

How Markets Coordinate Decisions

By Wayne D. Purcell

Coordination of economic activities from producer to consumer is important. If what is produced is not consistent with what is being demanded by consumers, valuable resources are not used in the best way. Producers, consumers and middlemen could benefit from changes which brought improved coordination. A market system is like a complex assembly line. The farmer starts the process by producing the basic raw material.

As the raw material moves up through the system, it is processed to meet demands of the final consumer. *Form utility*, where utility equals satisfaction, is being created by changing the product to make it acceptable to the consumer. The amount of processing varies among commodities, but consumers are increasingly willing to pay for the services required to create form utility. Ready to cook broilers are acceptable to consumers — a live chicken is not.

Market systems also create *place* and *time utility*. The processed food or fiber product is moved to a place where it is readily accessible to the consumer. The modern supermarket, with its wide array of products, emerged because the consumer looks for convenient access to products and services. Storage of the nonperishable product and canning, freezing and other methods of making perishable products available throughout the

year create time utility. The consumer wants the product on a yearround basis. If the consumer is willing to pay for them, the market system will provide the time-related services.

If the market system offers the consumer a product form inconsistent with consumer demand, the "assembly line" is not working very well. The optimal level of coordination between production and consumption is not being achieved. Changes need to be made. How the changes are prompted depends on the way the system is organized. For most commodities, the production-marketing system is characterized by separate ownership of each stage of economic activity. Negotiated prices become important. Price signals come from buyer-seller negotiations along each interface where two stages of economic activity merge. It is these price signals that bring coordination.

Consumers can start the process by buying more aggressively a particular product or quality within a product line. As consumers compete for the available supply, price gets "bid up." Retailers bid higher prices to wholesalers in an attempt to get more of the product which is moving well. Wholesalers bid higher to the processors from whom they buy — and the process is continued until the price signal, a *price premium* in this instance, reaches the producer. Theoretically,

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cally, the producer reacts to this price signal by reallocating resources and producing more of the preferred product or the preferred quality. Coordination between what is demanded by consumers and what is provided is restored. *Price discounts* reverse the process and encourage producers to offer less of a particular product or quality.

Obstacles — The process is obviously more complex than a simple assembly line which has an overseer to observe the level of interstage coordination being achieved. Price signals follow a long and complicated path and there are obstacles along the way. Among those obstacles which have been identified in the research literature are: Goal conflicts at the interface where buyer and seller must interact; absence of any perception of a total system; inadequate grades and related descriptive terminology; and lack of competition on a price basis.

Buyer and seller have a most legitimate conflict of interest. Sellers want high prices, buyers want low prices. But the goal conflicts encountered sometimes go beyond the legitimate arena. For example, producers will often try to maximize output — yield per acre, weight per head at weaning time, etc. This may or may not meet the needs of the processor who is looking to the producing sector for a timely flow of raw material of a certain and consistent quality. If processors could control what is being done at the producing level, they would often do it differently.

Participants in the production-marketing system often do not perceive of themselves as part of an overall system. They do not see the “assembly line” at work and do not see what they are doing as a

“work station” in that assembly line. Thus they do not see interstage coordination as something they should worry about, and make no attempt to work with others in the system.

Cutability and Competition

If a system of price signals is to be effective, the available grades or descriptive terminology used in negotiating prices must be adequate. All significant and discernible differences in value must be identified and categorized by grades and the grades must be widely used by all buyers and sellers. A price signal cannot be attached to a product attribute which is not identified.

As an example, consider the situation in the beef complex prior to the initiation of yield grades. Quality grades (Prime, Choice, Good, etc.) were being used as a measure of palatability. But within the Choice grade, beef carcasses of comparable weight could vary significantly in value because of different ratios of lean and valuable cuts to total carcass weight. Price signals could not be expected to motivate changes toward high cutability cattle (high ratio of lean to total carcass weight) by producers when cutability was not being brought into the pricing process. A set of grades which allows all important value-related product attributes to be brought into the pricing process is a necessary condition to high levels of coordination between what is being produced and what is in demand at the consumer level.

Today's supermarket has a wide array of products that are available on a year-round basis.



Absence of competition on a price basis can block transmission of price signals. For example, a wholesaler might recognize the higher bid from a retail chain for a particular commodity and simply absorb it in the form of a wider operating margin instead of passing it to his supplier. A high level of competition, which encourages the "passing on" of the price premium, is important.

The cutability issue in cattle provides an interesting illustration. Since 1975, all beef carcasses which are quality graded must also be yield graded (or vice versa). Yield grade 1 is attached to carcasses with the highest ratio of lean cuts to total carcass weight, and yield grade 5 identifies low cutability carcasses. Yield grade 3 is the average or "par" carcass. The market is currently attaching a price discount, often substantial, to yield grades 4 and 5. But there is little or no visible evidence of a premium being paid for yield grades 1 and 2 — and there are usually as many 1's and 2's in a pen of cattle as there are 4's and 5's. There is room for an hypothesis that the level of competition is not adequate to "force" the paying of premiums for 1's and 2's.

The price system is actually a communication system. If high levels of vertical coordination are to be achieved, the system must "communicate" effectively to producers. The price mechanism must be an effective overseer of the systemwide assembly line. Economic incentive in the form of price signals must replace the verbal communication the overseer of an assembly line uses to make sure inter-stage coordination is achieved. Achieving effective levels of communication is no small assignment. Even if all other obstacles are overcome, the organizational structure of

most food and fiber systems often gets in the way.

Along the vertical continuum from producer to consumer, tremendous differences in the economic structures prevail. The modern retail chain is part of an industry sector organized as what economists might call an oligopoly. There are a few large firms. These firms tend to compete by spending huge sums of money on advertising. A particular firm reacts to the competitor's price specials by also running price specials to "offset" impact of the other firm's advertising program. You can be sure the manager of a supermarket in a particular market keeps a close eye on newspaper ads of the competition.

Sticky Prices Fail to Do Job

Except for this type of retaliatory price competition in the newspapers, retail prices tend to be "sticky" and slow to change. Changing prices is costly to the supermarket and irritating to the final consumer, so retailers hold the line on prices and let them go up over time in a stairstep fashion. Such an approach does not do much to help the probability that price signals will turn out to be effective messages in a communication system.

"Middlemen" tend to operate in a similar organizational structure. There are a few, large firms in any particular market area. There is price competition, but these large firms (flour mills, cotton merchants, grain exporters, vegetable processors, meat packers, etc.) have at

Wheat hauled to a local elevator, such as this one in St. John, Wash., brings the posted bid price for that day with premiums or discounts for protein level, moisture, foreign matter, etc.

least a degree of market power — the capacity to influence price or other terms of trade. The goal is often the realization of a certain gross margin per head, per ton, etc.

When a limited supply of raw material forces the processor's procurement cost up, this might simply mean taking a smaller margin than desired for a few weeks. But when raw material is in abundant supply, the large processor tends to "get even." Operating margins are allowed to increase, at least for a limited time, as the price of the raw material is forced lower. Any price signals which enter this operating arena from higher up in the system may be totally concealed or even reversed in the short

run as the firm wields an element of market power. Needed resource reallocation is blocked or slowed.

Price Takers — Skipping down to the producer level, the operating structure changes completely. The norm here is many small producers, approaching conditions economists call pure competition. The individual is a *price taker*, not a *price maker*. Price is determined at the aggregate level by interaction of demand and supply and the producer sells, on any particular day, at the prevailing price. A truckload of wheat hauled to the local elevator brings the posted bid price for that day with premiums or discounts for protein level, moisture level, foreign matter content, etc.



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Price for raw material at the producer level is a derived price, reflecting essentially value at the consumer level less the sum of the operating margins of all middlemen. And since the middlemen have at least some element of market power, the price to the producer does not and will not vary directly with changes in value at the consumer level. Add to this the complicating influence of extreme price variability at the producer level and it is easy to see why some researchers have questioned the effectiveness of the price mechanism as a communication system. If there is concern about the effectiveness of that communication effort, then there must be concern about the level of vertical coordination being achieved.

Contracts Supplement Signals

Relying on the communication processes of the price mechanism is not the only way to get vertical coordination. The alternatives range from approaches which supplement the price mechanism to vertical integration, a way of organizing which replaces price signals with management directive. Contracts can be used to supplement price signals. Say a processor is having difficulty getting a consistent flow of high quality raw material. Contracts with producers which specify quality standards, indicate time of delivery, and offer appropriate economic rewards for compliance can help. Such approaches are widely used throughout agriculture, but are especially prevalent in the fruits and vegetables sector. How

effective this approach will be in prompting alignment between what is produced and what is demanded depends on ability of the processor to interpret what is needed at the consumer level, get this reflected in a contract, and offer an incentive which will motivate producers to change.

Buying and selling by description can enhance the effectiveness of price signals. The emerging electronic marketing systems, where buyers bid or buy over computerized or other electronic systems, must consistently use a complete and detailed set of grades or other descriptors. Insofar as price differences are clearly related to differences in identified product attributes, the producer is better able to "sort out" and see the message inherent in the prices because of the increased visibility and importance of grades.



Almost all broiler production is in the hands of integrated firms. Chickens are hatched, fed, processed, packaged, and made ready for retail by one firm. These broilers are feeding on a special formulated and mixed feed in Mississippi.

Vertical integration is at the other end of the continuum from the open exchange systems. A type of vertical coordination, it involves the bringing of two or more stages of economic activity under the ownership and control of a single business entity or management. Management directive replaces price signals as a means of coordination. Management in the processing arm of the business simply passes the specifications for raw materials back to the producing arm of the business. Within technological and cost limitations, quality and timing of product flow are controlled and there are no visible, negotiated prices. Vertical integration is not unusual in fruits, vegetables, and grains. And almost all broiler production is in the hands of integrated firms. The chickens are hatched, fed, processed, packaged, and made ready for retail display by one firm.

Types of Efficiency — In discussing implications of various ways of achieving vertical coordination, it is useful to recognize that analysts of marketing systems talk about two types of efficiency. *Technical efficiency* deals with the cost of doing a job. The ratio of useful output to inputs gives a mental picture. Other considerations equal, a higher level of technical efficiency would be desirable. There is evidence in the research literature that the vertically integrated system can achieve higher levels of technical efficiency than an open market exchange system. This is consistent with the opportunity to specify raw material attributes and control the flow of those raw materials.

The second type or form of efficiency is *pricing efficiency*. High levels of pricing efficiency suggest that what is being produced is consistent with what is demand-



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ed by consumers. Pricing efficiency, therefore, is a measure of the system's communication effectiveness. In a vertically integrated system, the ability to "match" what is produced with the demands of consumers is constrained only by management's ability to decipher those consumer demands, by the available technology, and by the cost-benefit ratio of making changes to maintain alignment with consumer demands. But this does not mean society would necessarily benefit from moves to vertical integration.

The net benefits of vertical integration are perhaps impossible to measure. Since price negotiations are effectively eliminated, what are the implications to society of the disappearance of previously observable prices? And if integrating means larger size and the possibility of increased market power, what are the implications to society? Leaving these issues for another forum, this chapter will focus attention on the current and pending interplay between open exchange systems and vertically integrated systems. For purposes of discussion, it is useful to hypothesize that failure of the price mechanism, in an open exchange system, to achieve high levels of vertical coordination will prompt moves to vertically integrated systems. Let's look at some reasons why this might occur.

Short and Long Run Impact

In the short run (within a year), failure of the marketing system to achieve high levels of interstage or vertical coordination are costly to society in general and to the individual firm. Consumers are denied access to preferred products and/or qualities at the levels and with the consistency they would prefer. Impact on the individual firm is best seen by con-

sidering the position of a processing firm. If the system does not generate a consistent flow of raw materials of acceptable quality, the firm has a difficult time meeting orders from its customers. A variable flow of raw materials is sure to increase the per unit costs of processing. Labor, for example, is either overworked or underworked depending on the flow of raw materials into the plant. In the short run, therefore, failure to coordinate can mean poor alignment between what is produced and what is demanded by consumers and increased costs of the final product at the consumer level.

Over a longer planning horizon, failure to coordinate has significant cost implications. Continuing to use the processing firm as an example, the type of plant which is planned and constructed will vary with anticipated problems in raw material flows. If a highly variable flow is anticipated, the plant must be flexible in terms of daily or weekly quantity it can handle. A flexible plant will be less efficient in a technical sense than a plant which can be designed for a particular operating volume and a stable flow of raw materials into the plant. Over time, the reduced efficiency and higher costs get passed on to the consumer in the form of higher product prices.

In a short and long run context, there are economic incentives for higher levels of vertical coordination. If the exchange system and the price mechanism do not generate acceptable levels of coordination, pressures for vertical integration emerge. Everyone, from producer to consumer, has a stake in what type of system we will see and the level of coordination realized. More widespread understanding of how markets coordinate decisions would help.