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# INCREMENTAL FUTURES HEDGING AS A TOOL FOR GREATER INCOME STABILIZATION FOR FEED GRAIN PRODUCERS

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## The Futures Market as a Marketing Tool for Grain Producers

The many roles in which the commodity futures markets perform fall in two basic categories. The first role is that of inventory guidance. The futures market in this role provides a means for the temporal allocation of seasonally produced commodities. The second role is that of price discovery and forward pricing. In the futures market, the views of many buyers and sellers are focused on a single market. They have diverse objectives in terms of hedging and speculation, but the process leads to a continual appraisal of price-making forces (Tomek p.263).

Futures market prices at a point in time reflect the future conditions of supply and demand, insofar as current information and market conditions permit. The new harvest futures price, which is the futures price in the first contract month immediately following harvest, is often used as an estimator of the supply that is to be produced in a given year. The degree to which this futures price provides an accurate indicator of the supply that is to be produced depends upon the period in the production cycle in which this price is examined. Generally, the new crop futures price, as a supply estimator, is more apparent during the planting season. The reason for this is that at planting time hedging activity in the market is at a minimum, with most hedging activity occurring before and after the planting season. Therefore, with hedging activity at a minimum, the futures price mostly reflects the estimates of individuals of future conditions in

the market. Gardner (1976) states that the use of futures prices seem to be a promising tool in supply analysis.

Recently economists have displayed increasing interest in the potential for further contributions of the futures market as an aid to production decisions and to achieve greater price and income stability for producers. Many economists such as William Chandler, J. E. Meade, and Tetteh Kofi accept the desirability of price and income stabilization. As a result, there has been much interest and research pertaining to income stabilization programs. Most of these schemes, however, interfere with the proper functioning of the futures markets. In the past researchers have most often turned to government programs to effect greater income stability. Surprisingly enough, little attention and research has been conducted to analyze how well futures markets perform the functions of guidance of inventories and establishment of forward prices and, hence, indirectly stabilizing prices and incomes. Instead of turning to the already overburdened government to initiate an income stabilization program, it would seem logical to examine the possibilities of increased producer usage of one of the best examples of the working free enterprise system, the commodity futures markets.

One of the primary functions of the futures market as a marketing device for producers is its function as a medium for risk aversion. Risk in this context is defined as the reduction in realized net income when price expectations do not materialize. It is true that price fluctuations exist from year to year in the production of feed

grains. This, however, is not necessarily undesirable. Variations in year to year prices reflect in part a change in product demand. For the producer who is able to vary his production, as is the case with most feed grain producers, income instability need not result solely because of year to year price variability (Peck). Therefore, the crucial risk remaining is that risk associated with the producers error in his price forecast. This is the risk of an adverse price movement and is the type of risk that producers try to reduce by hedging.

## Futures Hedging for the Grain Producer

The remainder of this paper will be devoted to a discussion of incremental futures hedging as a tool for greater income stabilization for feed grain producers.

Tomek and Gray (1970) show in their study on temporal relationships among prices on commodity futures markets, that production period hedging will stabilize incomes for potato producers. Due to the fact that potatoes are a perishable commodity with no inventory carried into the new crop year, the new crop futures price is a self-fulfilling prophecy of the forward pricing mechanism of the producers decision on the market. Futures quotes at planting time of the new crop are virtually constant from year to year. Also, the planting time new crop futures prices are less variable than the harvest time cash prices. Therefore, through systematically hedging his crop at planting time, the potato producer can achieve greater income stability contrasted to speculating with his crop in the cash market at harvest.

This type of fixed hedging strategy does not work out so nicely with feed grain producers. First of all, feed grains are a semi-perishable commodity in which inventories are carried over into succeeding crop years. Inventory levels affect new crop prices. For this and other reasons, planting time futures quotes of the new crop contract month for corn (December contract) is at least as variable if not more variable than harvest time cash prices. Therefore, the feed grain producer, unlike the potato producer, would gain little in terms of income stabilization by systematically hedging his crop each year at planting time.

The point of the previous discussion citing research by Tomek and Gray is that successful hedging for the feed grain producer requires much more than watching the futures market at planting time. There simply is and can be no fixed rules or strategies for producer hedging of feed grains. Whether the farmer sells cash grain at harvest, or forward prices through the futures market, he cannot realize a profit unless a profit is shown on the market. A farmer can just as easily lock in a loss as a profit through a futures hedge. Futures hedging requires close attention and study of the futures market and basis relationship. But, through careful utilization of this tool, producers can achieve greater flexibility and security as well as increased income stability through the years. By utilizing an incremental futures hedging program, producers have a year to spot profits on the market and systematically lock them in on the futures market. This is in contrast to the very short period of time during harvest that a profit may or may not be realized in the cash market

for producers who have inadequate storage.

When considering a hedging program, it is important that the producer knows the seasonal basis relationship. The basis is simply the futures price minus the cash price. Although futures prices and cash prices fluctuate widely up and down, the basis remains much more stable. Research shows that as the contract month approaches the cash and futures prices converge. In other words, the basis starts out very wide at harvest and narrows until the end of the contract. This relationship is illustrated in Figure 1.

The top of each arrow represents an estimate of the futures market price obtained by adding to the cash market price the carrying charges which include storage, insurance, and interest from the purchase date to the date of the scheduled use of the crop (Hammons p.13). The length of the arrow represents the basis. In a real illustration neither the cash or futures prices could be plotted on so straight a line, but the corresponding basis relationship is practically the same from year to year.

The basic principals shown in the simple diagram are easily backed by research. To illustrate this point is Tetteh Kofi's (1973) study on the efficiency of the futures markets as a price forecaster. As a part of this study, Kofi compared the estimated linear regression relationship between the spot (cash) market price and the futures price of the first contract month after the harvest of the corn crop (December). The study covered the years 1953-1969. In the analysis the dependent variable was the closing spot (cash) price on the

expiration of the December contract for corn. The independent variable was the closing futures price of the December contract on the last day of each of the preceding eleven months prior to December. The $r^2$ test was used as a measure of variability. Results are shown in Table 1.

The table shows that as the contract approaches there is increasingly less variation in the futures price as compared to the cash price. For example, at the end of November there is typically only 3% variation. Therefore, the longer the producer waits to place his hedge, the closer the futures price will be to the harvest time cash price.

Once the producer is aware of the historical basis relationship for his commodity, he has an excellent foundation on which to construct a hedging strategy.

There are seven basic steps that a producer goes through when leading up to the placement of a hedge. At this time these decision processes will be followed through to the end.

Step one is for the producer to identify his alternatives for the production and marketing of his crop. Once the producer has decided what and how much to produce, he has at least eight different options open in marketing of that crop. These marketing alternatives are as follows:

1. Sell the cash crop at harvest.
2. Store grain at harvest for later sale.
3. Establish a cash contract forward price for the growing crop and deliver at harvest.

4. Harvest and store crop under cash contract for deferred payment.
5. Establish a futures contract forward price and sell growing crop at harvest.
6. Harvest the crop and store under a futures contract for deferred payment.
7. Sell cash crop at harvest, then, purchase an inventory equivalent through the futures market.
8. Market grain as feed for animals on the farm.

Alternatives 1, 2, 7, 8, represent speculation in either the cash or the futures market. It will be assumed that the producer wishes to transfer his risk in hopes of greater income stabilization rather than speculate with his crop. Alternatives 3 and 4 involve forward cash contracts. Although profits undeniably can be locked in with the cash forward contract, this instrument does not provide elements such as: ease of transaction, high liquidity, and security from buyer default that are needed for successful hedging. The remaining alternatives are 5 and 6, which involve the futures markets. For simplicity, it will be assumed that the producer in question does not have adequate storage available to him and, therefore, will choose alternative 5. This alternative involves hedging his growing crop and selling at harvest.

The second step the producer must take is to estimate as accurately as possible his production costs. This is imperative in order to be sure of locking in a profit rather than a loss on the futures hedge.

The third step is to estimate prospective returns that the market shows and determine if he is satisfied with these returns.

The fourth step is for the producer to evaluate his production risks. This is essential in determining how much of the expected production is to be ultimately hedged.

The fifth step is for the producer to evaluate the basis risk and to arrange financing of possible margin calls for the open futures contracts. Most agricultural lending banks are willing to make loans for margin calls on hedged crops. At the same time, however, liens are placed on gains in the margin account.

The sixth step is to contract for inputs and to carry out the production plan.

The seventh and final step may begin at least in part before the sixth step. This is to incrementally place the hedge by selling futures contracts in the new crop futures month (December for corn) when the futures price shows an acceptable profit. A common rule of thumb is to hedge the crop in increments of thirds. Many economists agree that incremental hedging is a useful instrument in further risk aversion. Often a producer can hedge one-third of his crop as soon as he has a fairly definite idea on his input costs. This may occur before the end of the old year and a tax advantage may be accrued by executing a part of the hedge before December 31.

The second third is often hedged somewhere between February 15 and April 15. The final third can be held back in expectation of locking in higher prices at seasons end. When conducting this type of

strategy, the best method is to place a stop loss order at around 5 cents below the market when it yields a desirable profit. Then the market can be ridden up in periods of a bullish market by continually raising the stop loss order behind the market. If the market goes down, there is no concern because the order will be executed and a profit will be locked in. The stop loss order lets the producer take advantage of favorable price movements. It is the answer to the often heard complaint that a hedged crop cannot take advantage of favorable price movements.

Producers and economists differ alike on the subject of how much of a growing crop should be hedged. Some individuals are of the belief that it is unwise to hedge over 50 percent of the crop because of the possibility of adverse weather movements that would cause the production level to fall significantly short of the producer's estimate. There is however a trade off. The greater the proportion of the crop left unhedged, the greater the risk in the cash market. On the other side, the greater proportion of the crop hedged, the greater the risk of adverse weather movements causing production levels to fall short of the quantity hedged up. This trade off is up to the producer to evaluate. Even for a producer who desires to be completely hedged, 90 percent of his crop is probably the highest percentage he should hedge.

## Concluding Remarks

This paper has briefly tried to illustrate the futures market and its use as a hedging medium and, therefore, a tool for greater income

stability for a feed grain producer. The logic of the decision process leading up to a hedge was examined. In this section both marketing alternatives and futures market contracting decisions were discussed. It was shown that a farmer is essentially a price taker and that hedging provides no increase in income stability unless a profit is at some time shown on the market. It was also shown that incremental futures hedging could allow the producer greater flexibility and income stabilization by the fact that through the futures market the farmer has a whole constellation of prices to choose from during the period of a year, instead of the year's low prices that are offered in the harvest time cash market for the producer with inadequate storage.

Because of this fact, the farmer throughout the years can indeed achieve greater income stability through the initiation of an incremental hedging program. He not only can transfer the risk that is normally carried through the production period when sales are made in the cash market, but the producer can also have more control over his selling price and, hence, his level of income. Because of these reasons there is much to be gained by the farmer examining the possibilities of incrementally hedging his crop.

| Interval[a] | Corn $r^2$ |
|---|---|
| 11 | .51 |
| 10 | .50 |
| 9 | .47 |
| 8 | .54 (planting season) |
| 7 | .52 |
| 6 | .67 |
| 5 | .74 |
| 4 | .84 |
| 3 | .78 |
| 2 | .91 |
| 1 | .97 |

Table 1. Variation in the closing spot (cash) price as explained by the closing futures price in each of the eleven months preceding the expiration of the futures contract.

[a]Time interval represents months in advance of the December contract expiration date.

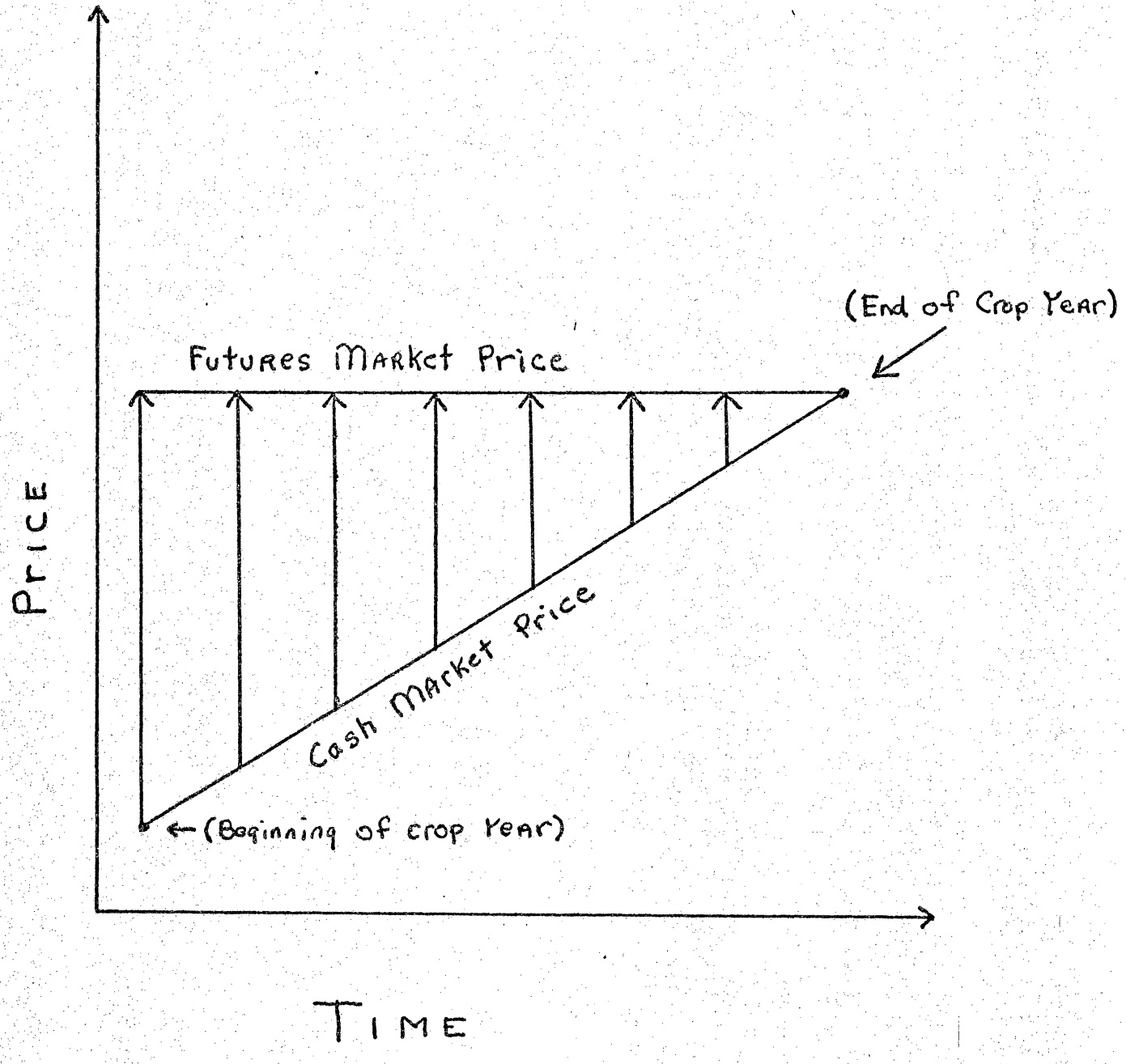


Figure 1. The relationship between the cash and futures prices of the new crop futures contract from the opening to the expiration of the contract.

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