A Framework for Assessing Corporate Governance Reform

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Structure of the presentation

1. Introduction

2. Model I: Setup, solution and implications

3. Model II (Extension of the Model I): Setup, solution and implications
Introduction

• Study the effect of potential regulatory reforms in corporate governance

• Governance arrangements as a constrained-optimal contracts within firm

• Governance reforms are just special case of contract regulation
• Three conditions under which restrictions on contracts can be welfare improving (Hermalin and Katz, 1993)
  (i) information asymmetries between parties
  (ii) contract between parties has an externality on a third party
  (iii) lack of remedies and penalties

• Particularly, the paper looks at
  (i) disclosure requirements
  (ii) criminal penalties on managers
Model I: Setup

- Revenues of the firm (which is also BD’s payoff) is

  \[ \alpha + \epsilon \quad E(\epsilon) = E(\epsilon|\alpha) = 0 \]

- Payoff of the CEO is

  \[ w + b \text{Pr}\{\text{not fired}\} - k(e) \]

  Reservation utility is \( u_R \geq b \).
Model I: Solution
Backward induction: Start from the last stage.

• Suppose that the BD observes $e$. Then after the realization of the signal $y$, the posterior mean and variance of the CEO's ability are

$$
\mu' = \frac{q\tilde{y}}{q + \tau} \quad \text{and} \quad \tau' = \tau + q
$$

where $\tilde{y} = y - e$. In addition, given the prior estimates of CEO's ability

$$
\tilde{y} \sim N(0, 1/H) \quad \text{where} \quad H = \frac{q\tau}{q + \tau}
$$
• Then the firms expected value prior to receiving signal is

\[ V = \int_{-\infty}^{\infty} \max\{-f, \mu'\} \sqrt{\frac{H}{2\pi}} \exp\left(-\frac{H}{2} \tilde{y}^2\right) d\tilde{y} \]

\[ = \frac{\sqrt{H}}{\tau} \phi(Y \sqrt{H}) - f \Phi(Y \sqrt{H}) \]

where \( Y = -\frac{(q+\tau)f}{q} \)

**Remark 1** Fix \( w \), then \( \partial V/\partial q > 0 \).
• CEO Choice of Effort

Note that CEO is fired if

$$\tilde{y} < Y$$

however, as BD does not observe $e$, then the condition to fire is

$$\tilde{y} < Y + \hat{e} - e$$

Then CEO solves

$$\max_e \left[ w + b\Phi(-(Y + \hat{e} - e)\sqrt{H}) - k(e) \right]$$

The F.O.C. is given

$$b\phi(-(Y + \hat{e} - e)\sqrt{H})\sqrt{H} - k'(e) = 0$$
In a pure strategy equilibrium BD correctly anticipates the CEO’s choice of effort; thus

\[ b\phi(-Y \sqrt{H})\sqrt{H} - k'(e^*) = 0 \]

**Lemma 1** If \( b \) and \( H \) are not too large, then pure strategy equilibrium exists and is unique.

**Remark 2** \( \partial e^*/\partial q > 0 \) and \( \partial \Phi(-Y \sqrt{H})/\partial q < 0 \).
• In the first stage the BD solves

\[
\max_q \left[ \frac{\sqrt{H}}{\tau} \phi(Y\sqrt{H}) - f\Phi(Y\sqrt{H}) - w \right]
\]

s.t. \( w + b\phi(-Y\sqrt{H}) - k(e^*(q)) \geq u_R \)
Model I: Implications

Proposition 1 Suppose lowest possible level of reporting quality $q > 0$ and $k(e) = e^2/2$. Then, if $bf\tau \ge 1$, the level of reporting quality that maximizes expected firm profit subject to the CEO’s participation constraint is $q = q$. 
Corollary 1  Under the assumption of Proposition 1, if the effect of externally imposed reforms is to raise the minimum permissible quality of reporting information, $q$, then these reforms will cause (i) a fall in firm profits; (ii) an increase in the CEO turnover rate and (iii) an increase in CEO compensation.
Model II: Setup

• Suppose, now, that $q > 0$ is fixed exogenously.

• Introduce an endogenous variable $p$—the probability that the BD does not observe the signal, $y$. $p$ is chosen by the CEO in the second stage along with $e$. 
The cost to the CEO is $c(p, r)$, which satisfies

**Assumption 1**  
(i) $c(0, r) = 0$ and $\partial c(0, r)/\partial p = 0$ for all $r$;  
(ii) $\partial c(1, r)/\partial p = \infty$ for all $r$;  
(iii) $c(p, r)$ is convex in $p$;  
(iv) $\partial c(p, r)/\partial r \geq 0$ and $\partial^2 c(p, r)/\partial r^2 > 0$ for all $r$. 
Model II: Solution and Implications
Numerical solution with the particular functional specifications

\[ k(e) = \frac{e^2}{2} \quad \text{and} \quad c(p, r) = -r \times (\ln(1-p) + p) \]

provides the following result:

**Proposition 2** When the CEO can take efforts to conceal the signal, then increasing the limit on penalties can, but won’t necessarily, increase welfare. Furthermore, raising the mandatory penalties can, but won’t necessarily, reduce welfare.