Information Sharing between Vertical Hierarchies

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  - Sellers share information about consumers' demand
  - Firms disclose information about management's performance

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- Ganuza and Jansen (2012) show how information sharing affects firms' incentive to acquire signals about their costs

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- Link between information sharing and vertical contracting: Calzolari and Pavan (2006) analyze information transmission in sequential common agency

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- Principals face a *prisoner's dilemma* when they do not share information

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$\Rightarrow$ α measures **correlation** between θ_1 and θ_2;
$\Pr(\underline{\theta}) = \nu; \quad \Pr(\overline{\theta}) = 1 - \nu;$

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- *Limited liability* for agents

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- A_i's cost can be credibly transmitted by P_i to P_j / A_j

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5. Agents produce and payments are made

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- **Lemma:** *P_i's expected equilibrium profit is*

$$V_i^* = \kappa + (\underbrace{\mathbb{E}_{s_i}\left[q_i^*\left(s_i\right)|\theta_i\right]}_{\text{average of } q_i^*(s_i)})^2 + \underbrace{\mathbb{E}_{s_i}\left[q_i^*\left(s_i\right) - \mathbb{E}_{s_i}\left[q_i^*\left(s_i\right)|\theta_i\right)|\theta_i\right]\right]^2}_{\text{variance of } q_i^*(s_i)}.$$

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$\Rightarrow$ Principals maximize output volatility

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- **Proposition:** *Principals' information sharing decisions always maximize their profits*

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  3. Unilateral information sharing

No communication

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$$\mathbb{E}_{\theta_j}\mathbb{E}_{\theta_i}\left[S\left(q_i(\theta_i), q^e\left(\theta_j\right)\right) - \theta_i q_i\left(\theta_i\right)|\theta_i\right] - \nu\Delta\theta q_i(\overline{\theta})$$

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$\Rightarrow$ Type $\underline{\theta}$ produces the output that equalizes marginal benefit to marginal cost
Type $\overline{\theta}$'s output is downward distorted to reduce agents' rent

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  If goods are substitutes (complements), A_j's lower output induces A_i to produce more (less)

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(No full surplus extraction due to limited liability)

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  - $\Pr(\theta_j|\overline{\theta})$ measures how often output is inefficient

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- Distortion increases with $\frac{\Pr(\theta_j|\underline{\theta})}{\Pr(\theta_j|\overline{\theta})}$ since:
  - $\Pr\left(\theta_j|\underline{\theta}\right)$ measures how often P_i pays rent to type $\underline{\theta}$
  - $\Pr(\theta_j|\overline{\theta})$ measures how often output is inefficient

$$\frac{\Pr(\underline{\theta}|\underline{\theta})}{\Pr(\underline{\theta}|\overline{\theta})} > \frac{\Pr(\overline{\theta}|\underline{\theta})}{\Pr(\overline{\theta}|\overline{\theta})} \quad \Leftrightarrow \quad \alpha > 0,$$

$\Rightarrow$ if costs are positively correlated, the distortion of type $\overline{\theta}$'s output is larger when his opponent has a low rather than a high cost, since this is more likely

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$\Rightarrow$ Strategic linkage between P_i's output and A_j's cost

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$\Rightarrow$ P_j has a *competitive advantage* relative to P_i since she can impose a higher distortion in the less likely states

Do principals share information?

- **Proposition**: *When agents are privately informed about their marginal costs:*

  - *If* $\delta\alpha < 0$, *there is a unique equilibrium in dominant strategies in which both principals share information*
  - *If* $\delta\alpha > 0$, *there is a unique equilibrium in dominant strategies in which no principal shares information*
  - *If* $\delta = 0$, *principals are indifferent between sharing information or not*

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  - This reduces P_i's profits with strategic complements ($\delta > 0$) since P_i wants to produce less when P_j produces less
- The effect is of first-order: only the sign of δ matters and not its magnitude

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- **Corollary.** *Principals' decision not to share information when* $\delta\alpha > 0$ *does not maximize their joint profits*

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  - reduce agents' information rents
- Incentive to share information only depend on the sign of $\delta\alpha$