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RELATIONSHIPS BETWEEN FUTURES CONTRACTS AND ALTERNATIVE CONTRACTUAL ARRANGEMENTS IN AGRICULTURE

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This paper explores the interrelationships between futures contracts and other vertical contractual arrangements. I will examine how the existence of the futures market, a coordinating instrument, might affect other potential vertical coordinating arrangements, as well as the influence on the futures market when alternative contractual instruments are available. We will see that in some cases futures and alternative forward contractual devices work together as complements. In other cases they operate as substitutes. In still other instances they appear to be independent of each other. Also examined here will be the relationships between the existence or non-existence of futures contracts and the related market structure for agricultural products.

The literature in this area is sparse, and the collection of sufficient data to test any hypotheses is far beyond the scope of this seminar paper. Consequently, many of the statements are likely to be judgmental, and few, if any, issues will be resolved with any confident conclusions.

HISTORY OF FUTURES CONTRACTS

Let us first examine the history of futures contracts and how they are related to other vertical coordinating arrangements. Irwin [3] established that futures trading in the United States arose for each commodity out of the specific needs of the commodity trade, and not just as a medium for speculation. He established that futures trading in butter and eggs had arisen directly out of business needs, and implied the same for grains and cotton although the data were not as adequate. There is no evidence in the recent proliferation of futures contracts in metals, livestock, etc., that this hypothesis would be rejected, at least for those contracts which generate continuing trading interests and are not introduced merely as market experiments. Some scheme for forward dealings existed for each commodity.

Organized futures trading developed directly as an extension of existing marketing practices, namely the transition from time or forward delivery contracts. These latter contracts called for the delivery of a specified commodity at an agreed price with substantial deferred delivery. They are distinguished from "to arrive" contracts, which usually called for delivery within a relatively short time [2, p. 72] and are

often mistakenly given credit as the preceding stepping stone for the emergence of futures trading. Without question, it often took as long as 25 years for the early traded commodities to evolve from the development of forward contracts to the specialized form of organized futures trading.

Thus, the evolution of trading in futures contracts as we know it today comes from the organization of formal means to legalize and trade time contracts. These time contracts continue to exist depending upon business needs. In some cases they are used in conjunction with formal futures contracts, while in other cases their use is independent of formal futures contracts. With the more recently introduced contracts, the preceding forward dealings may not have been in actual time contracts, but in some economic equivalent like the contracting for a service.

LACK OF RECOGNITION OF FUTURES CONTRACTS

Unfortunately, in much of the agricultural economics literature concerned with contract production and vertical coordination in farming, use of the organized futures market is often ignored. Specifically, for many agricultural commodities the percent of output produced under contract or vertical integration is frequently reported (most recently by Mighell and Hoofnagle [5]), but these data do not reflect futures contracts entered into by producers, nor do the authors usually even mention this alternative possibility. Futures contracts may often have specifications very similar to production contracts.

Of course, collecting the appropriate information from commodity exchanges is nearly impossible, as futures market transactions are private and one cannot ascertain without a survey whether actions of individual classes of traders, like primary producers, are for speculative or hedging purposes. In addition, direct use of the futures market by primary producers has never been extensive, and when it is used, delivery seldom occurs. Also, one might argue that use of futures contracts is only a marketing device to be distinguished from contract production and vertical integration. But certainly holding of futures contracts can be one of a class of possible means for vertical coordination, and ignoring it in data reporting is a serious omission.

COMMODITIES WITH NO FUTURES CONTRACTS

Among those agricultural commodities for which there has never been a futures contract, one can find examples where production contracts or vertical integration represent a large proportion of the output produced, and counter examples where the proportion is low. Commodities in the latter group include hay and forage, dry peas, dry beans

and sheep. Commodities where contracting or integrating is significant and there are no futures contracts include many fruits and vegetables, seed crops and milk. The common characteristics that commodities must possess in order to be adaptable to futures trading are a matter of discussion, but one will be hard pressed to find a common set of characteristics for the above non-futures traded commodities. As pointed out previously, because organized futures trading grows out of an economic need and from forward time contracts, it could be argued that in the above list where the degree of contracting and integrating is low, there has been no relevant experience by the traders nor incentives that would lead to contracting, be it organized or not. In the list where contracting and integrating is high, many of the commodities are specialized and produced in a few localized areas, making trading so limited that a futures contract could probably not be maintained. Organized futures trading is not a logical next step from these highly specified production contracts. Milk, however, is somewhat different. It does possess some attributes which could lead to futures trading, but the existence of strong co-ops and market orders, among other factors, may well prevent such by providing strong alternatives.

Thus, for many commodities organized futures trading does not seem to be a real possibility, and this is independent of whether alternative contractual arrangements are in existence or not. These alternatives develop on their own, depending upon the economic needs of traders in the market.

COMMODITIES WITH FUTURES CONTRACTS

Organized trading in futures contracts has arisen where there already was some type of forward trading equivalent in existence. Thus, it seems futures trading might be a substitute for some types of vertical coordination. However, one needs to know what kinds of coordination are occurring. Little has been written in this area, but Paul [6] and Paul and Wesson [7, 8] have made important contributions. Their thoughts will be incorporated in much of the following discussion.

Arthur [1] points out that futures trading, government price support programs, and contract farming all have the following features in common. They entail future commitments, undertake to transfer certain risks, employ the legal device of contractual arrangements, and divide and reassign functions in the vertical production and marketing chain.

The three production-marketing alternatives to which Arthur refers may be thought of as substitutes for each other. However, all three are involved in coordinating economic activity within a broad system, and some situations may call for more than one coordinator at a time. The major distinctions futures contracts have from other alternatives is that they are easily exchanged on an open market.

We can find commodities with futures contracts which have little or no reported production contracting or vertical integration [5], such as corn, wheat, oats, soybeans, hogs and maybe cattle and cotton. On the other hand, futures contracts and significant production contracting or vertical integration coexist for potatoes, orange juice, sugar crops, eggs and broilers. Interrelationships among contracts have to be studied almost on a case by case basis.

At one extreme, forward buying and selling through futures contracts can be a direct substitute for contract farming or vertical integration [6, 7, 8]. This would be the case when there is a sharing of responsibilities, and the grower is responsible for rates of gain, commodity losses, and the efficiency of converting inputs into outputs. Such arrangements are available in hogs and cattle, and futures trading is a direct substitute. The producer may not need the processor as a partner and can obtain the necessary services and capital through forward markets rather than production contracts. Only the mechanics differ. At the other extreme where the arrangement gives the grower very little responsibility and he is essentially a laborer earning a fixed fee, then use of the futures market is quite different and in fact probably independent of contract farming decisions. Most arrangements, however, fall in between these extremes with a wide range of flexible alternatives, both in contracting and forward buying and selling.

Hedging on futures market has often been described as a temporary substitute for cash market transactions, but it might also be a temporary substitute for other contracting transactions. For example, a flour miller may purchase wheat (cash or contract) without an off-setting forward flour sale. Until such sale is made he may sell a wheat futures contract to pass on risks of price level changes. The futures market acts as a facilitating agent here, as without it, the miller may feel obligated to consummate contracts at both ends simultaneously. Similarly, the futures market may facilitate transactions when the miller makes a forward flour sale without wheat inventory at hand. Instead of immediately contracting for wheat, he can buy a futures contract and hold it until wheat is purchased. Likewise, feeders who anticipate future feed needs may purchase feed grains through the futures market, as opposed to contracting for them. Thus, in these cases if there were no organized futures markets, other contracting devices would surely emerge. Futures contracts certainly act as temporary merchandising and contracting substitutes.

Even the typical textbook hedging example fits into this particular class of transactions. That is, the grain elevator operator who buys grain from a farmer will immediately hedge it on the futures market. This undoubtedly replaces some other type of forward time contract. Soybean crushers and dealers have several options of buying and selling forward, using alternative contractual arrangements. They can buy or contract for cash soybeans, then sell soybean futures contracts, sell oil and meal futures contracts, or contract forward oil and meal cash sales.¹

Each of these combinations may reflect a different processing margin. Since the market is quite competitive and at times highly volatile, crushers want to be confident of the margin within which they are operating. Hence, although forward contracts and futures contracts exist side-by-side, the futures contracts contribute considerable short run liquidity to the market and reduce the requirements for extensive use of less flexible time contracts. Futures contracts can be substitutes in these cases, but they certainly have not replaced other contractual arrangements. As will be argued later, they could even be complementary in some cases.

Paul and Paul and Wesson pointed out that custom cattle feeding and futures trading are essentially equivalents, or institutional substitutes [6, 7, 8]. In each case, the buyer commits a small margin to take deferred delivery of a given quality and quantity of fed animals. Gains and losses are based solely on price changes and settlements are usually financial. Both seem to respond to common economic forces, primarily mobilizing capital for expansion to reduce costs and are true for broilers and hogs. In any case custom farming or forward trading allow for dividing up an enterprise, or specializing.

There are several examples where futures contracts and other types of forward contracts are complements. It is often common for a processor to establish a forward contract (production or sales) with a producer and then hedge or sell the equivalent of that contract on the futures market. Packers often contract forward with hog and cattle feeders and hedge the contracts on the futures market. Grain elevators contract forward farmer grain sales and hedge these purchases with futures contracts. The soybean processor mentioned above can take similar actions, but with several options available. These contract alternatives are complements and the growth of one may lead to the growth of the other.²

There is no question that the rapid growth in contract farming has encouraged futures trading in other commodities [8]. For example, contract farming in broilers, and possibly custom feeding in cattle, has led to an increase in futures trading in corn, soybeans, soybean meal, and soybean oil. Thus, there are strong indirect interrelationships between alternative contractual devices.

The influence of the flow of information cannot be ignored either in this analysis. The futures market generates considerable information as the price quotes permeate the whole market. In a way this may make it easier for the development of alternative contractual arrangements since both buyer and seller have a means of generating comparative price quotes. In fact, some contractual arrangements even base their prices off the futures quotations.

Also, one cannot ignore the financial aspects when talking about forward contract sales. Futures trading and other contracts subdivide enterprises into different parts and bind capital to each specified part or course of production. Traditionally, contracts were made to assure

supplies and financing was done by dealers. Now, the impetus behind many coordinating arrangements is to finance expansion to gain economies and reduce costs [6].

The futures market, one of many financial institutions, facilitates the investment of capital, or it facilitates equity investment in commodities. In this sense, futures trading is no different than any other type of contract for forward delivery. Any forward commitment results in investment of capital even though no funds may actually pass directly forward. This flow is indirect. The results are division of enterprise and specialization, regardless of the means for forward contracting [8]. An objection frequently made to this interpretation is that the aggregate lending based on futures trading is actually quite small, but this needs to be examined further in light of the importance of credit enhancement of firms that hedge.

Finally, in some cases vertical integration and vertical coordination are unrelated to futures trading and vice-versa. Due to location or product variety, futures contracts are not often viable market alternatives for some firms. Vertical integration backwards by the retailing and manufacturing sectors occurs whether futures trading exists or not. Their moves into processing and frozen fruits and vegetables and into dairy products involves commodities with no futures contracts. And, the moves by these firms into bread and coffee seems to have displaced little or no futures trading.

Similarly, government price and production programs in grains, potatoes, cotton, sugar and oilseed does not eliminate active commodity futures trading, although it could somewhat restrain it. The effects of government programs on other types of contractual arrangements is only problematical.

INFLUENCE ON MARKET STRUCTURE

Futures trading will not occur in commodities where manufacturing can control supply, where the products of an individual firm can be identified, where there is monopoly control or where prices remain fairly constant. The commodities must display opposite characteristics to be traded. Alternatively, one of the chief distinctions of futures markets is that they display a greater degree of competition than most any other market. The futures market is one of the best approximations we have to the competitive model. There are a large number of buyers and sellers, open competitive pricing, ease of exit and entry and considerable information available at low costs.³

Another characteristic of the market is that trading futures contracts is far more flexible than most other types of contracts. With a simple phone call, futures contracts can be created or cancelled, making them very appealing to business agents.

Consequently, as a result of these characteristics, I have argued

previously that the existence of the futures market surely has in some cases prevented or curtailed the development of other means of vertical coordination, especially vertical integration [4]. The fact that the market is there for a firm's use in inventory management and risk reduction decreases the need for certain alternative coordinating arrangements. It equalizes bargaining power and may well prevent the demise of those firms who would be unable financially to absorb losses which result from sudden changes in price level. The organization and control of our food marketing system could be far more oligopolistic than it presently is if it were not for the presence of the futures market as a coordinating device. Firms would have to resort to other contracts or mergers. The futures market has possibly kept many agricultural cash markets competitive.

On the other side of the coin, firms in a position to enjoy oligopolistic powers have often opposed futures contracts and either prevented them or brought their demise after their introduction. Such opposition has occurred in relation to wine, scrap iron and Idaho potatoes futures contracts. Large dealers also helped bring the demise of the onion contract during the Congressional hearings in 1958.

CONCLUDING COMMENTS

The market for trading standard futures contracts is not isolated with its own structure and functions, but is part of a broader system that encompasses the entire trading of a commodity. It creates a formal time dimension to the market, and is organized out of the trading of some type of forward commitments or economic equivalents. Consequently, analysis of the market must be made within a broad context.

Organized futures trading, forward trading "actuals," contract farming and contracting of services and sales all have several features in common [6]. Especially, they all involve time, but they also involve financing. They create a facility to invest capital in order to allow for specialization of enterprise, or fuller utilization of firm capacity. In this sense they appear as substitutes, since new opportunities in one often lessens the need for the others. For example, with some new arrangements in contract farming, there is less need to hedge. But we did see several examples above where they are complements and growth in one leads to growth in another.

As to which of these occurs, substitution or complements, depends upon the individual situation, which decision-maker is being analyzed, and the overall market structure for the commodity. Growth of futures trading at the expense of other coordinating arrangements will depend upon how viable the futures contract is as a hedging media, as well as the degree of competitiveness in the market. Also, futures trading will always have the advantage over alternative arrangements

of being more accessible and acceptable by the trade, as well as more flexible in fitting into the operations of the firm. Whether futures trading and alternative coordinating arrangements grow together or not will depend upon the economic needs of the traders and firms involved. Certainly, the growth of any coordinating arrangement depends in large part on whether economies can be realized as a result of the coordination.

Finally, any detailed research to be conducted in the future in this area should incorporate the concepts of the economics of uncertainty. The models developed must reflect that market agents are allocating the sharing of risks through a portfolio of alternative devices. Subjective probabilities as to various states of nature will be needed to help determine these portfolio structures, and then determine portfolio returns for firms. Since a high degree of uncertainty can destroy markets, such analysis may help explain why some arrangements exist and others fail. However, more information on the various contractual arrangements will be needed for the model building, especially how risks are shared, the distribution of power and decision-making, and how the value of the contracts are determined.

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¹ See [2] for a full listing of alternatives.

² Interesting then is to consider the example of a contract between a packer and a cattle feeder. The cattle feeder views the futures market as a substitute to this forward cash contract, but the packer sees the forward cash and futures contracts as complements. So whether futures contracts and forward cash contracts are substitutes or complements can be highly dependent upon which decision maker is being examined.

³ This is not to deny that imperfections can occur in a single commodity where trading is thin. Being considered here is the futures market as an institution within the whole marketing system.