

Authority, Risk Aversion, and Adaptation to Unforeseen Disturbances*

Yusuke Mori[†]

Ritsumeikan University

Abstract

We introduce a model of the firm based on risk aversion. Non-risk-loving transacting parties adapt to completely unforeseen disturbances where authority (decision-making) structure is non-cooperatively determined. We demonstrate that working under a partner with a different preference for adaptative actions reduces uncertainty about which action is taken. Then, an authority relationship emerges when an appropriate adaptive decision is relatively unimportant and risk aversion is sufficiently high, whereas the welfare-maximizing authority structure remains independent of risk aversion. Furthermore, whereas lower risk aversion entails a higher probability of obtaining authority, a party with the lowest risk aversion may work under the partner.

Keywords: Unprogrammed adaptation; risk aversion; unforeseen disturbances; authority.

JEL Classification: D23, L14

*I thank Hideshi Itoh and the participants in the Contract Theory Workshop for their helpful comments. I gratefully acknowledge a grant from the Japan Society for the Promotion of Science (22K01489). All remaining errors are my own.

[†]College of Business Administration, Ritsumeikan University, 2-150 Iwakura-cho, Ibaraki-shi, Osaka 567-8570, Japan. Telephone: +81-72-665-2090. E-mail: ymori@fc.ritsumei.ac.jp.

1 Introduction

Since Coase's (1937) seminal work, various theories of the firm have been proposed. Gibbons (2005) categorizes these into the rent-seeking theory (e.g., Williamson 1971), property-rights theory (e.g., Hart 1995), incentive-system theory (e.g., Holmstrom and Milgrom 1991 and 1994), and adaptation theory (e.g., Simon 1951; Baker et al. 2008, 2011). These formal(izable) theories generally assume that transacting parties can devise and commit a welfare-maximizing *ex ante* contractual arrangement (e.g., authority and asset ownership structures). While this welfare-maximization approach to the theory of the firm simplifies analysis, it is not without limitations. First, the welfare-maximization approach ignores relevant parties' incentives, especially the one to work under the authority of another party, which does not seem appropriate considering conflicts and disputes in real-world M&A transactions. Second, whereas adaptations to unanticipated disturbances in transacting circumstances have been considered as the central problem of economic organizations in the literature (e.g., transaction cost economics; Tadelis and Williamson 2013), the existing theories, including transaction cost economics, focus on sufficiently foreseeable disturbances in the sense that the parties can correctly anticipate their consequences (i.e., inefficiencies caused by contract incompleteness, including haggling, maladaptation, and hold-up problems) and devise contractual arrangements to restore efficiency in advance.

This study introduces a new model of the firm, which departs from the existing models of the firm in the following ways. First, we consider completely unforeseeable disturbances (i.e., the parties cannot even see the possibility of their occurrence *ex ante*), which means that no *ex ante* contractual arrangement is available to deal with the consequence of the disturbances.¹ Thus, decision-making (authority) structures are finalized not at the time of writing an *ex ante* contract but at the time of *ex post* adaptation to the disturbances since it may be hard for the parties to commit an authority allocation specified by the contract, which does not reflect the consequences of completely unforeseeable disturbances at all.² Our approach is compatible with the dynamic capabilities framework (e.g., Teece 2007), in which firms need to realign structures and activities in response to changes in a business environment. Second, to explicitly analyze incentives to acquire and hand over the decision right over the adaptation, we focus on non-cooperatively

¹We do not examine why incomplete contracts prevail. For the literature on deliberately incomplete contracts, see Halonen-Akatwijuka and Hart (2024).

²Criticism on the assumption of high commitment ability can be found in Cai (2003).

determined authority structures rather than welfare-maximizing structures. Specifically, in our model, party i 's authority (i.e., integration by party i) is established if i demands a decision right over an adaptive decision, and $j(\neq i)$ accepts this demand. Third, our model explicitly focuses on risk aversion, which is confirmed as a crucial determinant of whether an individual becomes self-employed or employed by numerous empirical evidence (see Simoes et al. 2016 for a review) but has been overlooked by the existing formal theories of the firm.

Our model considers two non-risk-loving transacting parties adapting *ex post* to a completely unforeseen disturbance in their transacting circumstances. Upon occurrence, two adaptive actions become available, and both parties observe the non-contractible identity of the appropriate action given the new circumstances. Their preferences for actions differ, and selecting the appropriate action provides each party with an additional payoff. The adaptive decision remains non-contractible, both *ex ante* and *ex post*. We employ a two-period authority-demand game to model renegotiation over a decision right: one party may initially demand authority over the adaptation, and if this demand is rejected, the first responder gains the right to make a second demand. If either demand is accepted, the accepted demander gains authority and selects the adaptive action. However, if no demand is accepted or made, no authority relationship emerges, and the decision right is allocated probabilistically (e.g., through a control fight).

Most existing models of authority consider asset ownership as a source of authority (e.g., Van den Steen 2010a). However, our model abstracts asset ownership; our approach is inspired by the criticism of viewing the firm as a collection of physical assets (e.g., Chou 2007) and the prevalence of asset-less firms (e.g., He 2016). Our focus is on the consequence of acquiring authority rather than the source of authority; in our model, there is a higher probability of the party with authority making the adaptive decision than its counterpart without authority. Our description of authority is compatible with the literature, in which authority is defined as a right to select actions (e.g., Simon 1951; Aghion and Tirole 1997).

This study indicates that an authority relationship (i.e., a decision-making structure in which one party allows the other to decide which adaptive action to undertake) is established if the appropriateness of the action is not sufficiently important (i.e., the additional payoff from choosing the appropriate adaptive action is not sufficiently high) and each party's risk aversion is reasonably high; otherwise, no authority prevails. Working under another party's authority reduces the possibility for undertaking his/her preferred adaptive action; however, this may

reduce uncertainty about the action choice and thereby economize a risk premium. Thus, if the uncertainty regarding the action choice is suitably high (i.e., if the appropriateness is not adequately important to ensure that both parties undertake the appropriate action), the party exposed to sufficiently high risk aversion prefers the other party’s authority to no authority. Our result contrasts with that of the traditional welfare-maximization approach: the welfare-maximizing decision-making structure is independent of risk aversion.

Among the four existing theories of the firm, our model is strongly related to the adaptation theory (e.g., Simon 1951; Baker et al. 2008, 2011) in that the adaptive decision is non-contractible both *ex ante* and *ex post*. Whereas the adaptation-theory models assume that decision-rights allocations specified in *ex ante* contracts cannot be renegotiated, authority structures in our model are finalized *ex post*.

This study relates specifically to Raith (2023), who compares employment to contract labor under *ex ante* uncertainty regarding the benefits and costs of tasks, in that both Raith (2023) and our study consider non-cooperatively determined authority structures. However, our study differs from Raith (2023) in the following two ways. First, Raith (2023) assumes that contract labor and employment differ in workers’ default payoffs (i.e., no trade with contract labor and the employer’s designated task with employment), whereas the authority in our model affects the probability of obtaining the decision right over the adaptation. Second, whereas Raith (2023) focuses on relational contracting, we instead consider risk aversion.

This study also relates to the literature on firm boundaries and *ex post* inefficiencies (e.g., Bajari and Tadelis 2001; Matouschek 2004; Schmitz 2006; Schmitz 2008; Goldlücke and Schmitz 2014; Powell 2015; Mori 2017). While most existing formal models focus on *ex post* inefficiencies caused by asymmetric information (e.g., haggling and maladaptation), the risk premium is the main *ex post* inefficiency in our model.³ In addition, we adhere to the traditional assumption (i.e., risk aversion) rather than employing behavioral assumptions, including shading triggered by aggrievement (e.g., Hart and Moore 2008; Hart and Holmstrom 2010) and loss aversion (Herweg and Schmidt 2015).

To the best of our knowledge, there are only a few formal models of self-employment and risk attitudes (e.g., Kihlstrom and Laffont 1979; Kanbur 1979). They assume that self-employment (i.e., operating a firm with a risky production function) is a riskier occupational choice than

³Whereas these models and ours consider bilateral monopoly, Ellingsen and Miettinen (2024) have developed a model of costly renegotiation under multi-sourcing.

wage employment (i.e., working for a riskless wage) and analyze a perfectly competitive labor market by employing a general equilibrium framework. Whereas their results and ours show that lower risk aversion leads to a higher probability of self-employment, we also show that a party with the lower risk aversion can choose to work under the partner with the higher risk aversion. In addition, our model differs from these existing models in several ways. First, we assume no risk asymmetry between the occupations (i.e., the employer and employee). Second, our model considers bilateral monopoly, which is inspired by Williamson’s “fundamental transformation” from *ex ante* competitive condition to *ex post* bilateral monopoly (e.g., Williamson, 1975).

This study focuses on the “right to decide” aspect of authority. Existing studies in line with this perspective consider the distinction between formal and real authority (e.g., Aghion and Tirole 1997; Aghion et al. 2004; Hart and Moore 2005), delegation to a well-informed but biased agent (e.g., Dessein 2002; Harris and Raviv 2005; Alonso and Matouschek 2007), external labor market condition (e.g., Marino et al. 2010), tradeoff between local adaptation and coordination (e.g., Dessein and Santos 2006; Alonso et al. 2008; Rantakari 2008), and differing priors (e.g., Van den Steen 2010a and 2010b). Unlike these, our model considers no asymmetric information, no strategic information transmission, bilateral monopoly between the transacting parties, single-decision situation (no coordination between agents), and no differing prior.

The remainder of this paper is organized as follows: Section 2 introduces our proposed model. Section 3 analyzes the model, presents the results, and compares them with the results of the traditional welfare-maximization approach. Section 4 presents the conclusions.

2 The model

Two non-risk-loving transacting parties, S and B , adapt to an unforeseen disturbance in their transacting circumstance. As the disturbance is completely unforeseeable, no effective *ex ante* contractual arrangement is available for its resolution. The game proceeds as follows (there is no discounting):

1. The unforeseen disturbance occurs, and two adaptive actions, a_S and a_B , are available; party $i \in \{S, B\}$ favors a_i and the adaptive decision is non-contractible both *ex ante* and *ex post*.⁴

⁴We can also think of the $N(\geq 3)$ -actions case in which $N-2$ actions apart from a_S and a_B are irrelevant.

2. Either a_S or a_B proves to be the appropriate action (i.e., action that fits the altered circumstance better), whose identity is observable to both parties but non-contractible.
3. Either party (say, party i) can demand a decision right over the adaptive action.⁵ If i makes no demand, timing 5 follows. We refer to the party who makes the demand at this time as the first demander. We consider the case in which no monetary transfer is possible.⁶
4. Party $j(\neq i)$, referred to as the first responder, decides whether to accept i 's demand. If j rejects the demand, timing 5 follows; if j accepts it, i 's authority (**i**) is established and timing 7 follows.
5. Party j (the second demander) can demand the decision right over the adaptive action. If j makes no demand, no authority (**N**) prevails and timing 7 follows.
6. Party i (the second responder) decides whether to accept j 's demand. If j 's demand is accepted, j 's authority (**j**) is established; if the demand is rejected, **N** prevails.
7. The adaptive action is made. The decision-making structures (**N**, **S**, and **B**) differ only in the decision-maker designation: let p_{ig} denote the probability of party i 's becoming the decision maker under a decision-making structure $\mathbf{g} \in \{\mathbf{N}, \mathbf{S}, \mathbf{B}\}$ ($p_{S\mathbf{g}} + p_{B\mathbf{g}} = 1$), then we assume⁷

$$p_{i\mathbf{N}} \equiv 1/2, \quad p_{ii} = 1, \quad p_{ij} = 0.$$

The party with authority chooses the adaptive action under **S** and **B**; however, under **N**, the fight over the adaptive decision takes place, and party i wins with probability 1/2.

We describe i 's payoff as the approximation of i 's certainty equivalent: let m_i represent i 's material payoff, then, i 's overall expected payoff under $\mathbf{g}$ is given by

$$\pi_i^{\mathbf{g}} \equiv E[m_i] - \frac{1}{2} r_i \text{Var}[m_i],$$

where $r_i(\geq 0)$ represents i 's absolute risk aversion, which is observable to both parties.⁸ m_i

⁵The probability, with which each party can first demand the decision right, does not matter, and thus, requires no further specification.

⁶If monetary transfer is possible, equilibrium authority structures coincide with welfare-maximizing structures.

⁷Our results do not qualitatively change as long as $\max[p_{S\mathbf{N}}, p_{B\mathbf{N}}] < \min[p_{SS}, p_{BB}]$ holds.

⁸The alternative assumption of unobservable risk aversion does not alter our main insight (i.e., each party may choose to work under the partner's authority to economize risk premium).

depends on if i 's preferred action is chosen and if the chosen action is appropriate. Specifically, undertaking a_i yields an inalienable benefit h_i to party i and l_j to j , where $h_i > l_i \geq 0$ for all $i \in \{S, B\}$ and undertaking the appropriate action provides party i (resp. j) with an additional payoff Δ_i (resp. Δ_j), which is larger than or equal to 0. h_i , l_i , and Δ_i are observable but non-contractible throughout.

3 Analysis

We consider the situation in which a_j has proven to be the appropriate adaptive action without loss of generality. For convenience, we refer to party i (resp. j) as “he” (resp. “she”).

3.1 Equilibrium adaptive actions

Using backward induction, we first identify the equilibrium adaptive actions. Conditional on a_j 's appropriateness, it is immediate that party j undertakes a_j , but i 's equilibrium adaptive action depends on the importance of the action appropriateness, namely Δ_i . Thus, there are two cases to be analyzed separately:

- Case I ($h_i - l_i < \Delta_i$) i prioritizes appropriateness over his own preference; both parties undertake the appropriate action a_j .
- Case II ($h_i - l_i \geq \Delta_i$) i prioritizes his own preference over appropriateness; S chooses a_S , whereas B chooses a_B .

3.2 Incentives to accept the other party's authority

Next, we analyze the authority-demand stage (timings 3–6), particularly under which condition each party accepts the other party's authority in each of the above-mentioned cases.

3.2.1 Case I: $h_i - l_i < \Delta_i$ (i prioritizes appropriateness over preference)

As both parties choose the appropriate action a_j , each party's overall payoff is given as follows:

$$\pi_i^{\mathbf{g}} = l_i + \Delta_i,$$

$$\pi_j^{\mathbf{g}} = h_j + \Delta_j.$$

As $\pi_i^{\mathbf{g}}$ and $\pi_j^{\mathbf{g}}$ do not depend on $\mathbf{g}$, the following result is immediately obtained:

Proposition 1 Suppose a_j is the appropriate adaptive action and $h_i - l_i < \Delta_i$ holds, then both parties are indifferent among the three decision-making structures.

Proposition 1 implies that if $h_i - l_i < \Delta_i$ holds, there is no positive reason for each party to demand the decision right and accept the partner's authority demand.

3.2.2 Case II: $h_i - l_i \geq \Delta_i$ (i prioritizes preference over appropriateness)

As the selected action depends on the identity of the decision maker (i.e., S chooses a_S , whereas B chooses a_B), each party's overall expected payoff is given as follows:

$$\pi_i^g = p_{jg}l_i + (1-p_{jg})h_i + p_{jg}\Delta_i - \frac{1}{2}r_i p_{jg}(1-p_{jg})(h_i - l_i - \Delta_i)^2,$$

$$\pi_j^g = p_{jg}h_j + (1-p_{jg})l_j + p_{jg}\Delta_j - \frac{1}{2}r_j p_{jg}(1-p_{jg})(h_j - l_j + \Delta_j)^2.$$

As it may be uncertain about the adaptive action that is undertaken, the adaptation may entail a risk premium, whose size depends on g . A comparison of these payoffs yields the following results:

$$\pi_i^i > \pi_i^N, \quad (1)$$

$$\begin{cases} \pi_i^j > \pi_i^N & \text{if } r_i > \frac{4}{h_i - (l_i + \Delta_i)}, \\ \pi_i^j \leq \pi_i^N & \text{otherwise,} \end{cases} \quad (2)$$

and

$$\begin{cases} \pi_j^i > \pi_j^N & \text{if } r_j > \frac{4}{(h_j + \Delta_j) - l_j}, \\ \pi_j^i \leq \pi_j^N & \text{otherwise.} \end{cases} \quad (3)$$

(1) implies that it is weakly optimal for both the first and second demanders to demand authority. Given (2) and (3), party i (if the second responder) accepts the other's authority demand iff $\pi_i^N \leq \pi_i^j$; i (if the first responder) accepts the demand iff $\pi_i^N \leq \pi_i^j$ and $\pi_j^N > \pi_j^i$ as his rejection provides him an opportunity to make an authority demand at timing 5.

The above analysis provides the equilibrium decision-making structures.

Proposition 2 Suppose a_j is the appropriate adaptive action and $h_i - l_i \geq \Delta_i$ holds, the equilibrium decision-making structures are summarized as follows:

- if $r_i \leq \frac{4}{h_i - (l_i + \Delta_i)}$ and $r_j \leq \frac{4}{(h_j + \Delta_j) - l_j}$, N ,

- if $r_i > \frac{4}{h_i - (l_i + \Delta_i)}$ and $r_j \leq \frac{4}{(h_j + \Delta_j) - l_j}$, **j**,
- if $r_i \leq \frac{4}{h_i - (l_i + \Delta_i)}$ and $r_j > \frac{4}{(h_j + \Delta_j) - l_j}$, **i**,
- if $r_i > \frac{4}{h_i - (l_i + \Delta_i)}$ and $r_j > \frac{4}{(h_j + \Delta_j) - l_j}$,

$$\begin{cases} \mathbf{i} & \text{if } j \text{ is the first demander,} \\ \mathbf{j} & \text{if } i \text{ is the first demander.} \end{cases}$$

Risk-averse parties incur risk premiums owing to the probabilistic identity of the decision maker (and the resulting action choice) under **N**; however, they will not incur any risk premiums under **S** and **B**. Thus, **N** prevails if each party's risk aversion is sufficiently low (see the first bullet point of Proposition 2). This implies that risk-neutral party i (i.e., $r_i=0$) never works under the other's authority.

Proposition 2 suggests that lower risk aversion entails a higher probability of obtaining the decision right (authority), which is consistent with the empirical evidence on risk attitude and self-employment (see Simoes et al. 2016 for a review). However, Proposition 2 implies that the equilibrium authority structure is determined not only by risk aversion but also by the loss owing to the lack of authority. Specifically, the second and third bullet points of Proposition 2 imply that the party with the lower risk aversion may work under the partner with the higher risk aversion. For example, the third bullet point indicates that, even under $0 < r_j < r_i$, **i** can prevail if j 's loss owing to the lack of authority (i.e., $(h_j + \Delta_j) - l_j$) is sufficiently larger than i 's (i.e., $h_i - (l_i + \Delta_i)$). Relatedly, each party i is more likely to accept the partner's authority when a_i is the appropriate action than when it is not; i 's loss owing to the lack of authority is $(h_i + \Delta_i) - l_i$ in the former case and $h_i - (l_i + \Delta_i)$ in the latter case.

Thus, we have the following corollary about the emergence of the authority relationship:

Corollary 1 *Suppose a_j is the appropriate adaptive action. The authority relationship (i.e., **S** or **B**) is established iff*

1. *the appropriateness of the action is not sufficiently important (i.e., $h_i - l_i \geq \Delta_i$ holds), and*
2. *risk aversion is sufficiently high (i.e., either or both $r_i > \frac{4}{h_i - (l_i + \Delta_i)}$ and $r_j > \frac{4}{(h_j + \Delta_j) - l_j}$ hold).*

The first point of Corollary 1 implies that **i** may be established if i has a sufficiently high bias in favor of his preferred action. The literature on leadership and commitment (e.g., Rotemberg and

Saloner 2000 on favoritism; Steen 2005 on differing beliefs about the right action; and Bolton et al. 2013 on overconfidence in belief precision) shows that when there are multiple directions that a team can pursue, a boss' bias in favor of a particular direction enhances team performance by inducing subordinates' concentrated efforts in that direction. These studies and ours indicate that the boss' bias is a key determinant of the relationship between relevant parties.

3.3 Welfare-maximizing decision-making structure

This subsection presents the optimal (i.e., welfare-maximizing) decision-making structures that the existing models of the firm have focused on and examines how these optimal structures differ from the equilibrium structures specified in Proposition 2.

In Case I ($h_i - l_i < \Delta_i$), as we have checked in Section 3.2.1, the aggregate overall payoff does not depend on the decision-making structure (i.e., $l_i + h_j + \Delta_i + \Delta_j$ regardless of $\mathbf{g}$); therefore, $\mathbf{N}$, $\mathbf{S}$, and $\mathbf{B}$ are indifferent (i.e., Proposition 1 prevails even under the welfare-maximization approach).

In Case II ($h_i - l_i \geq \Delta_i$), the aggregated overall expected payoff under $\mathbf{g} (\equiv \pi_S^{\mathbf{g}} + \pi_B^{\mathbf{g}})$ is

$$\begin{aligned} \Pi_{\mathbf{g}} = & p_{j\mathbf{g}}(h_j + l_i) + (1 - p_{j\mathbf{g}})(l_j + h_i) + p_{j\mathbf{g}}(\Delta_i + \Delta_j) \\ & - \frac{1}{2}r_j p_{j\mathbf{g}}(1 - p_{j\mathbf{g}})\{h_j - l_j + \Delta_j\}^2 - \frac{1}{2}r_i p_{j\mathbf{g}}(1 - p_{j\mathbf{g}})\{h_i - l_i - \Delta_i\}^2. \end{aligned}$$

A comparison between $\Pi_{\mathbf{j}}$ and $\Pi_{\mathbf{i}}$ yields

$$\begin{cases} \Pi_{\mathbf{j}} > \Pi_{\mathbf{i}} & \text{if } (h_i - l_i) - (h_j - l_j) < \Delta_i + \Delta_j, \\ \Pi_{\mathbf{j}} \leq \Pi_{\mathbf{i}} & \text{otherwise.} \end{cases} \quad (4)$$

Given (4), $\mathbf{N}$ turns out to be suboptimal: $\Pi_{\mathbf{j}} > \Pi_{\mathbf{N}}$ holds if $(h_i - l_i) - (h_j - l_j) < \Delta_i + \Delta_j$, and $\Pi_{\mathbf{i}} > \Pi_{\mathbf{N}}$ holds if $(h_i - l_i) - (h_j - l_j) \geq \Delta_i + \Delta_j$. Then, we derive the following result:

Proposition 3 *Suppose a_j is the appropriate adaptive action and $h_i - l_i \geq \Delta_i$ holds. The optimal decision-making structures are summarized as follows:*

$$\begin{cases} \mathbf{j} & \text{if } (h_i - l_i) - (h_j - l_j) < \Delta_i + \Delta_j, \\ \mathbf{i} & \text{otherwise.} \end{cases}$$

Proposition 3 implies that, even if a_j is the appropriate action, $\mathbf{i}$ prevails if i 's preference is far more important than the overall appropriateness.

The welfare-maximization approach exhibits a qualitatively different result from Proposition 2 if $h_i - l_i \geq \Delta_i$. First, whereas $\mathbf{N}$ can be the equilibrium decision-making structure, it will never be the optimal structure because of the risk premiums, which only $\mathbf{N}$ entails. Second, as the optimal structures entail no risk premium, their identities do not depend on each party's risk aversion, which crucially determines the equilibrium structures.

4 Conclusion

We introduce a new model of the firm based on risk aversion, in which non-risk-loving transacting parties engage in *ex post* adaptation to completely unforeseen changes in transacting circumstances. Our model complements the existing theories of the firm, which are characterized by welfare maximization, by examining non-cooperatively determined authority (decision-making) structures. We point out that working under a partner with a different preference for adaptive actions reduces uncertainty about which action is taken and thereby economizes a risk premium. Then, an authority relationship is established if the appropriateness of the adaptive action is not sufficiently important and each party's risk aversion is adequately high. Our equilibrium authority structures differ from the optimal (i.e., welfare-maximizing) structures whose identities do not depend on risk aversion; this difference in the results implies that the traditional welfare-maximizing approach overly mutes the impact of risk aversion.

References

- Aghion, Philippe, Mathias Dewatripont, and Patrick Rey. "Transferable control." *Journal of the European Economic Association* 2, no. 1 (2004): 115-138.
<https://doi.org/10.1162/154247604323015508>
- Aghion, Philippe, and Jean Tirole. "Formal and real authority in organizations." *Journal of Political Economy* 105, no. 1 (1997): 1-29. <https://doi.org/10.1086/262063>
- Alonso, Ricardo, Wouter Dessein, and Niko Matouschek. "When does coordination require centralization?" *American Economic Review* 98, no. 1 (2008): 145-179.
<https://doi.org/10.1257/aer.98.1.145>
- Alonso, Ricardo and Niko Matouschek. "Relational delegation." *RAND Journal of Economics* 38, no. 4 (2007): 1070-1089. <https://doi.org/10.1111/j.0741-6261.2007.00126.x>

- Bajari, Patrick, and Steven Tadelis. "Incentives versus transaction costs: a theory of procurement contracts." *RAND Journal of Economics* 32, no.3 (2001): 387-407.
<https://doi.org/10.2307/2696361>
- Baker, George P., Robert S. Gibbons, and Kevin J. Murphy. "Strategic alliances: bridges between "islands of conscious power"." *Journal of the Japanese and International Economies* 22,no.2 (2008): 146-163. <https://doi.org/10.1016/j.jjie.2008.03.001>
- Baker, George P., Robert S. Gibbons, and Kevin J. Murphy. "Relational adaptation." (2011) mimeo.
- Bolton, Patrick, Markus K. Brunnermeier, and Laura Veldkamp. "Leadership, coordination, and corporate culture." *Review of Economic Studies* 80,no.2 (2013): 512-537.
<https://doi.org/10.1093/restud/rds041>
- Cai, Hongbin. "A theory of joint asset ownership." *RAND Journal of Economics* 34, no. 1 (2003): 63-77. <https://doi.org/10.2307/3087443>
- Chou, Eric S. "The boundaries of firms as information barriers." *RAND Journal of Economics* 38, no.3 (2007): 733-746. <https://doi.org/10.1111/j.0741-6261.2007.00109.x>
- Coase, Ronald H. "The nature of the firm." *Economica* 4 (1937): 386-405.
<https://doi.org/10.1111/j.1468-0335.1937.tb00002.x>
- Dessein, Wouter. "Authority and communication in organizations." *Review of Economic Studies* 69.4 (2002): 811-838. <https://doi.org/10.1111/1467-937X.00227>
- Dessein, Wouter, and Tano Santos. "Adaptive organizations." *Journal of Political Economy* 114,no.5 (2006): 956-995. <https://doi.org/10.1086/508031>
- Ellingsen, Tore, and Topi Miettinen. "Markets and hierarchies: a simple model of governance." (2024), mimeo.
- Gibbons, Robert. "Four formal (izable) theories of the firm?" *Journal of Economic Behavior & Organization* 58,no.2 (2005): 200-245. <https://doi.org/10.1016/j.jebo.2004.09.010>
- Goldlücke, Susanne, and Patrick W. Schmitz, "Investments as signals of outside options." *Journal of Economic Theory* 150 (2014): 683-708.
<https://doi.org/10.1016/j.jet.2013.12.001>
- Halonen-Akatwijuka, Maija, and Oliver Hart. *More is Less: Why Parties May Deliberately Write Incomplete Contracts*. Cambridge University Press, 2024.
- Harris, Milton, and Artur Raviv. "Allocation of decision-making authority." *Review of*

- Finance 9, no.3 (2005): 353-383. <https://doi.org/10.1007/s10679-005-2263-z>
- Hart, Oliver. *Firms, contracts, and financial structure*. Clarendon press, 1995.
- Hart, Oliver, and Bengt Holmstrom. "A theory of firm scope." Quarterly Journal of Economics 125, no.2 (2010): 483-513. <https://doi.org/10.1162/qjec.2010.125.2.483>
- Hart, Oliver, and John Moore. "On the design of hierarchies: coordination versus specialization." Journal of Political Economy 113, no.4 (2005): 675-702. <https://doi.org/10.1086/431794>
- Hart, Oliver, and John Moore. "Contracts as reference points." Quarterly Journal of Economics 123, no.1 (2008): 1-48. <https://doi.org/10.1162/qjec.2008.123.1.1>
- He, Leshui. "Beyond asset ownership: employment and assetless firms in the property rights theory of the firm." Journal of Economic Behavior & Organization, 130 (2016): 261-273. <https://doi.org/10.1016/j.jebo.2016.08.003>
- Herweg, Fabian, and Klaus M. Schmidt. "Loss aversion and inefficient renegotiation." Review of Economic Studies 82, no.1 (2015): 297-332. <https://doi.org/10.1093/restud/rdu034>
- Holmstrom, Bengt, and Paul Milgrom. "Multitask principal-agent analyses: incentive contracts, asset ownership, and job design." The Journal of Law, Economics, & Organization 7, Special Issue (1991): 24-52. https://doi.org/10.1093/jleo/7.special_issue.24
- Holmstrom, Bengt, and Paul Milgrom. "The firm as an incentive system." American Economic Review 84, no.4 (1994): 972-991. <https://www.jstor.org/stable/2118041>
- Kanbur, Steven M. "Of risk taking and the personal distribution of income." Journal of Political Economy 87, no.4 (1979): 769-797. <https://doi.org/10.1086/260792>
- Kihlstrom, Richard E., and Jean-Jacques Laffont. "A general equilibrium entrepreneurial theory of firm formation based on risk aversion." Journal of Political Economy 87, no.4 (1979): 719-748. <https://doi.org/10.1086/260790>
- Marino, Anthony M., John G. Matsusaka, and Ján Zábajník. "Disobedience and authority." Journal of Law, Economics, & Organization 26, no.3 (2010): 427-459. <https://doi.org/10.1093/jleo/ewp005>
- Matouschek, Niko. "*Ex post* inefficiencies in a property rights theory of the firm." Journal of Law, Economics, & Organization 20, no.1 (2004): 125-147. <https://doi.org/10.1093/jleo/ewh026>

- Mori, Yusuke. "A formal model of firm boundaries and haggling." *Economics Letters* 156 (2017): 15-17. <https://doi.org/10.1016/j.econlet.2017.03.037>
- Powell, Michael. "An influence-cost model of organizational practices and firm boundaries." *Journal of Law, Economics, & Organization* 31.suppl_1 (2015): i104-i142. <https://doi.org/10.1093/jleo/ewv005>
- Raith, Michael. "Employee or contractor? a theory of the labor boundaries of the firm." (2023), mimeo.
- Rantakari, Heikki. "Governing adaptation." *Review of Economic Studies* 75, no.4 (2008): 1257-1285. <http://hdl.handle.net/10.1111/j.1467-937X.2008.00518.x>
- Rotemberg, Julio J., and Garth Saloner. "Visionaries, managers, and strategic direction." *RAND Journal of Economics* 31, no. 4 (2000): 693-716. <https://doi.org/10.2307/2696355>
- Schmitz, Patrick W. "Information gathering, transaction costs, and the property rights approach." *American Economic Review* 96, no.1 (2006): 422-434. <https://doi.org/10.1257/000282806776157722>
- Schmitz, Patrick W. "Joint ownership and the hold-up problem under asymmetric information." *Economics Letters* 99, no.3 (2008): 577-580. <https://doi.org/10.1016/j.econlet.2007.10.008>
- Simoes, Nadia, Nuno Crespo, and Sandrina B. Moreira. "Individual determinants of self - employment entry: what do we really know?" *Journal of Economic Surveys* 30, no.4 (2016): 783-806. <https://doi.org/10.1111/joes.12111>
- Simon, A. Herbert . "A formal theory of the employment relationship." *Econometrica: Journal of the Econometric Society* 19, no. 3 (1951): 293-305. <https://doi.org/10.2307/1906815>
- Tadelis, Steven, and Oliver E. Williamson. "Transaction cost economics." Gibbons R, Roberts J (ed.) *Handbook of Organisational Economics*, Chapter. 4. (2013): 159-189. <https://doi.org/10.1515/9781400845354-006>
- Teece, David. J. "Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance." *Strategic Management Journal* 28, issue 13 (2007): 1319-1350. <https://doi.org/10.1002/smj.640>
- Van den Steen, Eric. "Organizational beliefs and managerial vision." *Journal of Law,*

- Economics, & Organization 21, no.1 (2005): 256-283.
<https://doi.org/10.1093/jleo/ewi011>
- Van den Steen, Eric. "Interpersonal authority in a theory of the firm." American Economic Review 100, no.1 (2010a): 466-490. <https://doi.org/10.1257/aer.100.1.466>
- Van den Steen, Eric. "Disagreement and the allocation of control." Journal of Law, Economics, & Organization 26, no.2 (2010b): 385-426. 38-426.
<https://doi.org/10.1093/jleo/ewn020>
- Williamson, Oliver E. "The vertical integration of production: market failure considerations." American Economic Review 61, no.2 (1971): 112-123.
- Williamson, Oliver E., *Markets and Hierarchies: Analysis and Antitrust Implications*. New York, New York Free Press, 1975.