Lecture Note 4: Make, Buy, or Cooperate?[1]

In 1937, Ronald Coase 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. Coase's paper was to become the cornerstone of the economic theory of the firm (*i.e.*, the "make or buy" decision: which activities should be conducted within firms and which between?), but for several decades the paper lay fallow. Finally, in 1975, Oliver Williamson significantly deepened Coase's argument by suggesting both why markets might perform poorly and why firms might perform better than markets. Roughly, Williamson argued that markets rely on formal contracts (*i.e.*, those enforceable by a court), whereas firms might use "relational contracts" (*i.e.*, informal agreements not adjudicated by courts) to overcome some of the difficulties with formal contracts.

To support the second prong of his argument, Williamson relied primarily on Barnard (1938) and Simon (1951). But many organizational sociologists had also emphasized the importance of informal agreements in organizations, including Blau (1955), Dalton (1959), Gouldner (1954), and Selznick (1949) in the landmark case studies that signaled American sociology's departure from Weber's emphasis on formal organizational structures and processes. 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 the formal hierarchy of authority and the official body of rules …" (Blau and Scott, 1962: 6).

But informal agreements can be crucial 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

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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.[2]

In this note I summarize a recent economic model of relational contracts within and between firms (Baker, Gibbons, and Murphy, 2002). In this model, the parties' relationship takes center stage; the integration decision is merely an instrument in the service of that relationship. For example, in a supply relationship between an upstream supplier and a downstream user, the best feasible relational contract between the two parties can differ dramatically depending on whether the parties belong to one firm (vertical integration) or two (non-integration). In this model, the vertical-integration decision is thus driven by whether integration or non-integration facilitates the superior relational contract. Simply put, the old "make or buy" decision should instead be viewed as "make or cooperate" (Kogut, Shan, and Walker, 1992), where *both* options involve important relational contracts.

1. Review of the One-Shot Supply Transaction

Recall the model of a one-shot supply transaction developed in Lecture Note 3, involving an upstream party (supplier), a downstream party (user), and an asset (production equipment). 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 R, as shown in Figure 1 below.

Recall also one application of this model, in which Crown Cork and Seal Company 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).

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[2]   For more modern 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.
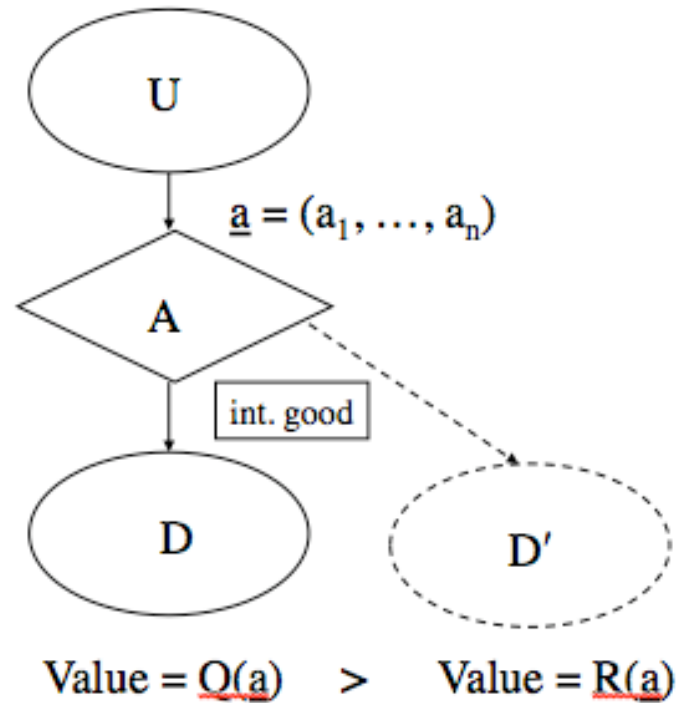
Figure 1: A One-Shot Supply Relationship

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, $Q > R$.

2. 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 note, 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.[3]

Crown's customer service illustrates both of Williamson's (1975) 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 exactly 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.

To see why the theory of repeated games may help in developing such a model, recall that the drawback of any relational contract is that it 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. Lecture Note 2 gives more detail on why this kind of logic — in which the shadow of the future subdues the temptations of the present — can be modeled using "trigger" strategies in repeated games, in which defection ruins the relationship.

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[3]   The facts in this paragraph are drawn from Gordon, Reed, and Hammermesh (1977).

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 in Figure 2, 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.
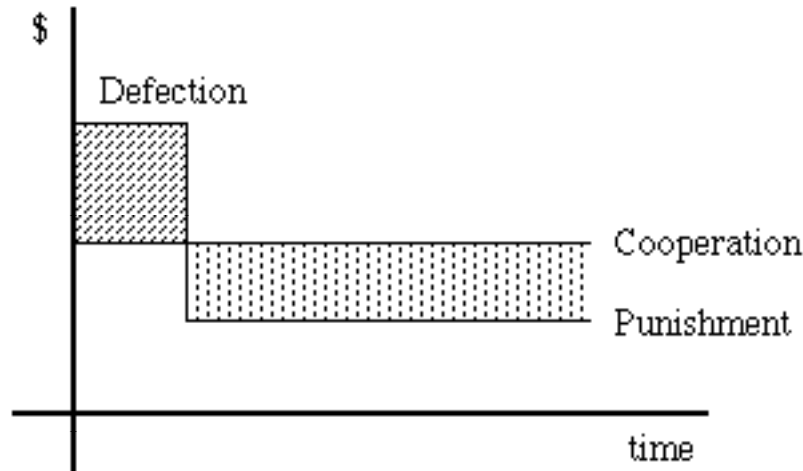

Figure 2: Time-paths of Possible Payoffs from Trigger Strategy

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.

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 2) 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.

To begin, suppose that the upstream party owns the asset. This case gives rise to the classic "hold-up" problem, because the upstream party can threaten to consign the good to its alternative use unless the downstream party pays a high price. That is, 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 R < Q. Thus, Crown's threat to sell the cans to Coke should not be carried out, because Pepsi is willing to pay more than R for the cans. Instead, after such a threat, suppose that Crown and Pepsi agree on some price between R and Q. The key point is that Crown will receive at least R, 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 R 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 Klein, Crawford, and Alchian (1978) and Williamson (1985). The insight of Grossman and Hart (1986), however, is that using formal instruments to eliminate one hold-up problem typically creates another. I will argue that this Grossman-Hart 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 at least ameliorate (and perhaps eliminate) all hold-up problems simultaneously.

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.[4]

Reneging on a promised bonus is just one example of possible hold-ups within organizations. Richer models could capture reneging temptations concerning promotions, task allocation, capital allocation, internal auditing 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 2.

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 R 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 third 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. Thus, in this simple model, the

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[4]　In case such reneging is not immediately plausible, recall the inventor-invention-manufacturer example sketched in Lecture Note 3. 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?

integration decision is merely an instrument to be used in this quest for a better relationship.

In the model above, I interpret a relational contract between non-integrated parties as a hand-in-glove supply relationship. But there are many other relational forms of organization discussed in the business and organizational literatures, including joint ventures, strategic alliances, networks, and business groups. Although the model above 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 the other 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, possibly through a central party. Formal structures such as fifty-fifty ownership in joint ventures or minority stock holdings in business groups may be better understood using models that study the interplay between these formal structures and informal relational contracts between the parties.

3. Conclusion

In Lecture Note 3 we argued that ownership can stop hold-up, and that using formal instruments (such as formal contracts or asset ownership) to stop one hold-up problem typically creates another. In Lecture Note 2 we argued that relational contracts offer important advantages over formal contracts, but relational contracts are vulnerable to reneging. Finally, in this note we have argued that implementing the best feasible relational contract requires optimizing the boundary of the firm (*i.e.*, the structure of asset ownership). Combining these ideas produces a new perspective on integration: the parties' relationship is the central issue; the integration decision should be made in the service of that relationship. In future discussions, we will use this perspective to analyze both novel organizational forms (such as radical empowerment) and "hybrid" organizations (*i.e.*, cases between integration and non-integration, such as joint ventures and alliances).

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