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HEDGING IN THE OHIO FED HOG MARKET-- AN EXAMINATION OF LIFTING A PRODUCTION HEDGE

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The trading of fed hog futures presents Ohio hog producers with the opportunity to hedge their production. The hedge is placed by selling a futures contract, usually the one closest to but following the expected date on which the hogs will be sold. When the hogs are sold, the hedge is lifted by buying back the futures contract. Note that the futures price at which the hedge was lifted minus the cash price received is the basis. Therefore, once a production hedge is placed, only the basis remains undetermined.

The basis is not constant but can vary over a range of values for any given day. Therefore, the net price resulting from the hedge, which equals the futures price at which the hedge was placed minus the basis, can also vary over a range of values. Thus, a producer should seek to close out a hedge with as favorable a basis as possible. By doing so, he/she maximizes the net price resulting from the production hedge.

In storable commodities such as grains, the existance of an unfavorable basis can be dealt with by moving the hedge into the next futures contract and continuing to store the commodity. This hedge would continue until the basis returns to a more favorable value. However, for hogs or cattle, such a hedge lifting strategy is not possible. The short period of optimum marketing precludes it. Therefore, another strategy must be devised for lifting the production hedge on hogs.

A recent study at The Ohio State University has examined one such strategy by using data for the Ohio fed hog market from 1972 through 1980. The

basis analyzed was calculated as the opening nearby futures price minus the high quote on the price range for U.S. number one and two barrows and gilts, 200-230 pounds, at country points. The latter price is an average for 11 order buyers and packers scattered throughout Ohio and thus is a direct market cash price.

Since the cash price could be readily obtained only for Friday's, prices were collected only for that day. Consequently, to allow comparisons across years, the Friday dates were grouped into four weekly time periods: days 1-7; 8-14, 15-21, and 22-31 of a month. An average was used if two Friday's fell in the 22-31 period. Therefore, the cash basis was computed for 48 weekly time periods. Lastly, since futures contracts are traded for February, April, June, July, August, October, and December delivery, seven contract changes were necessary to compile a continuous nearby basis. These changes were made during the third week period of the delivery month for the above futures contracts.

The specific hedge lifting strategy examined in this study involves a producer who is faced with the decision of whether to lift the hedge during the current week or the next week. That is, should the hogs be sold during the current week or the next week. This decision is a common one for a hog producer who hedges production.

Since the average of past observations provides the best indication of what the basis will be for a week, a simple strategy would be to compare the current week's known basis with next week's average basis. If the current week's basis differs from next week's average basis, next week's actual basis will probably be closer to next week's average basis than is the current week's basis. For example, if the current week's basis is $4 and next week's

average basis is $2, next week's basis will probably be closer to $2 than is the current basis of $4. Likewise, if the current week's basis is -$2 and next week's average is $2, next week's basis will probably be closer to $2 than is the current basis of -$2. In addition, the further the current week's basis is from next week's average basis, the greater the chance that the current week's basis will be closer to next week's average. That is, the higher the current week's basis is when compared to next week's average, the more likely the basis will be lower next week. On the other hand, the lower the current week's basis is when compared to next week's average, the more likely the basis will be higher next week.

To test the above strategy of comparing the current week's basis with next week's average basis, next week's basis was broken into five categories based on its average and standard deviation. The standard deviation measures the variation in the values used to compute the average. Thus, it reflects the closeness with which the past basis observations fall around their average. The greater the standard deviation, the greater the variation around the average.

Given the five categories, the current week's basis was then placed into one of them as follows:

Category 1: The observed basis for the current week is greater than next week's average expected basis plus 1.5 times the standard deviation of next week's basis.

Category 2: The observed basis for the current week is greater than next week's average expected basis plus 0.75 times the standard deviation of next week's basis but less than next week's average expected basis plus 1.5 times the standard deviation of next week's basis.

Category 3: The observed basis for the current week is within a range defined by next week's average expected basis plus or minus 0.75 times the standard deviation of next week's basis.

Category 4: The observed basis for the current week is greater than next week's average expected basis minus 1.5 times the standard deviation of next week's basis but less than next week's average expected basis minus 0.75 times the standard deviation of next week's basis.

Category 5: The observed basis for the current week is less than next week's average expected basis minus 1.5 times the standard deviation of next week's basis.

Given that the basis is defined as the futures price minus cash price, the first two categories represent observations in which the futures is substantially higher than usual against the cash. In contrast, categories four and five contain observations in which the cash is substantially higher than normal against the futures. Therefore, to maximize the net price resulting from the production hedge, it would be wise to sell when the basis is in categories four and five and to avoid selling when the basis is in categories one and two. If the current week's basis being in categories four and five suggests that it is unlikely that the actual basis next week will be in categories four and five, the producer should consider selling the current week. Furthermore, since category five is further from the average than category four, the current week's basis being in category five should provide a greater incentive to sell during the current week than if the current week's basis is in category 4. In contrast to the above, if the current week's basis being in categories one and two suggests that the actual basis next week will not be in categories one and two, the producer should consider selling next week. In addition, since category one is further from the average than category two, the current week's basis being in category one should provide a greater incentive to sell next week than if the current week's basis is in category two.

Before describing the results of this study, it should be noted that category three should contain the most observations while categories one and

five should contain the fewest number of observations. This result is expected because observations generally become fewer as the distance from the average increases.

Examination of Table 1 reveals that the above mentioned expectation on the distribution of observations did hold. Categories one and five did have the fewest number of observations. Nevertheless, 20 percent of the observations fell in these two extreme categories.

Table 1 also reveals that the above stated beliefs on the value of comparing the current week's basis to next week's average basis are supported by the data. The further the current week's basis was from next week's average basis the more likely next week's basis was closer to next week's average and the greater the amount of the move.

If the current week's basis fell in category five, there was a 100 percent chance of an increase in the basis on next Friday. Furthermore, to have waited until the next week to sell would have resulted on average in the loss of a $1.58/cwt on the net price from the hedge. The same general finding was obtained for category four although the probability of an increase was less and the average increase was substantially smaller. If the current week's basis fell in category three, little change occurred in the basis on average. In contrast, if the current week's basis fell in category one, there was a 93 percent chance of a decline in the basis. The average expected decline was $1.91/cwt. Thus, the net price from the common hedge would have increased on average $1.91/cwt if the producer had waited to sell next week. The same general finding was obtained for category two, but both the chance of a decline and the average decline were much lower.

The above results clearly demonstrate the importance of comparing the current week's basis to next week's average basis. Not taking this comparison

into account could result in lower profits through the untimely lifting of the production hedge. But just because the current week's basis falls in category five, the hedge should not necessarily be lifted during the current week. Likewise, just because the current week's basis falls in category one, the hedge should not be kept for one more week. This decision must also include a comparison of the cost of adding the extra pounds over the next week to the net price likely to result from the hedge. However, the above results do indicate that examining the potential basis change from the current week to next week can be an important consideration in lifting a hedge. Furthermore, it becomes more important the further the current week's basis is from next week's average basis.