

Information, Knowledge, and Organizational Design

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- Accidental data scientist: application of big data in the social sciences

Information and Knowledge in Economics

- Information lies in the core of modern economic analysis.
 - ▶ Information is the source of uncertainty. The characterization of uncertainties (e.g., risks) is largely (mathematical) description of information.
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- Knowledge is an important element in economics.
 - ▶ The knowledge embodied in humans: human capital, education, creativity.
 - ▶ The knowledge embodied in technology: innovation, patent

Economics of Hierarchy

- Big questions
 - ▶ Why do hierarchies exist? (Coase, 1937; Simon 1947; Arrow 1975; Williamson 1975)
 - ▶ Why do firms employ different organizational structure? (Chandler 1961; Rajan and Wulf 2006, 2012; Bloom and Van Reenen 2007, 2012)
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 - ▶ How to design optimal organizational structure?
- Economic theory of organizational design
 - ▶ Motivate agents with different preferences to exert an efficient level of joint effort
 - ▶ Coordinate agents with different information to achieve collective outcomes

Two Economic Views of Hierarchy

- Motivation view of hierarchy
 - ▶ Hierarchies emerge to mitigate agency problems (Alchian and Demsetz 1972)
 - ▶ Modeling framework (1): contract theory (Holmstrom 1979, 1982, Holmstrom and Milgrom 1991)
 - ▶ Modeling framework (2): incomplete contract (Grossman-Hart-Moore, 1986, 1990; Aghion and Tirole 1997)

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- Coordination view of hierarchy
 - ▶ Hierarchy emerges to aggregate information and coordinate actions (Arrow 1974)
 - ▶ Modeling framework (1): team theory (Marschak and Radner 1972)
 - ▶ Modeling framework (2): knowledge-based hierarchy (Garicano 2000)

My Research along this Line

- Authority, Incentives, and Performance: Evidence from a Chinese Newspaper (Wu, 2016, REStat)
 - ▶ Design to test the Aghion and Tirole theory of the allocation of decision rights
 - ▶ Central trade-off: control versus initiative to use local knowledge
 - ▶ Combine Holmstrom-Milgrom multitasking theory to reconcile empirical findings

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- Knowledge, Communication, and Organizational Capabilities (Garicano and Wu, 2012, OS)
 - ▶ Connect ideas in the economic theories of coordination-based hierarchies to strategy research
 - ▶ Build a coherent framework that incorporates a large class of theoretical models and is easy to work on
 - ▶ Organizational Structure and Product Choice in Knowledge-Intensive Firms (Wu, 2015, MS)

Knowledge and Organizational Design

- Knowledge: information used to solve problems (tasks)
 - ▶ Property 1: Knowledge is costly to acquire but can be used many times after acquisition
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- Knowledge-based hierarchy
 - ▶ Specialization: Knowledge acquisition (P1)
 - ▶ Managers as helpers: costly communication (P2)
 - ▶ Hierarchy: minimize the cost of acquisition and intensify the use of knowledge (P1+2)
 - ▶ Managers as translators: codify knowledge (P2)
 - ▶ Organizational growth: knowledge acquisition (labor markets) and communication (ICT, corporate culture)

The Role of Knowledge in Economic Development

- Lucas (1978, Bell): the firm size distribution is determined by managers' ability
- Rosen (1981, AER): superstars are generated by disproportionate demand for high talent
- Lucas (2007-2012): idea flow, knowledge growth, and economic development
- Garicano and Rossi-Hansberg (2015, Annual Review of Economics): knowledge-based hierarchy in market and economy
- Wu (2017, Economic Journal): incentive contract and allocation of talent