

Governance

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Firm Value and Corporate Governance: How the Former Determines the Latter

Benjamin E. Hermalin

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Centre for Financial Studies
Banking & Finance Conference*

29 September 2008

The Thesis of the Paper

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- Firms with more to protect have better governance

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- Firms with more to protect have better governance
- Suggests with firms with more resources will have better governance

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- But also suggests firms that have more **profitable** uses for resources will have better governance.

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 - Two firms A & B, B has greater marginal return to resources.

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 - If source of B's greater *MR* to resources also directly raises profits, then B will have greater profits than A in equilibrium.

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 - B has stronger governance than A in equilibrium.
 - If source of B's greater *MR* to resources also directly raises profits, then B will have greater profits than A in equilibrium.
 - Governance and profits positively correlated, but former does not cause latter.

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Causality in Governance Research

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- Regress a measure of firm performance
 - profits
 - firm value
 - Tobin's Q

Causality in Governance Research

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Conclusions

- Regress a measure of firm performance
 - profits
 - firm value
 - Tobin's Q
- on measure of governance
 - %-age of outside directors on board
 - strength of managerial incentives
 - score on an index of governance measures

The Standard Regression: The Data

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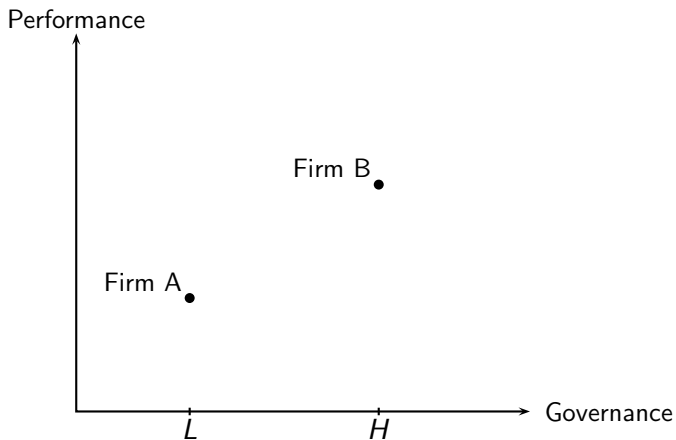
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The Standard Regression

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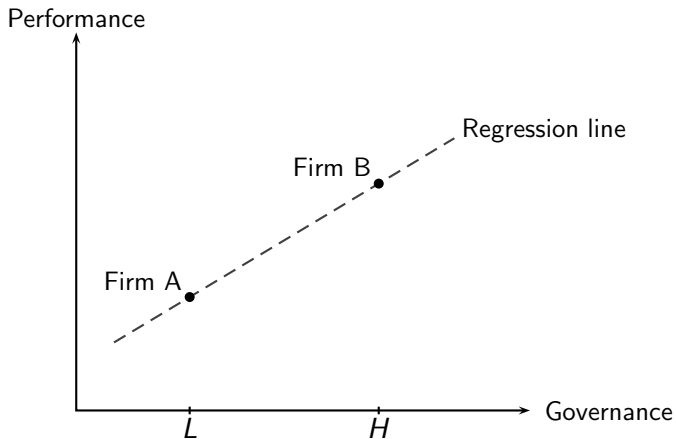
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We Don't Expect the Regression be Causal

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- Causality inconsistent with thesis sketched above.

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- Moreover, causality implies Firm A is playing suboptimally:

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- Moreover, causality implies Firm A is playing suboptimally:
 - If relation is causal than A would do better if it emulated B.

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- Moreover, causality implies Firm A is playing suboptimally:
 - If relation is causal than A would do better if it emulated B.
 - Firm A appears to be leaving money on the table.

An Equilibrium Interpretation: I

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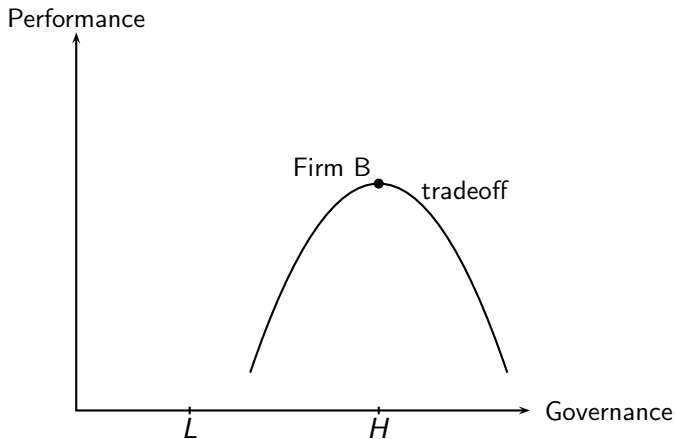
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An Equilibrium Interpretation: II

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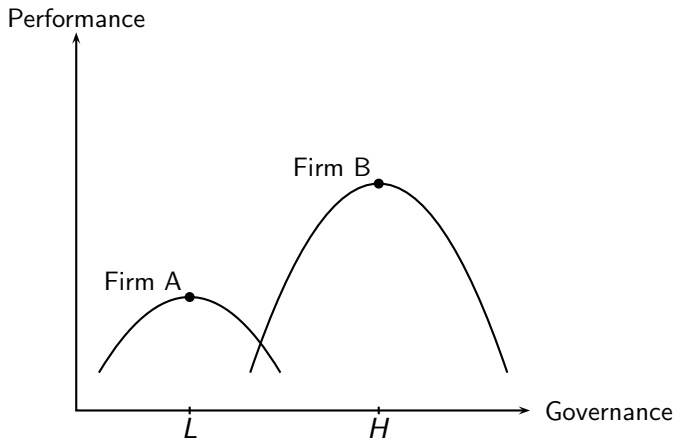
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An Equilibrium Interpretation: III

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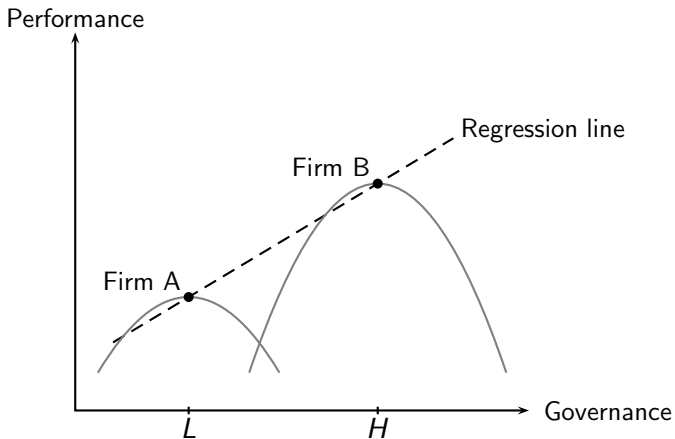
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What's Being Tested?

(and heterogeneity is not the end of the story)

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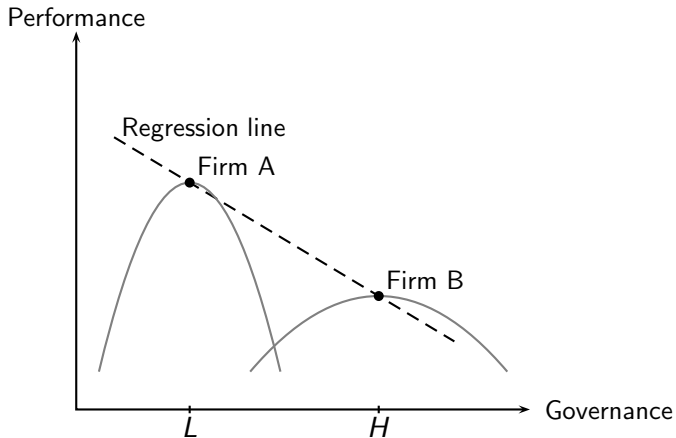
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Governance Still Matters

But Mattering has Nothing to do with Slope!

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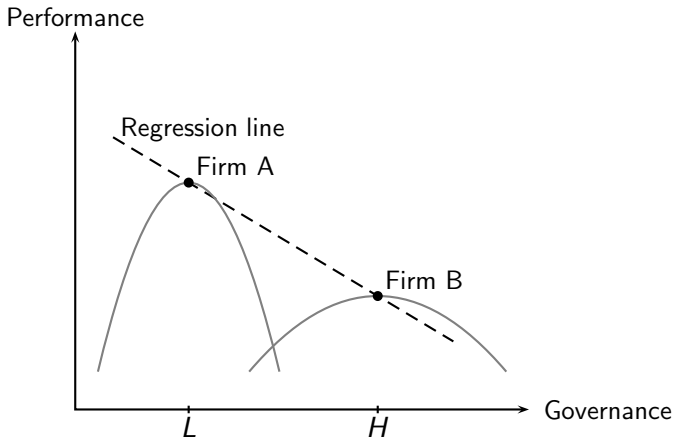
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What's Required of Theory?

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Conclusions

- It must explain why governance matters;

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Conclusions

- It must explain why governance matters;
- It must explain why there is **variation** in governance across firms; **and**

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Conclusions

- It must explain why governance matters;
- It must explain why there is **variation** in governance across firms; **and**
- It must also explain why we observe the **slopes** that we do.

But Why Do Firms Face Different Situations?

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- One answer: Firm B's potential profitability exceeds A's, so B's returns to governance are different than A's.

But Why Do Firms Face Different Situations?

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- One answer: Firm B's potential profitability exceeds A's, so B's returns to governance are different than A's.
- Nice feature of this explanation: it also explains the slope of the regression line!

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■ Notation

- Y = source of funds or pool of assets
- S = amount of funds or assets diverted by manager to his private benefit
- g = level of governance
- Manager's utility = $S + v(Y - S, g)$
 - (or, equivalently, $S - c(S, Y, g)$).
 - $v(\cdot, \cdot)$ = benefit manager derives from acting in accordance with owners' desires.

What Does Level of Governance Mean?

Interpreting g

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Possibilities:

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Possibilities:

- g = percentage of outside directors on board or key committees.

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Possibilities:

- g = percentage of outside directors on board or key committees.
- g = effectiveness of monitoring and auditing systems.

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Possibilities:

- g = percentage of outside directors on board or key committees.
- g = effectiveness of monitoring and auditing systems.
- g = strength of incentives given manager.
- g = governance index (e.g., Gompers et al., 2003).

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Possibilities:

- g = percentage of outside directors on board or key committees.
- g = effectiveness of monitoring and auditing systems.
- g = strength of incentives given manager.
- g = governance index (e.g., Gompers et al., 2003).
- g = expenditures on governance*

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Properties of $v(\cdot, g)$

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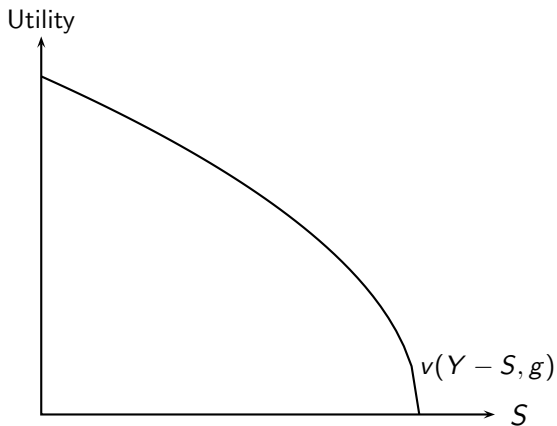
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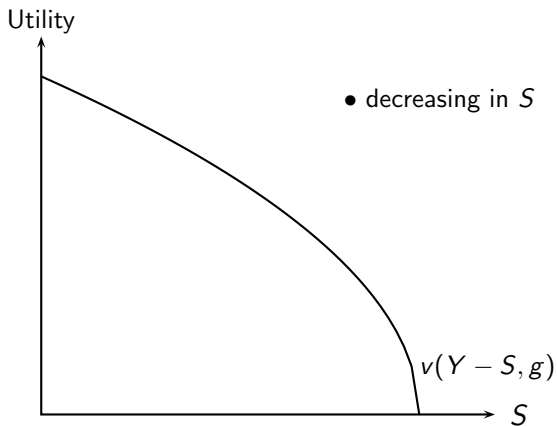
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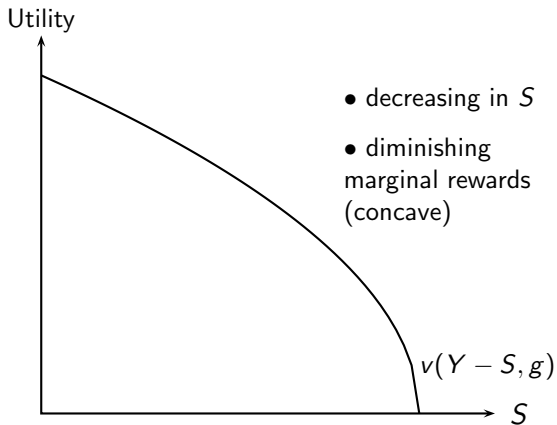
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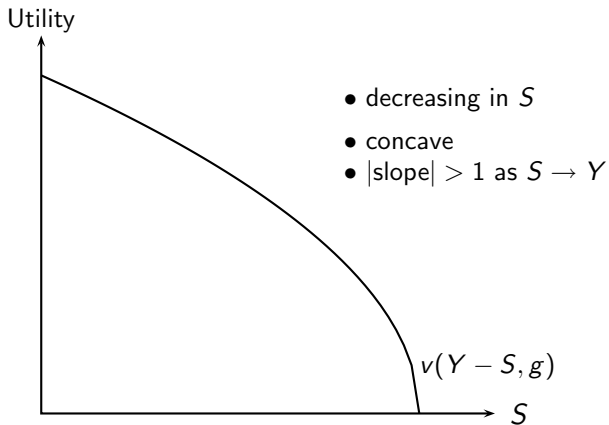
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Key Assumption: Governance Matters

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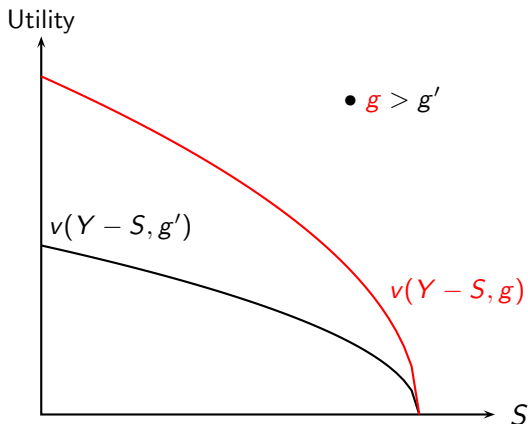
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Key Assumption: Governance Matters

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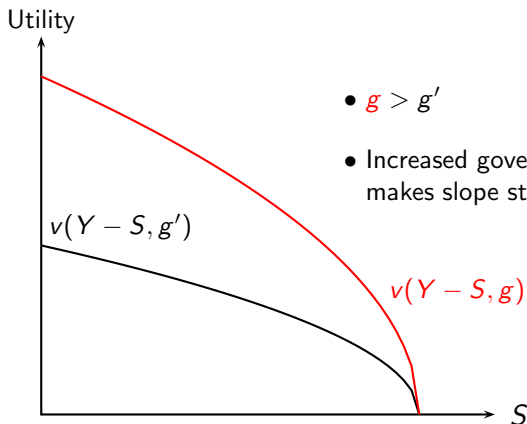
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Consequence of Greater Governance

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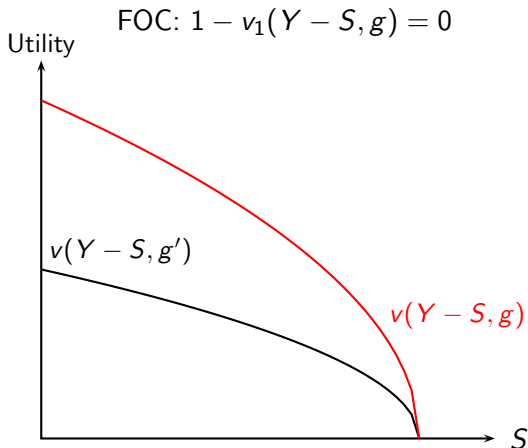
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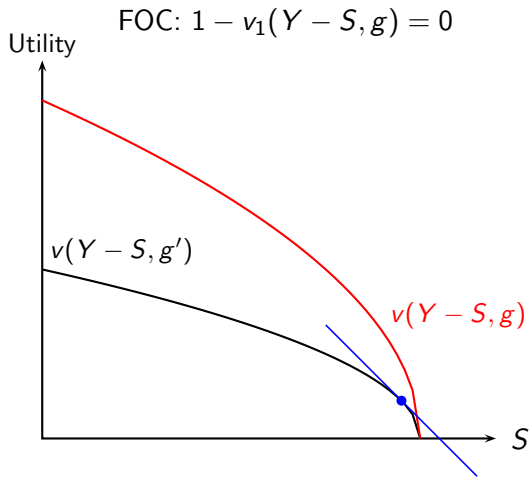
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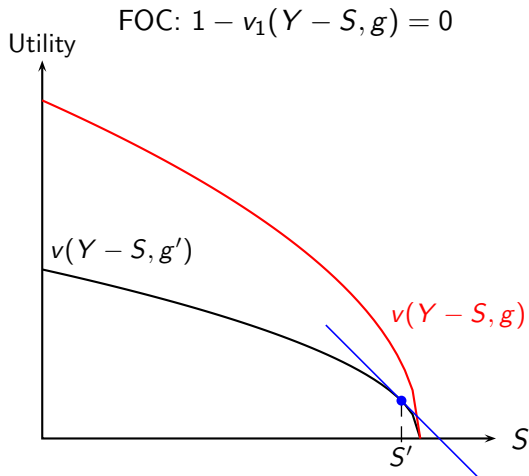
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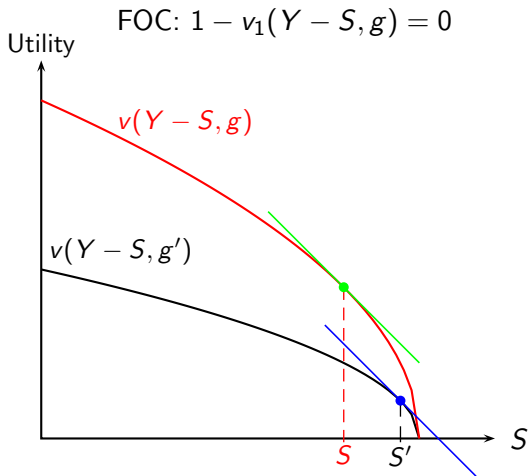
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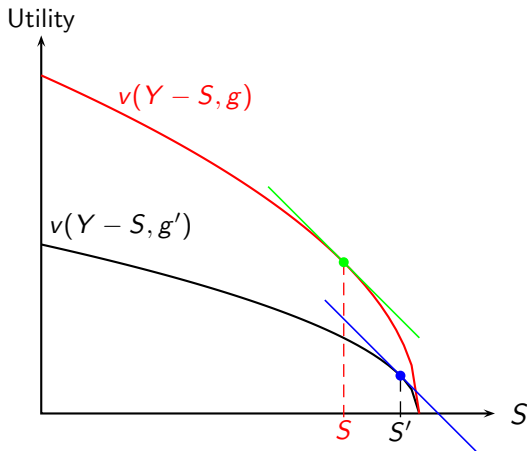
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Consequence of Greater Governance

More governance means less diversion

Increase in governance \Rightarrow amount diverted decreases



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Corner Solution of $S = 0$ Possible (i.e., no diversion)

Fix g and vary Y

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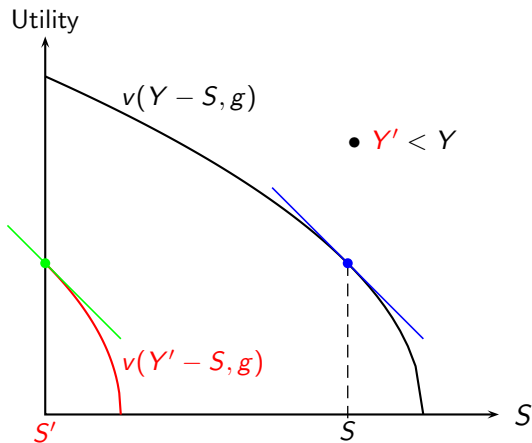
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Max Level of Resources Without Diversion, $Y(g)$

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Max Level of Resources Without Diversion, $Y(g)$

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- Define $Y(g)$ to be the *maximum* level of resources given governance g such that no diversion occurs.

Max Level of Resources Without Diversion, $Y(g)$

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- Define $Y(g)$ to be the *maximum* level of resources given governance g such that no diversion occurs.
- Observe $Y(g)$ defined by $v_1(Y(g), g) = 1$.

Max Level of Resources Without Diversion, $Y(g)$

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- Define $Y(g)$ to be the *maximum* level of resources given governance g such that no diversion occurs.
- Observe $Y(g)$ defined by $v_1(Y(g), g) = 1$.
- If $Y \geq Y(g)$, then $S = Y - Y(g)$; otherwise $S = 0$.

Max Level of Resources Without Diversion, $Y(g)$

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Conclusions

- Define $Y(g)$ to be the *maximum* level of resources given governance g such that no diversion occurs.
- Observe $Y(g)$ defined by $v_1(Y(g), g) = 1$.
- If $Y \geq Y(g)$, then $S = Y - Y(g)$; otherwise $S = 0$.
- By previous analysis, $Y(g)$ is strictly increasing in g ; that is, as governance increases, there will be no diversion for a larger set of resource levels.

Lemma 1

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Formally:

Lemma

For all governance levels, $g \in \mathbb{R}_+$, there exists an amount $Y(g)$, such that, in equilibrium, the manager diverts a positive amount if and only if total resources exceed $Y(g)$ (i.e., iff $Y > Y(g)$). The equilibrium amount of diversion is $S = \max\{Y - Y(g), 0\}$. Moreover, $Y(g)$ is strictly increasing and differentiable in g .

A Basic Comparative Statics Result

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Lemma

Let $f(\cdot, \cdot) : \mathbb{R}^2 \rightarrow \mathbb{R}$ be a function at least twice differentiable in its arguments. Suppose that $f_{12}(\cdot, \cdot) > 0$. Let \hat{x} maximize $f(x, z)$ and let \hat{x}' maximize $f(x, z')$, where $z > z'$. Then $\hat{x} \geq \hat{x}'$. Moreover, if \hat{x}' is an interior maximum, then $\hat{x} > \hat{x}'$.

Illustration of Lemma

\hat{x}' an interior solution

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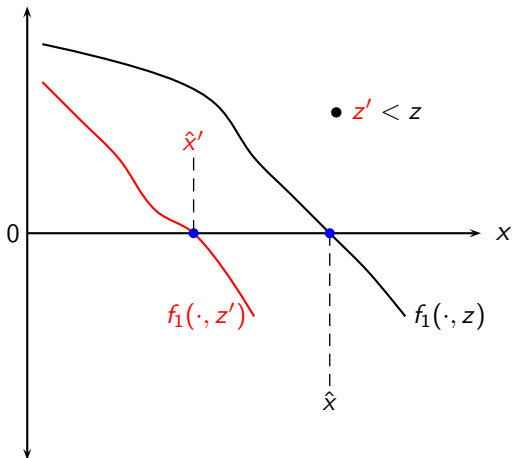


Illustration of Lemma

\hat{x}' a corner solution

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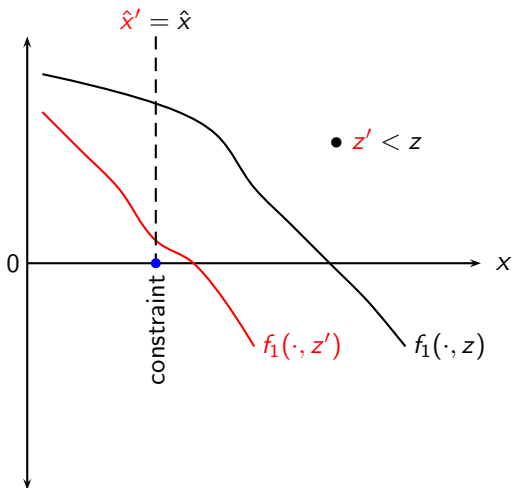
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The Preferences of the Owners

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The Preferences of the Owners

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- Payoff of owners is $B(Y - S, \tau) - C(g)$

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- Payoff of owners is $B(Y - S, \tau) - C(g)$
- $\tau \in \mathcal{T} \subset \mathbb{R}$ is an index of firm **type**.

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- $C(\cdot)$ is increasing and $C'(0) = 0$ (latter assumption eliminates certain corner solutions).

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- $C(\cdot)$ is increasing and $C'(0) = 0$ (latter assumption eliminates certain corner solutions).
- $B_1(\cdot, \tau) > 0$ — the more resources utilized, the greater the owners' benefit.

The Preferences of the Owners

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- $C(\cdot)$ is increasing and $C'(0) = 0$ (latter assumption eliminates certain corner solutions).
- $B_1(\cdot, \tau) > 0$ — the more resources utilized, the greater the owners' benefit.
- **Definition** of type:

$$B_{12}(\cdot, \cdot) > 0;$$

that is, the marginal benefit of net resources is greater for higher-index types than for lower-index types. [Help](#)

Interpretations

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Conclusions

One example satisfying the previous assumptions is $B(Y - S, \tau) = \tau\psi(Y - S)$, where $\psi'(\cdot) > 0$. For instance,

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One example satisfying the previous assumptions is $B(Y - S, \tau) = \tau\psi(Y - S)$, where $\psi'(\cdot) > 0$. For instance,

- $\psi(Y - S)$ is expected output and τ is the average price margin.

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- One example satisfying the previous assumptions is $B(Y - S, \tau) = \tau\psi(Y - S)$, where $\psi'(\cdot) > 0$. For instance,
- $\psi(Y - S)$ is expected output and τ is the average price margin.
 - $\psi(Y - S)$ is probability of successful R&D and τ profit from resulting innovation.

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- One example satisfying the previous assumptions is $B(Y - S, \tau) = \tau\psi(Y - S)$, where $\psi'(\cdot) > 0$. For instance,
- $\psi(Y - S)$ is expected output and τ is the average price margin.
 - $\psi(Y - S)$ is probability of successful R&D and τ profit from resulting innovation.
 - $\psi(Y - S)$ is realized cash flow and τ is proportion realized by owners.

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One example satisfying the previous assumptions is $B(Y - S, \tau) = \tau\psi(Y - S)$, where $\psi'(\cdot) > 0$. For instance,

- $\psi(Y - S)$ is expected output and τ is the average price margin.
- $\psi(Y - S)$ is probability of successful R&D and τ profit from resulting innovation.
- $\psi(Y - S)$ is realized cash flow and τ is proportion realized by owners. **Alternatively, τ is proportion realized by owners with ability to affect governance** (e.g., large institutional shareholders).

Timing

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Conclusions

- 1 Owners choose g — level of governance
- 2 Manager chooses S — amount to divert — in response.

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The Owners' Problem

- Treat Y as exogenous for the time being.

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Conclusions

- Treat Y as exogenous for the time being.
- Net resources will be $Y(g)$ if $Y(g) < Y$ or Y if $Y(g) \geq Y$.

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- Greater g , the more the owners' cost (recall $C'(g) > 0$).

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- Hence, owners will **never** choose g such that $Y(g) > Y$.

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- Define \bar{g} as solution to $Y(g) = Y$.

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- Define \bar{g} as solution to $Y(g) = Y$.
- Let $G(\cdot) = Y^{-1}(\cdot)$, then $\bar{g} = G(Y)$.

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Conclusions

- Treat Y as exogenous for the time being.
- Net resources will be $Y(g)$ if $Y(g) < Y$ or Y if $Y(g) \geq Y$.
- Greater g , the more the owners' cost (recall $C'(g) > 0$).
- Hence, owners will **never** choose g such that $Y(g) > Y$.
- Define \bar{g} as solution to $Y(g) = Y$.
- Let $G(\cdot) = Y^{-1}(\cdot)$, then $\bar{g} = G(Y)$.
- Owners' problem is, therefore,

$$\max_{g \in [0, \bar{g}]} B(Y(g), \tau) - C(g).$$

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Conclusions

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- Define \bar{g} as solution to $Y(g) = Y$.
- Let $G(\cdot) = Y^{-1}(\cdot)$, then $\bar{g} = G(Y)$.
- Owners' problem is, therefore,

$$\max_{g \in [0, \bar{g}]} B(Y(g), \tau) - C(g).$$

- Observe, a solution must exist. Let $g(\tau)$ be solution adopted by a type- τ firm.

Variance in Governance

Proposition 1

Proposition

Higher-type firms adopt at least as great a level of governance as lower-type firms (i.e., if $\tau > \tau'$, then $g(\tau) \geq g(\tau')$).

Moreover, if a lower-type firm has not adopted the maximum level of governance (i.e., $g(\tau') < \bar{g}$), then a higher-type firm will have a strictly greater level of governance (i.e., $g(\tau) > g(\tau')$).

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Variance in Governance

Proposition 1

Proposition

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Moreover, if a lower-type firm has not adopted the maximum level of governance (i.e., $g(\tau') < \bar{g}$), then a higher-type firm will have a strictly greater level of governance (i.e., $g(\tau) > g(\tau')$).

Proof: Given “Basic Comparative Statics Result,” proposition follows if

$$\frac{\partial^2}{\partial \tau \partial g} \left(B(Y(g), \tau) - C(g) \right) > 0.$$

That cross-partial is $\underbrace{B_{12}(Y(g), \tau)}_{> 0 \text{ def of type}} \times \underbrace{Y'(g)}_{> 0 \text{ (shown earlier)}} > 0.$ ■

Empirical Consequences

Proposition 2

Suppose $B_2(Y - S, \tau) > 0$; then

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Empirical Consequences

Proposition 2

Suppose $B_2(Y - S, \tau) > 0$; then

Proposition

Assume a common level of resources, Y . A firm that will be more profitable in equilibrium than another has at least as high a level of governance as the other firm.

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Empirical Consequences

Proposition 2

Suppose $B_2(Y - S, \tau) > 0$; then

Proposition

Assume a common level of resources, Y . A firm that will be more profitable in equilibrium than another has at least as high a level of governance as the other firm.

Proof: Equilibrium profits are

$$\pi(\tau) \equiv B\left(Y(g(\tau)), \tau\right) - C(g(\tau)). \quad (1)$$

By the envelope theorem,

$$\pi'(\tau) = B_2\left(Y(g(\tau)), \tau\right) > 0.$$

So $\tau > \tau'$ implies $\pi(\tau) > \pi(\tau')$. From Proposition 1, $\tau > \tau'$ implies $g(\tau) \geq g(\tau')$.

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Resource Levels and Governance Levels

Proposition 3

Suppose τ invariant (*i.e.*, no types). Owners would solve

$$\max_{g \in [0, G(Y)]} B(Y(g)) - C(g).$$

Recall $Y' < Y \Rightarrow G(Y') < G(Y)$; therefore

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Resource Levels and Governance Levels

Proposition 3

Suppose τ invariant (i.e., no types). Owners would solve

$$\max_{g \in [0, G(Y)]} B(Y(g)) - C(g).$$

Recall $Y' < Y \Rightarrow G(Y') < G(Y)$; therefore

Proposition

Assume all firms are the same type, but they differ as to the gross resources, Y , available to them. A firm with more resources will have at least as great a level of governance as a firm with fewer resources. It will also have at least as much profits as a firm with fewer resources. Hence, gross resources and the level of governance are non-negatively correlated and profits and the level of governance are non-negatively correlated. The correlation between profits and the level of governance will, therefore, be non-negative.

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Conclusions

- Previous analysis took amount of resources, Y , to be fixed.

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Conclusions

- Previous analysis took amount of resources, Y , to be fixed.
- Now, let resources be raised from capital market (*i.e.*, be **endogenous**).

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Conclusions

- Previous analysis took amount of resources, Y , to be fixed.
- Now, let resources be raised from capital market (*i.e.*, be **endogenous**).
- I = capital raised

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Conclusions

- Previous analysis took amount of resources, Y , to be fixed.
- Now, let resources be raised from capital market (*i.e.*, be **endogenous**).
- I = capital raised
- $Y = I - C(g)$ = resources available

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Conclusions

- Previous analysis took amount of resources, Y , to be fixed.
- Now, let resources be raised from capital market (*i.e.*, be **endogenous**).
- I = capital raised
- $Y = I - C(g)$ = resources available
- $N = I - C(g) - S$ = resources actually utilized

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Conclusions

- Previous analysis took amount of resources, Y , to be fixed.
- Now, let resources be raised from capital market (*i.e.*, be **endogenous**).
- I = capital raised
- $Y = I - C(g)$ = resources available
- $N = I - C(g) - S$ = resources actually utilized
- r = financial return; $r \sim F(\cdot|N, \tau)$. Hence,

$$B(N, \tau) \equiv \int_{-\infty}^{\infty} r dF(r|N, \tau).$$

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Conclusions

- Previous analysis took amount of resources, Y , to be fixed.
- Now, let resources be raised from capital market (*i.e.*, be **endogenous**).
- I = capital raised
- $Y = I - C(g)$ = resources available
- $N = I - C(g) - S$ = resources actually utilized
- r = financial return; $r \sim F(\cdot|N, \tau)$. Hence,

$$B(N, \tau) \equiv \int_{-\infty}^{\infty} r dF(r|N, \tau).$$

- Maintain previous assumptions; plus assume want to invest, but don't want to invest ∞ .

Consider Self-Financing Owners

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- Every dollar provided over $Y(g) + C(g)$ will be diverted by the manager.

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Conclusions

- Every dollar provided over $Y(g) + C(g)$ will be diverted by the manager.
- So owners never provide funding in excess of $Y(g) + C(g)$.

Consider Self-Financing Owners

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Conclusions

- Every dollar provided over $Y(g) + C(g)$ will be diverted by the manager.
- So owners never provide funding in excess of $Y(g) + C(g)$.
- Owners problem is, thus,

$$\max_Y \int_{-\infty}^{\infty} r dF(r|Y, \tau) - C(G(Y)) - Y,$$

where, recall, $G(\cdot)$ is inverse function of $Y(\cdot)$.

Proposition: Governance with Endogenous Investment

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Proposition

There will be a strictly positive correlation between the amount the owners invest in a firm and its level of governance. Furthermore, if expected return is increasing in firm type (i.e., $B_2(N, \tau) > 0$), then there will be a strictly positive, but non-causal, correlation between firm profit and level of governance.

Proof

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Proof: Let $y^*(\tau)$ denote solution to owners' problem. Note $0 < y^*(\tau) < \infty$ for all τ ; *i.e.*, an interior solution. The first part of proposition follows from comparative-statics lemma because the cross-partial derivative of

$$B(Y, \tau) - C(G(Y)) - Y$$

with respect to Y and τ is positive everywhere.

The “furthermore” part follows from the envelope theorem, which establishes that equilibrium profits are increasing in type, and from the first part of the proposition, which established that investment is increasing in type. ■

What if Owners Can't Self Fund?

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What if Owners Can't Self Fund?

- Let I be amount owners **self** fund

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- Let I be amount owners **self** fund
- Raise $Y + C(G(Y)) - I$

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Conclusions

- Let I be amount owners **self** fund
- Raise $Y + C(G(Y)) - I$
- Contract requires owners to give new investors $Z(r)$.

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Conclusions

- Let I be amount owners **self** fund
- Raise $Y + C(G(Y)) - I$
- Contract requires owners to give new investors $Z(r)$.
- Owners' problem is

$$\max_{\{Y, I, Z(\cdot)\}} \int_{-\infty}^{\infty} (r - Z(r)) dF(r|Y, \tau) - I \quad (2)$$

subject to

$$\int_{-\infty}^{\infty} Z(r) dF(r|Y, \tau) = Y + C(G(Y)) - I, \quad (3)$$

where (3) is the condition for investors to be willing to provide the required capital.

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Conclusions

Use (3) to substitute out I in (2), which yields unconstrained problem:

$$\max_Y \int_{-\infty}^{\infty} r dF(r|Y, \tau) - C(G(Y)) - Y,$$

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Conclusions

Use (3) to substitute out I in (2), which yields unconstrained problem:

$$\max_Y \int_{-\infty}^{\infty} r dF(r|Y, \tau) - C(G(Y)) - Y,$$

Proposition

If a firm's owners are not obligated to fund the level of governance before raising capital from the market, then the level of governance will be the same as if the owners could self finance. Moreover, there is not necessarily any correlation between the firm's capital structure and its level of governance.

Managerial Compensation

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Tweak the model a bit:

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Tweak the model a bit:

- Manager paid $w + g$ if successful (passes audit, positive signal, etc.)

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Tweak the model a bit:

- Manager paid $w + g$ if successful (passes audit, positive signal, etc.)
- Manager paid w if unsuccessful (fails audit, negative signal, etc.)

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Conclusions

Tweak the model a bit:

- Manager paid $w + g$ if successful (passes audit, positive signal, etc.)
- Manager paid w if unsuccessful (fails audit, negative signal, etc.)
- Probability of being successful is $p(S/Y)$, where
 - $p(0) = 1$
 - $p(1) = 0$
 - $p'(\cdot) < 0$; $p'(0) = 0$; and $p'(1) = -\infty$
 - $p''(\cdot) < 0$.

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Conclusions

Tweak the model a bit:

- Manager paid $w + g$ if successful (passes audit, positive signal, etc.)
- Manager paid w if unsuccessful (fails audit, negative signal, etc.)
- Probability of being successful is $p(S/Y)$, where
 - $p(0) = 1$
 - $p(1) = 0$
 - $p'(\cdot) < 0$; $p'(0) = 0$; and $p'(1) = -\infty$
 - $p''(\cdot) < 0$.
- Manager's expected utility is $w + S + gp(S/Y)$.

Net Funds as a Function of Governance

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Conclusions

- Define $h(\cdot)$ as inverse function of $-p'(\cdot)$.
- Solving manager's optimization problem, it turns out that

$$N(g) = Y - S = Y \left(1 - h\left(\frac{Y}{g}\right) \right).$$

- Can be shown that $0 < h(Y/g) < 1$.
- Given $p''(\cdot) < 0$, can be shown that $N(\cdot)$ is increasing; that is, stronger incentives lead to less diversion.

Constraints on the Owners' Problem

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Conclusions

- Assume manager can't buy job; that is, equivalently, he enjoys limited liability. This gives limited-liability constraint (LLC): $w \geq 0$.

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- Assume manager can't buy job; that is, equivalently, he enjoys limited liability. This gives limited-liability constraint (LLC): $w \geq 0$.
- Assume manager has a participation constraint (PC):

$$w + gp \left(\frac{Y - N(g)}{Y} \right) + \underbrace{(Y - N(g))}_S \geq \underline{w}, \quad (\text{PC})$$

where \underline{w} is reservation wage (utility).

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Conclusions

- Assume manager can't buy job; that is, equivalently, he enjoys limited liability. This gives limited-liability constraint (LLC): $w \geq 0$.
- Assume manager has a participation constraint (PC):

$$w + gp \left(\frac{Y - N(g)}{Y} \right) + \underbrace{(Y - N(g))}_S \geq \underline{w}, \quad (\text{PC})$$

where \underline{w} is reservation wage (utility).

- Assume firm resources, Y , exceed reservation wage, \underline{w} .

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Conclusions

The Owners' Problem

- Owners seek to solve

$$\max_{w,g} B(N(g), \tau) - w - gp \left(\frac{Y - N(g)}{Y} \right) \quad (4)$$

subject to (LLC) and (PC)

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The Owners' Problem

- Owners seek to solve

$$\max_{w,g} B(N(g), \tau) - w - gp \left(\frac{Y - N(g)}{Y} \right) \quad (4)$$

subject to (LLC) and (PC)

- Lemma 3: (PC) is slack and (LLC) binds.

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The Owners' Problem

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subject to (LLC) and (PC)

- Lemma 3: (PC) is slack and (LLC) binds.
- Intuition: one constraint, at least must bind, given $w = -\infty$ if unconstrained; can be shown that equilibrium expected bonus (*i.e.*, $gp((Y - N(g))/Y)$) is sufficiently large given $Y > \underline{w}$ that (PC) is slack.

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The Owners' Problem

- Owners seek to solve

$$\max_{w,g} B(N(g), \tau) - w - gp \left(\frac{Y - N(g)}{Y} \right) \quad (4)$$

subject to (LLC) and (PC)

- Lemma 3: (PC) is slack and (LLC) binds.
- Intuition: one constraint, at least must bind, given $w = -\infty$ if unconstrained; can be shown that equilibrium expected bonus (*i.e.*, $gp((Y - N(g))/Y)$) is sufficiently large given $Y > \underline{w}$ that (PC) is slack.
- So (4) becomes

$$\max_g B(N(g), \tau) - gp \left(\frac{Y - N(g)}{Y} \right) .$$

Correlations between Profitability and Compensation

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Proposition

Assume, regardless of type, the owners' marginal benefit of net resources (N) at zero net resources exceeds zero (i.e., $B_1(0, \tau) > 0$ for all τ). Assume resources (Y) exceed the market wage (\underline{w}) and the manager is protected by limited liability (i.e., $w \geq 0$). Then

- 1** *a higher-type firm pays its manager more in expectation than does a lower-type firm; and*
- 2** *if benefits are directly increasing in type (i.e., $B_2(N, \tau) > 0$), then firm profits and managerial compensation will be positively correlated.*

Proof

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Conclusions

Define $\pi(g, \tau) = B(N(g), \tau) - gp \left(\frac{Y - N(g)}{Y} \right)$.

Observe $\frac{\partial^2 \pi(g, \tau)}{\partial \tau \partial g} = B_{12}(N(g), \tau) N'(g) > 0$.

By familiar comparative statics result, g increasing in τ .

Expected compensation = $gp \left(\frac{Y - N(g)}{Y} \right)$.

This is increasing in g , hence part (1). By envelope theorem,

$$\frac{d\pi(g, \tau)}{d\tau} = B_2(N(g), \tau) > 0;$$

so, higher-type firms earn greater profits (on average) than lower-type firms. Given part (1), part (2) then follows.

Two Empirical Implications

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Conclusions

- 1 If profits a proxy for size, then last proposition offers another explanation for familiar empirical result that executive compensation increasing in firm size.

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Conclusions

- 1 If profits a proxy for size, then last proposition offers another explanation for familiar empirical result that executive compensation increasing in firm size.
- 2 If run cross-sectional regression

$$\text{Pay}_i = \delta_0 + \delta_1 \text{Profit}_i + \eta_i, \quad (\text{P on P})$$

then last proposition $\Rightarrow \delta_1 > 0$.

Firm Size and Executive Compensation

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Conclusions

- Well-documented positive correlation between firm-size and level of executive compensation.

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Conclusions

- Well-documented positive correlation between firm-size and level of executive compensation.
- Profits (or “multiple” such as firm value) often used as measure of size.

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Conclusions

- Well-documented positive correlation between firm-size and level of executive compensation.
- Profits (or “multiple” such as firm value) often used as measure of size.
- This joins other explanations such as talent-matching (Terviö and Gabaix & Landier) and talent-hierarchy (Calvo & Wellisz).

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- Well-documented positive correlation between firm-size and level of executive compensation.
- Profits (or “multiple” such as firm value) often used as measure of size.
- This joins other explanations such as talent-matching (Terviö and Gabaix & Landier) and talent-hierarchy (Calvo & Wellisz).
- Note this is a “talent-less” explanation

Problems with the Standard Pay-on-Performance Regression

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- Strength of incentives is g not δ_1

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- Strength of incentives is g not δ_1
- In fact, simple algebra shows that for a type- τ firm its δ_1 is $g(\tau)/\tau$.

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- Note $\delta_1 \neq g$ and note δ_1 is **not a constant** across firms as a cross-sectional regression such as (P on P) implicitly assumes.

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- Note $\delta_1 \neq g$ and note δ_1 is **not a constant** across firms as a cross-sectional regression such as (P on P) implicitly assumes.
- Even if you estimated firm-specific δ_1 s, they are misleading; for this model $\delta_1'(\tau) < 0$ while $g'(\tau) > 0$. **In other words, δ_1 s could give misleading impression of which firms give strong incentives and which don't.**

Problems **Not** Artifact of a 2-Outcome Model

Consider a Continuous-Outcome Model

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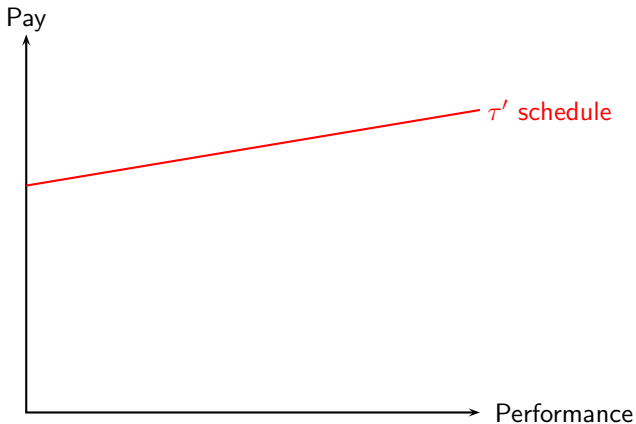
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Problems **Not** Artifact of a 2-Outcome Model

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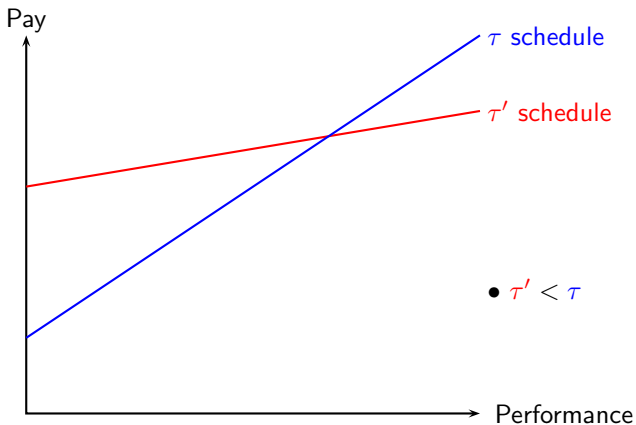
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What's the Data Look Like?

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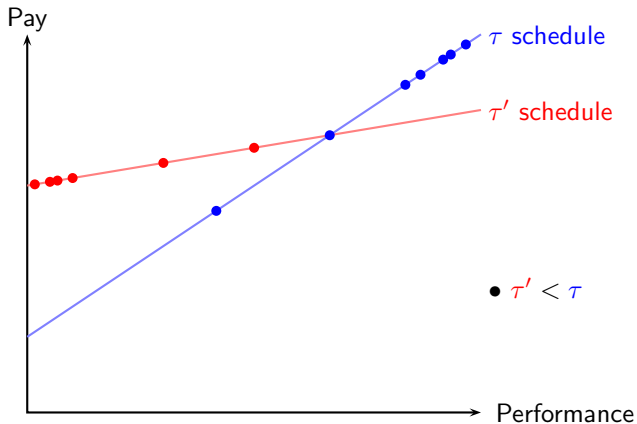
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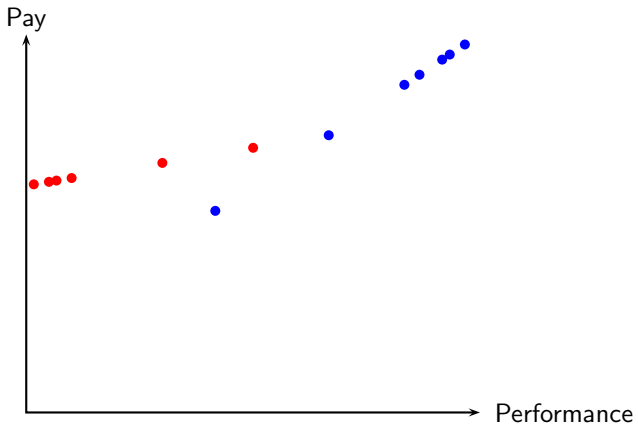
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How Good Is the Regression?

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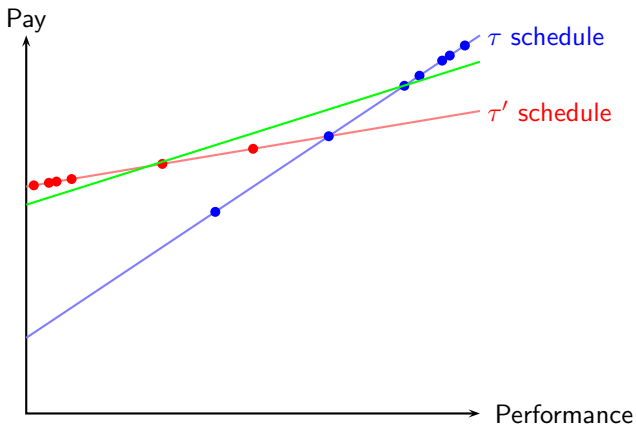
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An Even Worse Scenario

Consider a Continuous-Outcome Model

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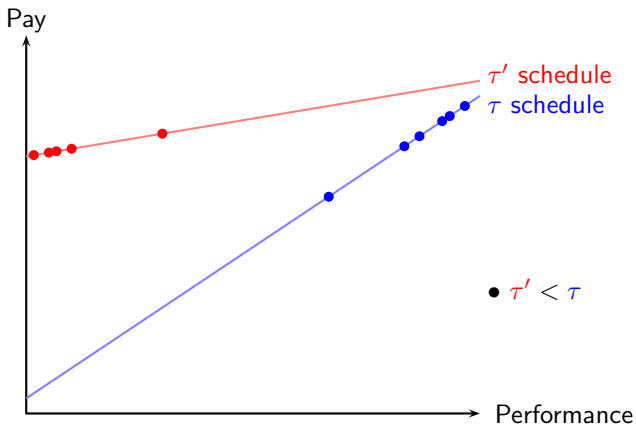
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An Even Worse Scenario

High τ still has greater *expected* compensation than low τ

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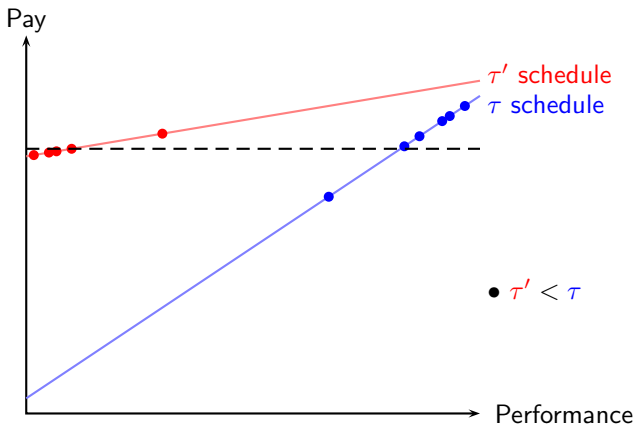
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An Even Worse Scenario

Regression is Biased Downward

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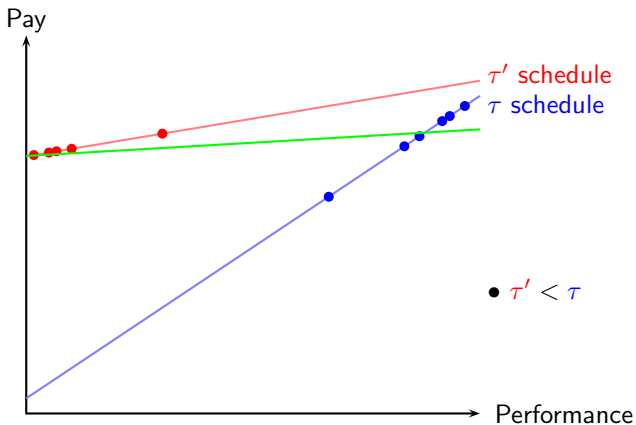
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Lessons about Pay-on-Performance Regression

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- Treating δ_1 as constant across firms is a bad idea.

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- Treating δ_1 as constant across firms is a bad idea.
- In any case, even true firm-specific δ_1 s could be a misleading measure of differences in incentive strength across firms.

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- Estimated δ_1 from a cross-sectional regression will be biased downward for at least some firms.

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- Estimated δ_1 from a cross-sectional regression will be biased downward for at least some firms.
- Estimated δ_1 from a cross-sectional regression could be biased downward for **all** firms.
- Last point raises doubts about conclusions, based on empirical estimates, that executives don't have strong enough incentives.

Trends in Corporate Governance

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- By most indicators, corporate governance has gotten stronger in past 25+ years.

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- By most indicators, corporate governance has gotten stronger in past 25+ years.
- One could argue that τ has increased in this period
 - Firms have become more (6 \times) valuable from 1980 to 2003.
 - 3-fold increase in patents from 1973 to 2003.
 - Impressive technology growth
 - Institutional investors have become bigger (20% in 1970 to 45% in 1994).

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- By most indicators, corporate governance has gotten stronger in past 25+ years.
- One could argue that τ has increased in this period
 - Firms have become more (6 \times) valuable from 1980 to 2003.
 - 3-fold increase in patents from 1973 to 2003.
 - Impressive technology growth
 - Institutional investors have become bigger (20% in 1970 to 45% in 1994).
- Not just because people complained about governance in 1980s & 90s — people have been complaining about governance since at least 1776 (also, recall, Berle & Means in 1932).

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- Firms have better governance when there is a reason for them to have better governance; that reason is arguably profit potential, which explains much of the empirical correlation.

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- Firms have better governance when there is a reason for them to have better governance; that reason is arguably profit potential, which explains much of the empirical correlation.
- The naïve causal explanation from empirical work suffers from the “leaving-money-on-the-table” critique.

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- Firms have better governance when there is a reason for them to have better governance; that reason is arguably profit potential, which explains much of the empirical correlation.
- The naïve causal explanation from empirical work suffers from the “leaving-money-on-the-table” critique.
- More importantly, such regressions cannot tell us governance matters.

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- Firms have better governance when there is a reason for them to have better governance; that reason is arguably profit potential, which explains much of the empirical correlation.
- The naïve causal explanation from empirical work suffers from the “leaving-money-on-the-table” critique.
- More importantly, such regressions cannot tell us governance matters.
- A good theory must explain (i) why governance matters; (ii) why it varies across firms; and (iii) why we see the slopes in the data that we do.

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- Firms have better governance when there is a reason for them to have better governance; that reason is arguably profit potential, which explains much of the empirical correlation.
- The naïve causal explanation from empirical work suffers from the “leaving-money-on-the-table” critique.
- More importantly, such regressions cannot tell us governance matters.
- A good theory must explain (i) why governance matters; (ii) why it varies across firms; and (iii) why we see the slopes in the data that we do.
- The standard cross-sectional pay-on-performance regression is very misleading.

Anticipated Questions

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- Multi-dimensional governance?
- Type affects cost of governance?
- All dimensions of governance increase?

Multi-Dimensional Governance

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Extend all assumptions in logical fashion to a vector of governance, \mathbf{g} .

Proposition

Higher-type firms spend at least as much on governance as do lower-type firms (i.e., if $\tau > \tau'$, then $C(\mathbf{g}(\tau)) \geq C(\mathbf{g}(\tau'))$). Moreover, if a lower-type firm has not blocked all resource diversion (i.e., $Y(\mathbf{g}(\tau')) < Y$), then the higher-type firm spends strictly more (i.e., $C(\mathbf{g}(\tau)) > C(\mathbf{g}(\tau'))$).

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Type Affects Cost of Governance

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Conclusions

Write the owners' payoff as $B(Y - S) - C(g, \theta)$, where θ denotes firm type in this alternative specification. As a definition of type, assume

$$C_{12}(\cdot, \cdot) < 0;$$

that is, higher-type firms have lower marginal costs of governance.

Can be shown (see §5.2 of paper), the model operates the same whether it is assumed that heterogeneity stems from different profit potentials or it is assumed that heterogeneity stems from different marginal costs of governance across firms. [← Back](#)

Comparative Statics When Governance a Vector

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Conclusions

Does $\tau > \tau'$ imply $\mathbf{g}(\tau) \geq \mathbf{g}(\tau')$?

Cannot be true generally: suppose $n = 2$,
 $v(Y - S, \mathbf{g}) = v(Y - S, \max\{g_1, g_2\})$, and

$$C(\mathbf{g}) = g_1 + \frac{1}{2}g_2 + \frac{3}{2} \left(g_2 - \min \left\{ g_2, \frac{2}{3} \right\} \right),$$

then the optimal \mathbf{g} to achieve effective governance level $g = \max\{g_1, g_2\}$ is $(0, g)$ for $g \leq 1$ and $(g, 0)$ for $g > 1$. Hence, if $g(\tau') < 1 < g(\tau)$, then $\mathbf{g}(\tau')$ and $\mathbf{g}(\tau)$ cannot be compared.

