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Introduction

Livestock futures markets are a marketing tool available to participants in the livestock and meat production, processing, and merchandising system. However, there has been controversy regarding the usefulness of the live cattle futures market for producers. Questions have arisen about the impact of futures markets on cash market price behavior, the accuracy of the futures market as a predictor of future prices, and the usefulness of this futures market to livestock producers, both large and small. This study will focus on the profit opportunities available to livestock producers through futures markets, and the risk premiums implicitly paid by hedgers.

As J. M. Keynes suggested, it does seem likely that futures markets used extensively for short hedging might have some downward bias. In a risk averse world, the difference between the futures price today and the futures price at the expiration of that contract represents the risk

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premium paid by those reducing their risk (i.e. hedgers) to those willing to accept that risk. Theoretically, one might expect that livestock futures markets with a preponderance of short hedgers would have a tendency for deferred futures prices (in the contracts a producer-hedger would be selling) to be biased downward. This suggests a producer routinely hedging would be worse off in the long run. It seems likely that speculators considering long positions in deferred futures contracts might require prices to be low enough to offer a "risk premium" before taking that position. This would compensate them for the greater risks associated with a) the greater length of time before the threat of delivery brings the cash and futures market together, b) less liquidity in the deferred futures contracts, and c) the greater number of unexpected market developments which might occur before liquidating the position. Yet, empirical studies of the existence of risk premiums in futures markets for storable commodities have shown mixed results (Peck).

Leuthold and Tomek summarized published studies by Leuthold, Huszar and Walters, and unpublished work by Tomek which suggests that live cattle futures did exhibit a downward bias in more distant contracts in the early 1970s, while the live hog futures market was efficient at least eight months prior to delivery (Leuthold and Tomek, p. 54-56).

A more recent study by Martin and Garcia found that the live cattle futures prices provided unbiased forecasts of eventual cash prices during 1965-77, but did not explain well the movements in cash prices (Martin and Garcia, p. 212). Live hog futures prices, on the other hand,

provided biased forecasts, but performed well as a forecaster except during volatile economic conditions.

If futures prices several months prior to the delivery month are biased downward, the frequency of improved returns through hedging would be small. Several previous hedging studies summarized by Leuthold and Tomek typically found that routine hedging can improve income stability for producers of live cattle and live hogs, and selective hedging could offer improved returns. Despite the evidence accumulated in these prior studies, controversy arose when the House Small Business Committee staff analyzed a 31 month period beginning in January 1978, and found that a break-even hedge was possible on only 4.5% of the trading days during the month cattle were placed on feed (though more often during the remainder of the feeding period). In addition, they found that the first time that the live cattle futures market rose above farmer-feeder costs, for a particular contract, it almost immediately dropped below those cost levels (Smith, p. 12). They interpreted this finding as indicative that the live cattle futures market served no economic purpose for small cattle feeders. However, in the late 1970s, there was excess feedlot capacity An alternative interpretation might have been that the futures market was performing as a competitive market might be expected to behave under conditions of excess capacity. Large, lower cost cattle feeders with empty feedlots might be expected to quickly take advantage of the opportunity to expand production at an assured profit, and their hedging pressure would soon eliminate the profit margin.

To provide a longer term perspective on the usefulness to hedgers of livestock futures markets, and the associated risk premiums for hedgers,

we undertook a study of the behavior of both live cattle and live hog futures during 1972-1981 and 1974-1981, respectively.

The objectives of this study are:

1. Determine the frequency of profitable hedging opportunities for cattle feeders and hog producers in the Midwest.

2. Compare the profit opportunities using futures with the profits obtained from the cash market.

3. Determine whether live hog and live cattle futures prices have a downward bias (risk premium).

4. Determine whether the magnitude of risk premiums differs during various phases of the livestock production cycles or the general economic cycle.

Procedure

In this paper, we focus on an ex post analysis, in which the average basis and the average cash price in the delivery month were compared to futures prices during the feeding period. This is done to determine whether the use of futures could have offered profits to cattle feeders and hog producers in the Midwest. In addition, we briefly refer to other results from: a) a similar analysis focusing solely on the profitability of trades during the month hogs or cattle were placed on feed; b) an ex ante analysis which determined the frequency of trading days offering expected profits; and c) an analysis which retrospectively determined the frequency of improved returns using futures versus reliance on the cash market. The computation procedures are summarized below:

Expected Profit

$$FP - EB - PC = EP$$

Actual Profit

$$FP - AB - PC = AP$$

Improved Returns

$$FP - AB - CP = IR$$

where:

FP = current price of the futures contract terminating just after the delivery period ($/cwt).

EB = expected delivery period basis, average for prior 5 years ($/cwt).

AB = actual delivery period basis ($/cwt).

PC = production and marketing cost ($/cwt).

CP = actual cash market price in the delivery period ($/cwt).

EP = expected profit ($/cwt).

AP = actual profit ($/cwt).

IR = improved returns (futures vs. cash) ($/cwt).

The midpoint of the daily Chicago Mercantile Exchange futures price range was used to represent a futures price that could have been reasonably obtained by a potential hedger. The cash market prices used were the Interior Iowa No. 1-2, 200-240 lb. hog price, and the Interior Iowa 900-1100 lbs. choice steer price.

Cost of production figures used to determine actual or potential profit levels were representative feedlot production and marketing cost figures developed by Iowa State University extension specialists in the

Departments of Economics and Animal Science, periodically updated since 1972 and checked against feedlot records. These cost estimates were based upon the typical feeding practices used in Iowa and other Midwestern states during that time period, the prevailing interest rates, feed grain and protein market prices during the relevant gestation (for farrow-finish hogs) and feeding periods, along with feeder pig and feeder cattle market prices in Iowa during the placement month.

To simplify the calculation process, we assumed that all feeder animal purchase prices and fed animal sales prices were at the average levels for the month, and that all hedges were closed out at the average futures price during the delivery period. Since the time when feeders were placed on feed was not known, we made the conservative assumption that hedges could not be made until the last half of the placement month. The time periods selected were 1972-1981 for cattle (approximately one cattle cycle) and 1974-1981 for hogs (typically the length of two hog cycles). While these periods were characterized by a rising price trend for cattle, and a more modest upward price trend for hogs, the overall results should be representative of the situation in an inflationary setting with highly volatile commodity markets and occasional governmental intervention of one form or another--perhaps a setting which will not be atypical in the future.

Frequency of Profitable Hedging Opportunities

Based upon cost of production estimates developed by Iowa State and the average basis during the twenty days prior to contract expiration, live cattle and live hog futures markets offered some opportunities for

producers to assure profits during the time periods studied. However, the frequency of profitable opportunities (defined as $.50/cwt. or more) for cattle and hog markets differed considerably (Tables 1-4).

Producers feeding yearling steers for six or seven months (seven months prior to 1978) experienced prolonged periods (up to two years) with no profitable hedging opportunities. Prolonged periods with many profitable hedging opportunities were not as frequent. During 1973-74, when the beef industry suffered the effects of red meat price controls and the OPEC-induced recession, there were relatively few profitable hedging days. During late 1975, all of 1976 and early 1977 as the cattle cycle liquidation coupled with high corn prices, many feedlot operators were forced out of business. This time period likewise offered relatively few profitable hedging opportunities. More recently there have been sporadic periods of profits available to cattle producers using the live cattle contract. Similar results were found when a seven month feeding period was assumed throughout 1972-81.

Analysis of nine month calf feeding operations show similar patterns of profitability, with increased frequency of profits due to the lower cost of production associated with calves.

In contrast, hog producers feeding pigs to market weight in four months experienced prolonged periods with frequent profitable hedging opportunities during 1974-1981. The longest period offering no profitable hedging was approximately seven months. Nine month hog production and feeding programs exhibited similar patterns of profit opportunities.

If producers had to place a profitable hedge during the first month of the feeding period in order to secure operating credit, there were

TABLE 1
PERCENT OF TRADING DAYS OFFERING
A PROFIT USING FUTURES[1]

CATTLE - SIX MONTH FEEDING PERIOD

Month Placed on Feed	Year Placed on Feed									
	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Jan.	61	54	0	66	0	75	91	91	9	13
Feb.	60	32	0	82	0	0	100	62	4	75
March	7	54	0	89	0	0	97	24	30	37
April	1	24	0	79	0	0	52	0	75	15
May	0	18	0	59	0	0	16	0	78	53
June	5	19	0	30	0	0	34	0	3	32
July	15	12	9	14	0	76	8	9	8	85
Aug.	28	13	1	0	0	32	79	66	19	66
Sept.	56	0	0	5	0	29	78	39	8	15
Oct.	78	0	6	0	0	58	61	69	27	24
Nov.	75	1	22	0	0	62	100	98	21	4
Dec.	86	19	40	0	0	93	100	100	43	5

[1] Profit refers to an accounting profit of at least $.50/cwt. before subtracting hedging costs.

TABLE 2
PERCENT OF TRADING DAYS OFFERING
A PROFIT USING FUTURES[1]

HOGS - FOUR MONTH FEEDING PERIOD

Month Placed on Feed	Year Placed on Feed							
	1974	1975	1976	1977	1978	1979	1980	1981
Jan.	54	100	64	27	82	100	25	19
Feb.	33	91	53	43	100	81	0	14
March	25	100	94	77	100	44	19	78
April	42	100	50	80	92	0	68	100
May	41	100	33	62	62	0	67	98
June	50	100	36	95	85	2	82	100
July	74	87	38	77	93	2	80	100
Aug.	76	100	35	50	89	28	69	94
Sept.	98	100	52	77	100	43	88	68
Oct.	98	100	64	82	100	99	67	70
Nov.	97	96	77	100	100	48	45	57
Dec.	87	70	63	100	100	75	54	91

[1] Profit refers to an accounting profit of at least $.50/cwt. before subtracting hedging costs.

TABLE 3
PERCENT OF TRADING DAYS OFFERING
A PROFIT USING FUTURES[1]

CATTLE - NINE MONTH FEEDING PERIOD

Month Placed on Feed	Year Placed on Feed									
	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Jan.	95	69	14	81	61	62	87	75	7	5
Feb.	65	30	13	83	41	62	84	39	0	0
March	68	46	4	81	57	48	71	37	0	29
April	58	21	3	100	29	30	78	1	61	49
May	87	42	5	65	13	21	66	0	45	77
June	83	33	10	25	7	12	89	4	47	77
July	81	28	21	34	8	41	96	37	44	76
Aug.	87	19	52	70	19	50	100	83	43	91
Sept.	92	25	57	56	35	82	100	27	41	
Oct.	64	17	96	64	89	85	100	44	23	
Nov.	70	32	75	64	69	78	100	50	9	
Dec.	88	52	78	45	68	78	77	45	3	

[1]Profit refers to an accounting profit of at least $.50/cwt. before subtracting hedging costs.

TABLE 4
PERCENT OF TRADING DAYS OFFERING
A PROFIT USING FUTURES[1]

HOGS - NINE MONTH FEEDING PERIOD

Month Bred	Year Bred							
	1974	1975	1976	1977	1978	1979	1980	1981
Jan.	48	100	88	100	93	48	25	95
Feb.	41	93	81	100	85	19	10	71
March	34	99	73	98	100	8	31	96
April	49	100	73	84	100	0	22	85
May	67	100	64	81	100	8	37	82
June	70	100	62	48	100	0	32	72
July	75	100	58	51	100	20	34	80
Aug.	99	100	9	40	100	0	20	74
Sept.	98	100	28	57	100	5	40	
Oct.	100	100	70	73	95	30	75	
Nov.	100	100	90	82	78	15	84	
Dec.	100	100	100	91	58	6	70	

[1]Profit refers to an accounting profit of at least $.50/cwt. before subtracting hedging costs.

even fewer profit opportunities for yearling cattle feeders than shown in Table 1. The profit opportunities (on a percentage basis) for hogs hedged in the first month of the feeding program were similar to those shown in Table 2 for the entire feeding period. Also, it should be noted that there were additional occasions when hedging could have improved returns (though not assured a profit) versus selling strictly on the cash market, especially for cattle during the 1975-77 period when few profits were available on the cash market (see Table 5).

Producers with lower costs of production would have more profitable hedging opportunities than shown in Tables 1-4. The level of actual returns from hedging would have depended on the choice of selective hedging strategies adopted. The distribution of daily profit and loss opportunities from hedging for the entire period of study is generally skewed toward profits for hog futures, and losses for cattle futures (Figures 1 and 2).

Risk Premiums in Livestock Futures

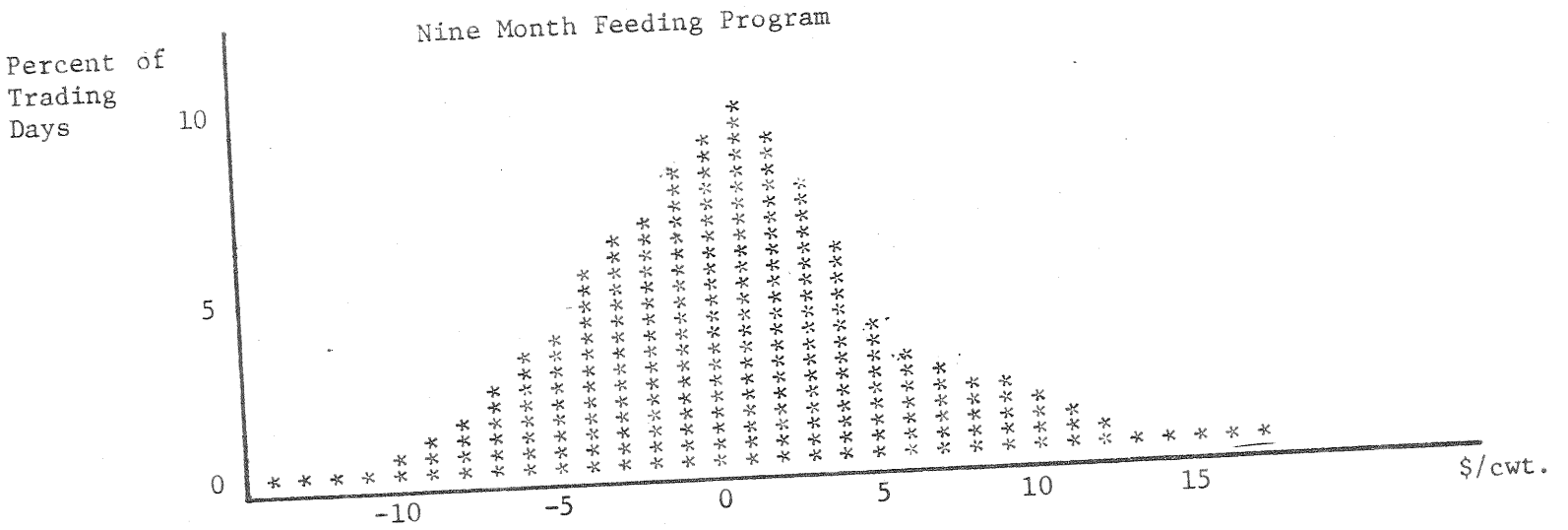
If the futures price at the time a producer hedge (a short position) is placed typically turns out to be lower than the price of the same contract at the time of delivery, this essentially is the insurance or risk premium which is paid by the producer to transfer risk to someone else. In an inflationary period, part of the risk premium may be due to conservative estimates of commodity price inflation. Nevertheless, it is still a cost to the short hedger. Obviously, establishing improved returns in the long run through hedging would be more difficult if the risk premium is large.

TABLE 5
PERCENT OF FUTURES TRADING DAYS OFFERING:

	A Profit	Improved Returns vs. The Cash Market
Nine Month Hog Program	66	40
Four Month Hog Program	69	43
Nine Month Cattle Program	51	50
Six Month Cattle Program	31	37

To calculate the average risk premium during the period studied, the mean of the midpoints of the futures range for each trading day during the "hedging month" was calculated and subtracted from the mean of the midpoints of the futures range for each trading day during the contract expiration month. If the average futures price when the short hedge was placed was lower than the average futures price when the hedge would be lifted, this would result in a positive risk premium implicitly paid by short hedgers for price insurance.

An analysis of the risk premiums for live cattle contracts expiring during 1972-81 showed that cattle futures positions taken one to nine months prior to contract expiration typically did not have a risk premium significantly different from zero (Table 6). A relatively small risk



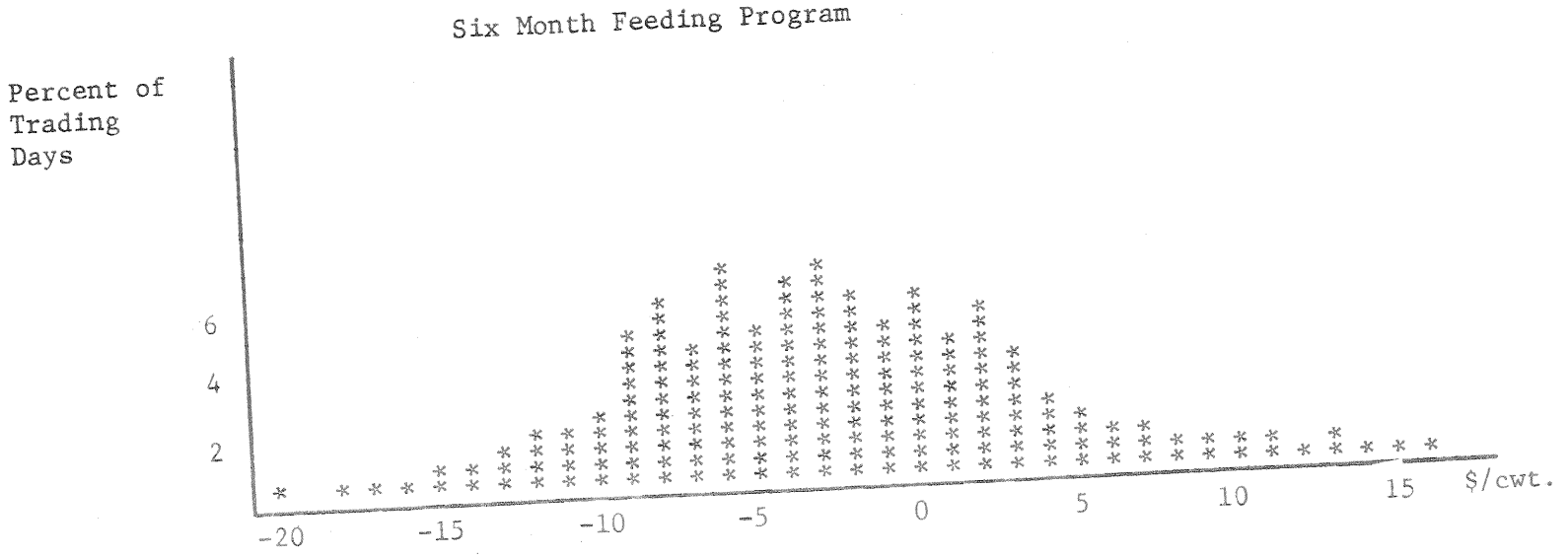


Figure 1. Percent of Trading Days Offering Profits or Losses in Cattle Futures Markets, 1972-1981

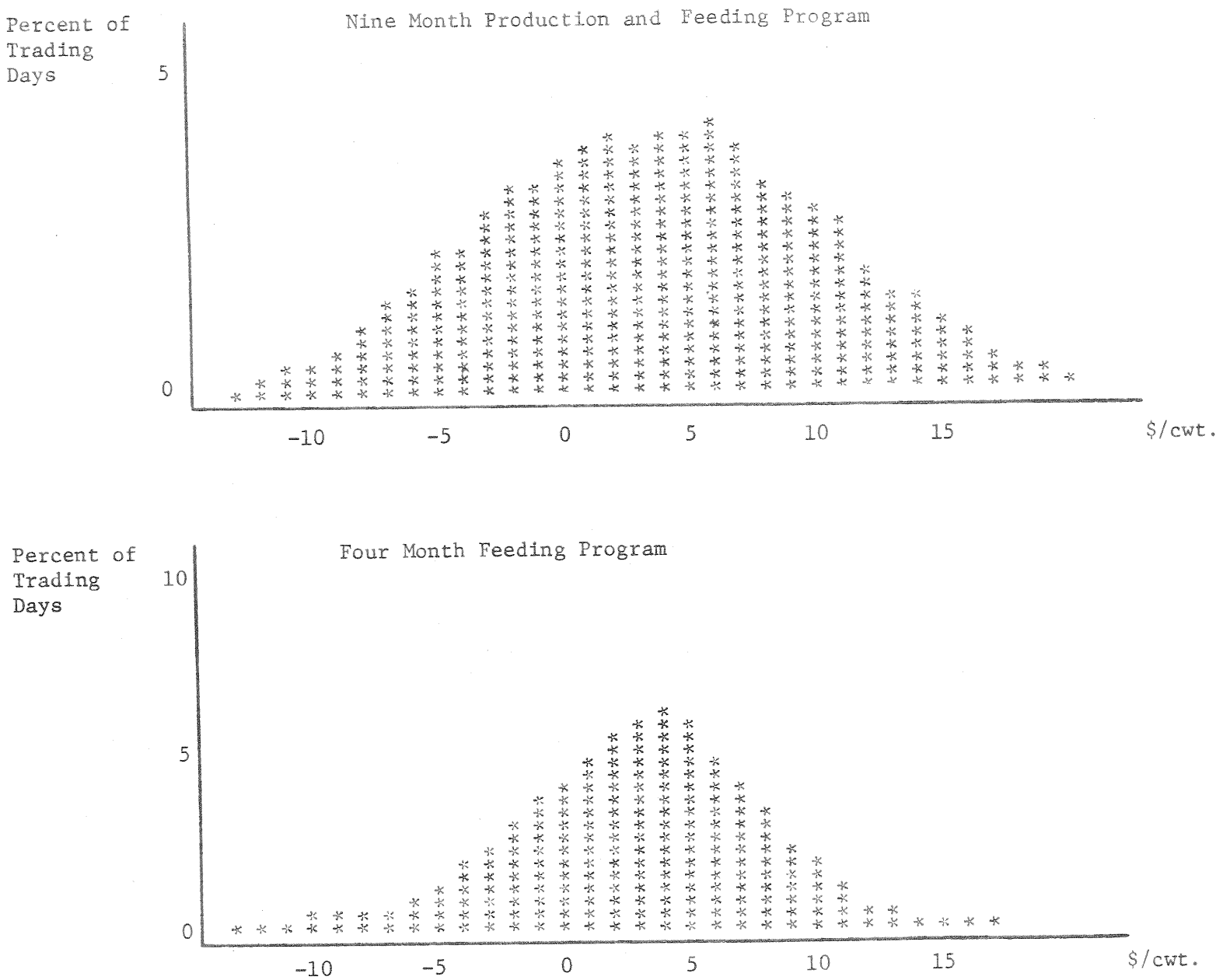


Figure 2. Percent of Trading Days Offering Profits or Losses in Live Hog Futures Markets, 1974-1981

TABLE 6
RISK PREMIUMS - LIVE CATTLE FUTURES[1]
FOR CONTRACTS EXPIRING IN 1972-81

Number of Months Prior to Contract Expiration	Contract Month						
	Feb.	April	June	Aug.	Oct.	Dec.	Avg.
	(dollars per cwt.)						
Nine	0.46	1.58	2.87	2.34	0.10	-1.33	1.00
Eight	0.68	1.65	2.28	2.02	-0.36	-1.51	1.05
Seven	-1.07	1.91	2.58	1.25	0.05	-1.06	0.61
Six	-1.68	1.53	2.26	0.73	-0.47	-0.66	0.28
Five	-0.64	1.94	1.72	1.14	-0.11	-1.96	0.35
Four	-1.03	1.65	1.30	0.13	0.53	-1.84	0.12
Three	-0.53	1.38	1.69	0.16	-0.60	-1.84	0.04
Two	-0.73	1.50	0.11	0.86	-0.59	-1.73	-0.09
One	-0.34	1.53	-0.20	-0.03	-0.37	-0.44	0.03

[1]Positive numbers indicate downward bias, or positive risk premium. None were significantly different from zero at the .05 confidence level.

premium near one dollar per cwt. was noted 8-9 months prior to contract expirations, and hedges placed closer to the contract expiration date involved even smaller risk premiums.

The risk premium patterns did vary for various contracts. The largest risk premiums were noted for hedge positions taken long before contract expiration in the April, June, and August contracts, while hedges placed in the February, October, and December contracts typically offered small futures trading profits to hedgers. While these premiums

may have economic significance to some market participants, none were statistically significant. While the cash market prices for cattle do not exhibit a strong seasonal pattern, hedged placed during the May-September period of seasonally high cash prices frequently had smaller or negative risk premiums. Similarly, the November-March low cash price period precedes the higher risk premium contracts. Futures market participants may be overreacting slightly to current market prices in determining their price forecasts and trading positions.

The risk premiums for the live hog contracts expiring during 1974-81 are shown in Table 7. The average risk premium was significantly different from zero for short hedges placed 4-9 months prior to contract expiration during the time period studied. Generally, the closer to the contract expiration that the hedge was placed, the smaller was the risk premium. The largest risk premiums were associated with the July and August contracts, while there was little or no risk premium associated with hedges placed in the April and June contract during 1974-81. This pattern seems to suggest that futures traders are conservative in their forecasts of the seasonal price peaks which typically occur in July and August and relatively optimistic about prices in the low April price period. Perhaps traders' expectations are biased toward the mean, and influenced (possibly excessively) by the current cash price levels (typically higher prior to April, typically lower prior to July and August). These patterns suggest that hedges placed in July, August, October, December, and February contracts several months before contract expiration often have had a significant opportunity cost for short

TABLE 7
RISK PREMIUMS - LIVE HOG FUTURES[1]
FOR CONTRACTS EXPIRING IN 1974-81

Number of Months Prior to Contract Expiration	Contract Month							
	Feb.	April	June	July	Aug.	Oct.	Dec.	Ave.
	(dollars per cwt.)							
Nine	4.95**	0.68	1.68	3.29**	5.40**	3.86**	2.91**	3.25**
Eight	4.92**	0.46	1.34	3.44**	4.96**	2.87**	2.14**	2.82**
Seven	2.62**	-0.36	1.47	3.11**	4.67**	3.59**	3.22**	2.62**
Six	2.26*	0.73	1.23	2.74**	3.60**	2.80**	2.90**	2.11**
Five	1.28	-0.55	0.83	1.71*	4.41**	3.79**	1.35*	1.83**
Four	0.75	-0.82	0.03	2.67**	3.41**	3.72**	0.67	1.49*
Three	0.67	-0.94	1.25	1.73*	3.98**	2.33**	0.00	1.29
Two	0.34	-1.36	0.31	2.02**	3.80**	1.21	-0.21	0.87
One	0.44	-0.10	0.48	1.52*	2.13**	0.54	0.69	0.81

[1]Positive numbers indicate downward bias, or positive risk premium.

* Significantly different from zero at the .05 level.

** Significantly different from zero at the .01 level.

hedgers, and a significant profit for long speculators. As more information becomes available closer to contract expiration, speculators may perceive less risk from unexpected market developments and from the greater liquidity always present in the contracts closer to expiration. These rationale may partially explain why the risk premiums are not fully

exploited in some contracts traded from four to nine months prior to their expriation.

Why is a significant risk premium found in the live hog futures market, but not in the live cattle futures market? Several possible hypotheses come to mind. More volatile commodity markets would be expected to be more risky, with a correspondingly higher risk premium required by speculators. A comparison of the price volatility in the live cattle and live hog markets shows that hog prices historically have been more volatile than cattle prices, with stronger seasonal price patterns and more frequent production cycles. 1951-80 coefficients of variation of annual average prices were typically much higher for hogs than for cattle (18.19 vs. 13.90) on a deflated basis (analysis done by J. Brandt, summarized in Hayenga, Rhodes, Brandt, et al.). However, the daily and monthly prices during the period covered by our study were more volatile for cattle than hogs (the standard deviation was 12.5 vs. 7.0 for daily prices, respectively). Thus, it is difficult to argue that greater price volaility was a cause of the larger risk premiums for hogs.

Differing rates of commodity price inflation could have been an influence on the relative size of the risk premiums, with a higher rate of price increase leading to an increase in the size of the risk premium when market participants underestimate later futures and cash prices. However, the overall rate of price increase was much greater for cattle ($3.48 per year) than for hogs ($.23 per year) during the period studied, so this had little influence on the relative size of the risk premiums.

Larger risk premiums would be expected in thinner futures markets or markets with a greater imbalance between short and long hedging volume (Gray). The live hog futures market certainly has had less trading volume than the live cattle futures market during the period studied, so the lack of liquidity could have a small influence on the risk premium required by some large traders, especially in live hog contracts traded 6-9 months prior to expiration. The hedging volume imbalance should not be an important factor, since both markets appear to have a roughly similar imbalance of short versus long large hedgers (Leuthold).

The live hog futures market is unique with respect to the presence of the closely related pork belly futures market. One possible contribution to the significant risk premiums in live hog futures may be a relative lack of speculators participating in live hog futures and providing effective arbitrage of the risk premiums found in our study. Since pork belly prices respond to most of the same fundamental factors influencing live hog prices, and are even more volatile, many potential speculators in live hog futures may be siphoned off into the closely related pork belly futures market which is usually characterized as a "speculators market," and leave the live hog futures risk premiums relatively less exploited versus live cattle futures.

Risk Premium Influences

To determine whether the changing optimism or pessimism (risk premium) built into futures prices was related to the phase of the livestock production or business cycle, we estimated the following statistical relationship. The dependent variable was specified as the

average price of the contract while it was trading during the expiration month (FP_E) minus the average price of the same contract for the full month, nine months earlier (FP_B). The gross indices of the hog production cycle were the change in hogs and pigs on farms (HNC_1) noted in the last USDA report compared to the report six months earlier (millions of head, June 1 and December 1 inventory reports), and the same change in the prior six month report (HNC_2). The cattle cycle was reflected by the change in cattle and calves on farms from a year earlier (millions of head, January 1 reports). The index of the stage of the business cycle was the most recent reported change in real GNP (GNPC, quarterly change, in billions of 1972 dollars, seasonally adjusted). While we found no statistically significant relationship between the cattle futures risk premium and the stage of the cattle and business cycle, the hog futures risk premium was related to those market influences.

$$FP_E - FP_B = -.111 + \underset{(2.67)}{.665}\ GNPC + \underset{(.498)}{.176}\ HNC_1 - \underset{(-2.08)}{.861}\ HNC_2$$

$$R^2 = .218;\ D.\ W.\ = 2.003$$

Both the GNPC and HNC_2 variables were statistically significant influences (at the 95 percent confidence level) on the prevailing risk premium during 1974-81, while the most recent reported change in hog numbers (HNC_1) was not a significant factor. If hog numbers increased between the reports at least six and twelve months earlier, the risk premium typically declined. This appears consistent with the biological and behavioral lags in supply response noted in the typical hog cycle. Increased hog numbers close to a year earlier probably leads to the

opposite expectations in the near future, so traders might be expected to bid up futures prices in expectation of lower supplies and higher cash and futures prices later

The recent change in real GNP also had a statistically significant influence, with recent increases leading to larger risk premiums in deferred hog futures. This was contrary to our original expectations. Since recent economic growth trends often persist into the future, the corresponding increase in purchasing power causes the expiring futures prices and cash prices to increase; however, that effect is not fully reflected into traders' expectations and price levels for the same futures contract prices nine months earlier.

A subsequent analysis tested whether current cash price levels (or current prices relative to a twelve month moving average price series) influenced the risk premium for live hog futures. No significant influence was indicated.

Summary and Implications

Based upon an analysis of hedging opportunities in 1972-81 and 1974-81, respectively, the livestock futures markets have offered frequent opportunities for profits or improved returns for cattle feeders and hog producers. The frequency of profit opportunities offered by the futures market was very high for hog producers, and less frequent for cattle feeders, especially feeders of yearling steers (see Table 5). Because our cost estimates were lower than those used in the Small Business Committee study, the estimated percentage of trading days which offered profit opportunities for cattle feeders were higher in the placement

month and the entire feeding period during 1978-80 and the longer period of time covered in our study.

The overall frequency of profit opportunities from using futures appeared to be generally consistent with the relative profitability of cattle feeding and hog production based on cash market prices during the same time periods. Even when the futures markets did not offer profit opportunities, they sometimes offered opportunities to minimize losses that otherwise were incurred in the cash markets.

The risk premiums paid by short hedgers were not significantly different from zero in live cattle futures positions taken 1-9 months prior to delivery during 1972-81. This finding was consistent with Martin and Garcia's findings for 1965-77, but inconsistent with earlier studies.

Live hog futures exhibited relatively large risk premiums for short hedgers taking positions 4-9 months prior to contract expiration, but relatively little risk premium for hedgers taking positions 1-3 months prior to delivery during 1974-81. This also is consistent with Martin and Garcia's findings, and different from earlier research results (Leuthold and Tomek). The risk premiums vary seasonally in live hog futures; it appears that deferred futures price levels may be slightly influenced by current cash market price levels even though the typical seasonal cash price patterns are well known. The larger risk premiums in live hog futures compared to live cattle futures may be related to the smaller trading volume and market liquidity in the live hog futures market, and the comptition for speculators offered by the closely related pork belly futures market.

The pattern of risk premiums for live hog futures nine months prior to contract expiration was significantly influenced by rough indices of the stage of the hog production cycle and the stage of the business cycle. In contrast, the smaller risk premiums, on average, for cattle futures were not statistically associated with the stage of the production or business cycles. This may not be surprising, since the hog cycle typically is much more pronounced than the cattle cycle. Since the live hog futures price nine months prior to contract expiration typically does not fully reflect current information on the stages of the hog production cycle and the business cycle, it cannot be classified as an efficient market.

We conclude that each market has offered economic opportunities to producer - short hedgers during the period studied. However, the rationale for the differences in the frequency and size of profit opportunities in both the cash and futures markets for cattle and hogs, the factors influencing the degree of optimism or pessimism reflected in the live hog futures prices, and the differences in risk premiums in these closely related markets deserve further exploration. Better understanding of these questions could lead to more successful hedging and speculative strategies, and more effectively arbitraged and efficient futures markets.

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