

PRICE FORMATION - THEORY AND PRACTICE

by

Olan D. Forker

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In this paper I wish to do two things. First, I wish to present some thoughts about price formation in theory. This will involve a partial review of literature and discussions of the relevance of the theories to the food industry.

Second, I wish to discuss price formation in practice as it relates to agriculture, agricultural economics, and the food industry. While in England on sabbatic leave, from September, 1981, through February, 1982, I attempted to conduct a comprehensive review of price formation in practice across commodities, and across the European Economic Community countries. Although I made progress, I was not able to do a complete review, and the information collection process is still incomplete. Even if it were complete, it is obvious that the transaction systems, and the processes by which prices are formed in the various countries, and for the various commodities, are far too complex to completely analyze, make inferences, and condense the information into a form manageable in one brief paper. This second part will be handled then by the presentation of some observations, and some propositions about price formation in theory and practice.

In most cases, these propositions, and the statements about them, must be considered tentative; they are presented to encourage discussion.

### Price Formation in Theory

If my reading of the literature is correct, there is evolving a new theory of price formation. It is referred to by some authors as a post Keynesian theory (Eicher p.81).<sup>3/</sup> The new theory diverges sharply from the models of pricing behavior found in economics textbooks. Its emphasis is on the role of prices in assuring the reproducibility and expansion of the system, rather than in allocating resources. It questions the assumptions of profit maximization. The evolution appears to be consistent with the concern of those who believe that current economic theory (macro and micro) is unable to handle productivity and capital formation issues (Drucker, p.16), in fact, the new theory is growing out of that concern.

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<sup>1/</sup>Olan D. Forker, Professor and Chairman, Department of Agricultural Economics, Cornell University, Ithaca, New York.

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<sup>3/</sup>Others involved are David Levine, Josef Steindler, and Kalecki.

The thrust of agricultural or farm policy in the US, the UK, and other developed countries has been directed toward a dissatisfaction with the price formation process, or at least the results of the process. One could argue that the intent of that policy, despite the political rhetoric, has been, and is, to cause a greater accumulation of capital and improve productivity, or, in other words, assure reproducibility and expansion of the farming sector.

Critics of the policy have used, and still use, the competitive model or free market as a norm, and have thus argued that interference with the free market process of price determination results in a misallocation (or inefficient use) of resources.

Research and policy pronouncements of agricultural marketing economists have followed three different paths. Almost all use the perfectly competitive model as their norm. Some have focused on ways to make markets and the transaction systems operate more efficiently so that the marketing system and the price formation process will yield prices efficient in time, form, and space dimensions, and moving toward the competitive equilibrium. New or modified processes, pricing mechanisms, and information systems, have been proposed to improve the marketing system - i.e. reduce the costs of the marketing process (physical), the transaction system (information), expand the scope of the market, increase the number of participants, and increase the number of visible transactions, etc. (Forker).

Other marketing economists have focused on ways to exploit the market and, using models of imperfect competition, have designed policy and programs to enhance returns to farmers. Thus we have marketing orders, marketing boards, special laws for cooperatives, etc.

Still other marketing economists, again aligned with the perfectly competitive model as a norm, have focused on the oligopolistic structure and conduct of the food manufacture and distribution sector. They judge its performance bad. They propose more strict enforcement of antitrust policy and a price formation process more closely aligned with that envisioned in the perfectly competitive model. All this to narrow the price spread between consumers' prices and farmers' prices.

To expand on this and form a basis for later discussion, let me briefly state price formation theory as it is stated within the theory of perfect competition. Such theory states that prices will tend toward an equilibrium where all product prices end up equal to all marginal costs, all factor prices end up equal to values of marginal products, all total costs are minimized, and consumer satisfaction is maximized (Samuelson). The nature of the price formation process is not explicitly stated. But, one can, within this model, specify marketing activities and the process of price discovery as productive activities. In this context, then, the operation of the market will cause systems, institutions, and arrangements to evolve which will be optimal in terms of their marginal costs and marginal benefits. Furthermore, the vertical arrangements between firms in the marketing chain will be such that total costs are minimized, including the costs of price discovery.

The perfectly competitive model specifies that all participants are price takers. Prices are formed in the market place. Through the specification of large numbers, a free flow of information, resource mobility, and a rapid adjustment process, an efficient set of prices evolves and an efficient allocation of resources results. Very few of these assumptions hold.

In view of our concern over capital accumulation and productivity issues now and in the past, one wonders whether we, who are concerned about the economics of the agricultural sector and the food industry, should continue to accept the competitive model as our norm. Perhaps we also should start thinking in terms of a post Keynesian theory of price formation.

### Price Formation in Practice

Price formation, in practice, involves the continual search for the appropriate, or best, price in view of the then current known or expected future economic conditions (supply and demand), conditioned by the objectives of the firm(s) or traders. It is a process. It is dynamic. It involves institutions and rules and regulations about the way individuals determine their individual transaction prices. And, in view of the uncertainties of the real (world) market place, each completed transaction is considered a trial price (and quantity), and used as a guide along with other information in the search for the best price (quantity) for future transactions (Paul). Thus, if we observe prices for a commodity (or a good or service) within any time frame, we will note a dispersion in prices, and we can calculate means and variances. Some of the differences can be explained by economic or technical factors, some cannot be explained.

If we wish to achieve the price set of the competitive norm, then we argue that certain conditions, similar to those specified or assumed in the competitive model, must prevail.

Various institutional arrangements have been developed in agriculture to facilitate the search process and to make it easier for potential buyers and sellers to communicate. But, it seems there has always been a question of the balance of power and the extent to which the flow of information is adequate.

The institutional arrangements that have evolved and are commonly used in the US, the UK, and various western European countries in the marketing of agricultural output from production to consumption are many. Various groupings or categorizations have been applied. One reasonable, all encompassing classification, is as follows:

1. Individual negotiation/decentralized trading.
2. Organized exchanges or auctions, including central or terminal markets.
3. Formula pricing off an organized exchange or other reference price.
4. Group bargaining.
5. Administered pricing - private firm.

6. Administrative pricing - government.
7. Futures markets.
8. Committee pricing.

I do not plan to discuss each herein beyond that necessary to make a point. A detailed discussion can be found in several places, see especially Tomek and Robinson for all but item 8 (for item 8, see Rogers).

In my review of the literature and interviews with individuals in the UK, the Netherlands, and Brussels, about the arrangements in Western Europe, three things stand out.

First, there is a great deal of similarity, yet important differences do exist in the type and range of institutional arrangements used for each of the various commodities in each European country and the US.

Second, each type of arrangement exists in some form for each of the several groups of agricultural commodities.

Third, similar trends exist in Europe and the US. On this latter point, one might expect, if and when Europe becomes one economic community, for agricultural production and distribution, that the institutional arrangements might become even more similar. This would happen because the length of the trading channels will become longer, there will be more regional specialization of production, and production processing and distribution will likely become more vertically integrated.

What are the similarities and the differences?

Some general similarities can be stated as follows:

1. First, and most important, farmer producers and citizen consumers are all price takers, and they behave as price takers, i.e., adjusting quantity and, as individuals, do very little to differentiate their products. This is true, even though the government does intervene and, to a more or lesser degree, depending on product and country, achieves administered prices through intervention.
2. A private sector administered price system exists at the consumer-retailer interface.
3. There is universal concern about monopoly power in price formation at the retail level and among food manufacturers. (Note - monopoly power, it is alleged, results in excess profit and cost inefficiencies, not just excess profits.)
4. A trend toward decentralization of markets and marketing arrangements for livestock, most pronounced for pigs, is occurring in all countries, but decentralization is more advanced in the US.
5. Decentralization is consistent with the increase in vertical integration, as well as horizontal integration.

6. Price and Market News Information reporting systems are quite advanced in all countries with similar problems of timeliness and the difficulty of obtaining complete, or adequately representative, information in decentralized market situations.

7. For each commodity, in most countries where laws do not specify a single arrangement, there exists an overlapping system of different pricing arrangements, both horizontally and vertically, from individual negotiation through organized markets to administered pricing. As I will discuss later, I think this diversity is important.

8. Milk is priced by a public and/or private sector administered price arrangement of some form in every country.

Even with these similarities, there are many important differences.

1. The amount of administered pricing by the public sector is more extensive and pronounced in European countries than in the US. This is evidenced by the market intervention activities of the EEC, the monopoly or quasi-monopoly arrangements such as the UK Milk Marketing Board, and the threshold price arrangements at the trade frontier of the European Economic Community member countries.

2. The Futures Market is a more important part of the scene in the US and appears to have a different role. In the UK and Europe, futures contracts exist mostly for commodities that are imported or traded internationally and are storable. Also in the UK and Europe, those who belong to and trade on the futures exchanges are mostly individuals or firms who are also merchants dealing in the physical commodity (about 80%). In the US, most of the futures trading (about 80%) is done by speculators or specialists, and the commodities are those produced in the United States. Furthermore, some contracts are for commodities that most would consider perishable such as live cattle, live hogs and broilers.

3. Attempts at committee pricing that I have been able to identify have occurred in three countries - the US for eggs and cotton, Germany for slaughter pigs, piglets and apples, and the Netherlands for potatoes. There are, perhaps, others. The essence of the committee arrangement is that experts appraise the market and publish a price quotation which is then used as a reference point for individual transactions by formula. The committee for eggs in the US is made up of non-industry representatives (experts). For cotton, the committee is made up of cotton traders. In Germany, the process involves the Delphi method of voting by a committee representing various aspects of trade, with some non-trade representation.

I should comment that the price reporting Committees, appointed to report prices for specified types of livestock and other commodities to the EEC, are not pricing committees in the traditional sense. However, they are important in the price formation process to the extent to which their prices are used as a basis for EEC intervention activities.

4. There are many country and commodity differences, but first some that are uniquely country differences.

(a) The most pronounced country difference is the Netherlands, with its Clock, or Dutch Auction, arrangement for fresh fruit, vegetables, and flowers. Currently, if a producer is a member of a marketing cooperative, he must, by fact of membership, sell all of his volume under the clock. From 1930 to 1967, all production in the country had to be sold that way by Federal Law. Since the law's abolishment in 1967, there has been a gradual decline in volume under the clock, except for cut flowers. The move has been for a more direct selling through individual negotiation. Potted plants have moved through the clock auction arrangement because they are mostly grown by cut flower growers and sold through the same wholesale, retail system. However, there has been a great deal of dissatisfaction on the part of growers, and they are experimenting with negotiation and forward contract arrangements.

(b) The second most pronounced country difference appears to be Italy where marketing and pricing arrangements are much less open than in the northern countries. For example, only one multinational grain company operates in Italy. No one that I talked to in the EEC could describe to me the arrangements in Italy, or in Greece. The general reaction was that it is impossible to find out.

(c) Another significant country difference is Denmark, where cooperatives dominate the scene for several commodities, especially pigs.

5. The pricing arrangement for each commodity, or commodity group, is somewhat different in each country. To provide a perspective, I will provide some details on just two - cereals and livestock.

(a) Cereals - the EEC threshold price, and variable level scheme, at the common frontier for trade, limits the extent to which world market forces affect internal prices. But, the internal market forces still are at work, and prices are formed internally through relatively openmarket arrangements - more open in the northern member countries than in the southern. A futures market, and a cash market, function in Rotterdam. These prices serve as reference prices for most other transactions and are linked to the cash prices being paid in the field to farmers. The link is strong in countries where large volumes are purchased from the farmers. The link is not as strong where most of the volume is used internally for feed. The linkage is probably strong in the UK, the Netherlands, France, Belgium, Denmark and Germany. However, in France, dealers must register with the government, and this, perhaps, limits entry to some extent, and thus might influence price formation. But, France is the only large national exporter to other countries so one might expect different institutional arrangements to exist there.

In the UK, most commercial transactions between grain merchants and farmers are by individual negotiation. Some grain merchants, usually the large ones, hedge in the futures market, but the system appears to not be as universally used as in the US. The merchants buy and sell on margin for export, or for feed fabrication, or milling, or for resale to other farmers.

In Ireland, private merchants negotiate a flat price on barley with the Farmers Union.

In Germany and Belgium, grain exchanges and local merchants function at the local level.

In the US, the futures market price, and the farm price, as well as prices throughout the marketing chain, are closely linked as a large portion of all volumes purchased by first and later handlers is almost simultaneously hedged on the futures market, with an offsetting transaction being made when the commodity is sold.

(b) Livestock - There is a trend in all countries toward more direct trading between producers and packers and a decline in central market, auctions or terminal market volume. At the extreme of this trend, all farm transactions will be by private negotiation. But, the trend has not yet reached its extreme, and probably never will. The trend has moved quite far for pigs in all countries. In the US, individuals have established, and cooperatives have formed assembly points where packers can quote offer prices and quantities daily. Farmers can shop around for the best offer, packers can adjust their offer prices as the day progresses, and the volume forthcoming becomes more evident. In West Germany, only 17 percent now go through a central or regional market. In the UK, large numbers still go through local auctions, but, large numbers are sold under contract with the price determined by formula, with a published price as reference. In Germany, a group is experimenting with a Committee price quotation as a reference price for formula pricing, but, most pigs are sold liveweight at a negotiated price. In Denmark, the price is set by the Cooperative Board one week in advance, and prices are deadweight. In France, cooperatives have tried to establish auction markets - some are in operation - and some packers use the prices that evolve there as a basis.

The Beef market functions differently. The swing toward decentralization is quite far along in the US. A substantial volume still moves through several terminal markets, and a small volume moves through local auction markets, but, the largest portion moves directly from farm to packer. The packing plants are now located in the areas where cattle are fed. Packers' agents compete against each other for supplies at the farm feed lot. A futures market contract exists for live cattle, and the linkage with the cash price is quite strong. No terminal markets exist for carcasses such as Smithfield in London.

In the UK, over 50 percent of the cattle move through local auctions. Most of the balance move direct and are priced by individual negotiation.

In Holland, Denmark, and France, most sales move through dealers or commission men and through regional markets where trading is by individual negotiation.



### Some Propositions

Many different propositions have evolved from my search of the literature and my attempt to make sense out of what I have observed. I have selected four that seem important and that I want to try out.

1. Pricing methods in agriculture progress from bargaining on each transaction, to centralized markets, then to decentralized markets, and finally to a price committee system.

This is not my proposition. Professor Shepherd suggested this many years ago (quoted by Rogers, 1970).

The first three parts of this proposition are accepted by many. We have seen it occur. We can point to evidence as I have, to a limited extent, in earlier parts of this paper. We can even identify attempts to establish committee systems for some commodities - eggs and cotton in the USA, potatoes in the Netherlands, pigs and apples in West Germany. But, none have as yet become firmly institutionalized as integral parts of the price formation process. And, it is possible that they never will become firmly established. Other forms of pricing arrangements, or services such as the futures market, public sector administered pricing, or electro communication exchange systems, might satisfy or continue to satisfy, the demand for pricing services, even though the marketing system becomes highly decentralized and vertically integrated. Of course, Shepherd might not have meant a committee system as we have tended to develop it - a group of experts who meet on a schedule, evaluate the market situation in a very decentralized, relatively closed, system, establish a price quotation which is published, and then used as the price or the reference price, in a formula pricing arrangement for individual transactions. We have tended to develop it as a way to place both an objective and subjective test to the market and effectively shorten the search process. Our colleagues in West Germany argue that their price discovery agency for pigs is quite well established and the one for apples is growing in importance. But, as of now, it is just one of several arrangements in operation.

In most cases I suspect it will not become institutionalized because it goes counter to our concept of how a perfectly competitive system should work, and it will thus be ruled in violation of antitrust statutes. And, this is likely, even though it might be the least most cost-effective means of providing a pricing service for a commodity, and one that might yield price results closer to those of a competitive system than would result without it.

2. The greater the degree of decentralization, and the more complex the marketing system becomes, the greater the dispersion in prices, that is, there will be greater variance in price within markets and the mean prices of connected, but separate, markets will be further apart.

Tomek has demonstrated in a study of the decline in the terminal cattle markets in the US, that as a number of transactions go below a certain level in a market or markets, the variance becomes larger and the mean prices of separate but connected markets move further apart (Tomek, 1980). Allan Paul (1974), has

stated it another way. In referring to the increased complexity of the market, he states that the larger the number of price points, the greater the task of acquiring information about offers and performance guarantees. Since the spread in prices in different parts of a market can logically equal the cost of the search (Stigler), then increases in cost will likely result in increased dispersion.

Of course, each participant need not incur the cost of searching the entire market as long as there are overlapping patterns of search. Innovative and effective arrangements such as committee pricing, markets for futures contracts, or other ways to cause overlaps in the search, or reduce the cost of the search, will be necessary to keep the dispersion narrow.

3. An organized futures market where none now exist, and where the market is decentralized, could help to open up the market, broaden participation, and bring about a reduction in the cost of the search. It would do this by expanding the effective time frame of information brought to bear on current or spot transactions, and encompassing a large number of potential traders, i.e., those that are interested in their transaction occurring at a different point in time. Telser (1981), argues that the purposes and role of the futures market is not as many have argued for years, i.e., just to provide risk insurance, liquidity and convenience yield. Rather, he argues that its purpose is to facilitate trade among strangers. Allen Paul, I believe, supports this when he argues that the purchase of a commodity for forward delivery is equivalent to the purchase of (a) a commodity for spot delivery, and, (b) a set of services to make the spot commodity into a forward commodity (Paul, 1979). It seems to me that the two statements (Paul and Telser) support each other and support my proposition.

4. The conclusions and the pronouncements by agricultural economists and others that the food retailing and food manufacturing sectors are concentrated, are misdirected and counterproductive. The claims are, no doubt, true when the actual structure, conduct and performance dimensions of the industry are compared with the competitive norm. However, the tendency toward decentralization and the concentration does have an economic basis, it is universal in developed countries. Developed countries where the situation exists, have the highest standards of living, the lowest percent of total consumer expenditures going toward food, and the largest choice of food types and forms. Even if the estimates of the degree of exploitation are correct, and even if laws could be effectively developed and enforced to eliminate or prevent the monopoloid tendencies, the savings appear to be small. It would seem that we have more to gain as a profession and the efficiency gains could even be larger by working closely with the industry on better ways to improve productivity, and other ways to achieve the most appropriate levels of capital accumulation. The pronouncements antagonize the industry and make it difficult, if not impossible, to gain their cooperation.

Summary and Closing Statement

The above propositions are four of several possible propositions about price formation. I have provided a brief and partial coverage of price formation theory. The coverage of price formation, in practice, has been partial and pragmatic. The linkage between the three parts of the paper is not too obvious, but exists.

I have been critical of the competitive model because it does not match with the capitalistic market economy as it functions. But, I have used it in explaining the existence, and in judging the adequacy of existing pricing arrangements. I think it quite safe to state that the institutional arrangements, and the mix of institutional arrangements for price formation (for assisting in the search for the best, or appropriate, set of prices) that currently are in use, exist because they provide the least cost method in terms of benefits of any possible arrangement, and they will continue to survive as long as they do the job as well, or better, than other arrangements. Except for the administered prices, they are consistent with our competitive model of how the economy should work.

Market conditions, the structure and organization of production and distribution, continually change, and our goals change so that new institutional arrangements, including the form of public sector administered prices not yet thought of (perhaps to be thought of by agricultural economists) will likely be needed. The committee approach, perhaps, has a role to play, but needs a great deal of work to make it reliable enough to become institutionalized.

In the future, the real changes will occur by small increments, as they have in the past, and will involve gradual changes in the relative importance of the kind of arrangements that we now observe in practice. We must, as agricultural economists, be critical observers of the whole process - the competitive dimension, and government interference.

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