Delegation and Strategic Silence

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Introduction

Decision Processes in Organizational Economics

- Organizations with choice and execution:
  - Choice: what is intended to be done (Mintzberg, 1979)
    - e.g. projects.
  - A subordinate executes what is chosen.
- Who makes a decision on choice?
  - Choice in a top-down manner is a feature of hierarchical organizations.
  - Delegation to the executor may influence performances in the organization.

Introduction

Two Contrasted Successes during the Financial Crisis

- Nintendo (Inoue, 2010):
  - Satoru Iwata (President) motivated the engineers through 'directing a "non-tech" way'.
  - Nintendo Wii regained top market share in the seventh generation.
- HCL Technologies (Nayar, 2010):
  - 'Inverting the pyramid' to capture imagination at the bottom.
  - Numerous innovative ideas from employees.

Introduction

Questions

- Why did both Nintendo and HCLT successfully motivate workers by different decision processes?
  - Iwata's direction (centralization in Nintendo).
  - Inverting the pyramid (delegation in HCLT).
- When is the bottom-up approach feasible if it is desirable but the boss must hold authority?

Introduction

Purpose of This Paper

- We investigate an organization (P-A model) with choice (project) and execution (effort).
  - Each has imperfect information on the project.
  - Successful execution of the project requires the agent's effort.
  - Incomplete contracting: no incentive contract.
- The allocation of authority is specified formally:
  - centralization: the principal chooses a project.
  - delegation: the agent chooses a project.
- Later, formal delegation is infeasible:
  - informal delegation (empowerment): the principal chooses a project based on the agent's report.

Introduction

Results

- The allocation of authority influences
  - the probability to choose the promising project (direct effect); and
  - the agent's motivation to execute the project (indirect effect).
- It may be optimal to allocate authority to the party with less precise information.
- Empowerment might be prevented even without conflict of interest over projects.
  - benefit of being passive: the agent may deny to report his proposal.

Related Literature

Related Works

- The allocation of authority: Aghion and Tirole (1997); Bolton and Dewatripont (2013); Gibbons et al. (2013); Mookherjee (2013)
- Choice and execution:
  - Blanes i Vidal and Möller (2007, 2016a,b), Landier et al. (2009), Itoh and Morita (2018)
  - Zábojník (2002):
    - formal incentives are available.
  - Other setup with allocation of authority: Bester and Krähmer (2008), Hirata (2017), Ishihara (2020)

Related Literature

Related Works

- Informal delegation in relational contracting: Baker et al. (1999), Alonso and Matouschek (2007), Li et al. (2017). Lipnowski and Ramos (2020)
  - Non-credible informal delegation due to conflict of interest over projects: the principal has incentives to overturn the agent's proposal.
  - We demonstrate non-credible informal delegation even without conflict of interest.

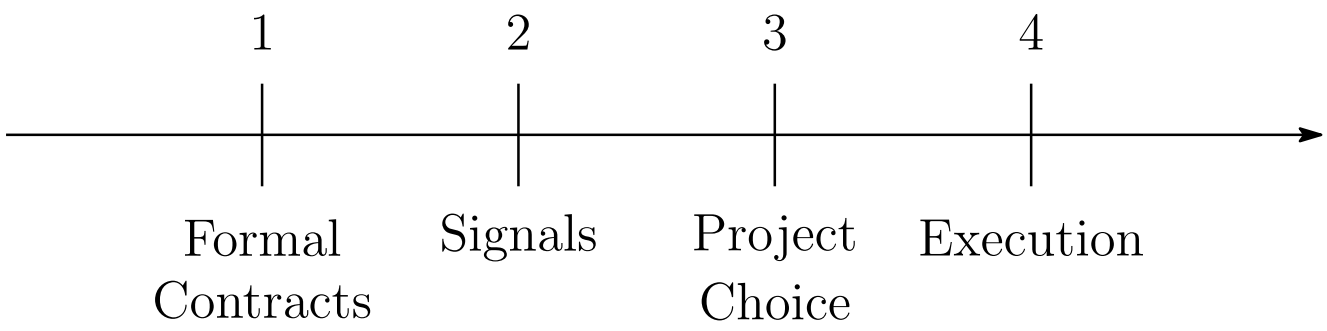
Outline

1. The Environment
2. Optimal Formal Allocation of Authority
3. Informal Delegation and Strategic Silence
4. Conclusion

Setup

Players and Decisions

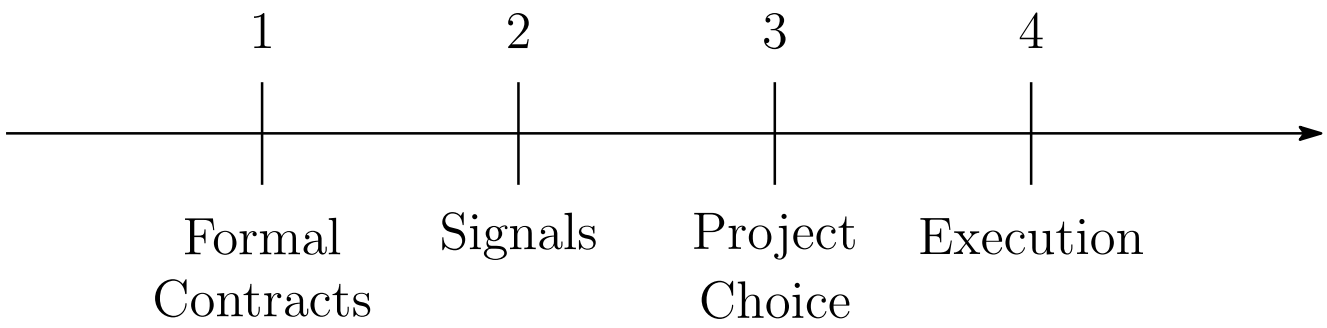
- Players: Principal (P) and Agent (A), both risk neutral.
- Timing in period t:



- Stage 1: P offers a formal contract that specifies the party with authority $\alpha \in \{P, A\}$:
  - centralization: $\alpha = P$;
  - delegation: $\alpha = A$.

Setup

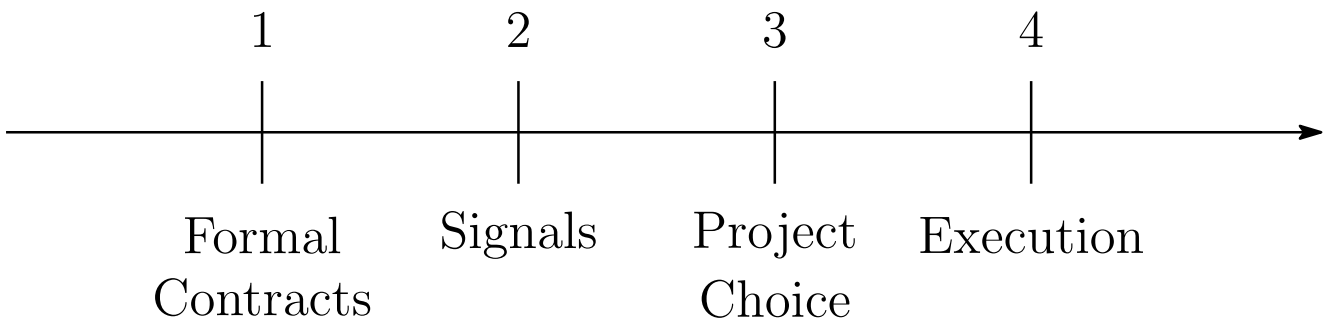
Players and Decisions



- There are two alternative projects: $\{1, -1\}$
- Stage 2:
  - (Unknown) state variable $s \in \{1, -1\}$ indicates the promising project.
    - Prior $Prob(s = 1) = Prob(s = -1) = 1/2$
  - Each $i \in \{P, A\}$ receives signal $\theta_i \in \{1, -1\}$ such that $Prob(\theta_i = s \mid s) \equiv q_i \in (1/2, 1)$.
    - $Prob(s = \theta_i \mid \theta_i) = q_i$: precision of the signal

Setup

Players and Decisions



- Stage 3: party α chooses a project $d \in \{1, -1\}$.
- Stage 4: A chooses execution effort $e \in \{1, 0\}$ with effort cost ce, where $c > 0$.
- The project results in either
  - $x = 1$ (success) $\iff$ $d = s$ and $e = 1$; or
  - $x = 0$ (failure) $\iff$ $d \neq s$ or $e = 0$.

Setup

Assumptions

- P and A receive benefit xB and xb, respectively, where $B > 0$ and $b > 0$.
- Payoffs given e and x:
  - P: xB;
  - A: $xb - ce$.
- Informational assumptions
  - verifiable variables: α
  - observable but nonverifiable variables: d and x
  - private information: θ_i (and e)
  - unobservable variables: s

Setup

Timing and Equilibrium

- P's optimal perfect Bayesian equilibria in which Bayes rule applies as much as possible
  - Fudenberg and Tirole (1991, Ch. 8).
- Equilibrium actions: $(\alpha, d^{\alpha}(\theta_{\alpha}), e^{\alpha}(\theta_A, d))$
  - Centralization ($\alpha = P$) or delegation ($\alpha = A$)?

Formal Allocation of Authority

Equilibrium Conditions

- Given $\alpha \in \{P, A\}$, let
  - π^α be P's optimal expected payoff;
  - u^α be A's associated payoff.
- Constraints:
  - (PIC): α chooses $d^\alpha(\theta_\alpha)$.
  - (EIC): A chooses $e^\alpha(\theta_A, d)$.

Formal Allocation of Authority

Project Choice (PIC)

Lemma

$d^{\alpha}(\theta_{\alpha}) = \theta_{\alpha}$.

- The project is chosen based on the decision maker's information.
- The party with a more precise signal (i.e., higher q_i) is more likely to choose the promising project.

Formal Allocation of Authority

Effort Choice (EIC)

- $e^{\alpha}(\theta_A, d) = 1$ if and only if

$$\mathrm{Prob}(s = d \mid \theta_A, d, \alpha) b - c \geq 0$$

$$\iff v \equiv \frac{b}{c} \geq \frac{1}{\mathrm{Prob}(s = d \mid \theta_A, d, \alpha)}.$$

  - v: A's intrinsic incentive.
  - $\mathrm{Prob}(s = d \mid \theta_A, d, \alpha)$: A's confidence.
    - Posterior belief of the chosen project to be promising given A's signal θ_A.
    - A exerts more effort as he believes project d to be promising more likely.

Formal Allocation of Authority

Delegation

- For $\alpha = A$, since $d = \theta_A$, A's confidence is

$$\text{Prob}(s = d \mid d = \theta_A, \alpha = A) = q_A.$$

- A exerts effort (for all d and θ_A)

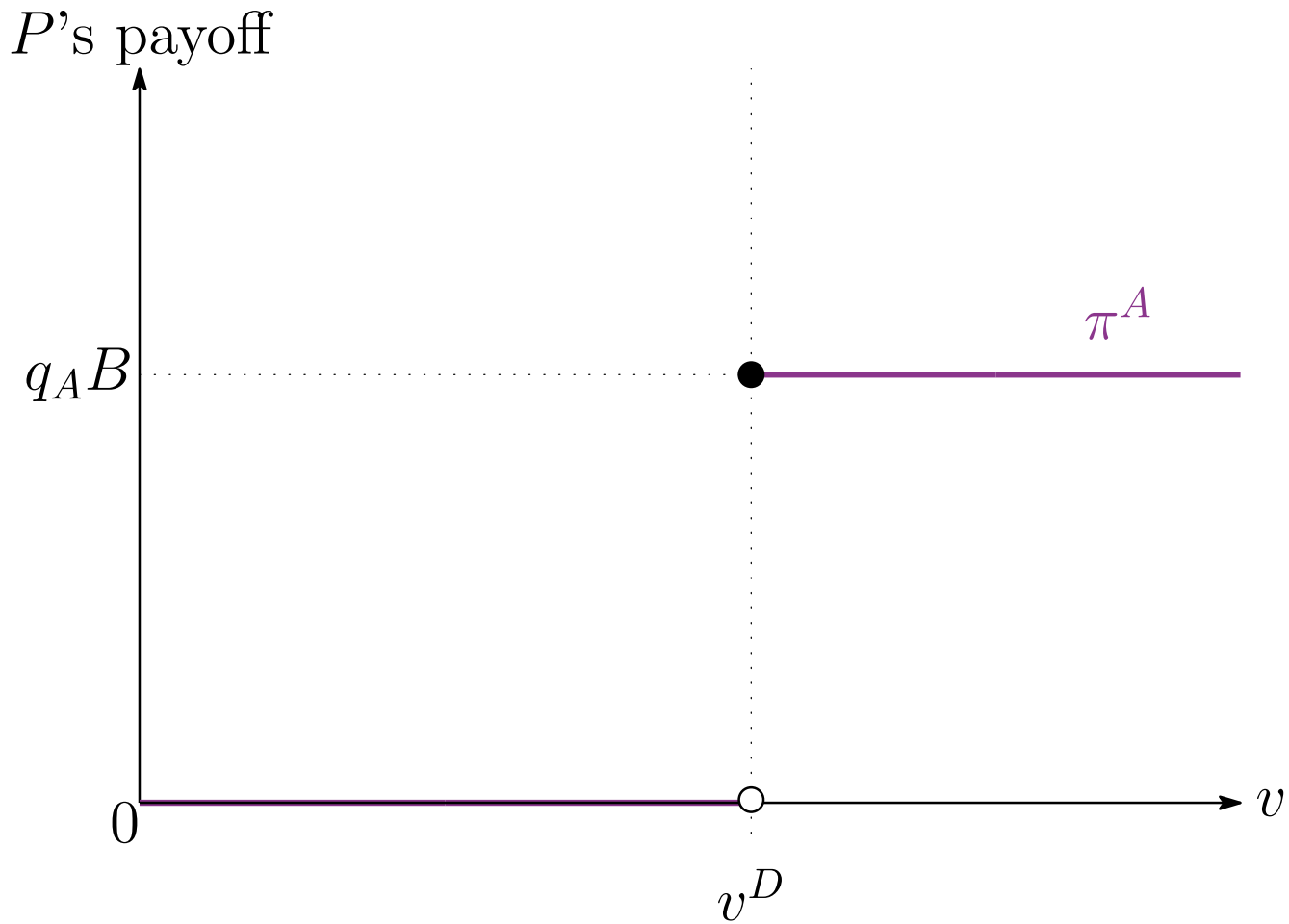
$$\iff v \underbrace{\geq}_{\text{(EIC)}} v^D \equiv \frac{1}{q_A}.$$

  - P's payoff: $\pi^A = q_A B$
- Otherwise, A exerts no effort (for all d and θ_A).
  - P's payoff: $\pi^A = 0$

Formal Allocation of Authority

Delegation

- Illustration of π^A:



Formal Allocation of Authority

Centralization

- For $\alpha = P$, A learns θ_P through P's choice $d = \theta_P$.
- By Bayesian updating,

$$\begin{aligned}
&\text{Prob}(s = d \mid \theta_A, d = \theta_P, \alpha = P) \\
&= \begin{cases} \dfrac{q_P q_A}{q_P q_A + (1 - q_P)(1 - q_A)} & \text{if } \theta_P = \theta_A, \\ \dfrac{q_P (1 - q_A)}{q_P (1 - q_A) + (1 - q_P) q_A} & \text{if } \theta_P \neq \theta_A. \end{cases}
\end{aligned}$$

- A's confidence is (*ex ante*) uncertain:

$$\begin{aligned}
&\text{Prob}(s = d \mid \theta_A = d = \theta_P, \alpha = P) \\
&\quad > \text{Prob}(s = d \mid \theta_A \neq d = \theta_P, \alpha = P)
\end{aligned}$$

Formal Allocation of Authority

Centralization

- (Full execution): A exerts effort for all d and θ_A

$$\iff v \underbrace{\geq}_{\text{(EIC) for } d \neq \theta_A} v_1^C \equiv 1 + \frac{(1-q_P)q_A}{q_P(1-q_A)},$$

  - P's payoff: $\pi^P = q_P B$

Formal Allocation of Authority

Centralization

- (Partial execution): even for $v < v_1^C$, A may exert effort only when A is more confident ($d = \theta_A$):

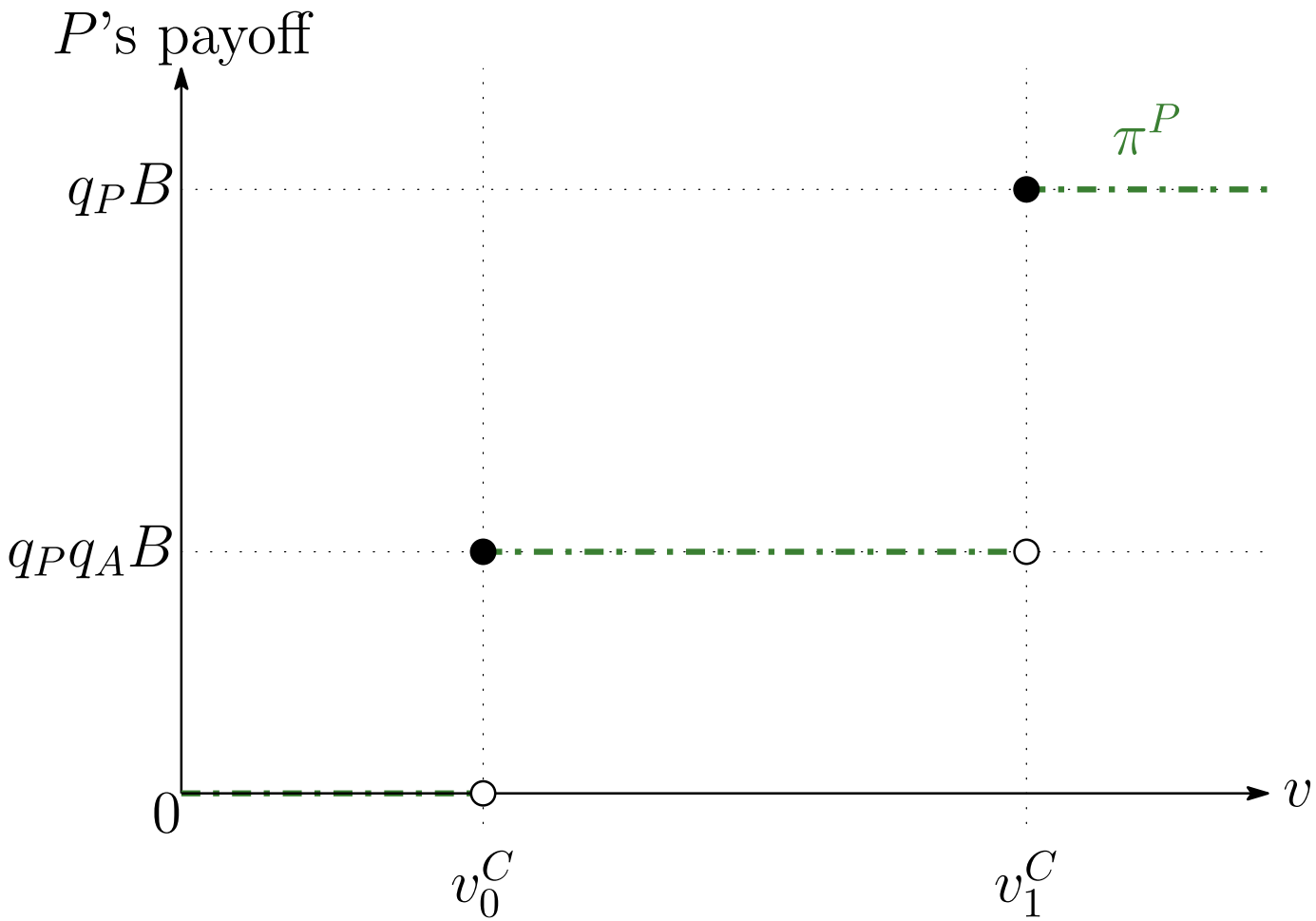
$$\iff v \underbrace{\geq}_{\text{(EIC) for } d=\theta_A} v_0^C \equiv 1 + \frac{(1-q_P)(1-q_A)}{q_P q_A}.$$

  - P's payoff: $\pi^P = q_P q_A B$

Formal Allocation of Authority

Centralization

- Illustration of π^P:



Formal Allocation of Authority

Optimal Allocation of Authority

- Let $\overline{q}_A \equiv q_A^2/[q_A^2 + (1 - q_A)^2] (> q_A)$.

Definition

P is

- *strongly (informationally) superior if* $q_P \geq \overline{q}_A$.
- *weakly (informationally) superior if* $q_P \in (q_A, \overline{q}_A)$.
- *(informationally) inferior (or A is superior) if* $q_P \leq q_A$.

- When $q_P \geq \overline{q}_A$, P always holds authority.

Formal Allocation of Authority

Uncertainty of Confidence

- If $q_P < \overline{q}_A$, A's confidence satisfies:

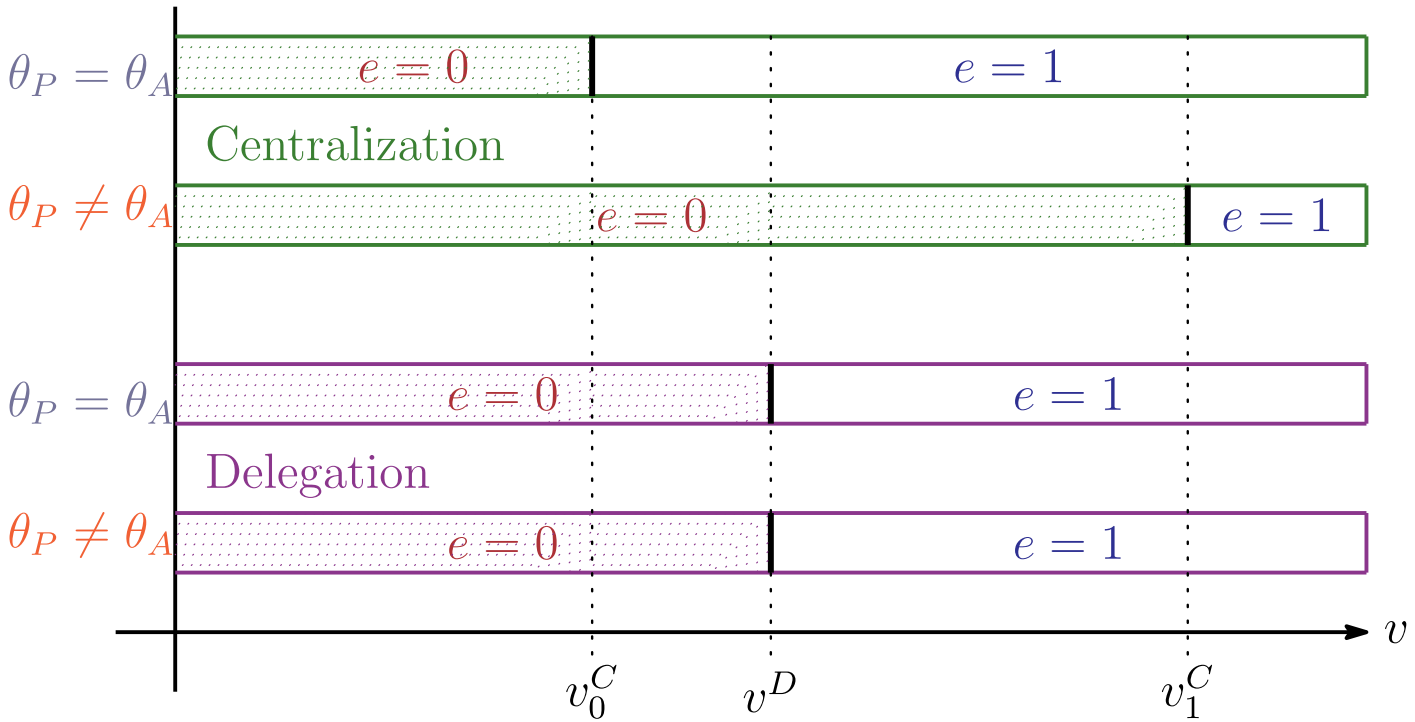
$$\underbrace{Prob(s = d \mid d = \theta_A)}_{\text{Centralization with } d=\theta_A} > \underbrace{Prob(s = d \mid \theta_A)}_{\text{Delegation}} > \underbrace{Prob(s = d \mid d \neq \theta_A).}_{\text{Centralization with } d\neq\theta_A}$$

- Uncertainty of A's confidence under centralization:
  - misalignment of the signals ($d \neq \theta_A$) demotivates A to exert effort;
  - alignment of the signals ($d = \theta_A$) motivates A to exert effort.

Formal Allocation of Authority

Comparison of Effort

- Effort decision when $q_P < \overline{q}^A$

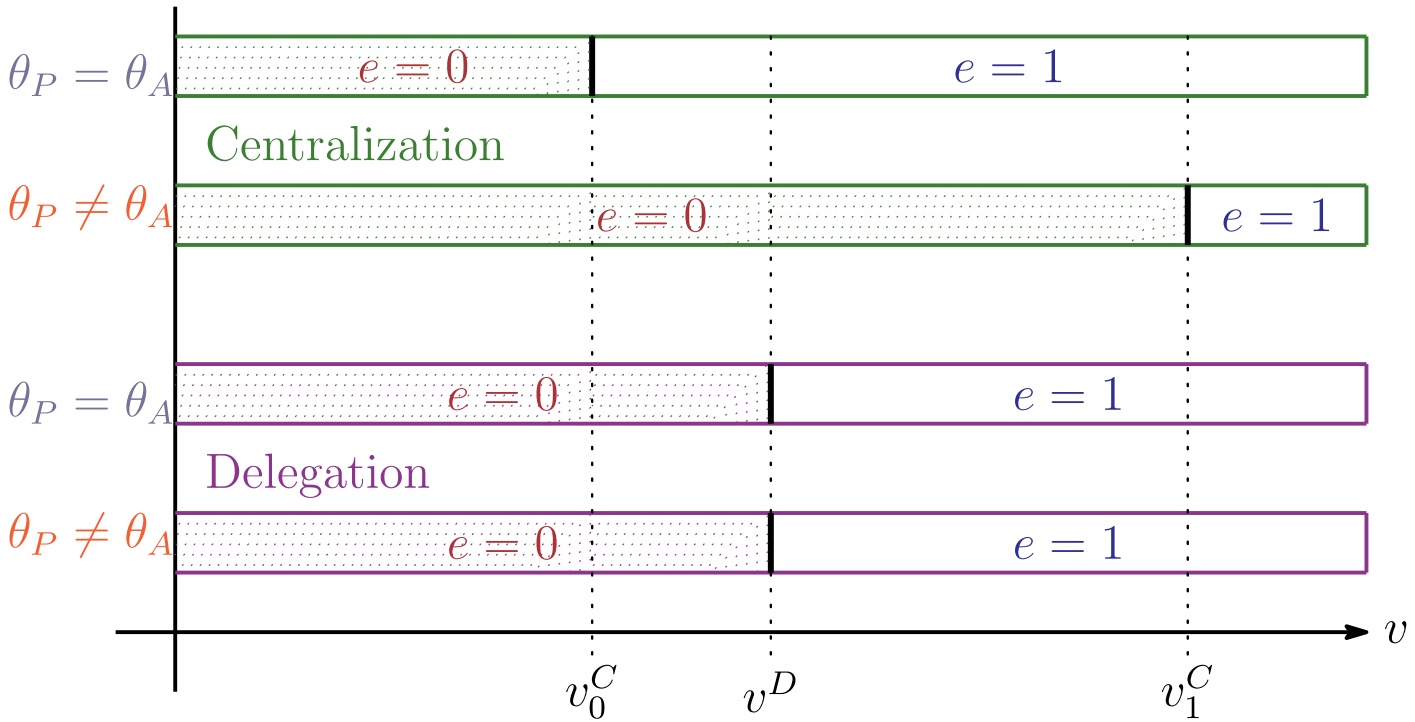


- For $v \in [v^D, v_1^C)$, only delegation can induce full execution.

Formal Allocation of Authority

Comparison of Effort

- Effort decision when $q_P < \overline{q}^A$

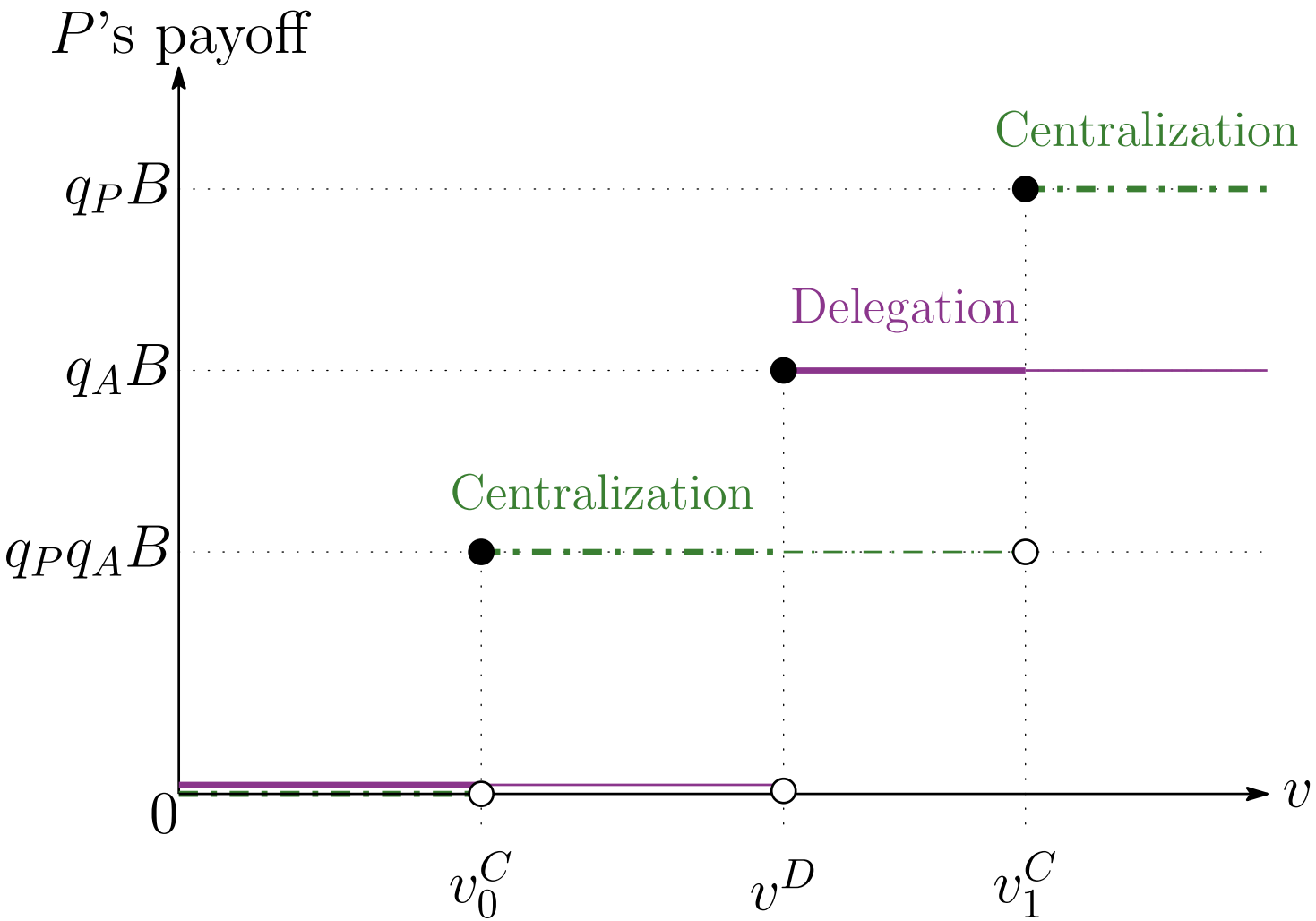


- For $v \in [v_0^C, v^D)$, only centralization may induce effort.

Formal Allocation of Authority

P Is Weakly Informationally Superior

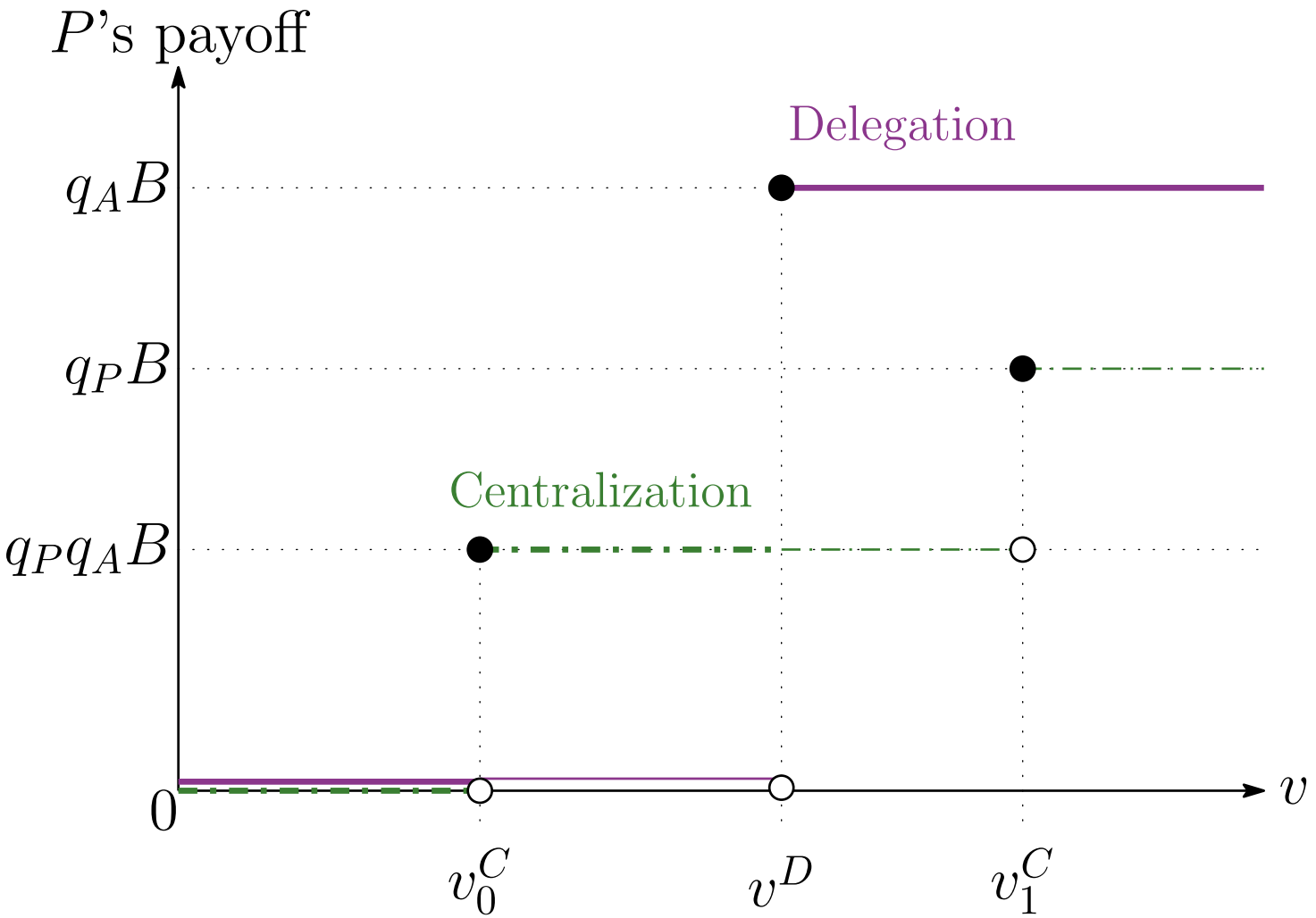
- Even if $q_P \in (q_A, \overline{q}_A)$, A may hold authority.



Formal Allocation of Authority

A Is Informationally Superior

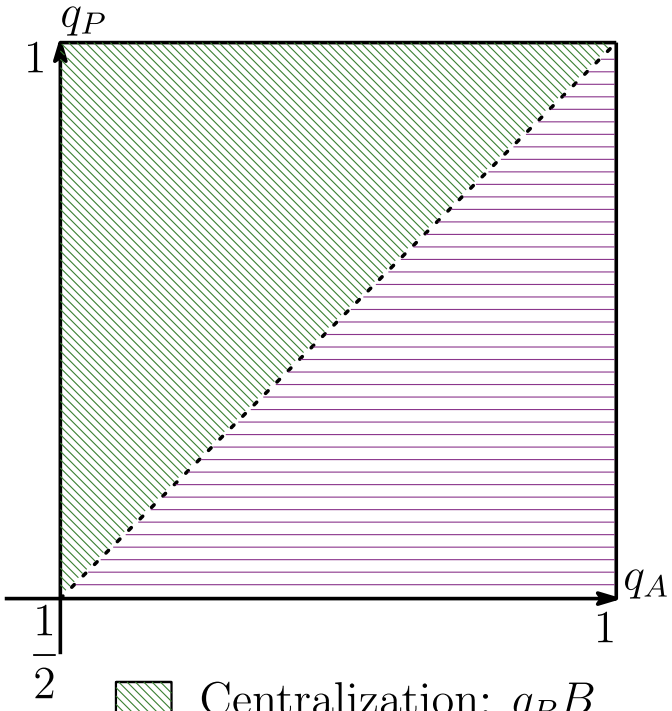
- Even if $q_P \leq q_A$, P may hold authority.



Formal Allocation of Authority

Interpretation: Another Look

$v \geq 2$



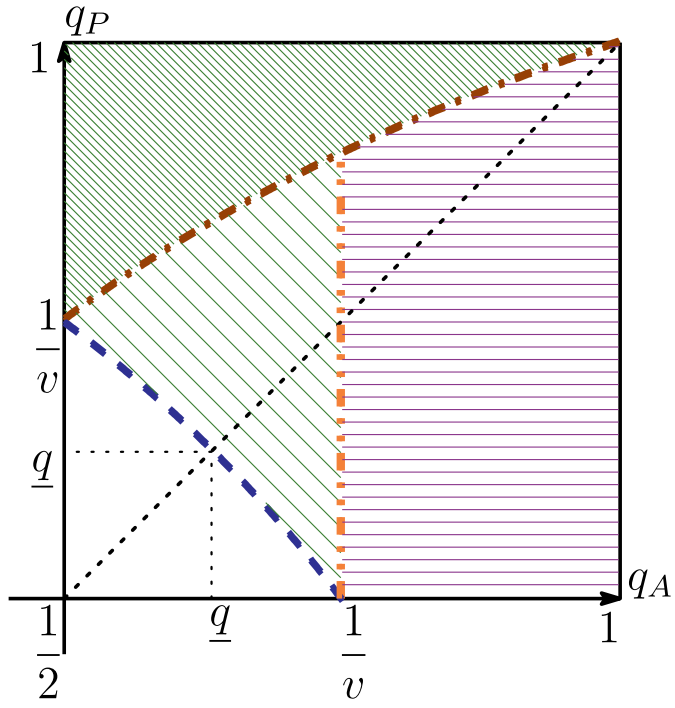
Centralization: $q_P B$

Delegation: $q_A B$

Centralization: $q_P q_A B$

Indifferent: 0

$v \in (1, 2)$



$v_0^C = v$

$v_1^C = v$

$v^D = v$

$\underline{q} \equiv \frac{1-\sqrt{v-1}}{2-v}$

Formal Allocation of Authority

Case Studies: Nintendo

- High uncertainty to develop hit products in the video game industry.
  - Low q_P and q_A
  - Centralized decision making
    - is a desirable way to motivate employees; but
    - induces environments to be more uncertain due to the motivation problem.

Formal Allocation of Authority

Case Studies: HCLT

- Necessary for customers satisfactory to learn what customers need (Nayar, 2010)
  - High q_A: employees directly interact with customers and would have better information.

Empowerment

Informal Delegation

- It is often argued that all formal decision rights must reside at the top.
  - Control rights are not contractible.
- Empowerment: informal delegation as a form of report and ratification.
- Can the equilibrium outcome of delegation be implemented through A's report on his signal?
  - P chooses d based on A's report.

Empowerment

Modified Setup

- Timing modified:
  0. ~~Formal contracting to specify α.~~
  1. s, θ_P, and θ_A.
  2. A reports $m \in \{\theta_A, \phi\}$.
  3. P chooses d.
  4. A chooses e.
- Signal θ_A is concealable, but not fabricatable (disclosure games by Milgrom (1981)).
- Let $m(\theta_A)$ be A's message.

Empowerment

Modified Setup

Requirement 1

1. *(Symmetric Messages) either*
   - 1.1 $m(\theta_A) = \theta_A$ *for any* θ_A*; or*
   - 1.2 $m(\theta_A) = \phi$ *for any* θ_A*.*
2. *(Symmetric Beliefs) If* $m = \phi$ *is off the equilibrium path,* $\mathrm{Prob}(\theta_A \mid \theta_P, m = \phi) = \mathrm{Prob}(\theta_A \mid \theta_P)$*.*
3. *(Continuation Optimality) After the communication stage, the parties' play an optimal equilibrium for the principal.*

Empowerment

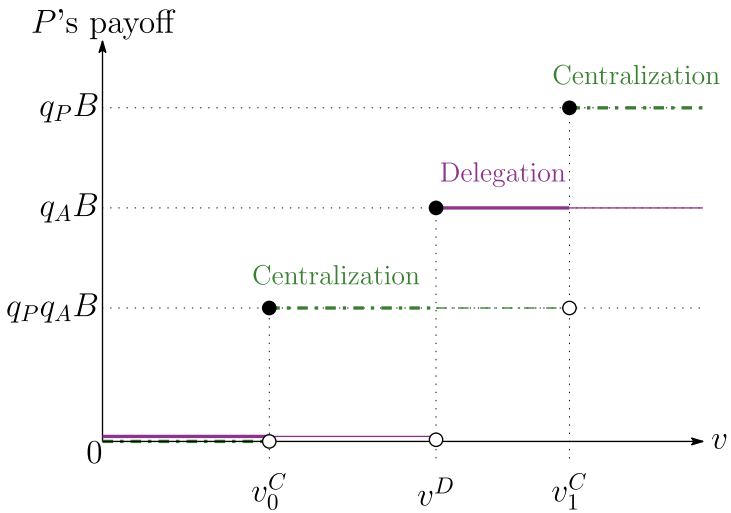
Modified Setup

- P behaves as if she has no additional information after observing $m = \phi$.
- Neologism-proof (Farrell, 1993) by Requirement 1.
  - "Even when neologisms are naively believed, A does not prefer to use such neologisms."
- The strategy constitutes empowerment if
  - $m^I(\theta_A) = \theta_A$ for all θ_A;
  - $d^I(\theta_P, m) = m$ for all θ_P, and $m \in \{1, -1\}$; and
  - $e^I(\theta_A, m, d) = 1$ for some (θ_A, m, d) such that $d = m$.

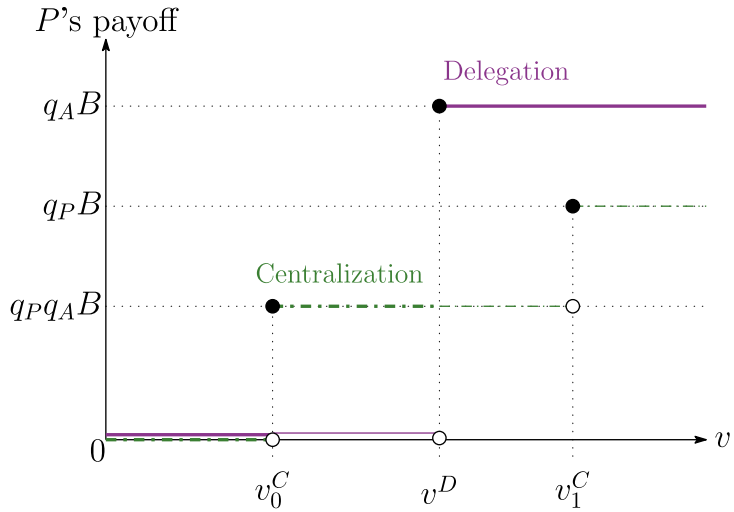
Empowerment

Delegation versus Empowerment

$\overline{q}_A > q_P > q_A$



$q_A \geq q_P$



- Recall: delegation is strictly preferred to centralization $\iff$
  - $q_P \in (q_A, \overline{q}_A)$ and $v^D \leq v < v_1^C$; or
  - $q_A \geq q_P$ and $v \geq v^D$.
- Under these parameters, can empowerment be implemented?

Empowerment

Delegation versus Empowerment

Proposition

There exists an equilibrium that constitutes empowerment and satisfies Requirement 1 if and only if

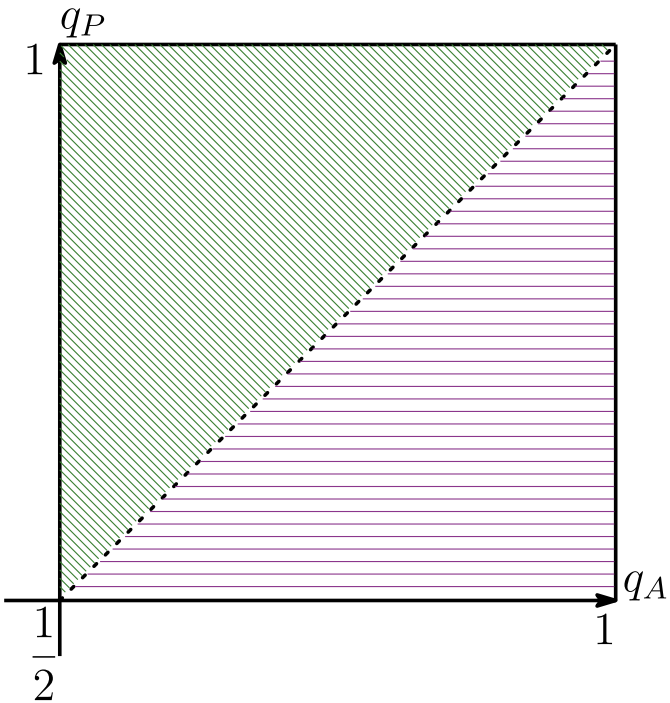
1. $v \geq v^E \equiv 1 + q_P(1 - q_A)/[(1 - q_P)q_A]$; *and*
2. $q_P \leq q_A$.

- Empowerment is implemented only when A is informationally superior.
- For $q_P \in (q_A, \overline{q}_A)$ and $v^D \leq v < v_1^C$,
  - formal delegation is strictly preferred; but
  - it cannot be implemented informally.

Empowerment

Centralization and Delegation

$v \geq 2$



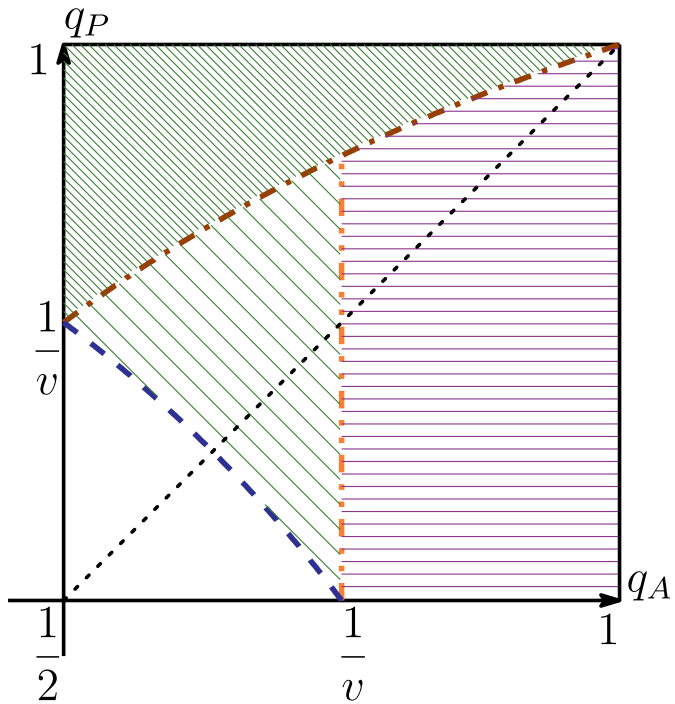
Centralization: $q_P B$

Delegation: $q_A B$

Centralization: $q_P q_A B$

Indifferent: 0

$v \in (1, 2)$



$v_0^C = v$

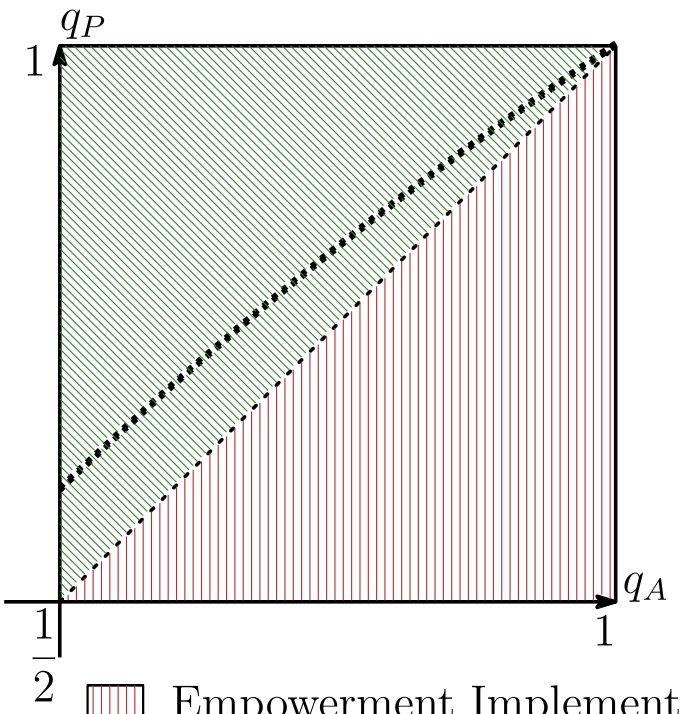
$v_1^C = v$

$v^D = v$

Empowerment

Centralization and Empowerment

$v \geq 2$

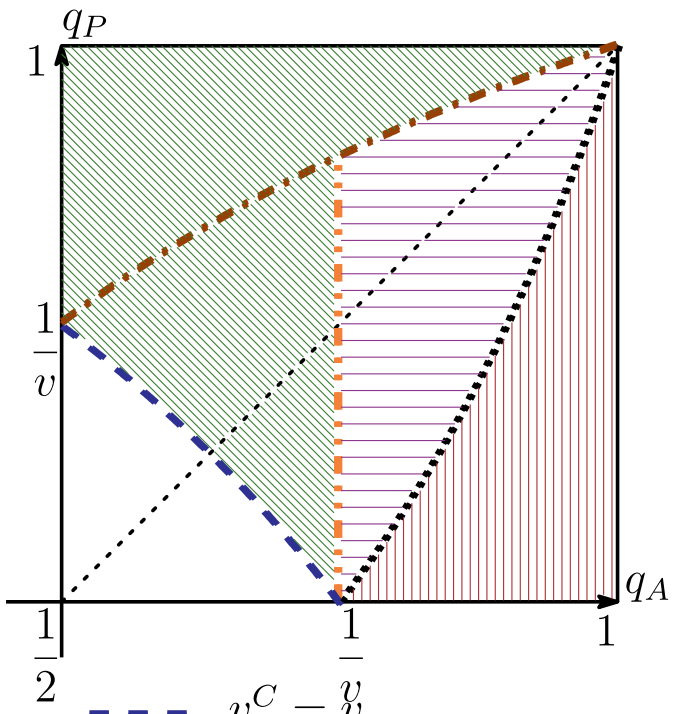


Empowerment Implementable

Empowerment Desirable but Not Implementable

Centralization

$v \in (1,2)$



$v_0^C = v$

$v_1^C = v$

$v^D = v$

$v^E = v$

Empowerment

Interpretation

- Informationally inferior A conceals his information.
  - If A conceals θ_A,
    - P chooses $d = \theta_P$;
    - A knows θ_P when he decides e.
- Intuition: benefit of being 'passive' worker
  - Strategic silence yields additional information.
  - Executed projects become more selective.
  - A saves execution costs for the project with less confidence.

Empowerment

Interpretation

- In the initial phase of 'inverting the pyramid', employees in HCLT were quite passive.
  - They believed that managers wanted to make all the decisions.
- Nayar tried to convince employees that
  - they understand business better than CEO;
  - the CEO was not able to answer all the employee's questions ($q_P \downarrow$).

Empowerment

Interpretation

- The previous literature: non-credibility of empowerment due to the ratification process.
  - Conflict of interest over projects matters.
- Empowerment might be impossible even if the parties have no conflict of interest over projects.
  - Another factor necessary for empowerment: subordinates' information transmission.

Conclusion

- Incomplete contracting models of allocation of authority.
- Motivational advantage and disadvantage:
  - Delegation shuts down the boss's signal
    $\Longrightarrow$ certain confidence.
  - Centralization provides an additional signal
    $\Longrightarrow$ uncertain confidence.
- Gap between delegation and empowerment.
  - Preventing informal delegation due to information concealment.

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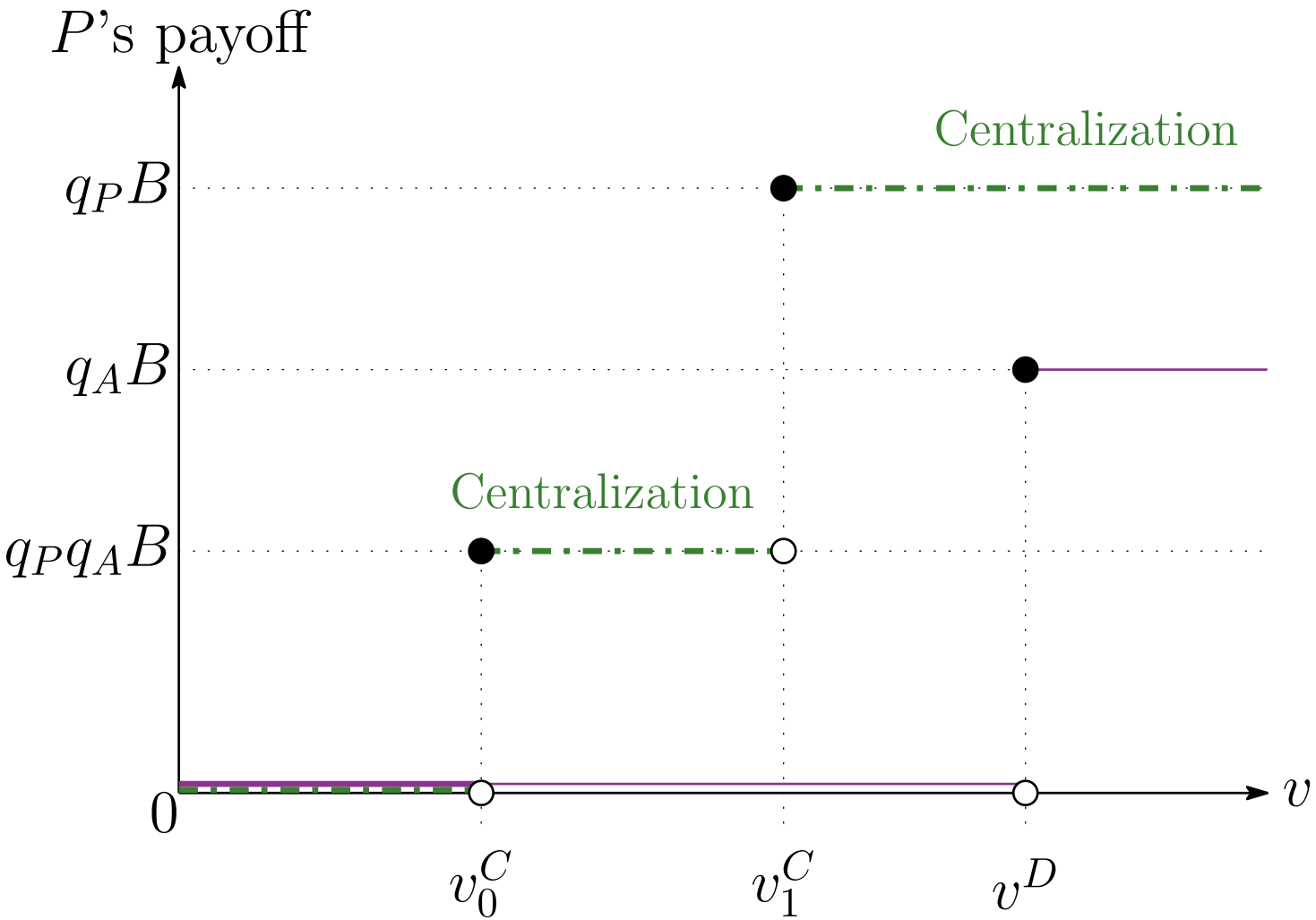
Appendix: Formal Allocation of Authority

P Is Strongly Informationally Superior

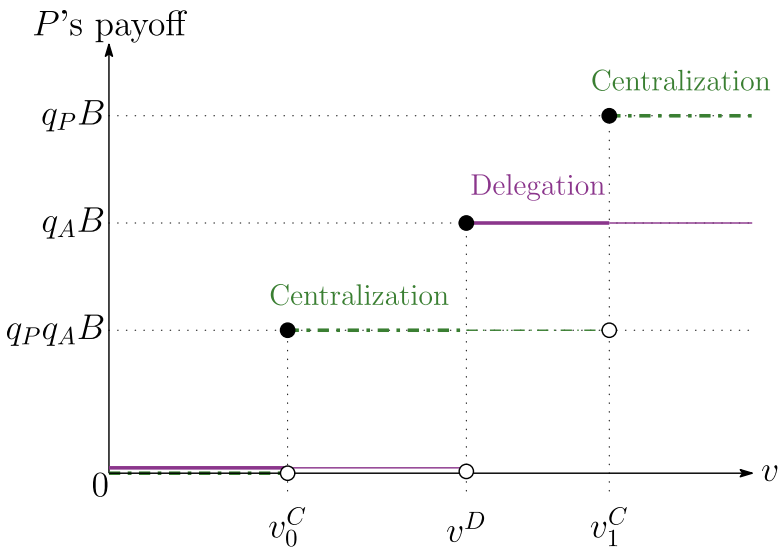
- When $q_P \geq \overline{q}_A$, P always holds authority.



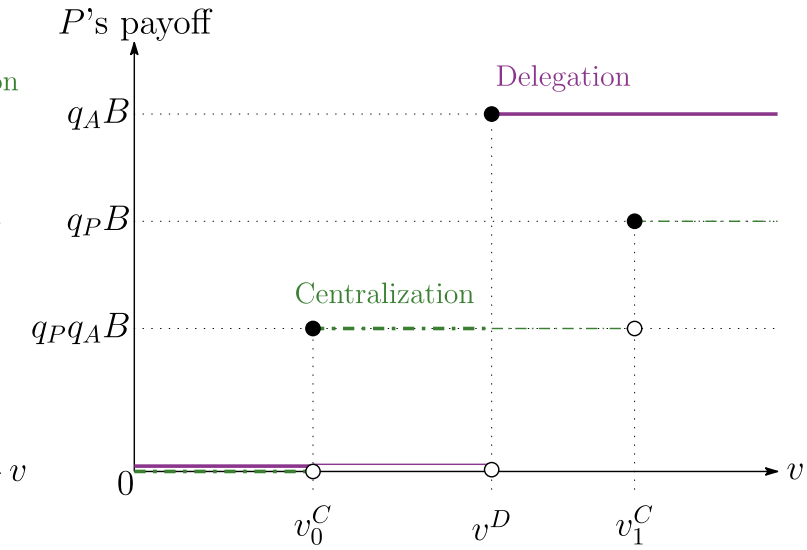
Appendix: Formal Allocation of Authority

Interpretation: Large v

$\overline{q}_A > q_P > q_A$



$q_A \geq q_P$

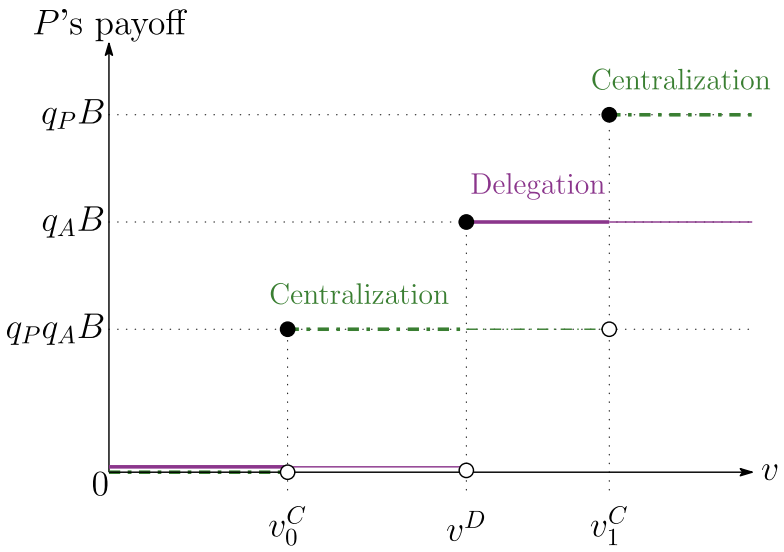


- $v \geq v_1^C$: effort is easily induced.
  - The superior party should have authority.

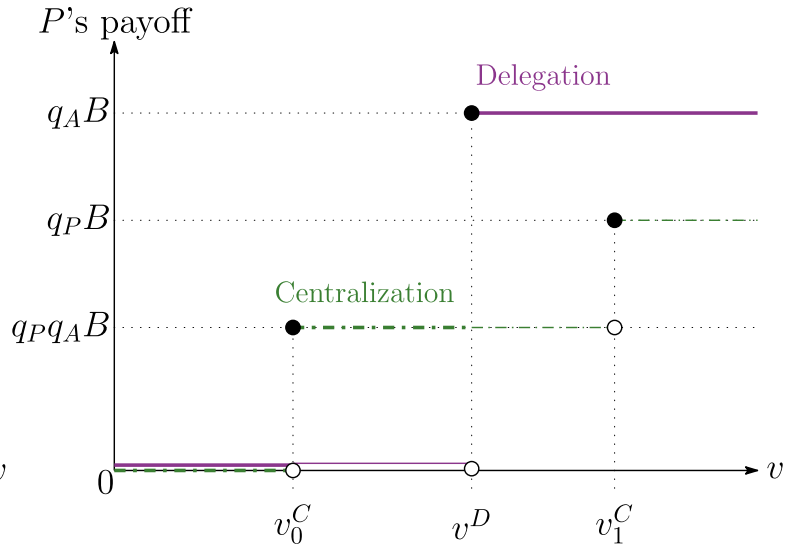
Appendix: Formal Allocation of Authority

Interpretation: Intermediate v

$\overline{q}_A > q_P > q_A$



$q_A \geq q_P$

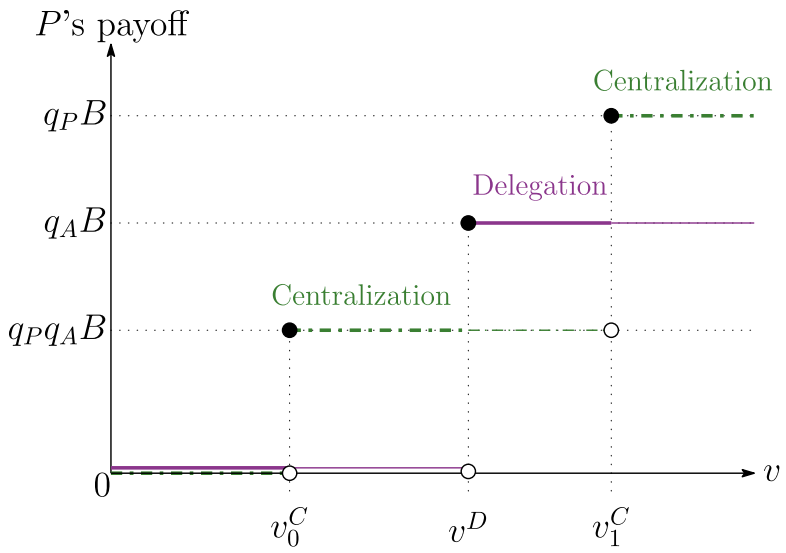


- $v \in [v^D, v_1^C)$: advantage of delegation
  - Centralization prevents A from exerting effort after observing $d \neq \theta_A$.
  - Delegation is optimal even when $q_A < q_P$ since A's confidence is not reduced.

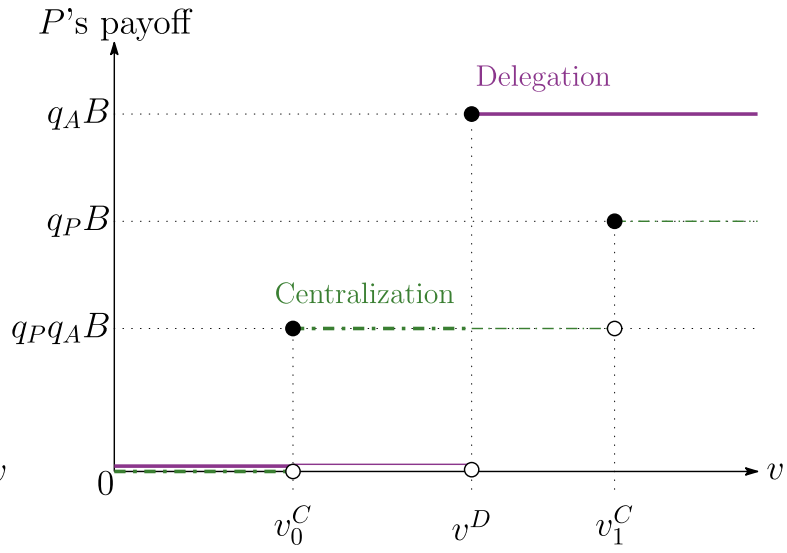
Appendix: Formal Allocation of Authority

Interpretation: Small v

$\overline{q}_A > q_P > q_A$



$q_A \geq q_P$



- $v \in [v_0^C, v^D)$: advantage of centralization
  - Delegation induces A to exert no effort.
  - Centralization is optimal even when $q_P < q_A$ since A's confidence is increased by observing $d = \theta_A$.

Appendix: Formal Allocation of Authority

Relation to Zábojník (2002)

- Zábojník (2002):
  - Incentive contracts are available.
  - No motivational advantage of centralization: centralization is optimal only when $q_P \geq q_A$.
    - Uncertainty of beliefs is costly for P.
- In our setup, centralization may be motivationally advantageous.
  - No incentive contracts.
  - When v is small,
    - centralization may induce effort; while
    - delegation does not induce effort at all.

Appendix: Formal Allocation of Authority

Relation to Zábojník (2002)

- Zábojník (2002): incentive contracts are available.
- When Δ is incentive payment for $x = 1$, (EIC) is

$$\begin{aligned} &\mathrm{Prob}(s = d \mid \theta_A, d)(b + \Delta) - c \geq 0 \\ \iff &\frac{1}{\mathrm{Prob}(s = d \mid \theta_A, d)} \leq \frac{b + \Delta}{c} \equiv \hat{v}(\Delta) \end{aligned}$$

  - Effort can always induced by sufficiently high Δ.
  - Under centralization, uncertainty of A's belief may yield A's rent if limited liability is imposed.
- In our setup, no incentive contracts $\implies \Delta = 0$.

Appendix: Empowerment

Revelation versus Concealment

- Informationally inferior A conceals his information.
- Suppose $q_A \leq q_P$ and $v^D \leq v < v_1^C$.
  - If A reports θ_A and P chooses $d = \theta_A$, then his payoff is $q_A b - c$.
  - If A conceals θ_A and P chooses $d = \theta_P$, then the project is executed only when $d = \theta_A$: his payoff is

$$\underbrace{q_A q_P}_{\text{Prob}(s=\theta_A=\theta_P)} \quad b - \underbrace{[q_A q_P + (1-q_A)(1-q_P)]}_{\text{Prob}(\theta_A=\theta_P)} c$$

  - The difference: $q_A(1-q_P)b - [q_A + q_P - 2q_A q_P]c$
    - negative for $q_A \leq q_P$.