Incentives for Contracting and Vertical Integration: A Transaction Cost Approach

To explain alternative forms of vertical coordination in the poultry, egg, and pork industries, one must rely on the existence of market failures (Milgrom and Roberts). In the traditional neoclassical paradigm, coordination through spot markets can reconcile the individual objectives of many consumers, direct many valuable and limited resources to production, and motivate firms to produce the right products. The resulting allocation of goods is efficient given the following assumptions:

- Each producer knows prices and production technology and maximizes profits.
- Consumers know prices and preferences and maximize utility given income.
- Prices adjust to equate supply and demand for each good.

Under these assumptions, prices allocate resources to their most valued use, and consumers prefer no other allocations given available resources and technology. In reality, however, firms have concerns about their ability to buy and sell the quantities they want at given prices. Buyers and sellers may not know the exact specifications of goods that they demand or supply. Buyers face costs associated with searching for adequate suppliers offering the most favorable prices, and sellers face costs associated with communicating the availability of products with specific attributes.

This report applies the transaction cost economics (TCE) paradigm, which relies on the existence of transaction costs.[10] Transaction costs are costs associated with reaching and enforcing agreements and have been equated to "the costs of running the economic system" (Masten, 1996; Williamson, 1996). Transaction costs include those costs associated with planning, adapting, and monitoring economic activities. While these functions are not directly productive, they are required to coordinate the activities of buyers and sellers.

TCE analysis suggests that the main purpose and effect of contracts and vertical integration is to reduce transaction costs. Transaction costs associated with spot-market coordination include buyer costs of searching for suppliers offering preferred quality features at favorable prices and seller costs of determining prices and buyer preferences. Buyers and sellers can reduce some of these costs by entering into a contract arrangement before production is completed, but they can still encounter other types of costs. *Ex ante* (prior to reaching an agreement) contracting costs are costs associated with drafting, negotiating, and safeguarding agreements. *Ex post* (following an agreement) costs are costs associated with enforcing agreements and may require measuring damages or injury to a contract party, enacting penalties, and compensating an injured party (North). Vertical integration may reduce costs of contracting and spot-market trading but may also introduce new types of transaction costs, including costs related to communicating information within a firm (Putterman and Kroszner). Firms choose a method of vertical coordination based on a comparison of the net effect on transaction costs.

Asset Specificity

Transaction costs and the choice of vertical coordination method depend on characteristics of the transaction. The TCE paradigm places an emphasis on the degree of *asset specificity* in an exchange relationship, or the degree to which assets are specifically designed or located for a particular use or user. Once specific assets are locked into a relationship, they can be redeployed only at a great loss in productive value, which results in sizable quasi-rents.[11] Because relationship-specific assets have much lower value in other uses by other users, they reduce the number of potential trading partners. Hence, the investing party will be subject to *holdup*, or exploitative, self-interested actions (also referred to as opportunistic behavior) by the other party to appropriate the quasi-rents and generate above-normal returns.

A decline in the number of buyers and sellers also can lead to *small-number* bargaining problems (Frank and Henderson). Coupled with specialized assets, small-

[10]Other explanations for alternative methods of vertical coordination include (i) to increase profits in noncompetitive markets (Royer), (ii) to price discriminate and create barriers to entry (Stigler), (iii) to shift price and production risk to firms that can manage risk more efficiently (Knoeber and Thurman; Martin, 1997), (iv) to ensure input supplies (Carlton), and (v) to sustain a strategic competitive advantage (Westgren).

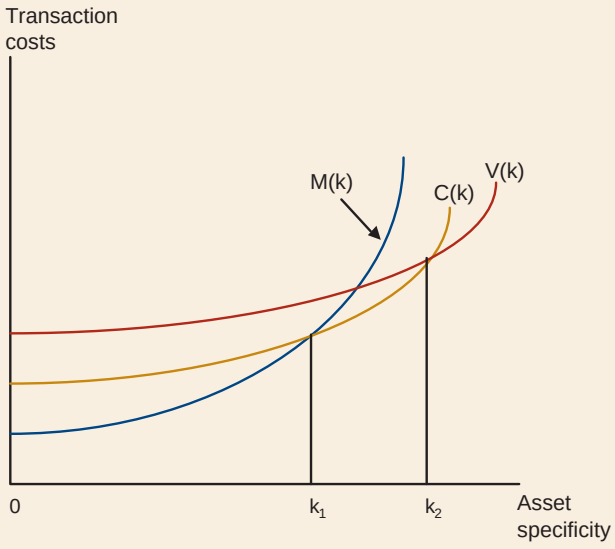
[11]The difference between the value of an asset in its best use and in its next-best use is referred to as "quasi-rent."

number bargaining increases the potential for opportunistic behavior because alternative exchanges cannot be easily arranged. Asset specificity and small-number conditions, however, create value in enduring exchange relationships.

Types of asset specificity include physical, site, and temporal. Physical specificity is derived from the physical features of an asset. For example, special-purpose equipment and specialized investments required for scale economies are physical specificities (Williamson, 1979). The buyer of the finished product can appropriate quasi-rents that are generated from these investments by offering a price lower than the originally agreed-upon price. As long as the offer price exceeds the value of the asset in its next-best use, the producer has few options but to accept the offer. Site specificity occurs when buyers and sellers locate facilities close to each other to reduce transportation costs. Because relocation costs are high, site specificities lock parties into an exchange relationship for the useful life of the asset. For example, a producer may be deciding whether to locate a farm operation close to a processor. The quasi-rents generated are the difference between the negotiated price and the price available from the next-closest processor, less transportation costs. Once again, the buyer can appropriate these rents by offering a lower price than originally agreed. Temporal specificity refers to the timing of delivery and its effect on product value. For example, temporal specificities may arise because a producer of a perishable product has difficulties finding alternative processors on short notice. The buyer may appropriate the quasi-rents by threatening to delay acceptance of the product. Temporal specificities are less severe in "thick" markets where large numbers of buyers and sellers enhance competition (Pirrong).

A party that invests in specific assets will choose alternatives to spot-market coordination that provide safeguards against opportunistic behavior and reduce resource expenditures on haggling and bargaining over price. In a contract relationship, one party may agree on investments to be made and quantities to be delivered. The other party may agree on prices to pay based on various contingencies that arise over time. Private actions for breach of contract and public laws protecting contract parties help enforce contracts and protect contract parties. As assets become more specialized, the investing party will expend more resources to specify more contract contingencies because there are greater benefits from "holding up" the asset owner. In addition, parties may not always honor contracts, and these actions may result in costs associated with investigating contract violations and court litigation. Consequently, vertical integration, which eliminates the exchange relationship, becomes more prevalent as asset specificity and the potential benefits to reneging on contracts increase (Klein, Crawford, and Alchian) (see box on relationship between asset specificity, transaction costs, and methods of vertical coordination).

Relationship between asset specificity, transaction costs, and methods of vertical coordination



Methods of vertical coordination are chosen to minimize transaction costs. In the figure, k is the level of asset specificity, M(k) is transaction costs associated with spot-market coordination, C(k) is costs associated with contracting, and V(k) is costs associated with vertical integration. Each method of vertical coordination is expressed as a function of asset specificity. For low levels of asset specificity ($k<k_1$), transaction costs of spot-market coordination are minimal. As asset specificity increases to intermediate levels ($k1<k<k_2$), contract arrangements minimize transaction costs. For transactions characterized by high levels of asset specificity ($k>k_2$), vertical integration becomes the cost-minimizing method of vertical coordination.

Source: Williamson, 1991.

Uncertainty

In addition to varying by asset specificity, transactions may vary by degree of uncertainty, which arises from three basic sources (Williamson, 1996; 1985; Koopmans). First, uncertainties arise due to technological changes, unpredictable changes in consumer preferences, and random acts of nature. Second, uncertainties may arise from lack of timely communication or the inability to determine simultaneous decisions and plans made by others, such as investment decisions and purchasing plans of consumers. Third, uncertainties may arise due to strategic behavior regarding nondisclosure, disguise, or distortions of information (also referred to as "behavioral uncertainty").

Greater uncertainty, coupled with asset specificity, increases the importance of organizing relationship-specific transactions in ways that avoid costly haggling by adapting to market conditions. Bounded rationality, which makes it impossible, or very costly, to specify all possible contingencies or appropriate adaptations in advance, makes it necessary for parties to adapt or "work things out" (Williamson, 1985).[12] That is, bounded rationality makes it costly to write a complete contract. Therefore, contracting parties are susceptible to opportunistic behavior as contracts are renegotiated in response to changing market conditions. Monitoring of performance and verification of breach of contract also become more difficult as uncertainty increases. In cases where the degree of asset specificity is low, uncertainty is expected to have no effect on vertical coordination because little value is placed in an ongoing relationship. The need to adapt to market conditions is lessened because alternative exchanges can be quickly arranged in light of unexpected events.

Given investments in specific assets, parties may respond to increasing uncertainty in two ways. First, parties may engage in contracts that may become more relational in nature. That is, instead of laying out specific details, contracts will specify the process through which future terms of trade will be determined. Contract terms will be specified that provide incentives for rent-increasing adaptations to changing market conditions, while limiting opportunism and the need for costly arbitration (Masten, 1996). For example, instead of negotiating a specific contract price, parties may agree to adjust the contract price based on a market-determined index. This arrangement reduces incentives to gain advantage by obtaining special information on future prices. In addition, if a negotiated contract price differs substantially from the market price, the disadvantaged party may be reluctant to continue the agreement. The party may then engage in subtle, costly behavior, such as requiring strict adherence to the rules, purposefully delaying deliveries, or interpreting the contract literally.[13] Market-based contract prices, which narrow the gap between contract price and market price, reduce these types of inefficient behavior.

Contracting parties may also respond to increasing uncertainty by progressing from marketing contracts to vertical integration in the spectrum of control (fig. 1) (Frank and Henderson). When the level of uncertainty becomes particularly high, *ceteris paribus*, vertical integration is expected to become more prevalent.[14] While contracting relies on the ability to anticipate potential problems, vertical integration requires no contract revisions and serves to facilitate adaptation to changing circumstances as they unfold (Masten, 1996). Vertically integrated firms can more readily adapt to changing conditions because opportunistic behavior is less likely within such a firm, disputes can be settled by top management, convergent expectations can facilitate planning, and access to relevant information can reduce haggling (Dietrich).

Measurement Costs

Transaction costs can also result from information asymmetry among trading partners regarding product value and producer effort. Some important attributes of a traded good may not be directly observable to the buyer, seller, or both. Consequently, parties may benefit by engaging in costly searching and sorting to obtain information about the attribute of the good. For example, a producer may sell low- and high-quality products at the same price, and the purchaser may expend resources to search for undervalued goods and reject those that are overpriced. Contracts that include compensation for efficient producer performance may require parties to measure appropriate indicators of production efficiency. Social waste occurs when mea-

[12]Bounded rationality refers to limits on people's knowledge, foresight, skill, time, and ability to articulate knowledge in a way that can be understood by others.

[13]According to Goldberg and Erickson, literal interpretation is often referred to as "working to the rules."

[14] The term "ceteris paribus" is used in economics to indicate that all variables except those specified are assumed not to change.

surement by buyers to determine the true value of a good simply redistributes wealth from sellers to buyers (Leffler, Rucker, and Munn). Expanding time and effort in haggling and delaying agreements to influence the terms of exchange is also inefficient (Milgrom and Roberts).

Vertical coordination arrangements can reduce transaction costs related to inefficient measuring and sorting, and leave more gains from exchange to be distributed among contracting parties. If measuring output quality were cost free, spot-market production would provide effective price incentives for performance. On the other hand, if measuring output quality were costly, parties would be encouraged to shirk, cheat, and engage in other types of opportunistic behavior. To limit such behavior, markets may be reorganized so that accurate measurements require less effort and cost (Milgrom and Roberts). For example, in contracts in which output is difficult to measure and inputs serve as an adequate proxy for output value, buyers may enter into contract arrangements that enable them to monitor production inputs.