Three *Biased* Lectures on Economic Models of Internal Organization: Pricing, Politics, and Path-Dependence

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Schedule

Nov. 7: Lectures 0 (Intro to OE) & 1 (Pricing)
Nov. 14: Lecture 2 (Politics)
Nov. 21: Lecture 3 (Path-Dependence)
1. What Is an Organization?

“Organizations are a means of achieving the benefits of collective action in situations where the price system fails.” (Arrow, 1974: 33)

- firms, consortia, unions, legislatures, agencies, schools, churches, social movements, …

“All of them … [share] the need for collective action and the allocation of resources through nonmarket methods.” (Arrow, 1974: 26)

- dictator, planner, committee, coalition, …

2. Our Organizational Economy

Suppose that “a mythical visitor from Mars … approaches the Earth from space, equipped with a telescope that reveals social structures…

Our visitor … might be surprised to hear the structure called a market economy. ‘Wouldn’t ‘organizational economy’ be the more appropriate term?’ it might ask.” (Simon 1991: 27-28)
3. OE’s Footprint?

Decision-Making:
- Power & Politics
- Culture & Leadership

Employment:
- Pay for performance
- Skill development
- HR practices

Structures & Processes:
- Hierarchy
- Alternative forms
- Resource allocation
- Transfer pricing

Beyond Firms:
- Order without law
- Agencies; States

Within Firms:

Vertical Integration:
- Vertical integration; Supply chains

Horizontal Integration:
- Conglomerates; Corporate strategy

Contracts:
- Formal; Relational

Hybrids:
- Alliance; Network; Joint Venture

OE and (Some) Fields in Economics

OE and (Some) Management Fields

- Finance: corporate (vs. asset pricing)
- Accounting: cost (vs. financial)
- Strategy: corporate (vs. BU)
- HRM: internal “markets” (vs. external)
- Marketing: channels (vs. pricing)
- Operations: supply chain (vs. “inventory”)
- Int’l Mgmt: FDI, MNE (vs. exch. rates)
OE and (Some) Social Sciences

4. The Origins of OE

- Smith (1776)
- Walker (1887)
- Knight (1921)
- Berle & Means (1932)
- Coase (1937)
- Barnard (1938)
- Simon (1947)
- Penrose (1959)
- Chandler (1962)
- Cyert & March (1963)
- Williamson (1971)
- Alchian & Demsetz (1972)
- Hurwicz (1972)
- Marschak & Radner (1972)
- Richardson (1972)
- Arrow (1974)
- Mirrlees (1975)
- Jensen & Meckling (1976)

OE’s Wellsprings?

Vertical Integration:
- Vertical integration;
  Supply chains

Horizontal Integration:
- Conglomerates;
  Corporate strategy

Contracts:
- Formal; Relational

Hybrids:
- Alliance; Network;
  Joint Venture

If markets are so good, why are there firms?

Coase ’37

Williamson 71, 73, 75, 79
KCA 78
GHM 86, 90
...
Within Firms Between Firms OE’s Wellsprings?

Vertical Integration: Vertical integration; Supply chains
Horizontal Integration: Conglomerates; Corporate strategy
Contracts: Formal; Relational
Hybrids: Alliance; Network; Joint Venture

Decision-Making: Power & Politics; Culture & Leadership
Employment: Pay for performance; Skill development; HR practices
Structures & Processes: Hierarchy; Alternative forms; Resource allocation; Transfer pricing

Cyert and March (1963) at Fifty: A Perspective from OE

Why do organizations seem less rational than members?

March 62, 66 CM 1963

Decision-Making: Power & Politics; Culture & Leadership
Employment: Pay for performance; Skill development; HR practices
Structures & Processes: Hierarchy; Alternative forms; Resource allocation; Transfer pricing

Holmstrom (84), Milgrom-Roberts (88), Tirole (86), ...

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April 12, 2013

5. Progress on Internal Orgzn.

- Weberian bureaucracy (1924)
  - "precision, speed, expert control, continuity, discretion, and optimal returns on input"

- Post-Weberian Orgz' 1 Sociology (1950s)
  - "rules are often violated, decisions are often unimplemented, … and evaluation and inspection systems are subverted"

- Team Theory (Marschak & Radner, 1972)
  - rules for investigating, communicating, and deciding: Weber meets statistical decision theory

- Recent convergence
  - OE models of "organization as a decision-making process” (CM 63) → post-Weberian spirit: inefficient, informal, and institutionalized organizational “behaviors”

Gibbons Ind. Corp. Chng. 2003

- Early views:
  
  the “internal problems of the corporation, the protection of its various types of members and adherents against each other’s predatory propensities, are quite as vital as the external problem of safeguarding the public interests against exploitation by the corporation as a unit” (Knight, 1921 (1964): 254)

  “Where different parts of the organization have responsibility for different pieces of information relevant to a decision, we would expect … some attempts to manipulate information as a device for manipulating the decision. … [But] we cannot reasonably introduce the concept of communication bias without introducing its obvious corollary – 'interpretive adjustment.’” (Cyert-March 1963: 79, 85)

- Recent work:
  
  Milgrom-Roberts 88, Holmstrom-Tirole 91, Aghion-Tirole 97, …, Alonso-Dessein-Matouschek 08, Rantakari 08, …

- Summary:

  “It is possible, on considering these phenomena, to conclude that organizations are systematically stupid. … [Alternatively], it is possible to try to discover why reasonably successful and reasonably adaptive organizations might exhibit the kinds of … behaviors that have been reported. Perhaps the stories of … perversity tell us less about the weaknesses of organizations and more about the limitations of our ideas about [them].”

Gibbons JEBO 2005

Coase Meets Heckman (or Roy)

If contracts were perfect, why would we need bosses?
Firms not immune to problems that wreck markets.
6. Progress on Firms’ Boundaries

- Vertical integration
  - Make or buy

- Horizontal integration
  - Corporate strategy

- Contracts
  - Formal & relational

- Hybrids
  - Alliances, networks, JVs, …

Control (via Ownership or Contract)

![Diagram showing control rights across firm boundaries]

GH 86: Moving Control Rights Across Fixed Firm Boundaries?
7. **Partial Summary**

A. Organize the hard problems  
B. Formal is flawed  
C. Relational is required  
D. Formal and relational interact  
E. Institutional design

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**B. Formal Is Flawed**  
*(in hard problems)*

**Free-Lunch Challenge (I):**

Find an *employee* with *fabulous* incentives *created solely by a formula*.

- Employee vs. outsourcing  
- Fabulous vs. acceptable  
- Created vs. intrinsic (or owner)  
- Solely vs. partially  
- Formula vs. discretion
C. Relational Is Required
(to perform well in hard problems)

- “Relational contract” = shared understanding of parties’ roles in and rewards from collaboration (so rooted in parties’ relationship that cannot be enforced by court)
- = self-enforcing agreement / repeated-game equilibrium
- Firms are riddled with relational contracts:
  - Barnard 38, Simon 47, Selznick 49, Gouldner 54, Blau 55
  - Lawler 71, Dalton 59, Bower 70, Eccles 85
- So are business dealings:
  - Macaulay 63, Macneil 78, Dore 83
  - Kogut 89, Powell 90, Gerlach 91, Dyer 96, Gulati-Singh 98

D. Formal and informal interact

- It is impossible to understand the nature of a formal organization without investigating the networks of informal relations and the unofficial norms as well as the formal hierarchy of authority and the official body of rules, since the formally instituted and the informal emerging patterns are inextricably intertwined. (Blau and Scott, 1962: 6)
- [A]lthough Macaulay and others are correct in noting that many business relationships are self-enforced, transactors are not indifferent regarding the contract terms they choose to govern their self-enforcing relationships. (Klein, 2000: 68)

E. Institutional Design

“Bricks and ivy” choose formal to facilitate relational
Lecture 1: Pricing

1.1 Formal Incentive Contracts
   • Feltham & Xie *Acctng. Rev.* 94

1.2 Relational Incentive Contracts
   • Bull *QJE* 87, Levin *AER* 03

1.3 Formal and Relational Incentive Contracts
   • Baker, Gibbons, & Murphy *QJE* 94

1.4 Boundary of the Firm as an Incentive Instrument
   • Baker, Gibbons, & Murphy *QJE* 02

If markets get the prices wrong, then an economist’s job may be to fix the pricing, such as through an incentive contract.

Lecture 1.1: Formal Incentive Contracts

I. Agency Theory

II. Agency Problems

III. Multi-Task Models

I. Agency Theory

• output: \( y = a + \varepsilon \)

• utility: \( U(w-c(a)) \) \( U'' < 0 \)

• profit: \( y - w \)

• contracts: \( w(y) \) \( w(y, z) \)

• Mirrlees 75 (*RES* 99), Holmstrom *BJE* 79, Grossman-Hart *Ecta.* 83, …

• more agents: Lazear-Rosen *JPE* 81, Holmstrom *BJE* 82

II. Agency Problems

• Berle and Means 32

• Kerr *AMJ* 75

• Jensen and Meckling *JFE* 76

• Rent Seeking

• Politics
### III. Multi-Task Models

When does paying for $p$ increase $y$?
- $y = a_1 + \varepsilon$  
  $p = a_1 + \varphi$
- $y = a_1 + a_2$  
  $p = a_1$
- $y = a_1$  
  $p = a_1 + a_2$
- $y = a_1 + \varepsilon$  
  $p = a_2 + \varepsilon$

What makes a good performance measure?
- $y = f_1 a_1 + f_2 a_2 + \varepsilon$  
  $p = g_1 a_1 + g_2 a_2 + \varphi$

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### Elemental Cos($\theta$) Model

- $y = f_1 a_1 + f_2 a_2$  
  non-contractible
- $p = H$ or $L$  
  contractible
- $\text{Prob}(p=H) = g_1 a_1 + g_2 a_2$
- $\pi = y - w$  
  $w = s + b I_{(p=H)}$
- $U = w - c(a_1, a_2)$  
  $c = (1/2)(a_1^2 + a_2^2)$
- $\max_{a_1, a_2} E(w) - c(a_1, a_2) \Rightarrow a_1^*(b), a_2^*(b)$
- $\max_{s, b} E(y - w)$  s.t. $E(w) - c(a_1, a_2) \geq U_0$

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### Solution: Scaling & Alignment

Example 1: Manipulation  
(Holmstrom *JLEO* 99)

- $y = f e$  
  non-contractible
- $p = e + m$  
  contractible
- $w = s + bp$
- $c = (1/2)(e^2 + \lambda m^2)$  
  $\lambda = $ MC of manipulation
- $\max_{e, m} E(w) - c(e, m) \Rightarrow e^*(b), m^*(b)$
- $\max_{b} E(y - c(e, m)) \Rightarrow b^* = \frac{\lambda f}{1 + \lambda}$
Example 2: Principal Principle
(Gibbons ARE 10)

- $y = a_1 + a_2$ non-contractible
- $p_i = g_i a_i + m_i$ contractible ($g_i > 0, \lambda = 1$)

- Actor $i$ chooses $a_i, m_i$ $i = 1, 2$
- Principal $j$ receives $y$, pays $w_i = s_i + b_i p_i (+ B_i p_j ?)$

$$\max_b E(a_i) - c(a_i, m_i) \Rightarrow b_i^* = g_i/(1+g_i^2)$$

$\Rightarrow$ expected total payoff increasing in $g_i$

$\Rightarrow$ actor with lower $g_i$ should be Principal

I. Relational Contracts

- (Further) response to GWYPF?
- Many rewards not (wholely) formulaic
  - Bonuses for FX traders, I-bankers, CEOs, …
  - Raises, promotions, authority, resources, …
- $w = s + B(y)$
  - $y$ “observable but not verifiable”
  - “Discretion” vs. “subjectivity”

  *Most applications NOT pay-for-performance.*

II. Bull QJE ‘87
(as translated by BGM QJE 94)

- production:
  $$y = H \text{ or } L$$
  $$\text{Prob } (y=H | a) = a$$
- payoffs:
  $$P: \pi = y - w \quad A: \quad U = w - c(a)$$
  $$c'(0) = 0, c'(1) = \infty, c'' > 0$$
  parties discount at rate $r$
- first-best:
  $$a^{FB} \text{ solves } \max_a L + a \cdot (H-L) - c(a)$$
• timing:
  1. P proposes \((s, B)\)
  2. A accepts \((\rightarrow s \text{ paid})\) or rejects \((\rightarrow U_0, \pi_0)\)
  3. A chooses action \(a \geq 0\)
  4. P & A observe \(y\)
  5. P decides whether to pay bonus

• (relational) contract:
  \(w = s\) if \(y = L\)
  \(w = s + B\) if \(y = H\)

• Q: is relational contract self-enforcing?

• first-best bonus:
  \(B_{FB} = H-L\) \(\rightarrow a^*(B) = a_{FB}\)
  \(\rightarrow V(B_{FB}) - V_0 > rB_{FB}\)?

• second-best bonus:
  \(\max_B V(B) \quad \text{s.t.} \quad V(B) - V_0 > rB\)
  \(V'(B) > 0\) for \(B < B_{FB}\)
  \(B_{SB}(r)\) is largest \(B\) solving \(V(B) - V_0 = rB\)

• non-existence:
  given \(r\), does there exist \(B\) such that \(V(B) - V_0 > rB\)?
  \(cf.\) repeated Cournot

• If rel con is self-enforcing:
  \(a^*(B)\) solves \(\max_a s + a \cdot B - c(a)\)

• IR constraints:
  \(U_0 \leq EU(s, B) = s + a^*(B) \cdot B - c[a^*(B)]\)
  \(\pi_0 \leq E\pi(s, B) = (L - s) + a^*(B) \cdot (H - L - B)\)

• IC constraint:
  \((H - s - B) + (1/r) \cdot E\pi(s, B) > (H - s - 0) + (1/r) \cdot \pi_0\)
  \(\rightarrow rB < E\pi(s, B) - \pi_0\)

• IC and IR:
  \(rB < V(B) - V_0\)
  \(= L + a^*(B) \cdot (H - L) - c[a^*(B)] - U_0 - \pi_0\)

Bull QJE 87: Principal’s IC requires \(V(B) - V_0 \geq rB\)

Comparative Statics on \(r\)

(Expected profit as function of implicit incentives, \(b\))

(3, 2) Piece Rate

(notation from BGM 94: \(V(b) = V(B) - V_0\))
III. Levin *AER* ‘03
(moral-hazard case)

- production:
  - \( F(y \mid a) \) on \([y_L, y_H]\)
  - \( a \in [0, a_H] \)

- payoffs:
  - \( P: \pi = y - w \)
  - \( A: U = w - c(a) \)

- first-best and reservation values:
  - \( a^\text{FB} \) solves \( \max_a E_y(y \mid a) - c(a) \)
  - \( E(y \mid a^\text{FB}) - c(a^\text{FB}) > u_0 + \pi_0 > E(y \mid 0) - c(0) \)

- timing:
  1. \( P \) proposes \( s_t, b_t(y_t) \) (s contractible)
  2. \( A \) accepts (\( \rightarrow \) s paid) or rejects (\( \rightarrow \) \( u_0 \) and \( \pi_0 \))
  3. If \( A \) accepts then chooses \( a_t \) at cost \( c(a_t) \)
  4. \( P \) and \( A \) observe \( y_t \) (cf. subjectivity)
  5. \( P \) decides whether to pay \( b_t \) (\( A \) decides if \( b_t < 0 \))

- a relational contract is a complete plan, summarized by \( \{s_t, b_t(y_t), a_t, u(y_t), \pi(y_t)\} \)
  - for each history, it specifies
    a) compensation offered and paid
    b) accept or reject offer
    c) action

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**Equilibrium Conditions**

\( \text{IR}_A \)
\( E\{s_t + b_t(y_t) - c(a_t) + (1/r) u(y_t) \mid a_t\} \geq u_0[1 + (1/r)] \)

\( \text{IR}_P \)
\( E\{y_t - s_t - b_t(y_t) + (1/r) \pi(y_t) \mid a_t\} \geq \pi_0[1 + (1/r)] \)

\( \text{IC}_a \)
\( a_t\) solves \( \max_a E\{s_t + b_t(y_t) - c(a) + (1/r) u(y_t) \mid a\} \)

\( \text{IC}_{b-P} \)
for all \( y_t \), \( - b_t(y_t) + (1/r) \pi(y_t) \geq (1/r) \pi_0 \)

\( \text{IC}_{b-A} \)
for all \( y_t \), \( b_t(y_t) + (1/r) u(y_t) \geq (1/r) u_0 \)

\( \text{Perf.} \)
for all \( y_t \), self-enforcing continuation \( \rightarrow u(y_t), \pi(y_t) \)

Harshest punishment can’t violate IR, and IR is static equilibrium, so trigger strategies optimal here (and in Bull and BGM 94).
• Theorem 2
If an optimal contract exists, then there are stationary contracts that are optimal.
Proof: By construction.

• Theorem 3
An action \( a^* \) that generates value \( V^* = E(y | a^*) - c(a^*) \) can be implemented with a stationary contract if and only if there is a bonus plan \( b(y) \) that (i) induces \( a^* \) and (ii) satisfies \( \sup b(y_1) - \inf b(y_1) \leq (1/r)[V^* - V_0] \)

Proof: (necessity)
\[
(1/r) \left( \pi - \pi_0 \right) \geq b(y_1) \forall y_1 \text{ must hold at sup}
\]
\[
b(y_1) \geq (1/r) [u_0 - u] \forall y_1 \text{ must hold at inf}
\]
\[
\sup b(y_1) - \inf b(y_1) \leq (1/r) [\pi + u - \pi_0 - u_0]
\]

Proof (sufficiency)
Define \( B(y) = b(y) - \inf_y b(y) \) \Rightarrow \inf_y B(y) = 0 and \( \sup_y B(y) = \sup_y b(y) - \inf_y b(y) \)

Lecture 1.3: Formal & Relational Incentive Contracts
(~ Baker, Gibbons, & Murphy QJE 94)

Model [updated to \( \cos(0) \)]
- \( \Pr(y=1) = a_1 \) non-contractible
- \( \Pr(p=H) = a_2\cos(0) + a_3\sin(0) \) contractible
- Cost of effort = \( k(a_1^2 + a_2^2)/2 \)
- Agent’s outside option = \( u \)
- Principal’s outside option = 0

First-Best
- \( a_1 = 1/k \)
- \( a_2 = 0 \)
- Total Surplus: \( V_{FB} = 1/(2k) \)

Spot Contract:
\[
W = s + b \cdot 1_{\{p=H\}}
\]
- \( U = s + b[a_1\cos(0) + a_2\sin(0)] - k(a_1^2 + a_2^2)/2 \)
- \( a_1 = (b/k)\cos(0), a_2 = (b/k)\sin(0) \)
- \( b^* = \cos(0) \)
- Total Surplus: \( V_{spot} = (1/2k)\cos^2(0) \)

Relational Contract:
\[
W = s + B \cdot 1_{\{y=1\}}
\]
- First-Best: \( B=1 \)
- \( FB \) possible if \( V_{FB} - u \geq r \)
- Second-Best: largest \( B \) such that \( V_{rel}(B) - u \geq rB \)
- \( B_{SB} \) solves \( (1/2k)(2B^2 - B^3) - u = rB \)
Formal and relational contracts

\[ W = s + b \cdot 1_{\{p=H\}} + B \cdot 1_{\{y=1\}} \]  

[interaction optimally zero]

- \( U = s + b[a_1 \cos(\theta) + a_2 \sin(\theta)] + B a_1 - k(a_1^2 + a_2^2)/2 \)
- \( a_1 = b \cdot \cos(\theta) + B \)
- \( a_2 = b \cdot \sin(\theta)/k \)
- \( b^* = (1-B) \cos(\theta) \)
- Total Surplus: \( V_{\text{both}}(B) = V_{FB} - (1/2k)(1-B)^2 \sin^2(\theta) \)

First-Best (B=1, b=0) feasible if:

\[ V_{FB} - \max\{0, V_{\text{spot}}\} \geq r \]

Second-Best: largest B such that

\[ V_{\text{both}}(b, B) - \max\{0, V_{\text{spot}}\} \geq rB \]

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**Lecture 1.4:**  
The Boundary of the Firm as an Incentive Instrument  

I. Intro to Grossman-Hart *JPE* 86  
II. Supply Chain w/ One-Sided Investment  
III. BGM *QJE* 02
I. Introduction to GH 86

- Grossman-Hart 86:
  - 4400 GS citations 9/09 (8500 11/13)
  - 29 pages, 1 Proposition!
  - Framework / world view: “incomplete contracts”

Enrichments: Hart-Moore 90, Hart 95, …

Applications:
- Aghion-Tirole 94: R&D outsourcing
- Dewatripont-Tirole 94: debt contract
- Gertner-Scharfstein-Stein 94: internal cap mks
- Hart-Shleifer-Vishney 97: scope of government
- Antras 03: international trade

Elemental Property-Rights Model

- 2 parties $i \in \{1, 2\}$
- “specific investments” $a_i \in A_i$ at cost $c_i(a_i)$
- alienable DR $d \in D$
- private benefit $\pi_i(a, d)$ [ $a = (a_1, a_2)$]
- $d_i^*(a)$ solves $\max_{d \in D} \pi_i(a, d)$
- $d^{FB}(a)$ solves $\max_{d \in D} \pi_1(a, d) + \pi_2(a, d)$

II. Supply Chain w/ One-Sided Invt.

(Aghion-Tirole 94, Holmstrom 99, BGM 02, …)

- Upstream Supplier (U) creates input for Downstream User (D)
  - Input’s value to User = Q
- “Non-integration”: Supplier owns input
  - Supplier can sell input to Alternative User (value = $R < Q$)
  - User pays Supplier bargained price = $R + \alpha(Q - R)$
- “Integration”: User owns input
  - User can prevent Supplier from selling to Alternative User
  - Reverse hold-up ($100M bonus to R&D division?!)
One-Sided Investment (cont.)

- Upstream Supplier (U) creates input for Downstream User (D)
  - Input’s value to User = Q
- “Non-integration”: Supplier owns input
  - Supplier can sell input to Alternative User (value = R < Q)
  - User pays Supplier bargained price = R + α(Q - R)
- “Integration”: User owns input
  - User can prevent Supplier from selling to Alternative User
  - Reverse hold-up ($100M bonus to R&D division??)

Spot Outsourcing

- U chooses actions
- Q, R realized
- Bargained price = (Q + R)/2
- \( \text{Max}_a E\{(Q + R)/2\} - c(a) \rightarrow a^{SO} \rightarrow S^{SO} = U^{SO} + D^{SO} \)

Spot Employment

- U chooses actions
- Q, R realized
- D takes good!
- \( a^{SE} = 0 \rightarrow S^{SE} = U^{SE} + D^{SE} \)
- \( S^{SE} > S^{SO} ? \)

Hold-up May Be Your Friend

Example 1:
- \( Q = K + a_1 + f a_2 \quad f = \text{small} > 0 \)
- \( R = a_1 \)

Example 2:
- \( Q = K + a_1 \quad (- a_2 ?) \)
- \( R = a_1 + g a_2 \quad g = \text{large} > 0 \)

Example 3:
- \( Q = K + f_1 a_1 + f_2 a_2 \)
- \( R = g_1 a_1 + g_2 a_2 \)
**BGM QJE ‘02: “Relational Contracts and the Theory of the Firm”**

- **U**
  - $a = (a_1, \ldots, a_n)$
- **A**
- **D**
  - **D’**
  - Value = $Q >$ Value = $R$

- $Q \in \{Q_1, \ldots, Q_i\}$
- $R \in \{R_1, \ldots, R_j\}$
- $f(Q_i, R_j) > 0$ only if $Q_i > R_j$
- $Q, R$ observable but not verifiable

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**Governance Models**

<table>
<thead>
<tr>
<th>Asset Ownership</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>U owns</td>
<td>D owns</td>
</tr>
<tr>
<td><strong>“Social”</strong> Structure</td>
<td></td>
</tr>
<tr>
<td>Spot SO SE</td>
<td></td>
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<tr>
<td>Relational RO RE</td>
<td></td>
</tr>
</tbody>
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**Relational Contracts**

- $(s, \{b_{ij}\})$
- Trigger strategies
- Efficient (static) asset ownership after reneging

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**Relational Contracts**

- U chooses actions
- $Q_i, R_j$ realized
- D pays $b_{ij}$? U accepts $b_{ij}$?
- $\text{Max}_a s + E(b_{ij}) - c(a)$
  \[ \rightarrow a^R(s, \{b_{ij}\}) \rightarrow S^R = U^R + D^R \]
Relational Employment (D owns asset; Bull ‘87/Levin ‘03)

- $S^{SE} > S^{SO}$
- D pays $b_{ij}$?
  - $b_{ij} + (1/r)D^{RE} > 0 + (1/r)D^{SE}$
- U accepts $b_{ij}$?
  - $b_{ij} + (1/r)U^{RE} > 0 + (1/r)U^{SE}$

Relational Employment ($S^{SE} > S^{SO}$)

- $(1/r)[D^{RE} - D^{SE}] > b_{ij}$
- $b_{ij} > (1/r)[U^{SE} - U^{RE}]$
- $\max b_{ij} - \min b_{ij} < (1/r) (S^{RE} - S^{SE})$

Relational Employment

- $S^{SO} > S^{SE}$
- D pays $b_{ij}$?
  - $b_{ij} + (1/r)D^{RE} > 0 + \pi + (1/r)D^{SO}$
- U accepts $b_{ij}$?
  - $b_{ij} + (1/r)U^{RE} > 0 - \pi + (1/r)U^{SO}$

Relational Employment ($S^{SO} > S^{SE}$)

- $(1/r)[D^{RE} - D^{SO}] > b_{ij} + \pi$
- $b_{ij} + \pi > (1/r)[U^{SO} - U^{RE}]$
- $\max b_{ij} - \min b_{ij} < (1/r) (S^{RE} - S^{SO})$
Relational Employment

\[ \text{max } b_{ij} - \text{min } b_{ij} < \left( \frac{1}{r} \right) (S^{RE} - \max \{S^{SE}, S^{SO}\}) \]

Relational Outsourcing (U owns asset; Klein-Leffler ‘81?)

- Two new effects:
  - recourse
  - bargaining position

- Proposition:
  - integration effects temptation

Relational Outsourcing

- \( S^{SO} > S^{SE} \)
  - D pays \( b_{ij} \)?
    - \( b_{ij} + \left( \frac{1}{r} \right) D^{RO} > (Q_i + R_j)/2 + \left( \frac{1}{r} \right) D^{SO} \)
  - U accepts \( b_{ij} \)?
    - \( b_{ij} + \left( \frac{1}{r} \right) U^{RO} > (Q_i + R_j)/2 + \left( \frac{1}{r} \right) U^{SO} \)

Relational Outsourcing (\( S^{SO} > S^{SE} \))

\[ \left( \frac{1}{r} \right) [D^{RO} - D^{SO}] > b_{ij} - (Q_i + R_j)/2 \]

\[ b_{ij} - (Q_i + R_j)/2 > \left( \frac{1}{r} \right) [U^{SO} - U^{RO}] \]

Etc., etc., …
Relational Outsourcing

\[
\begin{align*}
\max [b_{ij} - (Q_i + R_j)/2 ] \\
- \min [b_{ij} - (Q_i + R_j)/2 ] \\
\leq (1/r) (S_{RO} - \max \{S_{SE}, S_{SO}\})
\end{align*}
\]

Same contract, different temptation

**Proposition:** Asset ownership affects the parties’ temptations to renege on a given relational contract.

⇒ New perspective on vertical integration: choose governance structure to facilitate superior relational contract

**Example**

(notation from BGM 02)

- \( Q \in \{Q_H, Q_L\} \) \( Q_H - Q_L = \Delta Q \)
- \( P \in \{P_H, P_L\} \) \( P_H - P_L = \Delta P \)
- \( \text{Prob}(Q = Q_H) = qa_1 \)
- \( \text{Prob}(P = P_H) = pa_2 \)
- \( c(a_1, a_2) = (1/2)(a_1^2 + a_2^2) \)

85

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**Coasian Horserace (vs. Selective Intervention)**