How Organizations Behave:

Towards Implications for Economics and Economic Policy*

Robert Gibbons

MIT and NBER

rgibbons@mit.edu

May 29, 2003

Abstract

This essay begins with introductions to the two sides of organizational economics: the economics of internal organization (which focuses on the internal structure and functioning of organizations) and the economic theory of the firm (which focuses on organizations' boundaries and on relationships across these boundaries). Taken literally, these issues are only loosely related to the conference theme of "How Humans Behave," but I do see a high-level parallel: both behavioral economics and organizational economics are investigating new approaches to modeling economic actors (individuals and firms, respectively). After these introductions to the two sides of organizational economics, I then try to connect "How Humans Behave" and "How Organizations Behave." In particular, I offer quick observations (hoping to prompt longer discussions) about (a) applying behavioral models in organizational settings and (b) how organizational settings might warrant new behavioral models. Finally, in an attempt to connect to economic policy, I consider (c) what do organizations do, and whether it matters that these activities are conducted within organizations (rather than outside).

* Written for the Federal Reserve Bank of Boston Economic Conference, "How Humans Behave: The Implications for Economics and Economic Policy" (June 8-10, 2003). Parts of this essay, especially Section 1, draw heavily on Gibbons (2003); other parts, especially Section 2, draw heavily on Gibbons (2001).

How Organizations Behave:

Towards Implications for Economics and Economic Policy

by

Robert Gibbons

For two hundred years, the basic economic model of a firm was a black box: labor and physical inputs went in one end and output came out the other; most economists paid little attention to the internal structure and functioning of firms or other organizations. Starting in the 1970s, however, the black box began to be opened: economists (especially those in business schools) began to study incentives in organizations, often concluding that rational, self-interested organization members might well produce inefficient, informal, and institutionalized organizational outcomes.

These past three decades of work on "the economics of internal organization" complement contemporaneous research on "the economic theory of the firm." Whereas the former focuses on the internal structure and functioning of organizations, the latter focuses on organizations' boundaries (the "make or buy" question) and on relationships between organizations (not only contracts, but also "hybrid governance structures" such as joint ventures, networks, and alliances). Together, these two research streams constitute the emerging field of "organizational economics," with the internal-organization side of the field sharing boundaries with corporate finance and labor economics, and the theory-of-the-firm side sharing boundaries with industrial organization and law and economics.

The origins of the theory-of-the-firm side of organizational economics are widely known (and duly celebrated): Coase (1937) argued that firms will exist only in environments in which firms perform better than markets could; to create space for firms, Coase suggested that some environments might be plagued by "transaction costs" that cause markets to perform poorly. It is almost as well known that Williamson (1975, 1985, 1996) significantly deepened the discussions of both why markets might perform poorly and why firms might perform better than markets. On why markets might perform poorly, Williamson has often argued that markets rely on formal contracts (*i.e.*, those enforceable by a court), but formal contracts are typically incomplete. On why firms might outperform markets, Williamson has given different (and complementary) arguments at different times. For example, Williamson (1975) argued that firms might use "relational contracts" (*i.e.*, informal agreements not adjudicated by courts) to overcome some of the difficulties with

formal contracts, whereas Williamson (1971, 1979, 1985) focused more on integration as a response to hold-up created by specific investments.[1]

Although both the internal-organization and the theory-of-the-firm sides of organizational economics are now receiving substantial attention in the leading economics journals, it typically goes unremarked (and perhaps unnoticed) that both of these research streams have important parallels to decades of research in organizational sociology (and other non-economic studies of organizations). For example, regarding internal organization, the landmark contributions by Blau (1955), Crozier (1964), Dalton (1959), Gouldner (1954), and Selznick (1949) depict organizations that differ radically from a hypothetical Weberian bureaucracy, with its "precision, speed, expert control, continuity, discretion, and optimal returns on input" (Merton, 1940: 561). Instead, in the post-Weberian view, "rules are often violated, decisions are often unimplemented, ... and evaluation and inspections systems are subverted." Moreover, "informal structures deviate from and constrain aspects of formal structure, and ... the organization's intended, rational mission [is undermined] by parochial interests."[2] As I will argue in Section 1 below (and argued in more detail in Gibbons, 2003), the spirit of this post-Weberian view from organizational sociology is quite consistent with recent economic models of organizational structure and functioning. Furthermore, organizational sociology's departure (in the 1950s and '60s) from Weber's view of bureaucracy is analogous to organizational economics's departure (in the 1980s and '90s) from Marschak and Radner's (1972) team theory (*i.e.*, we not only have reached similar destinations, but we also started from similar origins).

Turning to the theory-of-the-firm side of organizational economics, the story is broadly similar: while I know of no sociologists who anticipated Coase's (1937) question, a central part of Williamson's (1975) answer to that question echoes a prominent theme from four decades of organizational sociology. Specifically, Williamson draws on Barnard (1938) and Simon (1951) to argue that relational contracts within firms are crucial determinants of firm performance (and hence a reason why firms might outperform markets in some transactions), but many sociologists had also emphasized the importance of relational contracts in organizations (including but not limited to the aforementioned Blau, Crozier, Dalton, Gouldner, and Selznick). By 1962 it was uncontroversial (at least among sociologists) that "It is impossible to understand the nature of a formal organization without investigating the networks of informal relations and the unofficial norms as well as

[1] Readers with even passing familiarity with the theory of the firm will know that there are many important contributors beyond Coase and Williamson. I discuss this literature in more detail in Section 2.

[2] Observations in this spirit can be found in dozens of authoritative sources. These quotations happen to be drawn from Meyer and Rowan (1977: 343) and DiMaggio and Powell (1991: 12), respectively.

the formal hierarchy of authority and the official body of rules …" (Blau and Scott, 1962: 6). Furthermore, as I will argue in Section 2 below (and argued in more detail in Gibbons, 2001), this insight (that, in economics jargon, relational contracts are a crucial complement to formal control mechanisms) applies at least as well between firms as well as within. In sociology, Macaulay (1963) documented the importance of such "non-contractual relations" between businesses. In law, Macneil (1978) compared classical contracts (enforced to the letter by courts) and neoclassical contracts (interpreted and updated by arbitration) to relational contracts (interpreted and updated by the parties). And in organization theory, Dore (1983) was the first of many to describe Japanese supply relationships as relational contracts, and Powell (1990) emphasized that relational contracts exist horizontally as well as vertically, such as in the networks of firms in the fashion industry or the diamond trade.[3]

In this essay, I begin with partial introductions to both the economics of internal organization and the economic theory of the firm. (These introductions are "partial" in two senses – they are incomplete and biased.) In discussing internal organization in Section 1, I emphasize the recent convergence between economic and sociological views of organizational structure and functioning, and also an argument that economic models of internal organization that take their foundations seriously will necessarily generate predictions that are broadly in line with the sociological evidence and arguments. And in discussing the economic theory of the firm in Section 2, I focus on the existence and importance of relational contracts both within and between firms, and on how these relational contracts interact (not just co-exist) with formal control mechanisms.

After these partial introductions to the two sides of organizational economics, I then consider two topics that are closer to the central themes of this conference. First, in Section 3, I ask how humans behave in organizations (as opposed to in markets or in isolated settings). This discussion has two parts: (a) applying behavioral models to organizational settings and (b) understanding how organizational settings might warrant new behavioral models. That is, I am asking not only "How should behavioral economics influence organizational economics?" but also something like the reverse. Unfortunately, I cannot do much more than raise these questions, even though I eagerly await their answers. Second, in Section 4, I ask what organizations do, and whether it matters (*i.e.*, whether these activities are conducted differently because they are inside organizations rather than outside). As two

[3] For further examples of relational contracts between firms, see Nishiguchi and Brookfield (1997) on hand-in-glove supply relationships, Kogut (1989) on joint ventures, Gerlach (1991) and Gulati (1995) on alliances, Kogut, Shan, and Walker (1992) and Podolny and Page (1998) on networks, Granovetter (1995) and Dyer (1996) on business groups, and Chesbrough and Teece (1996) on "virtual" firms.

quick examples, organizations allocate resources and organizations employ people, but would resource allocation and work be different if these activities were conducted outside organizations rather than within? Again, I do not do much more than raise this question, but here I hope that data may be brought to bear on answering the question in the near term, whereas behavioral organizational economics seems likely to require longer-term theory development as well.

1. The Economics of Internal Organization

During the '80s, articles by several prominent economists implicitly suggested that the time might be ripe for a dialogue between economists and non-economists about the structure and functioning of organizations.[4] And during the '90s, many more economists began to explore this possibility. My own contribution to the latter genre was "Game Theory and Garbage Cans: An Introduction to the Economics of Internal Organization" (Gibbons, 1998).[5] In this section, I will use this paper (and another that followed) not only to sketch the recent convergence between economic and sociological views of organizational structure and functioning, but also to argue that economic models that take their foundations seriously will deliver a post-Weberian view of organizations.

"Game Theory and Garbage Cans" summarized economic models of problematic pay-for-performance schemes, wasted or non-existent investments in human capital, lobbying and other influence activities, the vagaries of subjective management practices, and herd behavior and group think. I chose these models for two reasons. First, these models showcase the rich and flexible toolkit of organizational economics – not only incomplete contracts and specific investments (tools from transaction-cost economics), but also agency theory, repeated games, and information economics. Second, and more important, these models are consistent with the spirit (if not yet the details) of the post-Weberian view of

[4] See, for example, Kreps (1990), Milgrom and Roberts (1988), Tirole (1986), and Williamson (1990).

[5] Some (or even most) economists may not know "A Garbage Can Model of Organizational Choice" by Cohen, March, and Olsen (1972). As a fleeting introduction, let me say that the garbage-can model is the antithesis of Marschak and Radner's (1972) *Economic Theory of Teams*. Whereas team theory envisions an organization whose members compute and execute optimal communication and decision rules to maximize organizational efficiency, the garbage-can model envisions "organized anarchy," featuring "collections of choices looking for problems, issues and feelings looking for decision situations in which they might be aired, solutions looking for issues to which they might be the answer, and decision makers looking for work" (p.1). Methodologically, team theory used statistical decision theory to probe the microanalytics of Weber's theory of bureaucracy, whereas the garbage-can model used a Fortran program to discover the stochastic tendencies of a post-modern organization theory.

organizations – one can sense that these are organizations rife with rule violations, unimplemented decisions, subverted inspections, parochial interests, and undermined missions. More specifically, these models deliver inefficient, informal, or institutionalized organizational outcomes, which are three important respects in which non-economist students of organizations often suggest that real organizations depart from economic models.

I hope "Game Theory and Garbage Cans" made some progress documenting the ongoing convergence between new economic models and long-standing non-economic insights about organizations. I continue to believe that existing and potential models in organizational economics can come closer to capturing life in organizations than seems widely recognized outside organizational economics. And I hope to convert not one but two audiences to this view: not only non-economists who assume that economic models predict efficiency, but also black-box economists who assume that real organizations achieve efficiency.[6] But I hasten to add that, by discussing "convergence," I do not mean that disciplinary boundaries will, should, or even could disappear; instead, I mean that the intersection region of the relevant Venn diagram is growing in size, interest, and activity.

There is much more work to be done to document convergence, but I now turn instead to a second issue: arguing that convergence is inevitable. In "Taking Coase Seriously" (Gibbons, 1999), I argued that it is a logical implication of the seminal paper in organizational economics (Coase, 1937) that organizations will have great difficulty being well-oiled machines of the kind Weber envisioned. That is, economic models that take their underlying assumptions seriously must deliver a post-Weberian view of organizations: rule violations, unimplemented decisions, subverted inspections, parochial interests, and undermined missions will be persistent problems, not exceptions. More specifically, Coase's famous argument (that firms exist only where they perform better than markets would) has the following long-dormant corollary: the firms we observe will be less efficient than the markets we observe, even though the firms we observe will be more efficient than the markets they replaced. Since this corollary is based on sample selection, I called it "Coase (1937) Meets Heckman (1976)."

---

[6] Some non-economists may harbor the misconception that economic models predict that rational, self-interested people will achieve efficient outcomes. In fact, an economic model's prediction of efficiency rests more on its assumptions about the environment than on those about the people. In a social dilemma or commons problem, for example, each person's incentive is to free-ride (*i.e.*, to contribute only as much as is warranted by the resulting increase in his or her own benefit, ignoring the benefits to others), so rational, self-interested individuals are predicted to achieve an inefficient group outcome. The recent economic models of internal organization are like those of social dilemmas: rational, self-interested people are again predicted to produce an inefficient outcome.

Figure 1 illustrates both Coase's original argument and its long-dormant corollary, by plotting the declining effectivenesses of market governance and of firm governance as transaction difficulty increases (*e.g.*, as imperfect contracts and specific assets become more problematic).[7] At the critical value of transaction difficulty indicated by the dotted line, markets and firms are equally effective governance structures. Coase's original argument is that transactions to the right of the dotted line will be governed by firms, to the left by markets. The corollary follows from comparing the observed effectiveness of firms (to the right of the dotted line) with the observed effectiveness of markets (to the left): the latter is superior, especially as transaction difficulty falls to zero, at which point market governance produces the efficient outcome familiar from neoclassical economics.

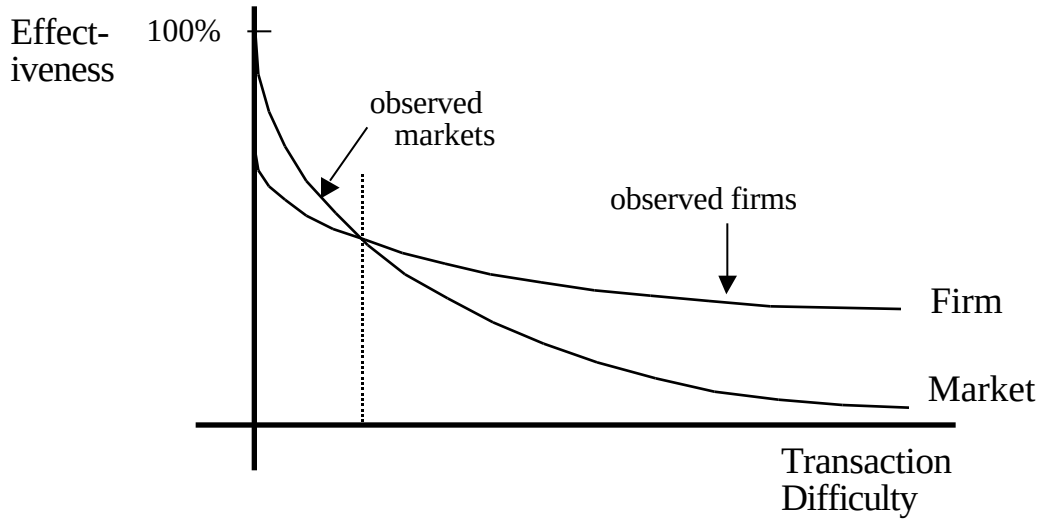

Figure 1. Coase (1937) Meets Heckman (1976)

In brief, this Coasian corollary asserts that firms will not be oblivious to conditions that wreck markets. As with documenting convergence, there is again much more work to be done in proving inevitability. For example, it will be important to have a formal model from which Figure 1 can be derived. I hope to produce such a model in the near future, probably beginning from the model in Baker, Gibbons, and Murphy (2001). But, for purposes of this

[7] For now, I intend this figure to be only suggestive. In this spirit, "effectiveness" means the ratio (expressed as a percentage) of (1) the social surplus actually achieved by the indicated governance structure (firm or market) in a transaction of the indicated difficulty to (2) the maximal social surplus that could be produced from the indicated transaction if governance were flawless and costless. For example, if your value from consuming a bag of salt is $10 and my cost of producing it is $6 then the maximal social surplus from our transaction is $4, but if we must spend $1 on a lawyer to write a contract then effectiveness is 75%. One could define "transaction difficulty" to be the collection of features that cause the effectiveness of market governance to decline, as shown in the figure, but it does not necessarily follow that the effectiveness of firm governance then declines as transaction difficulty increases, as assumed in the figure. For more on these issues, see the discussion of future work below.

essay, I will consider this partial introduction to the economics of internal organization to be complete, and so turn to an equally partial introduction to the economic theory of the firm.

2. Relational Contracts and the Theory of the Firm

After halting beginnings, the theory of the firm has become a big business. Forty years after Coase (1937) posed the theory's defining question – namely, which transactions are more efficiently conducted in a firm than in a market? – some of the most prominent and productive economists of their generation began to make the theory of the firm one of the most fertile fields in the profession.

One can now distinguish at least four theories of the firm: (1) an elemental "rent seeking" theory, which can be discerned in informal theoretical arguments by Klein, Crawford, and Alchian (1978) and Williamson (1971, 1979) and in empirical work by Monteverde and Teece (1982), Masten (1984), and Joskow (1985); (2) an elemental "property rights" theory, which can be discerned in formal models by Grossman and Hart (1986), Hart and Moore (1990), and Hart (1995); (3) an elemental "incentive system" theory, which can be discerned in formal models by Holmstrom and Milgrom (1991, 1994), Holmstrom and Tirole (1991), and Holmstrom (1999); and (4) an elemental "relational adaptation" theory, which can be discerned in informal theoretical arguments by Simon (1951),Williamson (1975), Klein (1996), and Klein and Murphy (1997). In this section, however, I will focus on an issue raised in only the last of these four theories: relational contracts (within and between firms).

I choose this focus for two reasons. First, this aspect of the theory of the firm is probably the least familiar to economists and yet the most in accord with sociological argument and evidence about the boundary of the firm (and relationships across this boundary). Second, to put all my cards on the table, this aspect of the theory of the firm is the one on which I have done the most work. In particular, in a series of papers, George Baker, Kevin J. Murphy, and I have explored several interactions between formal and informal organizational structures. For example, our 1994 paper on subjective performance assessments studies the joint use of both objective and subjective performance measures, focusing on how the presence of the latter changes the optimal use of the former. Similarly, our 1999 paper on informal authority asks how the organization's formal authority structure affects and is affected by the possibility of informal authority relationships. More recently, we have taken analogous approaches to "bringing the market inside the firm"

(2001), vertical integration (2002), and strategic alliances (2003). This series of papers implicitly argues that superior organizational performance typically cannot be achieved simply by optimizing the available formal instruments – such as incentive plans, job definitions, reporting relationships, resource-allocation processes, and formal contracts between firms. Instead, one needs not only to manage the relational contracts directly, but also to choose the formal structure to facilitate the relational contracts indirectly.

In this section, I provide an informal analysis of an abstract supply transaction involving an upstream party (supplier), a downstream party (user), and an asset (production equipment). (See Baker, Gibbons, and Murphy (2002) for details.) If these parties are separate firms, I interpret a relational contract between them as a "hand-in-glove supply relationship," which is one of the many relational forms of organization discussed in the business and organizational literatures. But there are many other relational forms of organization, including joint ventures, strategic alliances, networks, and business groups. Although the abstract model in this section has only two stages of production with one party at each stage, richer models could add both parties and stages. For example, one could begin to model a joint venture as two parties at one stage who create an asset at another stage that they control by both formal and informal means. Similarly, one could begin to model a business group as several parties at several stages of production, with both cross-ownership and relational contracts linking the parties. In short, this section is intended to give a stylized example from a very broad set of potential applications.

2.1 An Abstract Model of a Supply Transaction

Consider a one-shot supply transaction in which the upstream party uses the asset to produce a good that can be used in the downstream party's production process. The value of this good to the downstream party is Q, but the good also has an alternative use with value P. Such a supply transaction is shown in Figure 2 below.

If the upstream party owns the asset, we will call her an *independent contractor* (*i.e.*, someone who works with her own tools); if the downstream party owns the asset, we will call the upstream party an *employee* of the downstream organization (*i.e.*, someone who works with the boss's tools). Alternatively, we can think of the upstream and downstream parties as firms rather than as individuals, in which case it is more natural to use terms such as *supplier* and *division* rather than independent contractor and employee, respectively. Whether the parties are individuals or firms, if the upstream party owns the asset then we will call the parties *non-integrated*, but if the downstream party owns the asset then we will call the parties *integrated*.

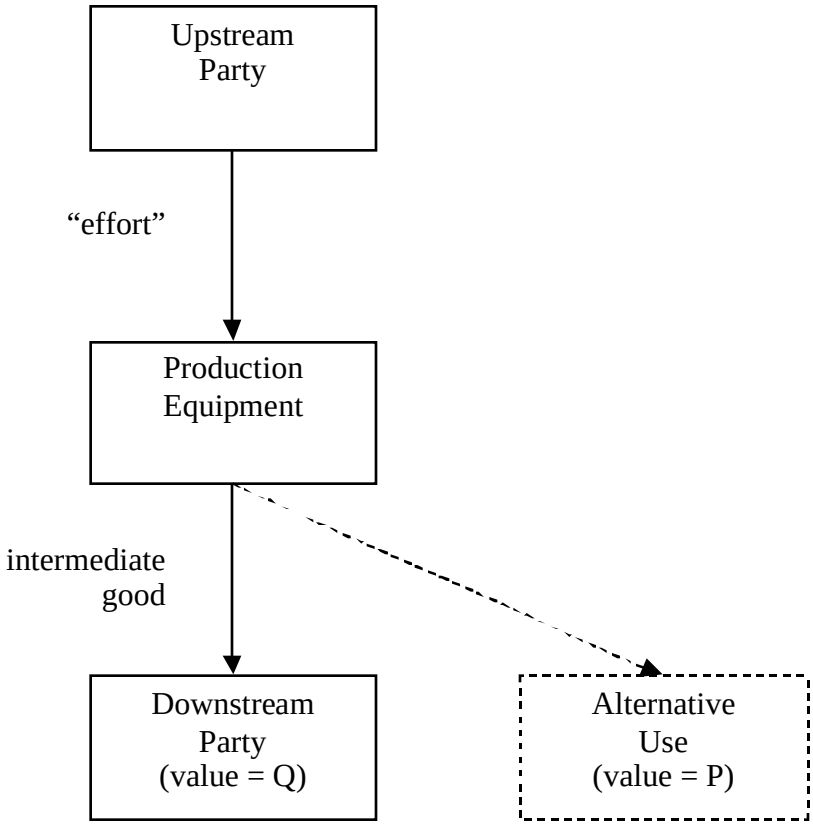

Figure 2: A One-Shot Supply Relationship

To fix ideas, much of the discussion will be cast in terms of a famous business-school case: Crown Cork and Seal Company (Gordon, Reed, and Hamermesh, 1977). The details of the case become important below; for now, it suffices to say that in the 1950s and '60s Crown made metal cans for the soft-drink industry. So suppose that Crown owns a can plant located near a Pepsi plant, but there is also a Coke plant two towns away. That is, Crown is the upstream party, Pepsi the downstream party, and Coke the alternative use. In actual fact, Crown was never integrated with Pepsi or Coke, but we will at times consider the hypothetical case in which Pepsi has purchased the can plant from Crown (in which case the can plant is a "division" of Pepsi).

Suppose that ownership of the asset conveys ownership of the good produced using the asset. For example, if Crown owns the can plant then Crown owns the cans produced there until Pepsi buys them. Furthermore, in bargaining over the sale of the cans, Crown can threaten to sell the cans to Coke (*i.e.*, under non-integration, the upstream party can threaten

to consign the good to its alternative use). On the other hand, if Pepsi owned the can plant then Pepsi could prevent the can plant from dealing with outside customers.

Suppose also that the production equipment has been specialized to meet the downstream party's needs. For example, the can plant might have been configured to produce cans to Pepsi's specifications rather than Coke's. Then the good's value to the downstream party will exceed its value in the alternative use; that is, Q > P. The surplus that the upstream and downstream parties can jointly achieve by transacting with each other is thus Q - P, but each party would like to capture all of this surplus. For example, Crown would like to sell its cans to Pepsi for Q, but Pepsi would like to pay only P.

There are many direct applications of this model, beyond soda cans in the 1950s. For example, suppose that the upstream party is an inventor, the downstream party is a manufacturer, and the asset is the inventor's invention. Rather than discuss ownership of a physical asset like a can plant, we now consider ownership of intellectual property – the invention. If the manufacturer will own any inventions that the inventor might produce then the inventor can be thought of as an employee working in the manufacturer's R&D lab. Alternatively, if the inventor will own her inventions then she can sell them either to the manufacturer or to an alternative user.

There are also indirect applications of this model. For example, organizational sociologists have long emphasized the distinction between formal and informal aspects of organizational structure. Formal aspects include the job descriptions and reporting relationships described in an organization chart, as well as formal contracts and ownership stakes; informal aspects include norms and mutual understandings, as well as networks of non-reporting relationships among individuals. In Figure 2, asset ownership is the formal aspect of organizational structure (and relational contracts will be the informal aspect, as discussed below). I believe that close cousins of the model sketched here can be used to analyze other formal aspects of organizations – not just ownership rights to physical or intellectual property, but also job design, reporting relationships, formal contracts, and share ownership. Throughout this family of models, the common question will be how formal aspects of organizations support or constrain informal aspects. To analyze this interplay between formal and informal organization structure, we begin by analyzing the direct effects of alternative formal structures (in the static analysis in Section 2.2) and then incorporate informal structure (in the dynamic analysis in Section 2.3).

2.2 Analysis of a One-Shot Transaction

To begin, suppose that the upstream party owns the asset. This case gives rise to the classic "hold-up" problem emphasized by Williamson (1971, 1979) and Klein, Crawford, and Alchian (1978): the upstream party can threaten to consign the good to its alternative use unless the downstream party pays a high price (*i.e.*, Crown could threaten to sell the cans to Coke). In the model, Pepsi's value for the cans is Q and Coke's is only $P < Q$. Thus, Crown's threat to sell the cans to Coke should not be carried out, because Pepsi is willing to pay more than P for the cans. Instead, after such a threat, suppose that Crown and Pepsi agree on some price between P and Q. The key point is that Crown will receive at least P, and this in turn gives Crown an incentive to take actions that increase P: Crown will pay attention to Coke so as to improve its bargaining position with Pepsi. But actions that increase P may have no (or even negative) effect on Q. Thus, Crown may find it privately optimal to take actions that give it a larger share of a smaller total surplus in its relationship with Pepsi. Such actions are inefficient: both Crown and Pepsi could be made better off if those actions were stopped.

Pepsi's instinctive reaction to this hold-up problem might be the one often prescribed in the transaction-cost literature: buy the can plant, in order to decree that the plant cannot sell cans to Coke. In this sense, vertical integration could indeed prevent one hold-up from occurring, as argued by Williamson (1971, 1979) and Klein, Crawford, and Alchian (1978). The insight of Grossman and Hart (1986), however, is that using formal instruments to eliminate one hold-up problem typically creates another. As an example of this conundrum, consider Klein, Crawford, and Alchian's account of the events preceding the acquisition of Fisher Body by General Motors. GM asked Fisher to invest in a new technology to produce closed metal auto bodies rather than the then-standard open wood bodies. Both parties understood that GM could hold-up Fisher after such an investment, such as by offering to pay only marginal rather than average cost. Consequently, the parties signed a contract that gave Fisher certain protections, including a formula specifying the price as a mark-up of Fisher's variable costs. But this contract created ways for Fisher to hold-up GM, such as by threatening to overstaff its plants so as to pad variable cost. Grossman and Hart's abstract model is similar: using asset ownership (another formal instrument, akin to a formal contract) to solve one hold-up problem inevitably creates another.

Ultimately, GM bought Fisher, but at a high price. The price had to be high because Fisher had to be persuaded to give up its strong bargaining position created by the pricing formula in the formal contract. But the reason that it was efficient for GM to buy Fisher

does not hinge on this acquisition price, which is merely a transfer between the parties and so has no effect on the efficiency of operations. Instead, the reason for GM to buy Fisher (according to Klein, Crawford, and Alchian) was to stop Fisher's inefficient actions, such as overstaffing. Analogously, it might be efficient for Pepsi to buy the can plant from Crown if, under non-integration, Crown has a strong incentive to take inefficient actions that increase the cans' value to Coke (P) but distract Crown from providing service to Pepsi (*i.e.*, reduce Q).

The striking feature of this long-standing and sensible account of the Fisher Body acquisition (see also Klein, 1988 and 2000) is that it never mentions life in the Fisher division of GM after the acquisition. But without considering the difference between life as a division and life as an independent firm, the analysis cannot ascertain whether the Grossman-Hart conundrum applies. That is, if vertical integration stopped Fisher's hold-up of GM, might it also have created a new way for GM to hold-up Fisher? In keeping with Grossman and Hart, I will argue that integration probably did create such a reverse hold-up. But I will then argue that this conundrum arises because of the reliance on *formal* instruments (such as formal contracts or asset ownership) to eliminate individual hold-up problems, and that a potential solution to the conundrum is to use *informal* instruments (namely, relational contracts) in tandem with formal instruments to ameliorate all hold-up problems simultaneously. To make these arguments concrete, I return to the Crown-Pepsi example and the model above.

2.3 Analysis of an Ongoing Supply Relationship

In the 1950s and '60s, the metal can industry looked horrible: suppliers were strong (such as U.S. Steel), customers were strong (such as Pepsi, Coke, and Campbell's Soup), and entry into the industry was cheap (a used production line cost only$150,000 and could be set up in a small space close to an important customer). Industry giants such as American Can and Continental Can were losing money and diversifying out of the industry, but Crown Cork and Seal made money by specializing in customer service. That is, Crown not only began a relationship with a customer by tailoring the specifications of the cans and the schedule for deliveries to the customer's requirements, but (more importantly) Crown stood ready to modify can specifications and delivery schedules when unusual circumstances arose. Of course, Crown did not make these modifications for free; to the contrary, Crown was able to charge a premium because of its reputation for flexibility and service. In short, in the terminology of this section, Crown had an important relational contract with its customers: Crown would make reasonable modifications under the terms of

the existing formal contract; substantial modifications could also be made, but would create the expectation of fair compensation, either on a one-shot basis or by revising the terms of the formal contract for the future.

Crown's customer service illustrates two of Williamson's (1975) central ideas. First, formal contracts are almost always incomplete — they often do not specify important future events that might occur, not to mention what adaptations should be made if a particular event does occur. Second, relational contracts may overcome some of the difficulties with formal contracts — relational contracts may allow the parties to utilize their detailed knowledge of their situation to adapt to new contingencies as they arise. Of course, the irony in this illustration is that Crown was not integrated with Pepsi. That is, the motivation for and benefits of relational contracts are as Williamson (1975) described, but the transaction is occurring between firms instead of within. A useful model of relational contracts must therefore be applicable both within and between firms.

The tool that economists currently use to model relational contracts is the theory of repeated games. To see why this tool is helpful, note that a relational contract cannot be enforced by the courts: having a contract that utilizes the parties' specific expertise makes it prohibitively expensive for the courts to adjudicate disputes. Therefore, relational contracts must be "self-enforcing," in the sense that each party's concern for its reputation must outweigh that party's temptation to renege on the relational contract. This kind of logic — in which the shadow of the future subdues the temptations of the present — is widely known outside economics from Axelrod's (1984) analysis of Tit-for-Tat strategies in the Prisoners' Dilemma. In economics, however, many analyses focus on "trigger" strategies in repeated games, in which defection ruins the relationship forever.[8] Trigger strategies can be applied in a very broad class of repeated games, including an ongoing supply relationship based on the one-shot model above.

To illustrate a trigger strategy, consider a repeated Prisoners' Dilemma. A player's current options are to "Cooperate" or "Defect," but defection will be discovered and result in "Punishment" forever after, whereas cooperation today will create the same choice between cooperation and defection tomorrow. As suggested by Figure 3 below, cooperation is the optimal choice today if the present value of the current and future payoffs from cooperation exceeds the present value of the higher current payoff from defection followed by the lower future payoffs from punishment.

[8] For a more detailed but still fairly non-technical motivation and analysis of trigger strategies in repeated games, see Gibbons (1997).

To analyze trigger strategies in an ongoing supply relationship, recall the model of a one-shot supply transaction described above, but now suppose that the transaction is to be repeated indefinitely, with the outcome of each transaction observed by both parties before the next transaction occurs. Crown's promise of customer service is an important relational contract between firms. In the model, think of Crown's promise as the upstream party's pledge to deliver a high value of Q to the downstream party. Of course, the same promise might also be quite important within a firm. That is, if Pepsi bought the can plant from Crown, Pepsi might well expect and desire its new can division to provide the same modifications to can specifications and delivery schedules that Crown had previously provided.

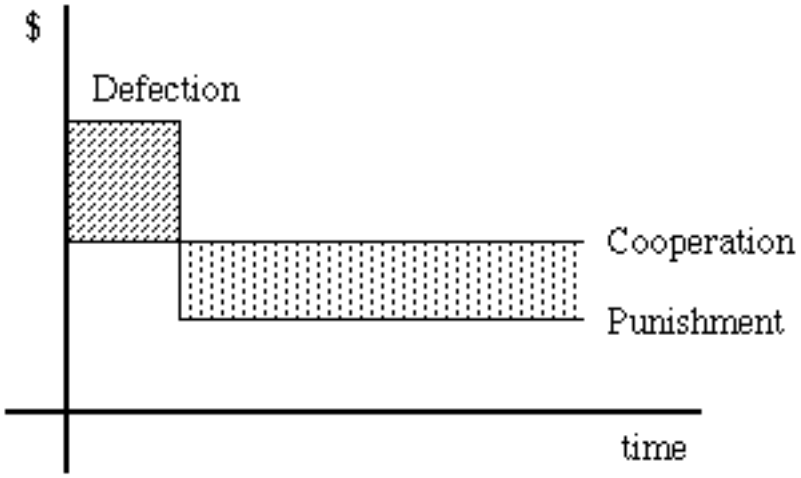

Figure 3: Time-paths of Possible Payoffs from Trigger Strategy

The key result in this repeated-game model of an ongoing supply relationship is that the size of the incentive to renege on a relational contract (*i.e.*, the extent to which the payoff from defection exceeds the payoff from cooperation in Figure 3) depends on who owns the asset. Consequently, implementing the best feasible relational contract requires making the right choice about integration. In certain settings, integration supports a better relational contract than non-integration can; in other settings, the reverse holds. The remainder of this section is devoted to explaining this key result.

Imagine that Pepsi bought the can plant from Crown. That is, the downstream party owns the asset. The upstream party is then an internal division rather than an external supplier, but the downstream party is still interested in receiving high-quality service. The downstream party could try to create an incentive for the upstream party to supply high-

quality service by promising to pay a bonus to the upstream party if the latter produces a sufficiently high value of Q. Unfortunately, like all relational contracts, this promise is vulnerable to reneging: when the downstream party owns the asset, the downstream party can simply take the intermediate good without paying the upstream party anything.[9]

Reneging on a promised bonus is just one example of possible hold-ups within organizations. Richer models could capture reneging temptations concerning promotions, capital allocation, transfer payments, and so on. (See Lawler (1971), Bower (1970), Dalton (1959), Eccles (1985), and many others for evidence that such varieties of reneging are alive and well in many organizations.) The key feature of all of these examples is that one party with authority makes a promise to another party without. In each case, the temptation to renege on such a promise can again be analyzed using Figure 3.

We are now ready to revisit the key result in this section: that the incentive to renege on a relational contact depends on who owns the asset. Suppose the parties would like the upstream party to deliver quality Q* and the downstream party to pay upstream a fee F*. Under non-integration, the upstream party is tempted to renege, by taking actions that increase P so as to collect a fee greater than F*, even if the resulting quality is $Q < Q^*$. Under integration, it is the owner (here, the downstream party) who is tempted to renege, by simply taking the good and not paying the fee F*. Thus, not only the size of the incentive to renege but also the identity of the party tempted to renege depends on who owns the asset.

We therefore have a situation dear to an economist's heart: a tradeoff. Upstream ownership offers the upstream party some recourse should the downstream party renege, and hence decreases the downstream party's temptation to renege, but upstream ownership also encourages the upstream party to consider the interests of other parties, and hence may create a temptation for the upstream party to renege. In some settings, the first of these considerations is more important, so integration is optimal; in others, the second dominates, so non-integration is preferred. In all settings, however, the guiding principle is to induce efficient actions (and discourage inefficient actions) by implementing the best possible relational contract. The integration decision is merely an instrument in this quest.

[9] In case such reneging is not immediately plausible, recall the inventor-invention-manufacturer example sketched above. Imagine that the inventor is an employee in the R&D lab of a large pharmaceutical firm, and suppose the firm has promised to share the profits from inventions 50-50 with the inventor. If the inventor creates a drug worth ten billion dollars, do we expect the firm to keep its promise? How would the situation differ if the inventor had worked in her own independent research firm?

2.4 Summary

I have tried to say four things about relational contracts and the theory of the firm. First, following Williamson (1971, 1979) and Klein, Crawford, and Alchian (1978), ownership can stop hold-up. Second, following Grossman and Hart (1986), using formal instruments (such as formal contracts or asset ownership) to stop one hold-up problem typically creates another. Third, following Barnard (1938), Simon (1951), Macaulay (1963), Macneil (1978), Williamson (1975), and many others, relational contracts offer important advantages over formal contracts and ownership structures, but relational contracts are vulnerable to reneging. Finally, following Baker, Gibbons, and Murphy (1999, 2001, 2002, 2003), implementing the best feasible relational contract requires optimizing the boundary of the firm. Combining these ideas produces a new perspective: the parties' relationship is the central issue; the integration decision should be made in the service of that relationship.

3. How Do Humans Behave in Organizations?

So far, this essay has discussed the two sides of organizational economics: the economics of internal organization and the economic theory of the firm. Taken literally, these discussions are not closely related to the conference's title, "How Humans Behave: Implications for Economics and Economic Policy." On the other hand, I do see a high-level parallel: both behavioral economics and organizational economics are investigating new approaches to modeling economic actors (typically individuals and firms, respectively). Furthermore, with only a little license, I think there are connections from both sides of organizational economics to the conference's themes, so I turn to these connections in this section and the next.

In this section, I try to connect "How Humans Behave" to "How Organizations Behave." In particular, I offer two sets of quick observations (hoping to prompt longer discussions) – first about applying behavioral models in organizational settings, and then about how organizational settings might warrant new behavioral models.

As is abundantly clear from much of the rest of this conference, behavioral economics is off to such a good start, spreading so far and so fast through other parts of economics, that we may someday reach the behavioral economists' goal: their approach may someday be "just economics," rather than a sub-field. To date, organizational economics has not been a leading area for applications of behavioral economics, but that could and should change (and perhaps already is). For example, there is some work that takes classic

psychological ideas such as heuristics and attributions (see Tversky and Kahneman (1974) and Ross (1977), respectively) and applies these ideas to organizational contexts (see Babcock and Loewenstein (1997) and Weber et. al. (2001), respectively). Turning from cognition to preferences, there are also economic models that replace self-interested preferences with social utility (such as where I care about your payoff; Kelley and Thibaut, 1978) and exogenous preferences with contingent preferences (such as where how I feel about your payoff depends on how I think you feel about mine; Dawes, Mctavish, and Shaklee, 1977) – see Fehr and Gächter (2000) and Rabin (1993), respectively. Finally, continuing the agenda of enriching economists' models of preferences, there is even recent work on identity (Akerlof and Kranton, 2000).

It is surely possible to embed these and other behavioral regularities in models of individuals who act in organizational settings. Weber et. al. 's (2001) experiment on leadership and the fundamental attribution error is a wonderful example of the potential value of this approach. But I would also like to see two other kinds of progress in behavioral organizational economics. First, there may be some behavioral regularities that are especially important in organizational settings (such as the possibility that extrinsic motivation may crowd-out intrinsic motivation). Second, there may be organizational settings that warrant new behavioral models. To conclude this brief section, I will mention two possibilities of the second kind – one related to identity, the other to relational contracts.

Identity: I think it is a terrific first step to incorporate identity into an enriched economic model of preferences, as Akerlof and Kranton have done. But even my lay exposure to the social psychology of organizations suggests that important issues remain regarding the role of identity in behavioral organizational economics (as Akerlof and Kranton certainly recognize). For example, March (1994) not only distinguishes between a logic of consequences (the standard economic model) and a logic of appropriateness (an identity model), but also begins to discuss under what circumstances a given individual might make decisions governed more by one of these logics than by the other. And from this idea of tension between logics it is of course a short step to considering tension between identities, and then another short step to considering changes in identity (such as socialization).

Organizational settings seem likely to be an especially important place to analyze identity issues using enriched economic models. At one extreme (in terms of the analysis's level of aggregation), we see efforts to build and change the "corporate culture" throughout enormous organizations. At the other extreme, organizations are the locus for a large share of the small-group interactions that many people engage in almost daily. Unfortunately, I

am woefully underprepared to take this discussion any further, so I will close it with two small speculations: (1) large-group applications of identity models may include not only corporate culture but perhaps also "social movements in organizations" (Zald and Berger, 1978); (2) small-group applications of identity models are not only prominent in social psychology (Brewer and Kramer (1986) is one of many examples) but are also starting to appear in economics (Ichino and Maggi (2000) is one of few examples).

Relational Contracts: When behavioral organizational economics is up and running, I expect analyses of identity issues to fall almost solely on the internal-organization side of the field, rather than on the theory-of-the-firm side. But I turn now to relational contracts, which I see as (a) crucial on both sides of the field, and yet (b) dramatically under-studied (certainly by economists and I believe by sociologists and psychologists as well).

I trust it is clear from Section 2 that I see relational contracts as a crucial complement to formal control mechanisms, both within and between firms. Happily, there is much evidence (and some argument) from outside economics that takes a similar position. Furthermore, there are starting to be economic models of these issues (say, of the interaction between relational contracts and formal control mechanisms) that teach us (or at least taught me) something unexpected. But these economic models, while instructive in one sense, are completely silent in other important senses. Specifically, all the economic models that I know of relational contracts within or between firms are repeated-game models of the kind sketched in Section 2. In these models, one simply turns on an equilibrium, as if one were turning on a light: check the incentive constraints and off we go. As a result, there is no room in this theory for the hard but important real-world tasks of building, managing, and (especially) changing equilibria. Put more colloquially, we have no (compelling) economic models of building trust, or of managing medium-scale adaptation, or of leading wholesale change.

It may be possible to make small progress on these issues using purely economic approaches (and/or non-standard economic approaches that, for all that they are non-standard in the economics literature, are also not firmly rooted in a behavioral literature). Over the next few years, I intend to try my hand at some of this work. But I expect that large progress on understanding the important real-world tasks of building, managing, and changing equilibria will require a fusion of economic and behavioral arguments, so I would welcome some help!

4. What Do Organizations Do (and Does It Matter)?

Having said something about the connections between "How Humans Behave" and "How Organizations Behave," with an eye on the implications of these connections for the development of behavioral organizational economics, I turn next to implications for economic policy. Specifically, I now consider what organizational economics (including behavioral organizational economics) might someday tell us about the effects of economic policies. That is, might organizational economics change our view of the economy's "policy response function?"

This is not a new question, but it is nonetheless (to my knowledge) relatively unexplored. There was some early work from the internal-organization side of organizational economics that could be seen as beginning to build microfoundations for a policy-response function – such as Cyert and March (1963) on how organizations reach pricing and output decisions, or Marris (1964) on managerial capitalism. As far as I know, however, this research stream has largely petered out. On the other hand, there is a larger and continuing research stream that explicitly bases antitrust prescriptions on arguments from the theory-of-the-firm side of organizational economics. This literature seems to have started with Williamson's (1975) little-noticed subtitle, "Markets and Hierarchies: Analysis *and Antitrust Implications*" (emphasis added); see Joskow (2002) for a recent contribution. Of these two research streams, the former seems more closely related to remodeling economic actors, and so seems closer the themes of this conference. Therefore, although the latter research stream is an important connection between organizational economics and economic policy, I will focus on the former here.

As with the discussion of behavioral organizational economics in Section 3, I cannot do much more here than raise what I think are interesting questions. In particular, in an attempt to rekindle the question of whether the internal-organization side of organizational economics could change our view of the economy's policy-response function, I will focus on two logically prior questions: (1) what do organizations do? and (2) does it matter (*i.e.*, would these activities be conducted differently if they were outside organizations rather than within)? My hope is that if we first catalogue what organizations do, and then understand which organizational activities are done differently because they are conducted inside organizations, we will finally be poised to ask whether (and, if so, how) the economy's policy-response function differs because the economy has organizations in it.

To understand what organizations do, we must start by defining what organizations are. Arrow (1974) takes a broad view: "Organizations are a means of achieving the benefits

of collective action in situations where the price system fails" (p. 33). Organizations thus " … share the common characteristics of the need for collective action and the allocation of resources through non-market methods" (p. 26). On Arrow's definition, we are indeed living in what Simon (1991: 28) describes as an "organizational economy," rather than a "market economy." Simply put, organizations are everywhere: not only firms, but also governments, schools, churches, political parties, social movements, communities, and so on.

But this definition of "organizations" may be too broad to be useful, at least for present purposes, so I will restrict attention to firms. Among the many activities that a firm conducts are: (1) allocating capital, (2) employing people, (3) interacting with other organizations, and (4) managing its internal affairs. But even if I restrict attention to these four activities, I (for one) lack even basic evidence on these issues. For example, what fraction of the US economy's capital is allocated inside firms rather than outside? Similarly, what fraction of the US workforce holds permanent employment in a large firm? (Only sloth prevents me from answering that one.) Or, turning to questions that are harder to conceptualize (not just to measure), what fraction of inter-firm transactions are not conducted via the "price system" (whatever that means)? And, analogously, what fraction of intra-firm transactions *are* conducted by the price system, rather than being "managed" (whatever *that* means).

In short, there seem to be two broad questions here. The first concerns the facts of resource allocation: how much capital and labor are allocated internally? I would welcome any help that conference participants might provide in answering this question. The second concerns the process of resource allocation: whether internal or external, which resource-allocation transactions are "managed," rather than conducted via the price system? Answering the latter will require us to define "management." As a professor in a business school, I am embarrassed to say that, at this point, organizational economics does not offer such a definition (not to mention a theoretical understanding of where should managers exist and what they should do). Instead, organizational economics is at the pre-definition stage of saying what a manager is not: in the language of agency theory, a manager is not the principal (who owns the enterprise) and not the agent (who manages nothing, beyond herself).[10] Again, help would be welcome.

[10] There are a few papers, such as Tirole (1986), that explore principal-supervisor-agent models, in which the supervisor might be called a manager. In this particular paper, however, the supervisor's job is limited to (a) observing a signal about the agent's activities and (b) deciding whether to report this signal to the principal. None of my MBA students would want this job.

As advertised above, in this section I am again mostly in the business of raising questions, not answering them. Two central questions thus far are (1) what is an organization? and (2) what is management? I turn next to "Does it matter (that certain transactions are conducted inside organizations rather than outside)?" Let me note in passing, however, that the existence of managed transactions between firms (and perhaps of price-system transactions within firms) suggests that the right question may instead be "Does it matter (that certain transactions are managed, rather than conducted by the price system)?"

There has now been enough work on the two internal-organization resource-allocation problems mentioned above (namely, allocating capital and employing people) to warrant surveys of the emerging theory and evidence. For example, see Stein (2002) on internal capital allocation and Gibbons and Waldman (1999) on employment. As these surveys emphasize, however, there are at least three reasons why a transaction conducted inside an organization might differ from a transaction conducted outside. These three reasons might be called sample selection, economic causation, and behavioral causation.

Figure 1 illustrates sample selection: one reason that we might observe a difference in, say, capital allocation within firms versus capital allocation between firms is that the boundary of the firm is endogenous, so integrated transactions are solving different problems than non-integrated transactions are solving. The possibility of such sample selection means it is a mistake to attribute the entire observed difference in capital allocation to the fact of integration.

On the other hand, Figure 1 also illustrates economic causation: the same transaction may well be conducted differently, depending on whether its governance structure is integrated or non-integrated – for example, because of incentive considerations like those analyzed in Section 2.2. Thus, it would equally be a mistake to attribute the entire observed difference in capital allocation to unobserved heterogeneity across transactions.

Finally, Figure 1 implicitly ignores the issues raised in Section 3, concerning behavioral organizational economics. For example, if corporate culture may socialize employees to adopt new identities, then a firm may be able to perform better than shown in Figure 1. Again, the same transaction may be conducted differently, depending on whether its governance structure is integrated or non-integrated, but now for behavioral rather than economic reasons.

Clearly, sample selection, economic causation, and behavioral causation all matter for deriving an organizational economy's policy-response function, but they matter in different

ways. If we are to make serious progress in understanding how an organizational economy differs from a market economy, we will need to understand at least economic causation and probably also behavioral causation, and we will need to avoid having sample selection distort our inferences from the data at hand.

5. "Conclusion"

I think organizational economics is beginning to ask some interesting questions, such as: What is an organization? What is management? And how can managers build, manage, and change ongoing relationships? I thank the organizers of this conference for prompting me to consider some complementary questions (even if others may have been considering these questions for some time), including: How do organizations affect human behavior? And how does an "organizational economy" (or a "managed economy") differ from a "market economy" in its response to policies? I look forward to further discussion of these issues shortly!

References

Akerlof, George and Rachel Kranton. 2000. “Economics and Identity.” *Quarterly Journal of Economics* 115: 715-53.

Axelrod, Robert. 1984. *The Evolution of Cooperation*. New York: Basic Books.

Babcock, L., and Loewenstein, G. 1997. “Explaining Bargaining Impasse: The Role of Self-Serving Biases.” *Journal of Economic Perspectives* 11: 109-26.

Baker, George, Robert Gibbons, and Kevin J. Murphy. 1994. “Subjective Performance Measures in Optimal Incentive Contracts.” *Quarterly Journal of Economics* 109:1125-56.

_____, _____, and _____. 1999. “Informal Authority in Organizations.” *Journal of Law, Economics, and Organization* 15: 56-73.

_____, _____, and _____. 2001. “Bringing the Market Inside the Firm?” *American Economic Review Papers and Proceedings* 91: 212-18.

_____, _____, and _____. 2002. “Relational Contracts and the Theory of the Firm.” *Quarterly Journal of Economics* 117: 39-83.

_____, _____, and _____. 2003. “Relational Contracts in Strategic Alliances.” Unpublished manuscript, MIT’s Sloan School.

Barnard, Chester. 1938. *The Functions of the Executive*. Cambridge, MA: Harvard University Press.

Blau, Peter. 1955. *The Dynamics of Bureaucracy*. Chicago: University of Chicago Press.

_____, and W. Richard Scott. 1962. *Formal Organizations: A Comparative Approach*. San Francisco: Chandler.

Bower, Joseph. 1970. *Managing the Resource Allocation Process.* Boston: Harvard Business School Press.

Brewer, Marilyn and Rodrick Kramer. 1986. “Choice Behaviors in Social Dilemmas: Effects of Social Identity, Group size, and Decision Framing.” *Journal of Personality and Social Psychology* 50:543-49..

Chesbrough, Henry and David Teece. 1996. "When is Virtual Virtuous? Organizing for Innovation." *Harvard Business Review*. January-February 65-73.

Coase, Ronald. 1937. "The nature of the firm." *Economica* 4: 386-405.

Cohen, Michael, James March, and Johan Olsen. 1972. “A Garbage Can Model of Organizational Choice.” *Administrative Science Quarterly* 17:1-25.

Crozier, Michel. 1964. *The Bureaucratic Phenomenon*. Chicago: University of Chicago Press.

Cyert, Richard and James March. 1963. *A Behavioral Theory of the Firm*. New Jersey: Prentice Hall.

Dalton, Melville. 1959. *Men Who Manage*. New York: Wiley.

Dawes, Robin, J. McTavish, and H. Shaklee. 1977. “Behavior, communication, and assumptions about other people’s behavior in a common dilemma situation.” *Journal of Personality and Social Psychology, 35,* 1-11.

DiMaggio, Paul, and Walter Powell. 1991. "Introduction." In W. Powell and P. DiMaggio (eds.), *The New Institutionalism in Organizational Analysis*. Chicago: University of Chicago Press.

Dore, Ronald. 1983. "Goodwill and the spirit of market capitalism." *British Journal of Sociology* 34: 459-482.

Dyer, Jeffrey. 1996. "How Chrysler Created an American Keiretsu." *Harvard Business Review* July-August, 32-46.

Eccles, Robert. 1985. *The Transfer Pricing Problem.* D. C. Heath: Lexington, MA.

Fehr, Ernst, and Simon Gächter. 2000. “Fairness and Retaliation: The Economics of Reciprocity.” *Journal of Economic Perspectives* 14: 159-81

Gerlach, Michael. 1991. *Alliance Capitalism: The Social Organization of Japanese Businesses*. Berkeley: University of California Press.

Gibbons, Robert, 1997. “An Introduction to Applicable Game Theory.” *Journal of Economic Perspectives* 11: 127-49.

_____. 1998. "Game theory and garbage cans: An introduction to the economics of internal organization." In J. Halpern and R. Stern (eds.), *Nonrational Elements of Organizational Decision Makin*g. Ithaca, NY: ILR Press.

_____. 1999. "Taking Coase Seriously." *Administrative Science Quarterly* 44: 145-57.

_____. 2001. “Firms (and Other Relationships).” Chapter 7 in P. DiMaggio (ed.), *The Twenty-First Century Firm: Changing Economic Organization in International Perspective*, Princeton University Press.

_____. 2003. “Team Theory, Garbage Cans, and Real Organizations: Some History and Prospects of Economic Research on Decision-Making in Organizations.” Forthcoming in *Industrial and Corporate Change*. http://web.mit.edu/rgibbons/www/index.html

_____, and Michael Waldman. 1999. “Careers in Organizations: Theory and Evidence.” Chapter 36 in Volume 3B of O. Ashenfelter and D. Card (eds.), *Handbook of Labor Economics*, North Holland.

Gordon, Karen, John Reed, and Richard Hamermesh. 1977. “Crown Cork and Seal Company, Inc.” Harvard Business School Case #378-024.

Gouldner, Alvin. 1954. *Patterns of Industrial Bureaucracy*. New York: Free Press.

Granovetter, Mark. 1985: “Economic Action and Social Structure: The Problem of Embeddedness.” *American Journal of Sociology* 91:481-510.

_____. 1995. "Coase Revisited: Business Groups in the Modern Economy." *Industrial and Corporate Change* 4: 93-130.

Grossman, Sanford and Oliver Hart. 1986. “The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Ownership.” *Journal of Political Economy*, 94: 691-719.

Gulati, Ranjay. 1995. "Does Familiarity Breed Trust? The Implications of Repeated Ties for Contractual Choice in Alliances." *Academy of Management Journal* 38: 85-112.

Hart, Oliver. 1995. *Firms, Contracts, and Financial Structure*. Oxford: Clarendon Press.

_____ and John Moore. 1990. "Property Rights and the Nature of the Firm." *Journal of Political Economy* XCVIII: 1119-58.

Heckman, James. 1976. "The common structure of statistical models of truncation, sample selection, and limited dependent variables and a simple estimator for such models." *Annals of Economic and Social Measurement* 5: 475-92.

Holmstrom, Bengt. 1999. "The Firm as a Subeconomy." *Journal of Law, Economics, and Organization* 15: 74-102.

_____ and Paul Milgrom. 1991. "Multitask Principal-Agent Analyses: Incentive Contracts, Asset Ownership, and Job Design." *Journal of Law, Economics, and Organization* 7:24-52.

_____ and _____. 1994. "The Firm as an Incentive System." *American Economic Review* 84: 972-91.

_____ and Jean Tirole. 1991. "Transfer Pricing and Organizational Form." *Journal of Law, Economics, and Organization* 7:201-28.

Ichino, Andrea, and Giovanni Maggi. 2000. "Work Environment and Individual Background: Explaining Regional Shirking Differentials in a Large Italian Firm." *Quarterly Journal of Economics* 115: 1057-90.

Joskow, Paul. 1985. "Vertical Integration and Long-Term Contracts: The Case of Coal-Burning Electric Generation Plants." *Journal of Law, Economics, and Organization* 1: 33-80.

_____. 2002. "Transaction Cost Economics, Antitrust Rules, and Remedies." *Journal of Law, Economics, and Organization* 18: 95-116.

Kelley, Harold and J. Thibaut. 1978. *Interpersonal Relations: A Theory of Interdependence*. New York: John Wiley & Sons.

Klein, Benjamin. 1988. "Vertical Integration as Organizational Ownership: The Fisher Body-General Motors Relationship Revisited." *Journal of Law, Economics, and Organization* 4: 199-213.

_____. 1996. "Why Hold-ups Occur: The Self-Enforcing Range of Contractual Relationships." *Economic Inquiry* 34: 444-63.

_____. 2000. "Fisher-General Motors and the Nature of the Firm." *Journal of Law and Economics* 43: 105-41.

_____, Robert Crawford, and Armen Alchian. 1978. "Vertical Integration, Appropriable Rents and the Competitive Contracting Process." *Journal of Law and Economics* XXI: 297-326.

_____ and Kevin M. Murphy. 1997. "Vertical Integration as a Self-Enforcing Contractual Arrangement." *American Economic Review* 87: 415-20.

Kogut, Bruce. 1989. "The Stability of Joint Ventures: Reciprocity and Competitive Rivalry." *Journal of Industrial Economics* 38: 183-98.

_____, Weigian Shan, and Gordon Walker. 1992. "The Make-or-Cooperate Decision in the Context of an Industry Network." In N. Nohria and R. Eccles (eds.), *Networks and Organizations: Structure, Form, and Action*. Boston: Harvard Business School Press.

Lawler, Edward. 1971. *Pay and Organizational Effectiveness: A Psychological View.* New York: McGraw-Hill.

Kreps, David. 1990. "Corporate Culture and Economic Theory." In J. Alt and K. Shepsle (eds.), *Perspectives on Positive Political Economy*. Cambridge University Press.

Macaulay, Stewart. 1963. "Non-contractual relations in business: A preliminary study." *American Sociological Review* 28: 55-67.

Macneil, Ian. 1978. "Contracts: Adjustments of long-term economic relations under classical, neoclassical, and relational contract law." *Northwestern University Law Review* 72: 854-906.

March, James. 1962. "The business firm as a political coalition." *Journal of Politics* 24: 662-678.

_____. 1994. *A Primer on Decision Making: How Decisions Happen*. New York: Free Press.

_____ and Herbert Simon. 1958 *Organizations*. New York: John Wiley.

Marschak, Jacob and Roy Radner. 1972. *Economic Theory of Teams*. New Haven, CT: Yale University Press.

Marris, Robin. 1964. *The Economic Theory of Managerial Capitalism.* New York: Free Press.

Masten, Scott. 1984. "The Organization of Production: Evidence from the Aerospace Industry." *Journal of Law and Economics* 27: 403-17.

Monteverde, Kirk, and David Teece. 1982. "Supplier Switching Costs and Vertical Integration in the Automobile Industry." *Bell Journal of Economics* 13: 206-12.

Merton, Robert. 1940. "Bureaucratic structure and personality." *Social Forces* 18: 560-568.

Meyer, John, and Brian Rowan. 1977. "Institutionalized organizations: Formal structure as myth and ceremony." *American Journal of Sociology* 83: 340-363.

Milgrom, Paul and John Roberts. 1988. "An Economic Approach to Influence Activities in Organizations." *American Journal of Sociology* 94:S154-S179.

Nishiguchi, Toshihiro and Jonathan Brookfield. 1997. "The Evolution of Japanese Subcontracting." *Sloan Management Review* Fall, 89-101.

Podolny, Joel, and Karen Page. 1998. "Network Forms of Organization." *Annual Review of Sociology* 24:57-76

Powell, Walter. 1990. "Neither Market nor Hierarchy: Network Forms of Organization." *Research in Organizational Behavior.* 12:295-336.

Rabin, Matthew. 1993. "Incorporating Fairness into Game Theory and Economics." *American Economic Review* 83: 1281-1302.

Ross, L. 1977. "The intuitive psychologist and his shortcomings." In L. Berkowitz (Ed.), *Advances in experimental social psychology,* (Volume 10). San Diego, CA: Academic Press.

Selznick, Philip. 1949. *TVA and the Grass Roots*. Berkeley: University of California Press.

Simon, Herbert. 1947. *Administrative Behavior*. New York: Free Press.

_____. 1951. "A Formal Theory Model of the Employment Relationship." *Econometrica* 19: 293-305.

_____. 1991. "Organizations and Markets." *Journal of Economic Perspectives* 5:25-44.

Stein, Jeremy. 2002. "Agency, Information, and Corporate Investment." Forthcoming in G. Constantinides, M. Harris, and R. Stulz (eds.), *Handbook of the Economics of Finance.*

Tirole, Jean. 1986. "Hierarchies and Bureaucracies: On the Role of Collusion in Organizations." *Journal of Law, Economics, and Organization* 2:181-214.

Tversky, A. and Kahneman, D. 1974. "Judgment under uncertainty: Heuristics and biases." *Science* 185: 1124-31.

Van den Steen, Eric. 2002. "Organizational Beliefs and Managerial Vision." Unpublished manuscript, MIT's Sloan School.

Weber, R. Rottenstreich, Y., Camerer, C. and Knez, M. 2001. "The Illusion of Leadership" Misattribution of Cause in Coordination Games." *Organizational Science* 12:582-98.

Williamson, Oliver. 1971. "The Vertical Integration of Production: Market Failure Considerations." *American Economic Review* 63: 316-25.

_____. 1975. *Markets and Hierarchies: Analysis and Antitrust Implications*. New York, NY: Free Press.

_____. 1979. "Transaction Cost Economics: The Governance of Contractual Relations." *Journal of Law and Economics* 22: 233-61.

_____. 1985. *The Economic Institutions of Capitalism*, New York, NY: Free Press.

_____ . 1990. "Chester Barnard and the Incipient Science of Organization." Chapter 8 in O. Williamson (ed.), *Organization Theory: From Chester Barnard to the Present and Beyond*. Oxford University Press.

_____. 1996. *The Mechanisms of Governance*. New York: Oxford University Press.

Zald, Mayer and Michael Berger. 1978. "Social Movements in Organizations: Coup d'Etat, Insurgency, and Mass Movements." *American Journal of Sociology* 83: 823-61.