

Hart/Holmstrom: A Theory of Firm Scope (QJE '10)

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Outline

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- 2 Set up
- 3 Optimal organizational form
 - Non-integration without cooperation
 - Non-integration with cooperation
 - Integration
 - (Takeover)
 - Delegation
 - Uncertainty
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Introduction: Theory of the firm

- non-contractible (nonverifiable) relation specific investment
- problem: under-investment (hold-up)
- focus on ex-ante distortion while ex post bargaining is efficient
- contract allocating ex post authority in return for ex ante payment
- Maskin mechanisms: make the observable verifiable (at least under symmetric ex-post information)

Set up

- 2 units (A,B) are operated by one manager each
- date 0: decision on organizational form (e.g. to integrate A and B or not)
 - no integration: manager i is also boss of i ($i=A,B$)
 - integration: professional outsider is boss of the integrated entity
- date 1: decision about coordination: Y/N by the boss
- payoffs:
 - monetary benefits v_A, v_B are diverted by the boss
 - nonmonetary/private benefits w_A and w_B go to the managers
 - let Δ denote the change in payoffs caused by coordination and define change in surplus (not accounting for aggrivement):
$$\Delta z_A = \Delta v_A + \Delta w_A \quad \Delta z_B = \Delta v_B + \Delta w_B$$
 - normalization: under non-coordination
$$v_A = v_B = w_A = w_B = 0$$

Gross-Payoffs

		Unit B	
		Y	N
Unit A	Y	$A: \Delta v_A, \Delta w_A$	$A: 0, 0$
	N	$B: \Delta v_B, \Delta w_B$	$B: 0, 0$
	Y	$A: 0, 0$	$A: 0, 0$
	N	$B: 0, 0$	$B: 0, 0$

Table I

Assumptions

- each party feels entitled to the coordination decision most favorable to her
- If party i receives k_i less than her maximum payoff, she will be aggrieved and shade to the point where the other parties' payoffs fall by θk_i with $0 < \theta < 1$.
Total deadweight loss is $\theta \sum_i k_i$.
- shading by i does not influence i 's own payoffs
- coordination reduces private benefits:
 $\Delta w_A \leq 0 \quad \Delta w_B \leq 0$
- ex ante: Y/N , Δv_i , Δw_i noncontractable
- organizational form is chosen to maximize expected future surplus net of ex post shading costs
 $S = \Delta z_A + \Delta z_B - \theta \sum_i k_i$

Preview etc.

- integration: internalizes externalities on monetary benefits
- non-integration: accounts fully for private benefits
- shading leads to a partial internalization of external effects

- Definition “first best”: surplus maximizing coordination decision without shading, i.e. coordination decision maximizing $\Delta z_A + \Delta z_B$

4(5) possibilities

- non-integration without cooperation (no shading possible)
- non-integration with cooperation (shading possible)
- integration (shading possible)
- (takeover)
- delegation (shading possible)

Non-integration without cooperation

manager i 's payoff is $z_i = v_i + w_i$ with $i = A, B$

- case 1: $\Delta z_A \leq 0, \Delta z_B \leq 0$
no coordination, $S = 0$
- case 2: $\Delta z_A \geq 0, \Delta z_B \geq 0$
coordination without aggrievement, $S = \Delta z_A + \Delta z_B$
- case 3: $\Delta z_i \leq 0, \Delta z_j \geq 0$ ($i \neq j$)
no coordination, no shading (by assumption), $S = 0$

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no coordination, no shading (by assumption), $S = 0$

results:

- first best (coordinate iff $\Delta z_A + \Delta z_B \geq 0$) achieved in case 1 and 2
- too little coordination in “non-integration without cooperation”
- no shading in equilibrium

Non-integration with cooperation

manager i 's payoff is $z_i = v_i + w_i$ with $i = A, B$

- case 1 and 2 as in “non-integration without cooperation” (aligned preferences)
- case 3: $\Delta z_i \leq 0, \Delta z_j \geq 0$ ($i \neq j$)

i will not veto coordination if this aggrieves j too much:

$$S = \begin{cases} \Delta z_A + \Delta z_B + \theta \Delta z_i & \text{if } \Delta z_i + \theta \Delta z_j \geq 0, \\ -\theta \Delta z_j & \text{otherwise} \end{cases}$$

Non-integration with cooperation

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results:

- first best (coordinate iff $\Delta z_A + \Delta z_B \geq 0$) achieved in case 1 and 2
- too little coordination in “non-integration with cooperation” (case 3)
- shading in case 3
- “non-integration with cooperation” can only be better than “non-integration without cooperation” if there is coordination

Integration

managers A/B have payoff w_A/w_B ; the conglomerate-boss has payoff $v_A + v_B$

- case 1: $\Delta v_A + \Delta v_B \leq 0$
no coordination; no aggrievement; $S = 0$

- case 2: $\Delta v_A + \Delta v_B > 0$
boss forces coordination if

$$(3.9) \quad \Delta v_A + \Delta v_B + \theta(\Delta w_A + \Delta w_B) \geq 0,$$

therefore:

$$S = \begin{cases} \Delta z_A + \Delta z_B + \theta(\Delta w_A + \Delta w_B) & \text{if (3.9),} \\ -\theta(\Delta v_A + \Delta v_B) & \text{otherwise.} \end{cases}$$

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results:

- boss partly internalizes his subordinates' wishes
- first best in case 1
- too much coordination in case 2 (compared to first best)
- shading in case 2

Proposition 1

Proposition

Non-integration errs on the side of too little coordination while integration errs on the side of too much coordination. If no coordination is first best “non-integration without cooperation” achieves it.

If coordination is first best,

- *integration leads to coordination but may not be optimal (deadweight loss)*
- *integration is optimal if change in private benefits is sufficiently small*
- *integration is uniquely optimal if additionally the distribution of profits is sufficiently uneven.*

Takeover

Manager A is the boss of both units

- case 1: $\Delta v_A + \Delta v_B \leq 0$
no coordination; no aggrievement; $S = 0$
- case 2: $\Delta v_A + \Delta v_B > 0$

Manager A coordinates if

$$\Delta v_A + \Delta v_B + \Delta w_A + \theta \Delta w_B \geq 0 \quad (3.11)$$

Therefore,:

$$S = \begin{cases} \Delta z_A + \Delta z_B + \theta \Delta w_B & \text{if (3.11)} \\ -\max\{\theta(\Delta v_A + \Delta v_B + \Delta w_A), 0\} & \text{otherwise.} \end{cases}$$

Takeover

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Therefore,:

$$S = \begin{cases} \Delta z_A + \Delta z_B + \theta \Delta w_B & \text{if (3.11)} \\ -\max\{\theta(\Delta v_A + \Delta v_B + \Delta w_A), 0\} & \text{otherwise.} \end{cases}$$

results:

- manager A is (weakly) better boss than professional outsider
- reason 1: internalizing Δw_A
- reason 2: manager A is no longer aggrieved

Why a professional boss?

Suppose auxiliary decision with only private consequences:

$$\Delta \hat{w}_A > 0 > \Delta \hat{w}_B \text{ and } \Delta \hat{w}_A + \Delta \hat{w}_B < 0$$

- manager A as boss goes ahead if $\Delta \hat{w}_A + \theta \Delta \hat{w}_B > 0$
- professional outsider never goes ahead
- surplus:

$$S = \begin{cases} \Delta \hat{w}_A + \Delta \hat{w}_B + \theta \Delta \hat{w}_B < 0 & \text{going ahead,} \\ -\theta \Delta \hat{w}_A & \text{not going ahead.} \end{cases}$$

- If there is a second auxiliary decision with reversed signs, a professional outsider is strictly better.

A professional outsider can also be better if Δw_A and Δw_B are uncertain and negatively correlated.

Delegation I

- boss of integrated firm delegates coordination decision to managers but can reverse this decision
- reversal leads to increased aggrievement $\bar{\theta} \in [\theta, 1]$
- idea: delegation as commitment

Delegation II

case 1: $\Delta v_A + \Delta v_B \leq 0$

- no coordination; no aggrievement; $S = 0$

case 2: $\Delta v_A + \Delta v_B > 0$

- If managers do not coordinate, boss will be aggrieved.

Managers coordinate reluctantly if:

$$\Delta w_i + \frac{\theta}{2} (\Delta v_A + \Delta v_B) \geq 0 \quad i = A, B$$

As managers are aggrieved, welfare is then

$$S = \Delta z_A + \Delta z_B + \theta(\Delta w_A + \Delta w_B).$$

- Suppose managers do not coordinate. Boss reverses if

$$\Delta v_A + \Delta v_B + \bar{\theta}(\Delta w_A + \Delta w_B) \geq 0$$

and welfare is

$$S = \Delta z_A + \Delta z_B + \bar{\theta}(\Delta w_A + \Delta w_B).$$

- If managers do not coordinate and boss does not force coordination, boss is aggrieved:

$$S = -\theta(\Delta v_A + \Delta v_B)$$

Delegation III

Proposition

Under delegation there is (weakly) less coordination than under integration but still too much coordination relative to the first best.

Delegation IV

Proposition

Under perfect certainty, “non-integration without cooperation” or integration can be strictly optimal, but delegation cannot.

Proof.

Suppose outcome under delegation is ‘no coordination’. Then “no-integration without cooperation” is better (less shading or Pareto superior decision).

Suppose outcome under delegation is ‘coordination’. Then integration is (weakly) better:

- managers reluctantly coordinate: coordination and same shading under integration
- boss reverses: coordination and less shading under integration



Uncertainty I

- payoffs are random but observed ex post by all parties
- assume $\Delta w_A = \Delta w_B = \Delta w$ and
 $\Delta v := 1/2(\Delta v_A + \Delta v_B) > 0$

Therefore,

- coordination under integration if $\Delta v \geq \theta|\Delta w|$
- reluctant coordination under delegation if $\theta\Delta v \geq |\Delta w|$
- forced coordination (reversal) under delegation if
 $\Delta v > \bar{\theta}|\Delta w|$

Uncertainty II

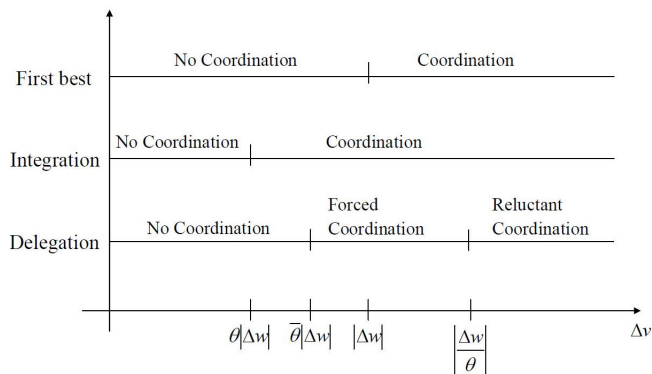


Figure 2

- Delegation more efficient than integration for $\theta|\Delta w| \leq \Delta v \leq \bar{\theta}|\Delta w|$
- If Δv is distributed on $[\theta|\Delta w|, \bar{\theta}|\Delta w|] \cup \left[\frac{|\Delta w|}{\theta}, \infty\right)$, delegation can be optimal.

Conclusion

- trade-off: integration internalizes external effects but puts too little weight on private benefits
- aggrievement can lead to ex post inefficiency but also to partial internalization of external effects
- delegation as a commitment device when ‘breach of promise’ leads to more aggrievement and shading

Discussion

Does the paper address the criticism:

- focus on ex-ante distortion while ex post bargaining is efficient
- contract allocating ex post authority in return for ex ante payment
- Maskin mechanisms: make the observable verifiable (at least under symmetric ex-post information)