirole, “A Model of Forum Shopping,” *American Economic Review*, 2006, *96* (4), 1091–1113.

Lizzeri, Alessandro, “Information Revelation and Certification Intermediaries,” *Rand Journal of Economics*, 1999, *30* (2), 214–231.

Mailath, George J., Masahiro Okuno-Fujiwara, and Andrew Postlewaite, “Belief-based Refinements in Signalling Games,” *Journal of Economic Theory*, 1993, *60* (1), 241–276.

Marinovic, Iván, “Dynamics of Financial Reporting,” 2010. Ph.D Dissertation, Northwestern University.

Moonitz, Maurice, “The Valuation of Business Capital: An Accounting Analysis,” *American Economic Review*, 1951, *41* (2), 157–165.

Plott, Charles R., “A Notion of Equilibrium and its Possibility Under Majority Rule,” *American Economic Review*, 1967, *57* (4), 787–806.

Stigler, George J., “Public Regulation of the Securities Markets,” *Journal of Business*, 1964, *37* (2), 117–142.

___ , “The Theory of Economic Regulation,” *Bell Journal of Economics*, 1971, *2* (1), 3–21.

Verrecchia, Robert E., “Discretionary Disclosure,” *Journal of Accounting and Economics*, 1983, *5*, 179–194.

Watts, Ross L., “Corporate Financial Statements, A Product of the Market and Political Processes,” *Australian Journal of Management*, 1977, *2* (1), 53–75.

___ , “Conservatism in Accounting,” *Simon School of Business Working Paper No. FR 02-21*, 2002.

___ **and Jerold L. Zimmerman**, “Towards a Positive Theory of the Determination of Accounting Standards,” *Accounting Review*, 1978, *53* (1), 112–134.

___ **and** ___ , “The Demand for and Supply of Accounting Theories: The Market for Excuses,” *Accounting Review*, 1979, *54* (2), 273–305.