Information Disclosure and Corporate Governance

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Talk at
Better Corporate Disclosure a Long-Sought Reform

1927: William Z. Ripley, *Main Street and Wall Street*

1932: Adolph A. Berle & Gardiner C. Means, *The Modern Corporation and Private Property*

1930s: Various reform legislation in wake of Great Depression

2002: Sarbanes-Oxley
An International Phenomenon

- Japan: major reforms in 2002.
Focus of Reform: Increased Transparency

Is Increased Transparency a Good Thing?

- General view is more disclosure $\Rightarrow$ better governance.
- Some empirical evidence suggests that firms that disclose more perform “better.”
Potential Problem Interpreting Empirical Evidence:

![Diagram showing points for Firm 1 and Firm 2 on a Performance vs. Amount Disclosed graph.]

- Firm 1
- Firm 2
Potential Problem Interpreting Empirical Evidence:

- Performance
- Amount Disclosed

Regression line

- Firm 1
- Firm 2
Potential Problem Interpreting Empirical Evidence:
Analyzing an Equilibrium Phenomenon

Performance

Amount Disclosed

Firm 1

Firm 2

Regression line

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Introduction

What This Paper’s About

Why could there be a tradeoff between disclosure (transparency) and performance?

What factors influence this tradeoff?

What are the consequences of more disclosure for corporate governance (agency problems)?

- More disclosure $\Rightarrow$ Greater managerial compensation in equilibrium.
- More disclosure $\Rightarrow$ More managerial turnover in equilibrium.
- More disclosure $\Rightarrow$ Changes to managerial actions in equilibrium.
  - ... including potentially greater managerial myopia.
  - ... including potentially greater conservatism.
Outline of Talk

1. Introduction
2. Model
3. General Analysis
4. Governance Models
5. General Equilibrium
6. Additional Discussion & Conclusions
The Model

Basic Timing

Owners (principal) set disclosure regime.
The Model

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Owners (principal) set disclosure regime.

 Owners negotiate with & hire CEO (agent)
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Information is revealed, the quality of which depends on disclosure regime.

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Owners base an action (e.g., dismissal) on information.
The Model

Basic Timing

Owners (principal) set disclosure regime.

Information is revealed, the quality of which depends on disclosure regime.

Owners negotiate with & hire CEO (agent).

Owners base an action (e.g., dismissal) on information.

Payoffs realized.
Owners learn information about CEO’s ability. Consequent action is whether owners keep or fire CEO. The CEO suffers a loss if fired.

Information: firm prospects. Consequent action: add or subtract resources invested. The CEO prefers to manage more resources than less ceteris paribus.

Information: lessens CEO’s informational advantage. Consequent action: adjustment to CEO’s compensation plan. The CEO loses information rents.

Notation and Payoffs

- $D$ denotes disclosure regime.
- $D \succ D'$ denotes $D$ more informative than $D'$.
- $w$ denotes CEO compensation.
- Owners’ payoff $= \pi(D) - w$.
- CEO’s payoff $= U(D) + v(w)$; $v'(\cdot)$ exists and is positive.
- CEO cannot buy his job; hence, $w \geq 0$. 
Differing Preferences

Condition

If $\mathcal{D}$ and $\mathcal{D}'$ are two disclosure regimes such that $\mathcal{D} \succ \mathcal{D}'$, then $\pi(\mathcal{D}) \geq \pi(\mathcal{D}')$ and $U(\mathcal{D}) < U(\mathcal{D}')$.

At the moment this is an assumption. Later will prove it holds in games of interest.
Assume compensation, $w$, set through generalized Nash bargaining. That is, $w$ set to maximize

$$
\lambda \log \left( \pi(D) - w \right) + (1 - \lambda) \log \left( U(D) + v(w) - \bar{u} \right),
$$

where

- $\lambda =$ owners’ bargaining power, $\lambda \in [0, 1]$; and
- $\bar{u}$ is the value of the CEO’s outside option (e.g., utility if he retires).
The Basic Tradeoff

Proposition

Assume wage bargaining is generalized Nash and the Condition holds. Then the CEO’s compensation, as determined by the bargaining process, is non-decreasing in how informative is the disclosure regime.

[The talk ignores corner solutions (i.e., worlds in which CEOs receive 0 compensation).]
Proof of Proposition 1

Non-extreme bargaining (i.e., $0 < \lambda < 1$)

\[ \frac{(1-\lambda)v'(w)}{U(D) + v(w) - \bar{u}} \]

\[ \frac{\lambda}{\pi(D) - w} \]
Proof of Proposition 1

Non-extreme bargaining: Better disclosure $\implies$ red curve shifts up

\[
\frac{(1-\lambda)v'(w)}{U(D)+v(w)-\bar{u}}
\]
Proof of Proposition 1
Non-extreme bargaining: Better disclosure $\implies$ blue curve shifts down

\[
\frac{\lambda}{\pi(D) - w}
\]
Proof of Proposition 1
Non-extreme bargaining (i.e., $0 < \lambda < 1$): Better disclosure
Proof of Proposition 1

Extreme bargaining (i.e., $\lambda = 1$ or $= 0$)

- If owners have all the bargaining power:  $U(D) + v(w) = \bar{u}$; hence, 
  $w = v^{-1}(\bar{u} - U(D))$.

- If CEO has all the bargaining power:  $\pi(D) - w = 0$; hence, 
  $w = \pi(D)$.
Why Might CEOs Resist Improved Disclosure?

Proposition

Assume wage bargaining is generalized Nash and the Condition holds. Assume, too, that neither party has all the bargaining power (i.e., assume $\lambda \in (0, 1)$). Finally, assume the CEO’s utility exhibits non-increasing marginal utility of income (i.e., assume CEO is risk neutral or risk averse in income). If there is a reform to disclosure that results in a disclosure regime that is more informative than the one the owners would have chosen, then the CEO’s expected total utility is reduced.
Proof of Proposition 2
Part I

- Let $D^*$ be the owners’ unconstrained choice and $D^R$ the reform level.
- By assumption $D^R \succ D^*$.
- Let $w(D)$ denotes equilibrium compensation given disclosure regime.
- Objective is to show $U(D^*) + v(w(D^*)) > U(D^R) + v(w(D^R))$. 
Proof of Proposition 2
Part II

First-order from general Nash bargaining tell us

\[
-\frac{\lambda}{\pi(D) - w(D)} + \frac{(1 - \lambda)v'(w(D))}{U(D) + \nu(w(D)) - \bar{u}} = 0. \tag{\star}
\]

\(D^R \neq D^* \implies \)

\[\pi(D^R) - w(D^R) < \pi(D^*) - w(D^*).\]

Proposition 1 \(\implies w(D^R) > w(D^*).\)

Therefore: \(U(D^R) + \nu(w(D^R)) < U(D^*) - \nu(w(D^*)).\)
What if More Disclosure Just Makes Being CEO a Worse Job?

- Suppose $\bar{u}$ reflects next best CEO job.
- If $U(D)$ goes down, perhaps $\bar{u}$ should go down too.
- To reflect that possibility, suppose $U(D) - \bar{u}(D) \equiv \Delta$. 
Compensation Still Rises

Proposition

Assume the owners’ gross expected profit, \( \pi(\cdot) \), is strictly increasing in the informativeness of the disclosure regime (i.e., \( D \succ D' \Rightarrow \pi(D) > \pi(D') \)) and that bargaining is generalized Nash. Suppose that the CEO’s gross expected utility from the job, \( U(\cdot) \), decreases one-for-one with his outside option as disclosure is made universally more informative. Then an increase in the level of disclosure causes an increase in the CEO’s compensation unless the owners have all the bargaining power, in which case his compensation is unaffected.
Proof of Proposition 3

The proof involves analyzing the relationship between bargain power and surplus. The equation for bargain power is given by:

\[\frac{(1-\lambda)v'(w)}{\Delta + v(w)}\]

which is plotted against surplus \(\pi(D) - w\) on the graph. The graph shows the interaction between these variables, highlighting the equilibrium point \(w^e\). The diagram illustrates how changes in surplus affect bargain power.
Proof of Proposition 3

\[ (1 - \lambda) \frac{\nu'(w)}{\Delta + \nu(w)} \]

\[ v^{-1}(\Delta) \quad w^e \quad w^e \]
Suppose owners’ payoff is $r \gamma(a) - c(a)$, where

- $a$ is owners’ action;
- $r$ is a stochastic return; and
- $\gamma(\cdot)$ and $c(\cdot)$ functions.

$\mathbb{E}\{r\} = \theta$.

$\theta$ is an unknown parameter.

From information owners receive, they form an unbiased estimate $\hat{\theta}$.

How good an estimate depends on disclosure regime.
Parameter $\theta$ is CEO’s ability (or monotonic transformation thereof). Action is fire CEO ($a = 1$) or keep ($a = 0$). (Alternatively, $a = 1 \Rightarrow$ sell to acquirer; $a = 0 \Rightarrow$ reject acquirer.)

$$c(1) > c(0) \quad (i.e., \text{firing costs}) \quad \text{and} \quad \gamma(a) = 1 - a.$$  

Or parameter $\theta$ reflects firm’s future prospects. Action is to adjust capital in firm ($a > 0$ is adding, $a < 0$ is subtracting).

$$c(a) = \frac{a^2}{2} \quad (i.e., \text{quadratic adjustment costs}) \quad \text{and} \quad \gamma(a) = K + a,$$

where $K$ is baseline capital in firm.
Governance Models
Learning Models
Owners’ Actions and Payoffs

- Given $\hat{\theta}$, owners choose $a$ to maximize $\hat{\theta} \gamma(a) - c(a)$.
- Let $a^*(\hat{\theta})$ be solution.
- Owners’ expected payoff conditional on $\hat{\theta}$ is, thus,
  \[
  \Pi(\hat{\theta}) = \hat{\theta} \gamma(a^*(\hat{\theta})) - c(a^*(\hat{\theta})).
  \]

Lemma

*The owners’ payoff function $\Pi(\cdot)$ is convex.*
Owners’ Choice of Action

Proof of Lemma

\[ \hat{\theta}_\gamma(a^*(\tilde{\theta})) - c(a^*(\tilde{\theta})) \]
 Owners’ Choice of Action

Proof of Lemma (continued)

\[
\hat{\theta}_\gamma(a^*(\tilde{\theta})) - c(a^*(\tilde{\theta}))
\]

\[
\Pi(\tilde{\theta})
\]

\[
\theta_L \quad \tilde{\theta} \quad \theta_R
\]

\[
\hat{\theta}
\]
Owners’ Choice of Action

Proof of Lemma (continued)

\[ \Pi(\hat{\theta}) \]

\[ \Pi(\tilde{\theta}) \]

\[ \theta_L, \tilde{\theta}, \theta_R \]
Information and Risk

- *Ex ante* the estimator $\hat{\theta}$ is a random variable.

- Result from statistics: If $\mathcal{D} \succ \mathcal{D}'$ in the sense of Blackwell informativeness, then the distribution of $\hat{\theta}(\mathcal{D})$ is a mean-preserving spread of the distribution of $\hat{\theta}(\mathcal{D}')$.

- That is, $\hat{\theta}(\mathcal{D})$ is riskier than $\hat{\theta}(\mathcal{D}')$ in the sense of second-order stochastic dominance.
Owners Like More Informative Disclosure Regimes

- From Lemma, owners’ payoff is convex in $\hat{\theta}$; that is, they are risk loving.
- From previous slide, more informative $\Rightarrow$ riskier.
- Hence, owners must prefer more informative disclosure regimes to less informative *ceteris paribus*.
- In other words, owners’ “part” of the Condition is met.
The Dismissal Model

- Consider the dismissal model outlined earlier.
- CEO’s utility is

\[ u(\hat{\theta}) = \begin{cases} 
-\ell, & \text{if } \hat{\theta} < -c(1) \\
0, & \text{if } \hat{\theta} \geq -c(1) 
\end{cases} \]
The Dispersive Order

- Let \( F(\cdot|\mathcal{D}) \) be the distribution function for \( \hat{\theta} \) conditional on the disclosure regime.
- Distribution \( F(\cdot|\mathcal{D}') \) dominates \( F(\cdot|\mathcal{D}) \) in the sense of the dispersive order (denoted \( F(\cdot|\mathcal{D}') \geq_{\text{disp}} F(\cdot|\mathcal{D}) \)) if

\[
F^{-1}(\xi|\mathcal{D}') - F^{-1}(\xi'|\mathcal{D}') < F^{-1}(\xi|\mathcal{D}) - F^{-1}(\xi'|\mathcal{D})
\]

whenever \( 1 > \xi > \xi' > 0 \).
The Dispersive Order

Red distribution dominates blue distribution in the dispersive order
The Dismissal Model

Opposing preferences

- All distributions of \( \hat{\theta} \) have the same mean.
- Hence, \( F(\cdot|D') \geq_{\text{disp}} F(\cdot|D) \) implies \( F(\cdot|D') \geq_{\text{ssd}} F(\cdot|D) \).
- Previous analysis implies \( F(\cdot|D') \geq_{\text{disp}} F(\cdot|D) \) means owners prefer \( D \) to \( D' \).
- CEO has opposite preferences:

Proposition

*Suppose the median of the estimate \( \hat{\theta} \) equals the mean and the mean exceeds firing cost. Then \( F(\cdot|D') \geq_{\text{disp}} F(\cdot|D) \) implies the CEO prefers \( D' \) to \( D \). In other words, the Condition holds for the dismissal model.*
Proof of Proposition 6

- Result follows if \( F(\cdot | \mathcal{D}') \geq_{\text{disp}} F(\cdot | \mathcal{D}) \Rightarrow F\left(-c(1)\middle| \mathcal{D}\right) > F\left(-c(1)\middle| \mathcal{D}'\right) \).
- \( F(\cdot | \mathcal{D}') \geq_{\text{disp}} F(\cdot | \mathcal{D}) \) implies
  \[
  F^{-1}\left(1/2 \middle| \mathcal{D}'\right) - F^{-1}\left(\xi \middle| \mathcal{D}'\right) < F^{-1}\left(1/2 \middle| \mathcal{D}\right) - F^{-1}\left(\xi \middle| \mathcal{D}\right) \quad (\dagger)
  \]
  for all \( \xi < 1/2 \).
- Mean and median coincide \( \Rightarrow F^{-1}\left(1/2 \middle| \mathcal{D}'\right) = F^{-1}\left(1/2 \middle| \mathcal{D}\right) \).
- Hence \((\dagger)\) implies, for all \( \xi < 1/2 \),
  \[
  F^{-1}\left(\xi \middle| \mathcal{D}\right) < F^{-1}\left(\xi \middle| \mathcal{D}'\right) \Rightarrow F^{-1}\left(F\left(-c(1)\middle| \mathcal{D}'\right) \middle| \mathcal{D}\right) < -c(1) \\
  \Rightarrow F\left(-c(1)\middle| \mathcal{D}'\right) < F\left(-c(1)\middle| \mathcal{D}\right),
  \]
  (recall \( F\left(-c(1)\middle| \mathcal{D}'\right) < F\left(\mathbb{E}\{\hat{\theta}\}\middle| \mathcal{D}'\right) = 1/2 \) and distributions are increasing functions).
An Example Satisfying the Dispersive Order

A normal-learning-model version of the dismissal model

- CEO ability, \( \theta \), is distributed normally with mean 0 and precision \( \tau \) (i.e., variance \( 1/\tau \)).
- Information: owners observe a signal \( s \), which is distributed normally with a mean equal to CEO’s ability and a precision \( \delta \).
- Hence, \( \delta > \delta' \) means signal given \( \delta \) more informative than signal given \( \delta' \); that is, \( \delta > \delta' \) corresponds to \( D > D' \).

Corollary

Consider the CEO-dismissal model. Suppose the estimate \( \hat{\theta} \) is formed according to the normal-learning model. Then mean and median of \( \hat{\theta} \) coincide. If \( D \) is a more informative disclosure regime than \( D' \), then 
\[
F(\cdot|D') \overset{\text{disp}}{\geq} F(\cdot|D).
\]
Hence, the owners prefer \( D \) to \( D' \) and the CEO prefers \( D' \) to \( D \). In other words, the Condition follows.
More on Learning Models of Governance

- Note that if the CEO’s utility were concave in $\hat{\theta}$, then the Condition would hold.
- Such would be the case, for instance, if CEO’s future wage were a multiple of $\hat{\theta}$ and the CEO were risk averse in income.
A Signal-Jamming Model

- Recall example in which owners’ action was to add \((a > 0)\) or subtract \((a < 0)\) resources/capital from firm.
- Suppose CEOs like to run bigger empires *ceteris paribus*.
- Specifically, CEO’s utility (gross of compensation) is \(K + a\), the size of his empire.
- Suppose, too, that the CEO can jam the owners’ information.
- Specifically, CEO can take action \(x \in \mathbb{R}_+\) such that owners see \(x\hat{\theta}\) whenever \(\hat{\theta} > 0\) (when \(\hat{\theta} < 0\), they see \(\hat{\theta}\)).
Signal-Jamming: A Heuristic Discussion

Graphical Interpretation

True distribution

0

signal
Signal-Jamming: A Heuristic Discussion

Graphical Interpretation

- True distribution
- Apparent distribution

X

signal
Signal-Jamming: A Heuristic Discussion

Graphical Interpretation: In equilibrium no one fooled

Equilibrium distribution

Apparent distribution

signal

$x$

$-\hat{x}$
Signal-Jamming: A Heuristic Discussion
Graphical Interpretation: Red queen problem
The Signal-Jamming Model: Continued

- As noted, no one fooled in equilibrium.
- That is, when statistic positive (i.e., $x\hat{\theta} > 0$), owners will divide it by $x_e$, the value they anticipate CEO chooses in equilibrium.
- Owners’ choice of $a$ maximizes $\mathbb{E}\{\theta\}(K + a) - a^2/2$.
- So choice of $a$ when statistic positive is $x\hat{\theta}/x_e$.
- Condition for equilibrium is $x = x_e$; that is,

$$
x_e = \underset{e}{\text{argmax}} \int_{0}^{\infty} \frac{x}{x_e} \hat{\theta} dF(\hat{\theta}|\mathcal{D}) - g(x), \quad (\dagger)
$$

where $g(\cdot)$ is CEO’s cost-of-effort function, which is increasing and convex.
The Signal-Jamming Model: Continued

- Employing integration by parts on (†) and using the FOC, $x_e$ is defined by
  \[
  \int_0^\infty (1 - F(\hat{\theta}|D)) d\hat{\theta} = x_e g'(x_e).
  \]
  An increase in the left-hand side implies an increase in $x_e$.
- If $D \succ D'$ in the Blackwell sense, then $F(\cdot|D') \gg_{ssd} F(\cdot|D)$, hence
  \[
  \int_0^\infty (1 - F(\hat{\theta}|D)) d\hat{\theta} > \int_0^\infty (1 - F(\hat{\theta}|D')) d\hat{\theta}.
  \]
  Hence, $x_e$ increases as disclosure becomes more informative.
- CEO’s equilibrium utility is $-g(x_e)$, so CEO prefers a less informative regime to a more informative regime ceteris paribus. We have shown:

**Proposition**

*If $D$ is a more informative disclosure regime than $D'$, then the owners prefer $D$ to $D'$ and the CEO prefers $D'$ to $D$. In other words, the Condition holds.*
Suppose the action $x$ directly or indirectly harmful to owners.

For instance, problem similar to Stein (1989) managerial myopia story: $x$ represents actions that boost earnings in short term in a negative-NPV way relative to the long term.

Then see that one downside to greater disclosure is it could lead to more harmful signal-jamming activities.
Agency Models

Timing and Assumption

Owners (principal) set disclosure regime.

Owners get information relevant to design of CEO bonus plan.

CEO chooses x and receives bonus, b, according to plan.

Owners hire CEO and his base salary, w, is set.

Owners set the bonus plan.
Hidden-Information Agency

- At last stage, before choosing action $x$, CEO only learns $\theta$, a payoff-relevant parameter.
- $\theta \in \{B, G\}$.
- Before setting bonus plan, owners learn $\psi = \Pr\{\theta = B\}$. With probability 1/2, $\psi = \delta + 1/2$; and with probability 1/2, $\psi = -\delta + 1/2$.
- $\delta \in (0, 1/2)$ is the information structure (disclosure regime).
- In what follows assume negative bonuses are not feasible.
Mechanism Design and Information Rent

- Bonus plan will be a mechanism: $\theta \mapsto \langle x(\theta), b(\theta) \rangle$.
- What is critical is the good type’s information rent: $I(x(B))$, where $I(\cdot)$ increasing and $I(0) = 0$. (Note $I(\cdot)$ is derived endogenously from rest of model.)
- Define $X(\psi) = x(B)$ under owners’ optimal plan given $\Pr\{\theta = B\} = \psi$. 

Hidden-Information Agency
Opposing preferences over disclosure

Proposition

If $\mathcal{D}$ is a more informative disclosure regime than $\mathcal{D}'$ (i.e., $\delta > \delta'$), then the owners prefer $\mathcal{D}$ to $\mathcal{D}'$. If the function mapping $[0, 1]^2 \rightarrow \mathbb{R}$ defined by

$$(\psi, \psi') \mapsto \psi I(X(\psi')) + \psi' I(X(\psi)),$$

is Schur concave, then the CEO prefers $\mathcal{D}'$ to $\mathcal{D}$; that is, owners and CEO have opposing preferences over disclosure regimes (i.e., the Condition holds)
Hidden-Information Agency

An Example

- Suppose owners’ payoff is $x - y$, where $y$ is CEO’s total compensation.
- Suppose CEO’s payoff is $y - x^2/k_\theta$, where $k_G > k_B > 0$.
- Then conditions of previous proposition can be shown to hold.
Disclosure and Outrage

- Lots of bad press about big payouts to CEOs.
- More disclosure could contribute to bigger payouts:

**Proposition**

*Consider the hidden-information agency model. The maximum bonus that can occur in equilibrium is greater the more informative is the disclosure regime.*
Hidden-Action Agency

- CEO utility is $b - x\bar{C}$, where $x \in \{0, 1\}$ is hidden action taken in last stage and $\bar{C} > 0$.
- Owners' payoff is $R(x) - b$, $R(1) > R(0)$.
- The realization $R(x)$ is not verifiable.
- If CEO “goofs off,” then owners detect this in a verifiable way with probability $\delta$.
- No negative bonuses.
Hidden-Action Agency

- Readily shown that to induce CEO to choose $x = 1$, owners should promise a bonus equal to $\bar{C}/\delta$ provided they don’t detect that he has goofed off.
- Detection of goofing off yields no bonus.
- Owners’ equilibrium payoff is $R(1) - \bar{C}/\delta$.
- CEO’s equilibrium payoff is $\bar{C}/\delta - \bar{C}$.
- Hence,

**Proposition**

*If $\mathcal{D}$ is a more informative disclosure regime than $\mathcal{D}'$ (i.e., $\delta > \delta'$), then the owners prefer $\mathcal{D}$ to $\mathcal{D}'$ and the CEO prefers $\mathcal{D}'$ to $\mathcal{D}$. That is, the Condition holds.*
A General Equilibrium Model

Might worry that considering one firm in isolation.
Now consider a market model.
A continuum of firms, with each firm being indexed by $\beta$.
Equal measure of CEOs, indexed by $\alpha$.
Let $\alpha[i]$ and $\beta[i]$ be, respectively, the $i \times 100$ percentile of CEO type and firm type.
Assume $\alpha[0] > 0$.
Assume the distributions of $\alpha$ and $\beta$ are twice continuously differentiable so that $\alpha[.]$ and $\beta[.]$ are as well. Both functions are strictly increasing.
Meaning of Type

- CEO’s index, \( \alpha \), is his type. Assume it is observable.
- Profit, gross of CEO compensation, is \( \alpha \Omega(\delta, \beta) \).
- \( \Omega : \mathbb{R}^2 \to \mathbb{R}_+ \) is twice continuously differentiable in each argument.
- As a definition of firm type:

\[
\frac{\partial^2 \Omega(\delta, \beta)}{\partial \delta \partial \beta} > 0. \tag{COMP}
\]

- Assume better disclosure raises gross profit; that is, \( \partial \Omega / \partial \delta > 0 \).
- Assume higher type firms have greater profit \textit{ceteris paribus}: \( \partial \Omega / \partial \beta > 0 \).
CEO Utility and Total Welfare

- CEO utility is $w + h(\delta)$.
- Assume $h(\cdot)$ is a twice continuously differentiable function.
- Consistent with the models above, assume $h'(\delta) < 0$.
- Welfare is $\alpha\Omega(\delta, \beta) + h(\delta)$.
- For all $\alpha$ and $\beta$, assume the function defined by
  \[
  \delta \mapsto \alpha\Omega(\delta, \beta) + h(\delta)
  \]
  is globally concave in $\delta$ and has an interior maximum.
- Global concavity implies this maximum is unique.
Rest of Assumptions

- In addition to working for one of the firms, a CEO can retire or pursue some vocation other than being CEO.
- His utility if he does so is $u$.
- Firms make compensation offers and do so simultaneously.
- Looking for an assortative-matching equilibrium.
Equilibrium

Lemma

An assortative-matching equilibrium of the market described above exists in which a firm of type $\beta_{[i]}$ chooses disclosure regime $\delta_{[i]}$, where $\delta_{[i]}$ solves

$$\max_{\delta} \alpha_{[i]} \Omega(\delta, \beta_{[i]}) + h(\delta).$$

In this equilibrium, the $i$th CEO is paid

$$w_{[i]} = u - h(\delta_{[i]}) + \int_{0}^{i} \Omega(\delta_{[j]}, \beta_{[j]}) \dot{\alpha}_{[j]} dj,$$

(WAGE)

where $\dot{\alpha}_{[j]} = d\alpha_{[j]}/dj$. 
Comparative Statics

Proposition

In equilibrium, a higher-type firm (e.g., a larger firm) has a greater level of disclosure than a lower-type firm. Furthermore, a more able CEO earns greater compensation, has greater utility, and works for a firm with more stringent disclosure than a less able CEO.
The Potential and Likely Unintended Consequences of Reform

Proposition

Let $\delta_{[\cdot]}$ be the equilibrium disclosure schedule absent reform. If a reform is imposed such that disclosure must be at least $\delta_{[\hat{i}]}$, where $\hat{i} \in (0, 1)$, and this reform causes no firms to go out of business, then all CEOs will see their compensation increase in equilibrium and all but the least able CEO will see his utility increase.
Who Wants Reform?

- In model above, neither owners nor CEO benefit from a binding “reform” of disclosure.
- But if we change timing to permit owners to lobby government after agreeing to compensation but before subsequent compensation negotiations, then owners have an incentive to do this.
- The paper analyzes how this plays out and shows that if owners cannot commit not to lobby, they will lobby.
Some Empirical Implications

- A consequence of imposing a binding disclosure reform on a firm should lead to (i) increases in managerial pay; (ii) increase in the turnover rate of top management; and (iii) a decrease in firm value.
- Larger firms should have greater disclosure than smaller firms.
- An increase in disclosure/information could lead to greater efforts at signal boosting and more myopia.
- An increase in disclosure could lead to greater managerial conservatism.
- Cross-sectionally, industries in which more information is released about managerial performance (e.g., mutual funds) could see higher pay and greater turnover rates than in industries in which less information is released.
Conclusions

- Disclosure/transparency is not unambiguously desirable from the perspective of good governance.
- In a model of optimizing behavior, external reforms aimed at increasing disclosure/transparency can be welfare reducing.
- Importance of an equilibrium approach to governance: Just because some policy is beneficial to owners ignoring equilibrium adjustments doesn’t mean it is truly beneficial (i.e., once equilibrium adjustments are taken into account).
- Model has applications to other principal-agent relations.
Schur Concavity

- A symmetric function $f : \mathbb{R}^n \to \mathbb{R}$, $n \geq 2$, is Schur concave if
  \[
  x \text{ majorizes } x' \implies f(x) < f(x').
  \]

- What does “majorize” mean?
- It essentially means the elements of the vector $x$ are a mean-preserving spread of the elements of the vector $x'$.
- For example $(1, 3, 7, 9)$ majorizes $(2, 4, 6, 8)$. 