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Effects on Profits and Risks of Hedging Hogs in the Futures Market

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Erratic hog prices in recent years have compounded management problems. As a result, interest has increased in ways of tying down prices before the hogs are ready for market. This report presents results of a study of one approach to the problem -- hedging in the futures market.

Our analysis was based on a simulated Kansas hog finishing operation producing 1500 hogs a year from May, 1968, through December, 1975. Feeder pigs weighing 40-50 lbs. were purchased at current weekly average southern Missouri prices -- fed 120 days and sold at an average of 227 lbs. at current St. Joseph, Mo., prices. The study covered 400 lots of hogs. All other costs, (feed and non-feed costs) were based on current prices during the period. Various marketing strategies were tested. Profits were calculated per head marketed. Profit variance was calculated as a measure of risk. Profits on unhedged operation were used to evaluate the hedging strategies. Where hedging was involved, the hedge was placed when pigs were placed on feed -- using futures contracts that would mature closest to the time the hogs would be ready for market.

Selling hogs unhedged -- a practice followed by most Kansas hog producers -- returned profits on 328 lots and losses on 72 lots. The average profit for the entire period was $9.67 per head (table 48). However, the variance was 86.3, the highest of any alternative examined, which means that profits fluctuated more widely under unhedged operations than under the hedged programs.

Routinely hedging all 400 lots produced the lowest risk (a variance of 24.8) but average profits were only $5.23 per head -- the lowest of all alternatives. That is consistent with most hedging analyses. Routine hedging tends to reduce risk, but from the standpoint of average profits, it would not be considered a satisfactory program by most producers.

In an effort to improve the profits and reduce risks, selective hedging strategies were tested. Two selective hedging systems gave slightly higher profits than selling unhedged. While the difference in profits was not statistically significant. both systems reduced risk substantially. Hedging only when futures prices (i.e. futures adjusted for "basis") were equal to or exceeded cash prices at the time pigs were placed on feed returned average profits of $9.79 per head with a risk factor of 57.9. Only 174 lots met the criterion for hedging. The other 226 lots were fed out unhedged. Of the 400 lots, 351 would have shown profits and 49 would shown losses.

A slightly different strategy, hedging only when futures prices were equal or exceeded both cash prices and calculated break-even prices when the pigs were placed on feed, produced almost identical results. Average profits were $9.78 per head and the risk factor was 57.9. Only 172 lots

Table 48. Average profits per head and variance, alternative hog hedging and contracting options, May, 1968 - December, 1975.

OPTION		1968	1969	1970	1971	1972	1973	1974	1975	Average profits	Variance	Lots hedged
I	Unhedged	3.33	11.98	1.25	0.97	9.92	16.68	4.64	26.49	9.67	86.352	0
II	Routine hedge	1.70	3.34	1.94	0.86	3.65	3.40	11.05	14.79	5.23***	24.773***	400
III	Futures equal or exceed breakeven price	2.38	4.06	-0.10	1.34	3.65	10.41	13.66	14.79	6.43***	42.569***	345
IV	Futures equal or exceed cash price	3.59	10.84	1.61	1.29	5.96	17.07	14.80	21.19	9.79	57.923***	174
V	Futures equal or exceed both breakeven and current cash prices	3.59	10.84	1.52	1.30	5.96	17.07	14.80	21.19	9.78	57.976***	172
VI	Fall hedge	2.55	8.28	2.81	0.87	7.73	17.35	0.70	20.09	7.76***	74.470*	138
VII	Contract	3.95	6.66	7.38	-0.45	3.27	7.31	7.27	14.36	6.31***	39.209***	0

***Difference compared with unhedged significant at 0.01.
**Difference compared with unhedged significant at 0.05.
*Difference compared with unhedged significant at 0.10.

met the hedging criteria under that program. The other 228 lots were fed out unhedged.

The rather commonly recommended strategy of hedging only when the futures price equalled or exceeded the break-even price returned average profits of only $6.43 per head. The risk factor was 42.6.

Since hog prices typically decline seasonally during fall months, we tested hedging only hogs marketed during the fall. Average profits were intermediate at $7.76 and the risk factor was relatively high at 74.5.

Summary and Conclusions

Results from the period analyzed indicate that profits from routine hedging were substantially less than from unhedged operations. While routine hedging reduced the risk (that is, resulted in greater stability in profits), it is doubtful that many producers would be satisfied with the trade-off in reduced profits. Two selective hedging alternatives returned profits slightly higher than unhedged operation (though the difference was not statistically significant) and at the same time produced a substantially lower risk factor than unhedged operations. Those alternatives were: (1) hedging only when the futures price (futures price adjusted for the basis) equalled or exceeded the current cash price when pigs were put on feed, and (2) hedging only when the futures price equalled or exceeded both cash price and calculated break-even price when pigs were put on feed.

The study revealed some unreliability in the "basis". Basis is the amount the cash price at a particular market is above or below the futures price. The amount varies depending upon location. That, in itself, would not present a problem if the basis remained relatively constant or predictable. But it does not, so uncertainty in the basis is a problem. The average basis over the years studies was about -$1.00. However, during recent months it has varied from about -$6.00 to +$6.00. A larger negative basis when the hedge is lifted than allowed for originally can result in an unexpected loss. Likewise, a less negative (or more positive) basis can result in an unexpected gain. Additional work is underway to determine characteristics of basis changes.