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COORDINATION AND EXCHANGE IN AGRICULTURAL SUBSECTORS

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VERTICAL COORDINATION AND EXCHANGE ARRANGEMENTS: CONCEPTS AND HYPOTHESES

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Vertical coordination! There are times when I wish I'd never heard the term. Obtuse, slippery, confusing—these and many other adjectives I've used in my rather frequent struggles with this topic. Just as I think I've figured out how to define, analyze and evaluate vertical coordination, the fog rolls in. My cataracts return.

Thus, my efforts in writing this paper are as much for my benefit as for the readers. I will attempt to clarify the meaning of vertical coordination and vertical organization, to define and describe the main conceptual approaches apparent in the literature, and to articulate hypotheses concerning vertical relationships which may be useful in future research. The sequence of the paper is ordered accordingly.

INTERPRETING VERTICAL COORDINATION

In a general sense, coordination is relatively easy to grasp. Whenever more than one person or organization is involved in accomplishing a single objective, coordination is required. A crew has a coxswain. A business firm has managers and written policies. An orchestra has a musical score and a director. Whether the objective is to win a race, make a profit, or play Beethoven's Fifth, the contributions of the various individuals must be integrated and synchronized.

The same is true for commodity sub-sectors. The actions of producers, processors, truckers, wholesalers and retailers obviously must be coordinated—but how and for what objective? In a sub-sector, there is no commonly agreed upon goal—nor is there a man with a baton to ensure that the contributions of all participants march in lock step. Given this situation and the recognition that the participants have at least partially conflicting goals and incentives—how does coordination occur? Who or what provides the integration and synchronizing of individual efforts? What are the elements of coordination? How do we know when it's been done well or poorly?

As economists, we frequently talk about market coordination and administered coordination. Where several vertically related entities within a sub-sector are linked by markets, the "market prices" are assumed to provide coordination of productive endeavors by the incentives or disincentives they represent. Administered coordination, on the other hand, refers to sub-sectors where all the functions are performed within a single firm. While the activities of the firm are certainly influenced by the signals it receives from its final market, they are at

the discretion of the firm management. The many intermediate activities of the firm are not subjected to a market test for worthiness.

But is this all there is to sub-sector coordination? If we could assume perfect competition, perfect markets, perfect knowledge, rational buyers and sellers and an unchanging environment, coordination would be a rather simple matter. In fact, of course, we cannot. The sub-sectors we deal with are characterized by imperfections and by constant change. These make coordination a much more difficult and complicated process.

There is a tendency to equate vertical coordination with exchange arrangements. I plead guilty to this common error myself. In doing so, I fear we confuse the process (coordination) with the mechanisms for coordination (exchange arrangements).

I interpret vertical coordination as a *process* by which the various functions of a vertical value adding system are brought into harmony regarding:

1. *What* is produced and marketed (quantity and quality).
2. *When* it is produced and marketed.
3. *Where* it is produced and marketed.
4. *How* it is produced and marketed. (That is, the efficient use of resources to complete the vertical value adding task. Unnecessary or inefficient steps and cross purpose workings are eliminated or combined.)
5. Adjustments and adaptations needed to respond promptly to changes in demand, new technology, or other shifts in profit incentives.

All vertical systems require some degree of coordination. Perfect coordination would require known demand for the output of the system, control over supply, and complete synchronization of all functions in the system. That is, perfect coordination results in a perfect match between the goods coming out of an efficiently organized "pipeline" and the preferences of customers. Zero coordination would imply the opposite—no match at all, and would also imply the demise of such a system. Using this interpretation, there is no such thing as an on-going system that is uncoordinated.

The above definition includes two levels of focus. The first three points refer to the synchronizing task in an existing system; the last two refer to changes and adjustments in the system. These may simply be two different parts of a continuum called coordination. However, the distinction merits some thought. Most frequently, we interpret coordination from a synchronizing point of view. This interpretation leads us to place emphasis on fine tuning an existing system so that the parts mesh smoothly together. It may encourage us to forget that we are also supposed to ask whether we might be able to create a new and superior system.

While I have included both the synchronizing and adapting dimen-

sions in the above definition of coordination, semantics may warrant separating them and labeling the former coordination and the latter adaptation.

System coordination in a fine tuning sense leads toward systematizing, routinizing and stabilizing member activities and relationships. It leads toward streamlined, efficient systems to satisfy short and intermediate period market demands. Such systems however, may become relatively rigid and inflexible in a longer run time horizon.

Coordination in an adaptation sense may involve quite different forces. It leads towards disrupting and remodeling an existing system so that it will be relevant in the long run. Major adaptations are also frequently introduced by outsiders. In this sense, the forces involved in adaptation tend to be contrary to those involved in the synchronization process. Mechanisms that improve synchronization may stifle adaptation.

I will use "vertical coordination" in this paper to refer to both the synchronizing and adapting process. Where it becomes necessary to distinguish between these two aspects of coordination, the terms synchronization and adaptation will be used.

COORDINATING MECHANISMS

It seems useful to me to distinguish between *coordination as a process* and the *mechanisms which influence that process*. Contracts, for example, do not ensure coordination. They are but a mechanism by which coordination can be achieved—if the contractor has adequate information, makes wise decisions, etc. Since contracts usually involve a transfer of certain rights, the contractor often has increased control over the actions of his suppliers and hence should realize better coordination. However, it is certainly not automatic.

A similar point can be made concerning vertical integration. By taking over the ownership of an adjacent stage, a firm should be able to improve coordination. Decisions concerning quantity, quality, timing and needed adjustments are all controlled within the firm. Once again, however, the influence of the mechanism (vertical integration) on the process of coordination depends upon the wisdom and knowledge of the decision-makers involved. Maintaining the various stages as separate, semi-autonomous profit centers can result in considerable cross purpose activity within a firm. Again—coordination is not automatic.

Certain coordinating mechanisms *generally* may result in improved coordination. By distinguishing between the process and the mechanism, however, useful insights may be gained as to why this is true.

I consider a broad range of institutions and arrangements as coordinating mechanisms. Markets of all types, private treaties, vertical ownership, cooperatives, bargaining associations, market orders, information systems (including grades and standards), transportation services,

credit services, government programs, trade practices and trade associations are all at least in part mechanisms of coordination.

To what extent can coordinating mechanisms influence the harmonizing process—coordination? The process of coordination depends upon the decisions of sub-sector participants, plus some factors that are largely beyond the control of sub-sector participants, such as weather and foreign supply. Decisions affecting coordination are influenced by:

1. Incentives (economic incentives as reflected in prices, social incentives such as the relationship between system members, security incentives which encourage conventional behavior, etc.).
2. The flow of information (which affects the level of knowledge, the level of uncertainty and the communication of incentives).
3. Adequacy of necessary inputs to be able to respond to incentives (i.e., the extent to which decisions are severely restrained).
4. Management alertness and ability.

Coordinating mechanisms can influence all four aspects of the "coordinating decisions environment." However all four factors are often not influenced by a single mechanism. Cooperatives, for example, might affect the first three but do little to change the ability of decision-makers, at least in the short-run. Information systems may largely affect the first two factors. Production contracts, however, may influence all four when certain decisions are transferred into more (or less) capable hands. To the extent that coordinating mechanisms facilitate (or impede) coordinating decisions, it may be well to understand why.

SUB-SECTOR VS. FIRM COORDINATION

The distinction between coordination of individual firm networks and coordination of the total sub-sector is also worth noting. Individual firm networks may be tightly coordinated in the sense that their various functions are harmonized with the goals and strategies of the firms involved. Whether in fact, the *composite behavior of individual firm systems* yields good coordination for the total commodity sub-sector is yet another matter. The broiler sub-sector, for example, is characterized by tightly coordinated, streamlined individual firm networks that have been responsive to new technology and market opportunities. However, the sub-sector continues to be plagued by serious price variations—suggesting some weaknesses in total sub-sector coordination. But, is this a valid conclusion? To what extent should price stability be used as an indicator of total sub-sector coordination?

The price of a commodity depends upon supply and demand forces within a relevant market. Many of the factors influencing either supply or demand are at least partially outside the control of sub-sector

members. Such factors as weather, disease, foreign supply and the supply of competing products have a strong voice in the price of a particular commodity. To the extent that variations in these factors cannot be completely controlled or anticipated, variations in price can be expected.

Even if the above factors are assumed constant, the price level of the commodity still depends upon the composite results of individual management decisions concerning how much to produce, when, etc. For these to be in balance with market demands would require a monopolistic sub-sector leader (public or private) with perfect knowledge of market demand.

New technology and shifts in demand are still other factors affecting supply-demand-price relationships over time. We would expect a well coordinated system to minimize the lags in responding to such factors—resulting in the system moving quickly to a new equilibrium. However, *changes* in prices are relied upon to signal the need for such adjustments, and hence can hardly be considered undesirable in a market economy.

Thus, short of some type of price controls, a high degree of price stability is neither likely nor desirable for most agricultural commodities. Price variations from one production cycle to the next may tell us little about sub-sector coordination. On the other hand, sizable price variations from day to day or week to week may provide evidence of defective vertical coordination.

To this point, I have attempted to indicate my interpretation of vertical coordination and coordinating mechanisms. Coordination can only be understood, however, within the context of the vertical systems or sub-sectors within which it occurs. Since vertical organization and vertical coordination are often confused, a few comments are in order regarding the organization of vertical systems.

VERTICAL SYSTEM (SUB-SECTOR) ORGANIZATION

The structural anatomy of a sub-sector has considerable influence on the process of coordination. Logic suggests that coordination in a sub-sector made up of two firms should be considerably easier than in one where seven different stages and enterprises are involved in the value adding process.

Relevant parts of the vertical organization of a system include the functions that are performed, the stages in the vertical system, the proprietary and authority structure, and the institutions and arrangements that are an integral part of the system. At least three levels of aggregation are apparent.

1. Functions — at the lowest level are the functions, or “jobs to be done” such as procurement, storage, transport, etc.
2. Stages — several functions may be grouped at any particular

stage or level in a sub-sector. In some but not all cases, stages are equivalent to establishments.

3. Institutions — the firms, private associations and public institutions that populate the sub-sector constitute the third level of aggregation. Of particular importance at this level is determining who has control or authority over what. Ownership rights, sovereign rights and vested rights are all important to understand.

Vertical organization and vertical coordination are interrelated; however, a change in one does not necessarily cause a change in the other. Vertical disintegration which results in a new industry developing, for example, represents a change in vertical organization that will also alter the coordinating mechanisms employed and will likely influence the process of coordination. The development of limited partnerships in agricultural production, however, may alter vertical organization only. On the other hand, an improved information system may influence the process of coordination without altering vertical organization.

The literature on the vertical dimensions of economic systems tends to be a conglomeration of these various topics. While much of the literature lacks consistency and clarity in addressing vertical relationships, some useful conceptual frameworks are apparent.

CONCEPTUAL APPROACHES TO VERTICAL ORGANIZATION AND COORDINATION

The conceptual literature on vertical organization and coordination reflects several different perspectives and emphases. Some writings concentrate largely on the causes or motives for vertical integration and other more enduring vertical relationships—perhaps with the implication that motives and consequences are closely related. I suspect that motives do provide some insights into the likely consequences, but possibly only a partial picture. A firm that vertically integrates to improve coordination may achieve improved coordination—but it may also find that it has more power over suppliers. In this case, market conduct is also likely to be altered. Thus, one must be cautious in assuming that motives provide a complete picture of likely results.

Another group of articles tends to ignore causes and focuses largely on expected results. While one may argue that it's really the results that count, understanding the motives for changes in vertical organization may also be useful in removing the motives for socially undesirable changes.

Finally a few publications provide a broad treatment of vertical organization and coordination—dealing both with causes and results. Mighell & Jones' classic report [15] is of this last type.

While all classification efforts involve a certain amount of oversimplification, I find three major conceptual views reflected in the

literature.¹ I've classified them as: 1) Technological determinism; 2) Behavioral, and 3) Market structure.

Since each suggests certain hypotheses (at least implicitly), I will attempt to summarize their central theses as I understand them. I recognize, however, that such groupings ignore some of the important differences among writers.

TECHNOLOGICAL DETERMINISM CONCEPTUAL FRAMEWORK

Paul [16], Stigler [20], and to some extent Mighell and Jones [15] have provided dynamic concepts of vertical organization based largely on intra-firm economics. A central theme of these writers is that new technology and changing market size bring changes in the optimum size and enterprise combination of firms. Vertical integration, disintegration, and contractual arrangements provide natural mechanisms for adjusting the scope of functions performed by firms at different stages so that they are in tune with the new economic conditions.

Where these changes have led to increased specialization, as is true in agricultural production, market price and production risks have also increased for the specialized firms. This is especially true for those firms whose resources are not easily converted to other enterprises (broiler production, for example). This has led to efforts to share the investment hazards involved with others—to what Paul calls “enterprise sharing arrangements”—which may or may not effect exchange arrangements.

Stigler perceives similar forces at work, although he places relatively little weight on the role of risk. He emphasizes the growth and decline of markets as determinants of optimum enterprise size and combination. His life cycle concept of markets suggests a pattern of integration when a market is small, disintegration as it grows to maturity, and integration again when the market declines.

While these writers differ some in their emphases, all seem to identify similar central causal forces to changes in vertical organization—namely the changes in technology and/or in market size that result in changes in optimum firm size and enterprise combinations. Vertical integration, joint ventures, and contracts are seen as natural mechanisms to shift functions from one stage to another (thereby altering the level of specialization/diversification), to spread risks where increased specialization evolves, and in some cases as instruments to spread cost reducing technology.

BEHAVIORAL CONCEPTUAL FRAMEWORK

Unlike the technological determinism perspective, which emphasizes *intra*-firm relationships and scale economies, writers with a behavioral orientation toward vertical organization and coordination tend to emphasize *inter*-firm relationships and the functioning of the sub-sector

as a *system*. Williamson [21] focuses particular attention on the causes of vertical integration. He contends that there are a variety of transactional problems and limitations that serve as incentives for firms to internalize transactions through vertical integration. Included are inconsistent incentives for buyers and sellers, uncertain and limited information situations that facilitate opportunistic dealings, information problems (accuracy, credibility and cost), differences in the risk aversion of sub-sector members, lack of trust and cooperation, conflicts concerning the distribution of rights and returns, and monopolistic distortions. Where such "market failures" occur, Williamson suggests that firms may find vertical integration a desirable alternative to market coordination.

This perspective is consistent with the emphases of writers such as Goldberg [6, 7], Stern [18, 19], McCammon [13, 14], and others—largely from business school faculties—who focus attention on the level of coordination and harmony within vertical networks. Implicitly, this group identifies two central influences on coordination—exchange arrangements and the behavior of individual decision makers. From this perspective, more durable exchange arrangements stimulate greater market and total system orientation, increased cooperation, and a reduction in dysfunctional conflict. Cooperation of system members—whether voluntary or forced—is cast as a key element in restraining the pursuit of individual firm goals which are in conflict with the interest of the total system. From this "system cooperation" perspective, the consequences of a tightly coordinated, cooperative system are lower costs per unit of output, increased profits for participants, increased responsiveness to market demand, and in many cases, greater output.

MARKET STRUCTURE CONCEPTUAL FRAMEWORK

The conceptual framework provided by industrial organization theorists concentrates on the impact of changes in vertical organization on the nature and effectiveness of competition. Consequences tend to be emphasized; however, the causes or motives for vertical reorganization are often inferred from the results.

In assessing the probable consequences of vertical integration, contract integration, etc., two contrasting points of view are apparent. One view—often identified with the University of Chicago—relies heavily on two rather simple and well known models. The first indicates the results of integrating a perfectly competitive industry with one controlled by a single-firm monopolist. It demonstrates that only where there are economies of vertically integrated operations would the monopolist have a profit motive to integrate.

The second model deals with integration of successive monopolies. This familiar model indicates that consumers are better off when a single firm combines two vertically related industries than when each is con-

trolled by a single monopolist. Output is increased and prices are reduced.

Based largely on these two models, devotees of this perspective

"find no fault with vertical mergers, tying agreements, long-term requirement contracts, vertical price fixing, and reciprocal selling (in their view a variant of vertical integration), and deny the existence of any adverse effects of the vertical squeeze on non-integrated suppliers. In their view, all of these manifestations are either to be welcomed or ignored because they either have neutral effects on competition, promote competition, increase efficiency, or are undertaken for irrational reasons, in which case their practitioners are more to be pitied than condemned, since they will not survive in the long run [9, p. 5]."

A contrasting view is expressed by writers such as Bain [1], Scherer [17], Mueller and Helmberger [9], who argue that vertical integration in the real world generally involves industries in-between perfect competition and monopoly. Helmberger and Mueller state,

"It is wrong to equate the behavior of oligopolistically structured markets with the behavior of monopolistic ones . . . Whereas a monopolist selling under conditions of blockaded entry would not have a profit incentive to integrate into a competitive industry, firms in an oligopolistic industry would have an incentive to integrate into an imperfectly competitive industry if the effect were to raise entry barriers and thereby entrench a previously weak oligopolistic position [9, p. 8]."

This view contends that where vertical integration (or modifications thereof) occurs in industries that are neither perfectly competitive nor monopolistic, the structure of the two markets must be examined to determine the likely effect of integration on future structure and conduct. Of particular concern should be vertical mergers that foreclose significant parts of a market, that increase entry barriers, and/or that facilitate squeezing sellers or buyers through discriminatory pricing.

Although some will doubtless disagree, these are the main conceptual frameworks that I detect in searching the literature. They do suggest a number of causes or consequences of changes in vertical organization that may be worth examining. As I see it, they are of four types.

1. The effect on technical efficiency—including the implementation of new technology, the redistribution of sub-sector functions, firm size and resource combinations, capacity utilization, and the cost of inter-firm linkages.
2. The effect on vertical coordination—including pricing efficiency, the information available, firm incentives and commitments, firm adaptability, and ultimately, the degree of match between quantity, quality, timing and location of products supplied with those demanded.

3. The effect on the distribution of rights, responsibilities and returns—including decision control, property rights, financing, the distribution of risk and returns, and legal liabilities.
4. The effect on competition—including widening or narrowing markets, changes in the barriers to entry, "squeezing" opportunities, and the knowledge and competence of buyers and sellers.

Efficiency, coordination, distribution and competition—these are the major effects of alternative vertical arrangements if the conceptual frameworks discussed earlier are all assumed to have some validity. Certainly one of our major concerns is to estimate, for different vertical arrangements, the trade-offs in results. Many believe, for example, that the exchange arrangements which are replacing open markets in some sub-sectors will improve technical efficiency and coordination. Many also wonder, however, about their effects on competition and the distribution of rights, responsibilities and returns. If there is such a trade-off, what is its shape? It is socially desirable? At this point, I don't think we really know.

HYPOTHESES CONCERNING PRODUCER-FIRST HANDLER ARRANGEMENTS

One place to start is to set down some hypotheses for examination and possible testing. Let me venture forth with several concerning exchange arrangements and vertical coordination. Some may be 180° off; others may not be testable. These can always be sorted out.

If we don't worry too much about precision, the various exchange arrangements can be arrayed from open production with spot exchange to vertical integration (or administered production). Such a continuum reflects the shift in decision control from producer to first handler, and to some extent the duration of the buyer-selling relationship. Following this rationale, I've used two schemes for developing hypothetical relationships. The first, shown in Figure 1, charts selected elements of producer control and producer risk under different exchange arrangements. The second, summarized in Figure 2, is a more general effort to relate exchange arrangements at the producer-first handler level to possible consequences.

Neither of these approaches is very profound; both represent rather crude guesstimates on my part. However, they may provoke some thinking. If exchange arrangements can be adequately classified, either approach could be pursued further.

Hypotheses can also be developed from the previously discussed conceptual frameworks. The hypotheses that follow reflect such an effort.

Figure 1
Hypothetical Relationships Between Exchange Arrangements and
Producer Management Control and Risk Exposure

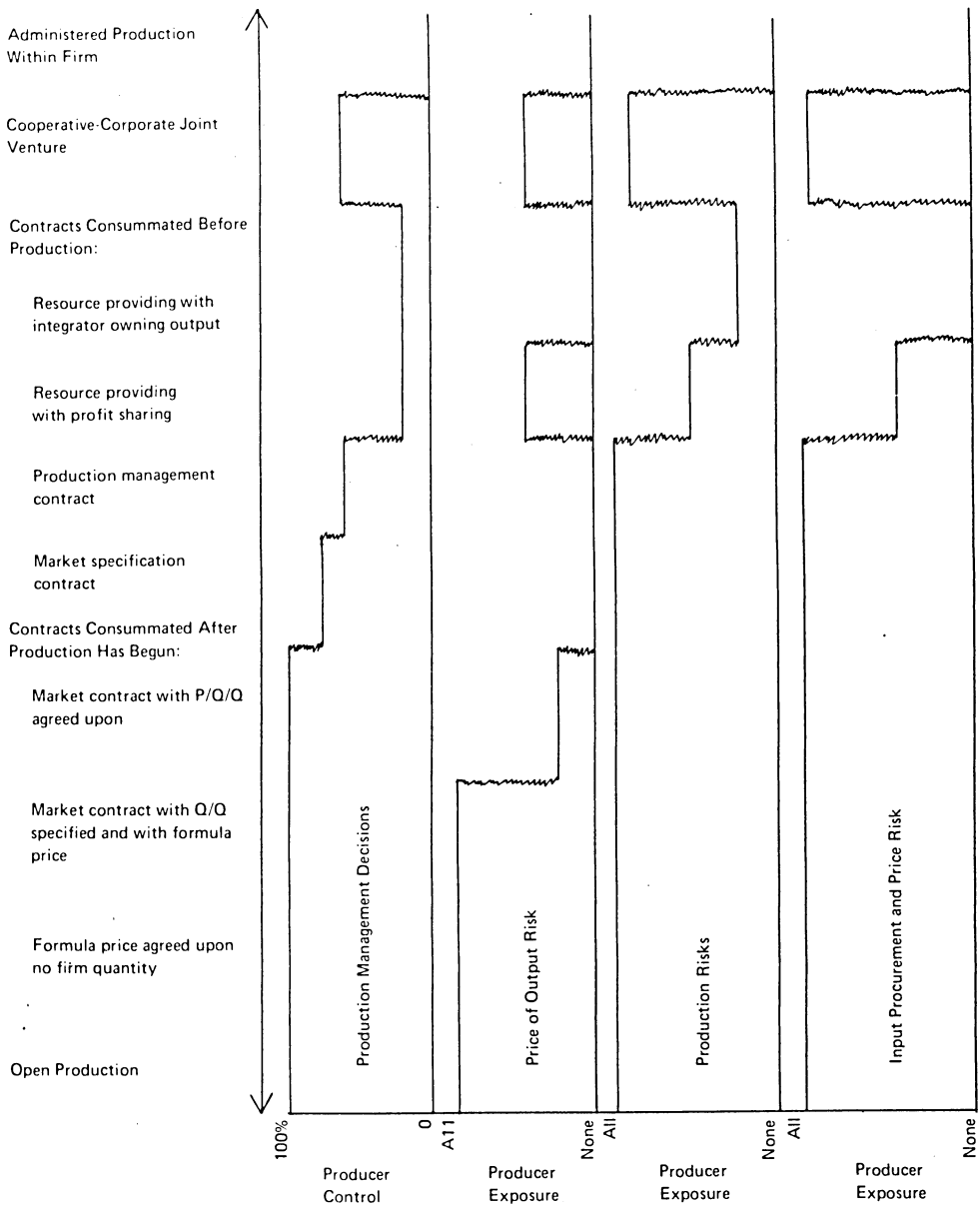


Figure 2
Estimates of the Performance Characteristics of Producer-First Handler Exchange Arrangements

Type of Exchange Arrangements	Technical Efficiency		Pricing Efficiency	Coordination of <i>S & D</i> , Re: Quantity, Quality & Timing	Influence on Market Information	Adoption of New Technology	Decision Control	Distribution of Risk	Impact on Market Structure		
	Transaction Costs	Cost of Physical Product Movement							Production	1st Handler	Bargaining Balance
Open Production: - Terminal Markets	High	High	Generally good	Poor in <i>SR</i> Varies in <i>LR</i>	Information available.	NPA*	NPA	NPA	NPA	Large firm advantage	Varies
Conventional Auctions	High	Generally high	Subject to B-S match-up		Usefulness depends upon grades & mkt. manipulation Improves Information	NPA	NPA	NPA	NPA		Favors large buyers
Electronic Exchange	Low	Low	Generally very good	Good in <i>LR</i> with adequate grades Varies greatly	Poor information	NPA	NFA	Less risk of market manipulation	NPA	NPA	May improve balance
Direct Buying	Med.-High	Depends on volume of producer	Depends on seller knowledge and alternative outlets						Large producer advantage	Large firm advantage	Depends on knowledge
Contracts: - Resource Providing With Integrator Owning Output	Medium	Low	Subject to buyer seller bargaining position	Very Good	Private information exchanged may improve. Public information reduced	Accelerates	Largely with integrator	Producer—only asset utilization risk	Large producer advantage	Large firm advantage	Generally favors integrator
- Production Management	Medium	Low		Very Good			Production Decision Contractor Product specified by buyer	Producer production risk Producer—production & price risk	Med.-Lg. producer advantage	Med.-Lg. firm advantage	NPA
- Market Specification (in advance of production)	Low-Medium	Low		Good-Very Good		Product changes may accelerate					
- Marketing Contracts (after production has begun)				Fair-Good	Information reduced	NPA					
Futures Market	Low		Generally good	Provides time extension; weak on quality coordination Good	Good Information	NPA	NPA	Means of transferring price risk for basis risk Depends on arrangement	Large producer advantage	Large firm advantage	NPA
Cooperative/Corporate Joint Ventures	Low	Low	Depends on transfer price arrangement		Similar to contracts	May accelerate	Varies by arrangement		Forecloses some of market	Large firm advantage	NPA

*NPA—No Particular Affect

A. Hypotheses Regarding Technical Efficiency

1. Technical efficiency in multi-stage segments of sub-sectors increases as the linkages between these stages approach vertical integration.

Ancillary Hypothesis:

- a. Vertical integration and contracts which transfer substantial control tend to accelerate the adoption of new technology, improve quality standardization, improve the scheduling of product flow, and stabilize facility utilization.
2. Technical efficiency at any stage in a sub-sector generally increases as the size and specialization of the enterprise increases. With increasing specialization, however, comes increased risks and often increased financial investments. Where risks are substantial, increases in firm specialization will be inhibited unless enterprise sharing arrangements (public or private) are available to allow sharing of risks.

Ancillary Hypotheses:

- a. Increased specialization results in reduced flexibility. The desired level of specialization, therefore, depends upon the rate of change in sub-sector demand and supply. With rapid change, flexibility is more important to firm and sub-sector performance than technical efficiency.
 - b. Since increased specialization reduces a firm's alternatives, it also tends to erode its bargaining power and makes it more vulnerable to exploitation and inequitable distribution of risk, responsibilities and returns.
3. When compared with a loosely coordinated sub-sector, a tightly coordinated sub-sector experiences lower total costs per unit of output, reduced levels of risk, lower prices to consumers, greater output, and lower total profits per unit.

B. Hypotheses Regarding Coordination of Supply and Demand:

1. Coordination of supply and demand = (f) pricing accuracy, information flow, cooperation between sub-sector members, and influence over demand.

Ancillary Hypotheses:

- a. Processing and distribution firms are in the best position to coordinate food sub-sectors due to their access to information on consumer preferences and their ability to influence demand.
- b. System linkages that transfer control forward in a sub-sector and which are relatively long in duration increase the amount of information communicated to and the market responsiveness of producers.
- c. Cooperation in a sub-sector = (f) consistency of firm goals, equality of bargaining power and level of information.
- d. The larger the number of stages and the more geographically dispersed, the more difficult the communication of accurate

information through the sub-sector. Communication is improved as intermediaries are eliminated and firms at different stages deal more directly with each other.

2. Synchronizing of supply and demand is improved when one stage in a sub-sector has significant control over supply.

Ancillary Hypotheses:

- a. Coordination of supply and demand improves as the concentration of the dominant stage in a sub-sector increases.
 - b. Commodities in which marketing orders allow for supply management and allocation enjoy better coordination than similar commodities without marketing orders or with marketing orders that concentrate on influencing demand.
3. Internal coordination (vertical integration) encounters some of the same problems as market coordination. Where markets are technically and allocatively efficient and free from manipulation, where grades and standards are adequate, and where sufficient information is available, market coordination will be equivalent or superior to internal coordination.

Ancillary Hypothesis:

- a. In large part, vertical integration and control transferring contracts result from the failures of existing markets.
4. The benefits from increased coordination increase with the perishability of products, the importance of careful scheduling between stages and the importance of quality specification.

C. Hypotheses Regarding Flexibility and Adaptability:

1. Adaptability of sub-sector = (f) cooperation , degree of market conflict

coordination, rate of growth of demand for output, sparseness of government guarantees/controls, and the equality of power between different stages in sub-sector.

Ancillary Hypothesis:

- a. For commodities where government farm programs provide price stability and an assured market, producers are relatively insensitive to changes in demand.

D. Hypotheses Regarding Distribution of Rights, Responsibilities and Returns:

1. The equity with which rights, responsibilities and returns are distributed among sub-sector participants = (f) equality of bargaining power between sub-sector dyads, and historical patterns of property right distribution.

E. Hypotheses Regarding Competition:

1. Large firms enjoy advantages over small firms in contracting or vertical integration. Contracts with large contractees are more economical to administer. Large contractors are better able to absorb the risk and administrative burden of vertical integration or control transferring contracts. Thus these modes of exchange tend to stimulate increased concentration.

2. Vertical integration or contracts which substantially alter control increase the barriers to entry into the integrator or contractor industry. Contracts which reduce the level of risk in the *contracting* industry may reduce the barriers to entry into that industry, however. The rate of entry/exit into the contracting industry following the adoption of contracts should indicate the perceived desirability of the risk-returns-freedom trade-offs.

F. Hypotheses Regarding Sub-Sector Characteristics:

1. Vertical integration or disintegration activity (or variants thereof) is positively related to the rate of growth or decline of commodities and the rate of technical change. That is, a sub-sector experiencing little growth or decline, and few technical changes would be expected to be organizationally stable.
2. The primary goal of firms in contracting for the sale of their output is to reduce market and price uncertainties. Their interest in contracting is positively related to their level of specialization and past variability of product prices, and negatively related to current price levels.
3. The primary goal of firms in contracting for input supply is to gain sufficient control over quantity, quality and the delivery schedule of inputs to assure efficient plant operations and the ability to satisfy market demands.
4. The incentives to contract are greatest for buyers when inadequate supply is available, and greatest for sellers when surplus supply exists and markets are glutted. Hence, there is a natural conflict of interest which encourages breaking contract commitments.
5. In most sub-sectors, firms at different stages have conflicting goals, do not accurately understand the goals and preferences of firms at the other stages, and are not "system oriented." Hence conflict is more prevalent than cooperation.

CONCLUDING COMMENTS

At this point in time, we know relatively little about the influence of vertical organization, exchange arrangements and other coordinating mechanism on vertical coordination and other performance dimensions. While some empirical work has been completed, much of its is limited by the lack of adequate conceptual models, the muddled use of terms such as "coordination," and the difficulty of measuring some aspects of sub-sector performance. Technical efficiency can be defined and measured. Coordination and the distribution of rights cannot, except in a rather general way. Thus, we are confronted with a great deal of rhetoric about vertical coordination and sub-sector analysis, but limited abilities to test its validity.

The three conceptual frameworks identified from the literature

provide useful insights into vertical organization and coordination. They are essential complementary views. If all three are at least partially on target, they suggest that vertical reorganizations are likely to influence technical efficiency, coordination, the distribution of rights, responsibilities and returns, and/or the nature of competition.

While we are far from being able to say what type of vertical change will bring a certain result, some hypotheses can be defined based upon the propositions in the literature. Those I have identified are a start. The challenge before us is to be sufficiently imaginative, creative, and tenacious to subject these and other hypotheses to the test of empirical validity. Only then will we have a clearer idea of the trade-offs involved, and some insights into the types of systems which will enhance efficiency and progress—yet also be consistent with social and economic values of society.

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