FORWARD CONTRACTING VS. HEDGING FED CATTLE: COMPARISONS AND LENDER ATTITUDES

Fred Eilrich, Clement E. Ward,
Wayne D. Purcell, and Derrell Peel*

Summary and Conclusions

Forward contracting of fed cattle increased sharply in the 1980s, causing questions to be raised about forward contracting and its impacts on prices. Earlier research has found that basis forward contracting resulted in lower net prices to cattle feeders than futures market hedging. In still other research, cattle feeders implied there was a financing advantage with forward contracting. This study compared basis forward contracting of fed cattle with hedging fed cattle using the live cattle futures market and assessed lender attitudes toward managing price risk via forward contracts versus alternative price risk management tools.

Daily fed cattle basis data for the Texas Panhandle and Western Kansas regions were analyzed for the period 1980 to 1990. The monthly average basis and variability of the basis for futures market nonexpiration and expiration months were compared. Generally, nonexpiration-month basis means were significantly different than for expiration-months. Also, nonexpiration months were found to have significantly higher basis variation than expiration months.

Trend and seasonality in fed cattle basis from 1980 to 1990 for each region was estimated with regression analysis. A significant positive trend in basis and a significant negative trend in basis variation was found for Western Kansas but not for the Texas Panhandle. The seasonal basis pattern was quite consistent across both regions. Basis generally peaked in May, June, and July, while the lowest basis was found during February, March, and April.

---

*Extension Economics Assistant, Oklahoma State University; Professor and Extension Economist, Oklahoma State University; Professor and Director, Research Institute on Livestock Pricing, Virginia Tech; and Assistant Professor and Extension Economist, Oklahoma State University, respectively.

Comparisons were made between basis forward contracting, simulated futures market hedging, and estimated cash marketing for 68 pens of steers contracted by five feedlots over the 1988-90 period. Actual contract basis adjusted for each of three possible transportation cost levels was compared with unadjusted actual and historical basis. When transportation costs were $.20/cwt. or greater, the adjusted contract basis was significantly lower than the historical basis and would therefore have worked to the disadvantage of the cattle feeder.

Transportation costs and margin expenses significantly affected net price comparisons. If transportation costs were waived, the net price received with a basis forward contract was significantly higher than the net price received with a simulated hedge (using actual basis) assuming a margin expense greater than $.05/cwt. In addition, the net price from forward contracting with no transportation costs was found to be significantly higher than a simulated hedge using historical basis at three different margin expense levels. When transportation costs reached $.40/cwt., the net price received from forward contracting was significantly lower at all margin expense levels than that received from a simulated hedge using historical basis figures. Net prices for simulated hedges using actual basis were compared with net prices for simulated hedges using historical basis but there was no significant difference between them. Results indicated no significant

difference between forward contracting and simulated hedging (using either actual or historical basis) at other transaction cost and margin expense levels.

Fewer data were collected on contracted cattle for this study than had been planned. Cattle feeders do not always keep data on basis levels and net prices for cattle that are contracted. For pens of cattle for which data were available, many were Holsteins. Given the potential extent of contracting for Holstein cattle, the level of contracting for cattle of beef breeding may be overestimated. Also, feeders frequently expressed relatively strong opinions regarding fed cattle contracting, but their "rules of thumb" proved to be correct only "on the average."

Lenders were surveyed by mail to determine their reaction to forward contracting compared with alternative price risk management tools. Responses were analyzed from 137 lenders in Kansas, Oklahoma, and Texas who indicated that they loan money for cattle feeding. Three-fourths or more of lender-respondents indicated they do not require cattle feeder-borrowers to use any price risk management tool (either cash or basis forward contracts, futures market hedge, or futures market options). However, several lenders provide incentives for borrowers to use price risk management tools.

Two risk management tools were nearly equally preferred by lenders, cash forward contracts and futures market options. Basis forward contracting was least preferred, ranking below futures market hedging. Preference rankings were highly correlated with familiarity or comfort with risk management alternatives. Similarly, the ordinal ranking for effectiveness of the four risk management alternatives was nearly the same as preferences for and familiarity with the four risk management alternatives.

Some lenders understand certain risk management alternatives better than others, and some lenders provide significant incentives for cattle feeder-borrowers who use price-risk management alternatives. Therefore, cattle feeders are encouraged to shop for the lender who can best serve their needs.

Introduction and Study Focus

Forward contracting of fed cattle was nearly nonexistent in 1980 but increased sharply in the 1980s. Cattle feeder respondents to a mail survey in the 13 leading cattle feeding states reported contracting 12.7 percent of reported marketings in 1988 (Ward and Bliss). In 1988, Packers and Stockyards Administration (P&SA) began monitoring the extent of packer-controlled supplies (including forward contracts, marketing agreements, and packer feeding). Packer-controlled supplies of fed cattle as a percent of steer and heifer slaughter were 19, 23, and 19 percent, respectively, for 1988, 1989, and 1990. Most of the year-to-year change in percent of packer-controlled supplies appeared to be changes in the extent of forward contracting, but forward contracting was not reported separately.

Ninety percent of forward contracting in 1988 (Ward and Bliss) occurred in the Plains states (Nebraska, Colorado, Kansas, Oklahoma, and Texas), with just under two-thirds of all contracting (63.4 percent) found in Texas (31.8 percent) and Kansas (31.6 percent). Ninety-five percent of all contracting was in feedlots marketing 3,000 or more cattle in 1988, and nearly half of all contracting (49.2 percent) was reported by feeders marketing 50,000 or more cattle. Most contracted cattle (96.2 percent) were sold to three meatpackers (Excel, 53.2 percent, IBP, 36.4 percent, and ConAgra, 6.6 percent). Together, the three firms operate eight large plants in Kansas and Texas, where contracting was most prevalent.

Ward and Bliss asked cattle feeders their perceptions of contracting benefits. Feeders perceived the primary contracting benefit to themselves was assistance in acquiring financing, followed by having a known buyer for cattle in advance of slaughter. Cattle feeders perceived procuring cattle prior to slaughter as the primary benefit for packers from forward contracting. The ability of packers to better control delivery for slaughter of contracted cattle than noncontracted cattle was the second most important benefit to packers according to

cattle feeders. Managing price risk was not perceived by cattle feeders as a primary benefit of forward contracting to either feeders or packers.

Basis contracting comprised two-thirds of reported fed cattle marketed by contract (Ward and Bliss). Basis contracts enable cattle feeders and packers to initially lock in a cash-futures price relationship (the basis specified in the contract) and to later lock in a cash price prior to delivery using the prevailing futures market price on the day a cash price is established.

Two concerns raised about forward contracting are addressed in this study. Elam studied cash forward contracts from a small sample of Texas cattle feeders and concluded that contracting yielded lower prices than hedging with a futures market contract. Elam's findings suggest cattle feeders who forward contract transfer both risk and returns to

packers. One possible reason cattle feeders would be willing to enter into such contracts is that cattle feeders are not fully aware of historical basis levels and seasonal patterns in basis.

The second concern stems from cattle feeders' response regarding cattle feeder benefits from contracting in the Ward and Bliss study. Cattle feeders implied there is a financing advantage with forward contracting. Cattle feeders, it was suggested, forward contract because lenders require it as a precondition to loaning money for cattle feeding. However, given Elam's findings, both cattle feeders and lenders may be unaware that cash forward contracting might transfer returns to packers, thereby lowering borrowers' returns from cattle feeding and impacting their ability to repay loans.

Objectives

The overall objective of this study was to compare cash forward contracting of fed cattle with hedging fed cattle using the live cattle futures market, both from the perspective of cattle feeders and lenders. Specific objectives were:

(1) Empirically compare historical forward contract basis bids and resulting fed cattle prices with simulated live cattle futures market hedging results; and

(2) Assess lender attitudes toward managing price risk via forward contracts vs. alternative price risk management tools.

General Procedure and Data

Since two-thirds of forward contracting occurred in Texas and Kansas (Ward and Bliss), this study focused on the Southern Plains (Kansas, Oklahoma, and Texas). Fed cattle basis is defined as the difference between a cash market price and a futures market price, expressed as cash minus futures. Cash market prices were daily fed steer prices collected from Western Kansas and the Texas Panhandle by the Agricultural Marketing Service, U.S. Department of Agriculture over the period 1980 to 1990. Futures market prices were daily live cattle futures market closing prices collected by the Chicago Mercantile Exchange for the same period.

One step in meeting objective one was to analyze historical basis data for trend and seasonality of basis level and variability. A second step involved analyzing actual basis contract bids and comparing contract results with simulated hedging results. Forward contracting data were collected from cattle feedlots in Western

Kansas, and the Oklahoma and Texas Panhandles. A list of cattle feedlot managers was developed from industry sources and managers were surveyed by mail to identify cattle feeders who had contracted fed steers and heifers, excluding Holstein cattle, during each of the years 1988, 1989, and 1990. About 50 cattle feeders were then contacted by phone and invited to participate in the study. Of those, nearly half expressed some interest in providing data and were sent data collection forms. Five cattle feedlot managers provided data on 68 pens of steers, totaling 17,894 head. Data requested on each pen of contracted steers included: (1) number of head; (2) contract date; (3) trigger or settlement price date; (4) cattle delivery date; (5) futures contract month; (6) contract basis quote; (7) trigger (settlement) futures market price; and (8) whether or not cattle specifications were waived. Many cattle feeders did not retain the data needed for the analysis, or the data were not easily accessible.

For objective two, a list of over 500 lending institutions in Kansas, Oklahoma, and Texas was compiled from industry sources. Lenders were surveyed by mail to determine their reaction to forward contracting compared with alternative price risk management tools. Responses were received from 137 lenders who indicated they loan money for cattle feeding. Another 157 lenders indicated they did not loan money for cattle feeding. Of the 137, several lenders indicated they aggressively seek cattle feeder-borrowers, and several lenders had considerably larger loan portfolios for cattle feeding than others. Thus, lender-respondents were divided into two categories, called "larger" and "smaller" lenders. Larger lenders consisted of 29 lenders with an average loan size for cattle feeding of $250,000 or more and who typically expressed average or above-average aggressiveness in seeking cattle feeding borrowers. Smaller lenders consisted of the remaining 108 lenders responding to the survey.

Analysis of Historical Live Cattle Basis

Forward contracting occurs for cattle on feed which are owned by cattlemen or investor-feeders. During the feeding period, a cattle owner and packer enter into either a flat price or basis forward contract. With a basis forward contract, the packer bids a futures market basis for the month in which cattle are expected to reach slaughter weight and finish. The feeder who accepts basis contract offers then has the option of determining when to price the cattle by selecting a futures market price. From that futures market price, a cash selling price can be computed using the agreed-upon basis. Sometimes the contract settlement price (the then-current futures market price) is chosen when the basis contract is signed. If so, the basis, futures market price, and cash sale price are all discovered on the date the contract is signed. In effect, there is little difference between this basis contract and a flat price forward contract. The price bid by the packer with a flat price contract has an implied basis in the sale price bid.

If the futures market price is not chosen immediately, the basis bid is discovered on the contract date but the contract settlement price and cash sale price are discovered at a future date. Typically, the price can be established any time until the last day of the month prior to the expiration month for the chosen futures market contract. If cattle are scheduled for delivery in a nonexpiration month, price discovery is not required until the day before actual delivery. For example, assume that X days or weeks after the basis contract is signed, a cattle feeder believes the futures market price for the specified contract month has peaked. The cattle feeder notifies the packer and chooses the then-current futures market price, thereby establishing the cash sale price based on the previously-agreed basis bid. Therefore, the basis forward contract with its pricing flexibility is especially attractive when the futures market is trending upward. A basis contract becomes a flat price contract once the futures market price has been chosen. There is no difference between a flat price contract and a basis contract which uses the futures market price when the contract is initiated to establish a sales price. Thus, both alternatives are equally acceptable during a period of flat or downward trending futures market prices.

Expiration Month vs. Nonexpiration Month Comparisons

The monthly average basis and variability for the futures market contract expiration months as well as the months prior to each expiration month were computed (Appendix Tables 1-4). Statistical analysis compared the mean basis and variability of each nonexpiration month to its corresponding expiration month (the following calendar month). Results for both the Texas Panhandle and Western Kansas regions are shown in Table 1. With the exception of the September to October comparison for the Texas Panhandle and the November to December comparison for Western Kansas, all nonexpiration-month basis means were significantly different than the expiration-month basis means. For the period analyzed, the months with the highest mean basis level (strong cash prices relative to futures market prices) were equally divided between the expiration and nonexpiration months. The differences in basis were caused primarily by seasonality patterns which will be discussed in the following section.

Nonexpiration months were found to have a significantly larger standard deviations than expiration months. The two regions had similar results for mean basis and standard deviation levels. May delivery on a June futures market contract had the largest (most favorable to cattle feeders) mean basis but also varied more than other months. September delivery on an October futures market contract had the smallest mean basis (weak cash prices relative to futures market prices), but February delivery on a February futures market contract had the smallest variation of any delivery month. Basis statistics reported in Table 1 were calculated with data for the entire period. Appendix Tables 1-4 contain monthly average basis means and standard deviations for each year. Combined, the tables demonstrate the possible variation which can exist for a particular month from year to year. For example, the mean basis for May from 1987 to 1990 increased significantly compared with preceding years, apparently due to increased strength of cash prices relative to futures market prices. Other months, such as September and November, also illustrate differences in mean basis levels within the period analyzed.

Table 1. Comparison of Nonexpiration vs. Expiration Months for Live Cattle Basis, 1980 to 1990.

Contract	Comparison	Basis	Mean	Mean Std. Dev.	t-stat[1]
Texas Panhandle					
February	Jan.	1.00	1.12[2]	17.60***	
	Feb.	-0.05		0.77[2]	
April		Mar.	-0.32	1.33[2]	5.27***
		Apr.	0.06	1.04[2]	
June		May	2.35	1.87[2]	14.54***
		June	0.95	1.26[2]	
August	July	1.28	1.69[2]	19.09***	
		Aug.	-0.22	0.78[2]	
October	Sept.	-0.37	1.47[2]	1.40	
		Oct.	-0.27	0.93[2]	
December		Nov.	0.73	1.62[2]	5.02***
		Dec.	1.14	1.05[2]	
Western Kansas					

February	Jan.	0.81	1.10[2]	17.83 ***	
		Feb.	-0.31	0.68[2]	
April		Mar.	-0.25	1.50[2]	4.72***
		Apr.	0.17	1.12[2]	
June		May	2.57	2.23[2]	12.30***
		June	1.10	1.19[2]	
August	July	1.31	1.74[2]	15.59***	
		Aug.	-0.15	0.79[2]	
October	Sept.	-0.69	1.33[2]	6.60***	
		Oct.	-0.18	0.90[2]	
December		Nov.	0.83	1.81[2]	1.10
		Dec.	0.95	1.11[2]	

[1]Calculated t-statistics are absolute values and significance level is designated by *** = .01, ** = .05, and * = .10 significance levels.

[2]Statistically significantly different variance.

Appendix Tables 3 and 4 provide evidence of the potential forecasting error which can occur when estimating basis variation. The variation for a given month each year can be very small, thus resulting in a small standard deviation averaged over several years. However, the historical mean basis for that month may be highly variable, ranging relatively widely over several years. Conversely, the opposite can occur.

Frequency distributions were calculated to further evaluate the monthly basis patterns and to graphically illustrate the similarities and differences between the futures market nonexpiration months and subsequent expiration month. Distributions are presented graphically in Appendix Figures 1-12. Each regional futures contract graph contains basis distributions for the nonexpiration and expiration month.

Careful study of the graphs reveal differences concerning frequency of a particular basis level, variation in the basis, and regional differences. In both regions, July has been the most difficult month to estimate basis accurately for two reasons. One is the absence of a prominent peak (one basis level occurring considerably more often than other basis levels), while the second reason is the wide range in the observed basis. May and June are equally difficult to predict. May had a small noticeable peak and a wide range of basis levels. The distribution for the June Texas Panhandle basis had no peak while the June Western Kansas basis exhibited a small peak in the number of observations for any one basis level. In contrast, the graphs suggest that February, August, and October futures market months are more predictable because there is a prominent peak or tendency for a given basis level and a more narrow basis distribution. Consequently, those months should be better months to deliver fed cattle with a forward contract or to hedge cattle using the futures market than other months. Several months exhibit widely varying distributions and frequency levels.

Appendix Tables 5 and 6 contain statistical summaries of each month's basis distribution for the two regions. Again, the tables illustrate that within-month basis variation can be relatively large. The variation and possibility of an adverse error becomes apparent when comparing the observed maximum and minimum basis with the monthly average basis, especially in such months as May, July and March. Basis levels by months might vary relatively widely for any given year, but the historical mean basis for a particular month may vary relatively little and be reasonably predictable over several years.

Frequency tables and figures for basis observations emphasize the importance of understanding historical basis levels and patterns. They also indicate the presence of basis risk, the variance or potential fluctuation of basis within and between years. Potential basis variation must therefore be a consideration when

estimating basis for a relatively volatile month such as May. Adjustments may be required to account for current conditions and factors which cause the current year's basis to deviate from the historical basis pattern. The tables and figures also provide some indication of what might be an acceptable basis when forward contracting or hedging fed cattle.

Basis Trend and Seasonality

Trend and seasonality in fed cattle basis from 1980 to 1990 for each region were estimated with regression analysis. The model in general form was:

(1) Monthly Average Basis = f(Trend, Monthly dummy variables).

March was used as the base month to which all other dummy variables were compared. March was chosen as the base month because it had the lowest mean basis among all months for the Texas Panhandle and was nearly the lowest month for Western Kansas.

A similar model, simply substituting monthly average standard deviation of the basis for monthly average basis, was also estimated. Its general form was:

(2) Monthly Average Standard Deviation of the Basis = f(Trend, Monthly dummy variables).

August was the base month for seasonal dummies in the model involving standard deviations. August was found to have the lowest basis variation for the Texas Panhandle and was nearly the lowest month for Western Kansas.

Results for both models are shown in Table 2. Coefficients for monthly dummy variables in equation 1 indicate differences in average basis for each respective month compared with March. Coefficients for monthly dummy variables in equation 2 indicate differences in standard deviations for each respective month compared with August.

No significant trend in fed cattle basis was found for the Texas Panhandle. However, a significant positive trend was found for Western Kansas, suggesting that fed cattle prices have strengthened relative to futures market prices over the 1980-90 period. The probable cause for the stronger basis is increased fed cattle slaughtering capacity relative to cattle feeding capacity in Western Kansas during the 1980s, thus leading to increased cash prices relative to futures. The trend variable coefficient (.009 on a monthly basis) for Western Kansas translates to an $.11/cwt. increase per year or a $1.21/cwt. increase in basis over the 11 years analyzed.

Figure 1 shows the 11-year average seasonality in the live cattle basis, using March as the base comparison month. The seasonal pattern was quite consistent across the two regions. The largest coefficient was for May, indicating the highest average live cattle basis in both regions. Live cattle basis generally peaked in May, June, and July, followed by above-average basis in November, December, and January. The lowest basis was found during February, March, and April, and in August, September, and October.

Table 2. Trend and Seasonality Regression Results for the Live Cattle Basis, 1980 to 1990.

	Texas Panhandle[1]	Western Kansas[1]

Variable	Basis	Std.Dev.	Basis	Std. Dev.
Intercept	-0.40	0.65	-1.01	0.67
Trend	.0008	-.0006	.009***	-.002***
	(.33)	(1.03)	(3.34)	(3.55)
Jan.	1.40***	0.33***	1.19**	0.30***
	(3.19)	(2.93)	(2.50)	(2.74)
Feb.	0.33	0.02	0.10	-0.04
	(0.75)	(0.14)	(0.21)	(0.37)
Mar.		--[2]	0.09	--[2] 0.17
		(0.78)		(1.56)
Apr.	0.42	0.17	0.51	0.28**
	(0.95)	(1.47)	(1.07)	(2.53)
May	2.72***	0.14	2.61***	0.24**
	(6.18)	(1.21)	(5.48)	(2.20)
June	1.33***	0.44***	1.35***	0.42***
	(3.03)	(3.91)	(2.83)	(3.84)
July	1.77***	0.42***	1.69***	0.46***
	(4.02)	(3.77)	(3.55)	(4.23)
Aug.	0.12	--[2]	0.17	--[2]
	(0.27)		(0.36)	
Sept.	0.05	0.26**	-.07	0.27**
	(0.12)	(2.34)	(0.14)	(2.47)
Oct.	0.15	0.05	0.20	0.04
	(0.34)	(0.43)	(0.43)	(0.38)
Nov.	1.06**	0.26**	0.99**	0.28**
	(2.40)	(2.27)	(2.08)	(2.56)
Dec.	1.51***	0.16	1.30***	0.24**
	(3.43)	(1.41)	(2.72)	(2.23)
R^2	0.42	0.25	0.39	0.32
N	132	132	132	132

[1]Calculated t-statistics are absolute values and significance level is designated by *** = .01, ** = .05, and * = .10 significance levels.

[2]Base months for mean and statistical deviation were March and August, respectively.

No trend in basis variation was found for the Texas Panhandle, but basis variation decreased significantly for Western Kansas over the decade of the 1980s. Translated to a yearly change, the variation has decreased approximately two and one-half cents per hundredweight per year, or about $.27/cwt. reduction in basis variation over the 11 years.

Regression results on seasonality of basis variation were also relatively consistent for both regions. June and July, two of the highest basis months, were also the most variable months (Figure 2). Other high basis months, January and November for both regions, in addition to May and December in the Western Kansas region, had significantly higher variances than August, the base month. Most of the remaining months were not statistically different from the base month. These results suggest that the basis risk exposure increases with efforts to obtain the highest basis.

Forward Contracting vs. Hedging Comparisons

A futures market hedge was simulated for each pen of cattle that had been contracted by the responding cattle feeders. Contracting data from feeders were incomplete in some cases due to the nature of the contracts and feeders' limited access to past transaction files. Therefore, assumptions were required to utilize incomplete data.

Once the feeder determines that a forward contract is desired and has entered into a contractual agreement with the packer, a settlement price must be discovered. Price can be established immediately or some time in the future, as was noted earlier. The optimal time to establish the settlement price is when the appropriate futures market price peaks. Similarly, if a feeder perceives the futures market price has peaked, then the feeder would also recognize that a futures market hedge is desirable for downside price protection and would initiate a hedge at that time. Therefore, the trigger or price settlement date was used as the hedge initiation date for the hedge simulation. The hedge would be completed at the time cattle are delivered, thus the delivery date was used as the completion date.

Appropriate dates were the most difficult to obtain because they were not always included on the contracts. The contract date and trigger date were assumed the same if one but not both dates were given. When both dates were provided by feeders, the dates were often the same or within a few days of each other. When both the contract initiation date and trigger date were missing but the delivery date was provided, it was assumed the contract was initiated three months prior to delivery, which was the mid-point for the period of time most cattle feeders contracted cattle prior to slaughter (Ward and Bliss). Often, the delivery date was given as a month only. In those cases, the second Tuesday of the month was assumed to be the delivery date. The second Tuesday of the month falls between the 8th and 14th of each month, about midway between the 1st day of the month and the last day of futures market trading in the expiration month. Also, Tuesday was found to be between the highest and lowest basis days of the week in prior research (Ward, 1991b), and was the day in which buyer activity was greatest (Ward, 1991a). Data were not used when delivery occurred after the appropriate futures market contract expired. If the settlement futures price was not included, the futures close for the settlement date was used.

Elam stated that when the hedge price and forward contract price were initiated on the same date, the net price difference between them was essentially equal to the difference between the hedge basis and contract basis. He also indicated a need to adjust the two basis amounts for differences between the two marketing alternatives, such as differences in transportation costs and transaction costs. Likewise, there is a need to adjust the contract basis for the $10/head advance partial payment frequently employed on contracted cattle. Three-month Treasury bill rates were used to calculate the interest on the $10/head advance partial payment. The equation for adjusting the forward contract basis was that used by Elam:

(3) Adjusted Contract Basis = Contract Basis - Transportation Cost + Interest on Deposit.

All data were in dollars per hundredweight.

With cash marketing, packers pay transportation costs between the feedlot and packing plant. With forward contracting, cattle feeders typically pay transportation costs. However, phone conversations with feeders revealed that transportation costs varied depending on which plant was receiving the cattle and whether part or all transportation costs were waived by the packer when the forward contract agreement was executed. Packers retain the privilege of determining the delivery date on contracted cattle and the plant to which cattle will be delivered, which may not be the closest plant to the cattle feedlot. Therefore, three transportation costs were assumed to represent a reasonable range of transportation costs: (1) zero, when transportation costs are waived; (2) $.20/cwt.; and (3) $.40/cwt. Transportation costs of $.20 and $.40/cwt. assume a $1.80/mile transportation rate for a 45,000-pound truckload of cattle shipped 50 and 100 miles, respectively.

Consequently, Elam's equation (#3 above) was expanded to three similar equations differing by the assumed transportation costs.

This study, like Elam's study, adjusted the hedge basis for transaction costs. The futures market transaction cost in this study was assumed to be $.055/cwt., based on a round-turn brokerage commission of $22 for a 400 hundredweight live cattle contract. Brokers contacted indicated that discount brokers were most often used by cattle feeders and charged less than full-service brokers, thus a lower transaction cost was used compared with Elam's study. Also, brokers indicated no execution cost was charged, which Elam assumed. In this study, unlike Elam's work, the hedge basis was adjusted for possible margin expense. Elam assumed cattle feeders could deposit Treasury bill notes for the margin account. However, brokers contacted indicated that use of Treasury bills was not a valid assumption in some cases. Preliminary calculations suggested that three levels of margin expense would represent a high, low, and midrange estimate depending on which direction futures market prices moved: (1) zero, equal to the assumption of a T-bill deposit; (2) $.05/cwt.; and (3) $.10/cwt. The hedge basis equation was:

(4) Adjusted Hedge Basis = Actual Basis - Transaction Cost - Margin Expense.

Elam argued for the need to remove year-to-year basis variation. That was accomplished by modifying equation 4, replacing the actual basis with the historical average basis:

(5) Adjusted Historical Hedge Basis = Historical Basis - Transaction Cost - Margin Expense.

Basis forward contracting versus futures market hedging was then analyzed in two ways. The first involved an evaluation of the specific contract basis, and the second involved an evaluation of the resulting net price for each price risk management alternative.

Contract Basis Evaluation

The contract basis adjusted for each of the three transportation cost levels was compared with the unadjusted actual and historical basis. A paired t-test determined whether differences in mean basis levels were significantly different from zero (Table 3). When transportation costs were $.20/cwt. or greater, the adjusted contract basis was significantly lower than the historical basis. This supports Elam's inference and suggests that packers bid a lower basis than is justified by historical data. However, when comparing the adjusted contract basis with the actual basis, results showed no statistical difference between the two at any level of transportation cost. These results suggest either that packers' basis expectations were incorrect for the data time period or that packers bid a higher basis in order to contract (purchase) the cattle well in advance of slaughter. Given the need to adjust basis for year-to-year differences in market conditions, basis bids may be more competitive at some times than others. Under highly competitive conditions, a smaller portion of the basis may be retained by the packer for risk compensation than Elam's results suggest.

Net Price Evaluation

The estimated net price from cash marketing of fed cattle was compared with the estimated or actual net price from basis forward contracting and from simulated hedging.

Table 3. Forward Contracting Basis Comparisons, 1988 to 1990.

Basis Comparison	Difference	Mean t-stat[1]
Estimated Actual Basis vs. Historical Basis	-.16	1.00
Adjusted Contract Basis (0 Transportation) vs. Estimated Actual Basis	.14	.77
Adjusted Contract Basis (0 Transportation) vs. Historical Basis	-.02	.28
Adjusted Contract Basis ($.20 Transportation) vs. Estimated Actual Basis	-.06	.33
Adjusted Contract Basis ($.20 Transportation) vs. Historical Basis	-.22	3.35***
Adjusted Contract Basis ($.40 Transportation) vs. Estimated Actual Basis	-.26	1.43
Adjusted Contract Basis ($.40 Transportation) vs. Historical Basis	-.42	6.43***

[1]Calculated t-statistics are absolute values and significance level is designated by ***=.01, **=.05, *=.10.

A summary table of significant results is shown in Table 4, and a complete table of comparisons is presented in Appendix Table 7.

Transportation costs significantly affected the net price outcome. If transportation costs were waived (zero transportation costs), the net price received with a basis forward contract was significantly higher than the net price received with a simulated hedge (using actual basis), assuming a margin expense greater than $.05/cwt. In addition, the net price from basis forward contracting with no transportation costs was also found to be significantly higher than a simulated hedge using historical basis at all three margin expense levels.

When transportation costs reached $.40/cwt., the net price received from basis forward contracting was significantly lower at all margin expense levels than that received with

Table 4. Summary of Net Price Comparisons for Forward Contracting, Futures Market Hedging and Cash Marketing, Western Kansas and Texas Panhandle, 1980 to 1990.

Net Price Comparison	Mean Difference	t-stat[1]
Adjusted Contract Price (0 Transportation) vs. Adjusted Actual Hedge Price (.05 Margin Cost)	0.30	1.73*
Adjusted Contract Price (0 Transportation)	0.35	2.02**

vs. Adjusted Actual Hedge Price (.10 Margin Cost)		
Adjusted Contract Price (0 Transportation) vs. Adjusted Historical Hedge Price (0 Margin Cost)	0.11	1.85*
Adjusted Contract Price (0 Transportation) vs. Adjusted Historical Hedge Price (.05 Margin Cost)	0.16	2.72***
Adjusted Contract Price (0 Transportation) vs. Adjusted Historical Hedge Price (.10 Margin Cost)	0.21	3.59***
Adjusted Contract Price (.40 Transportation) vs. Adjusted Historical Hedge Price (0 Margin Cost)	-0.29	5.13***
Adjusted Contract Price (.40 Transportation) vs. Adjusted Historical Hedge Price (.05 Margin Cost)	-0.24	4.26***
Adjusted Contract Price (.40 Transportation) vs. Adjusted Historical Hedge Price (.10 Margin Cost)	-0.19	3.38***
Adjusted Actual Hedge Price (.10 Margin Cost) vs. Adjusted Historical Hedge Price (.10 Margin Cost)	-0.16	1.00
Adjusted Contract Price (0 Transportation) vs. Cash Price	-1.37	4.51***
Adjusted Contract Price (.20 Transportation) vs. Cash Price	-1.57	5.17***
Adjusted Contract Price (.40 Transportation) vs. Cash Price	-1.77	5.83***
Adjusted Actual Hedge Price (0 Margin Cost) vs. Cash Price	-1.50	4.80***
Adjusted Actual Hedge Price (.05 Margin Cost) vs. Cash Price	-1.55	4.96***
Adjusted Actual Hedge Price (.10 Margin Cost) vs. Cash Price	-1.60	5.11***

[1]Calculated t-statistics are absolute values and significance level is designated by ***=.01, **=.05, *=.10.

a simulated hedge using historical basis figures. Net prices for simulated hedges using actual basis were compared with net prices for simulated hedges using historical basis
and no significant difference was found at any margin expense level. The results indicated no significant difference between basis forward contracting and simulated hedging, using either actual or historical basis, at other transaction cost and margin expense levels.

Net prices for basis forward contracts and simulated hedges were then compared with simulated cash marketing. For the period analyzed, forward contract net prices were found to be significantly lower than cash market prices at all levels of transportation costs. The same outcome existed for net prices from simulated hedge prices at all levels of margin expense. Therefore, from a net price position, cash marketing of fed cattle appeared to be the best marketing alternative for the pens of cattle included in this study during the 1988 through 1990 period. However, an ex post analysis is severely limiting because cash marketing provides no downside price risk protection. Price risk management was an assumed objective of cattle feeders who either forward contracted or hedged cattle during the study period. It is also important to recall that how forward contracting compared with hedging depended significantly on the level of transportation costs associated with basis forward contracts.

Lender Reactions to Price Risk Management Alternatives

Lenders responding to a mail survey in August 1991 regarding price risk management alternatives for cattle feeding varied in several ways. The number of active cattle feeding loans ranged from 1 to more than 200, with a mean response of 33 loans. Similarly, average loan size ranged from $10,000 to more than $2,500,000, with a mean of $255,000. On average, lender-respondents required 24 percent equity or $128/head and charged 11.2 percent interest rate for cattle feeding loans. Lenders surveyed were asked to rate how aggressively they pursued cattle feeding loans, and 44.4 percent of respondents rated aggressiveness from 1 to 3 on a scale of one to seven, number 1 being most aggressive.

The motivation for the lender survey stemmed from earlier responses by cattle feeders that there were financing benefits to feeders from forward contracting (Ward and Bliss). That finding raised other questions. Were there also financing benefits to feeders from using other price risk management tools such as futures markets and options on futures markets? Were lenders "forcing" or "strongly encouraging" cattle feeders to forward contract fed cattle? Was there a difference among lenders regarding price risk management tools? For example, did lenders who aggressively pursued cattle feeding loans and who were larger in terms of average loan size for cattle feeding respond differently than lenders who did not aggressively pursue cattle feeding loans and made smaller loans?

Use and Incentives

Three-fourths or more of lender-respondents indicated they do not require cattle feeder-borrowers to use any price risk management tool (either cash or basis forward contracts, futures market hedges, or futures market options). Specifically, for forward contracts, 80 percent said they do not require cash forward contracts and 88 percent said they do not require basis forward contracts. No significant difference was found in responses from larger and smaller lenders. On a few surveys, lenders scratched through the word require and replaced it with the word encourage. Thus, some lenders may encourage price risk management but do not consider it a precondition for making cattle feeding loans.

Lenders may not require use of price risk management tools, but they may encourage their use by providing various types of incentives. For example, 18 percent of respondents indicated they would lower the interest rate charged if borrowers used some type of price risk management tool. Over half of those willing to lower the interest rate indicated reducing the rate by .5 percentage points, while the remaining lenders offered lowering the rate from .25 to 1 percentage points. A higher percentage of smaller lenders were willing to lower the interest rate from .5 to 1 percentage point than larger lenders. However, smaller lenders charged on average about a .3 percentage point higher interest on cattle feeding loans than did larger lenders.

Over one-third of the respondents (38 percent) indicated they would lower the percentage equity requirement for cattle feeding loans if price risk management tools were employed by cattle feeders. In this case, a higher percentage of larger lenders provided an incentive to use risk management tools than did smaller lenders, 50 percent vs. 35 percent, respectively. The percentage equity requirement could be reduced by as much as 15 percentage points by larger lenders, while over half offered a reduction from 10 to 15 percentage points. Smaller lenders were willing to lower the percentage equity requirement by as much as 20 percentage points, with over half offering 10 to 20 percentage point reductions.

Fewer lenders offered an incentive to manage price risk by lowering the dollar equity requirement than the percentage equity requirement. Twenty-eight percent of all respondents would lower the dollar equity requirement, 39 percent of larger lenders and 24 percent of smaller lenders. The reduction in dollar equity ranged from $10 to $100 per head, or as much as a 50 percent dollar equity reduction for some lenders.

Lenders willing to reduce the dollar equity requirement by as much as 50 percent could potentially provide twice the size of loan to the same borrower if risk management tools were employed. However, less than one-third of respondents (28 percent) indicated a willingness to increase the total loan amount when cattle feeder-borrowers used price risk management tools.

Lenders could provide cattle feeders an incentive to use futures market hedges by loaning money for margin calls. Seventeen percent of lender-respondents indicated they would not provide financing for margin calls. Larger lenders were more willing to finance part or all of margin calls than smaller lenders, 93 vs. 80 percent, respectively. About three-fourths of larger lenders (76 percent) would finance all margin calls, compared with a smaller percentage of smaller lenders (63 percent).

Another incentive to hedge cattle is to have a three-way agreement between the lender, commodity broker, and borrower which specifies the responsibilities of each. Three-way agreements typically also arrange for automatically crediting and debiting the borrower's account as futures market prices move up and down and as margin calls become necessary. These types of agreements make margin calls less noticeable to borrowers and reduce the stress which sometimes occurs from repeated margin calls. The emotional stress from margin calls at times causes the borrower to incorrectly lift the hedge prior to when cattle are sold in the cash market, sometimes at the encouragement of the lender.

Fifty percent of respondents had used three-way lender-broker-borrower agreements. Sixty-four percent of larger lenders had used them, compared with 47 percent for smaller lenders. Another 20 percent of the respondents had considered using three-way agreements but had not done so according to the survey.

Lenders indicated that three-way agreements: (1) improved communications among the three parties regarding the distribution of responsibilities and current status of the account; (2) improved monitoring and control of the account; and (3) reduced speculative futures market trading by borrowers. Disadvantages noted were additional time required for paperwork and debt servicing, and potentially increased lender liability. Many lender-respondents indicated three-way agreements had no disadvantages.

Preferences and Effectiveness

Lenders were asked to rate their preferences among the four price risk management tools. Mean preferences for all respondents and the distribution of rankings are shown in Table 5. Two risk management tools were nearly equally ranked first: cash forward contracts and futures market options. There was a significant gap between the two highest-ranking tools and the remaining two. Basis forward contracts were least preferred, behind futures market hedging. Nearly half of all lender-respondents (47.5 percent) ranked basis forward contracting last. The rankings for larger and smaller lenders were essentially the same as for all lenders.

Table 5. Price Risk Management Preferences of Lenders in the Southern Plains.

Risk Management Tool	Mean Response[1]	Percent Ranking 1st	2nd	3rd	4th

Cash Forward Contracts	1.88	45.0	29.2	18.3	7.5
Futures Market Options	1.90	45.8	27.5	16.7	10.0
Futures Market Hedging	2.94	9.3	22.9	32.2	35.6
Basis Forward Contracts	3.23	2.5	18.6	31.4	47.5

[1]Lower mean response indicates a higher preference.

Preferences among lenders for risk management alternatives may relate to how knowledgeable lenders are about each alternative and how effective lenders perceive each alternative to be. Preference rankings were highly correlated with familiarity or comfort with various risk management alternatives. Table 6 shows mean familiarity response and distribution of ratings by larger and smaller lenders. The ordinal ranking of degree of familiarity or comfort among lenders, whether larger or smaller, was similar. However, the level of familiarity or comfort was slightly higher (lower means) for larger lenders. Lenders indicated being more familiar or comfortable with cash forward contracting, followed by futures market options and futures market hedging, and lastly with basis forward contracting. Ward and Bliss found that two-thirds of forward contracts for fed cattle were basis forward contracts and only one-third were cash forward contracts. Therefore, some of lenders' familiarity with cash forward contracts may stem from cash forward contracting of feeder cattle or other commodities. The degree of familiarity or comfort paralleled lenders' preferences among the risk management alternatives.

A significant percentage of larger lenders (39.3) indicated a relatively high (#2) familiarity or comfort rating for basis forward contracts. However, at least some larger lenders rated their familiarity or comfort of basis forward contracting in all seven possible categories. Smaller lenders also ranked the degree of familiarity or comfort with basis forward contracting in all seven categories, but with much less grouping in a single category compared with larger lenders.

Table 6. Degree of Familiarity or Comfort with Price Risk Management Alternatives by Lenders in the Southern Plains.

Risk Management Tool	Mean Response[2]	Percent Rating[1] 1	2	3	4	5	6	7
		Larger Lenders						
Cash Forward Contracts	1.8	42.9	39.3	14.3	0.0	0.0	3.6	0.0
Futures Market Options	2.3	21.4	46.4	21.4	7.1	0.0	3.6	0.0
Futures Market Hedging	2.5	25.0	35.7	25.0	3.6	3.6	7.1	0.0
Basis Forward Contracts	3.5	10.7	39.3	7.1	7.1	17.9	7.1	10.7
		Smaller Lenders						

Cash Forward Contracts	2.2	37.4	33.6	15.0	5.6	1.9	2.8	3.7
Futures Market Options	2.7	32.1	21.7	19.8	11.3	6.6	4.7	3.8
Futures Market Hedging	2.8	26.4	21.7	23.6	14.2	5.7	2.8	5.7
Basis Forward Contracting	3.8	12.3	15.1	17.9	17.0	15.1	12.3	10.4

[1]Rating number 1 equals Very Familiar or Comfortable and 7 equals Unfamiliar or Uncomfortable.

[2]Lower mean response indicates more familiarity or comfort.

Table 7 shows how larger and smaller lenders rated the effectiveness of each risk management alternative. Again, the ordinal ranking among the four risk management alternatives is the same for larger and smaller lenders. Lenders, whether larger or smaller, perceive the effectiveness of cash forward contracting the highest and basis forward contracting to be the lowest. Futures market options and hedging are between the two types of contracts. The range of mean responses for perceived effectiveness in Table 7 is slightly wider for larger lenders (2.0 for cash forward contracts to 4.0 for basis forward contracts) than for smaller lenders (2.2 for cash forward contracts to 3.5 for basis forward contracts). The distribution was wider for basis forward contracts relative to other risk management alternatives for larger lenders. Smaller lenders rated effectiveness of nearly all alternatives in all seven possible categories.

Table 7. Perceived Effectiveness of Price Risk Management Alternatives by Lenders in the Southern Plains.

Risk Management Tool	Mean Response[2]	Percent Rating[1] 1	2	3	4	5	6	7
		Larger Lenders						
Cash Forward Contracts	2.0	50.0	19.2	19.2	7.7	3.8	0.0	0.0
Futures Market Options	2.7	14.8	37.0	11.1	33.3	3.7	0.0	0.0
Futures Market Hedging	3.0	7.4	18.5	37.0	37.0	0.0	0.0	0.0
Basis Forward Contracts	4.0	4.0	8.0	24.0	40.0	8.0	8.0	8.0
		Smaller Lenders						
Cash Forward Contracts	2.2	27.1	42.7	20.8	5.2	1.0	1.0	2.1
Futures Market Options	2.5	18.7	34.1	26.4	16.5	3.3	0.0	1.1
Futures Market Hedging	3.0	16.1	21.5	30.1	18.3	7.5	4.3	2.2
Basis Forward Contracting	3.5	4.8	16.7	32.1	27.4	8.3	8.3	2.4

[1]Rating number 1 equals Very Effective and 7 equals Ineffective.

[2]Lower mean response indicates higher perceived effectiveness.

Advantages and Disadvantages

Lenders were given an opportunity to list advantages and disadvantages from their perspective for each of the four price risk management alternatives. Advantages to some lenders with a single risk management alternative were disadvantages to other lenders. Advantages (disadvantages) by some lenders with one risk management alternative provided insight into disadvantages (advantages) with other alternatives. The four alternatives are discussed in order of preference: cash forward contracts; futures market options; futures market hedging; and basis forward contracts. Advantages and disadvantages are not discussed in any particular order. Use of the term lenders in this section refers to some but not all of the lender survey respondents.

Lenders indicated an advantage of cash forward contracts was their simplicity and low cost. They provide downside price protection, thereby reducing price risk exposure for borrowers. Cattle feeders eliminate price risk and basis risk, have no up-front cost for risk protection, and do not have margin calls. Lenders and borrowers can use cash forward contracts in planning because they know what the price is and can potentially lock in a profit. Lenders may then be able to reduce the equity requirement for the loan or interest rate charged. Cattle feeders can concentrate on production and keeping production costs in line with their estimate.

One disadvantage noted for cash forward contracts could offset all advantages. Lenders indicated that cash forward contracts can rarely be used. It was often difficult to find a buyer who will offer anything above the break-even price. Therefore, one of the major advantages of cash forward contracts, locking in a price and profit, became a disadvantage. Forward contracts fail to allow any flexibility. They provide needed downside price and profit protection but allow no upside price and profit potential, thereby also eliminating any opportunity for profit gains resulting from upward price movements.

Lenders also expressed the disadvantage that cash forward contracts transfer control over delivery to packer-buyers. Cattle may be called for slaughter before they reach optimum slaughter weight and finish or may not be called until the cattle are over-weight and over-finished, resulting in higher feeding costs for cattle owners. Lenders were concerned about which packer contracted the cattle, their financial stability, and whether contracts would be honored if prices dropped sharply below the price quoted in the contract. However, some feeders mentioned that they forward contracted because of the reputation of packers with whom they contracted.

Lenders thought futures market options were a useful management tool. They liked the insurance concept offered by options, which they often expressed as a flexibility advantage. Futures market options can be used to establish a price floor for a market-determined premium without limiting the opportunity to gain from an upward price movement. Therefore, options provide price insurance against catastrophic losses from feeding cattle. Borrowers can lock in a price and a profit or constrain losses to a certain level subject to basis risk and still have the opportunity for a higher price and profit if cash market prices move upwards. For lenders, the risk of the loan is known immediately, is limited or constrained, and costs are known up front. Lenders may have borrowers lock-in a price which covers the lender's loan risk. Lenders thought the concept of options was easy to understand and explain to borrowers. The cost of insurance was considered to be relatively inexpensive and lenders liked the known one-time, up-front cost without margin calls. Lenders thought options also reduced the temptation of borrowers to speculate.

While some lenders thought options were good in theory, others found them difficult to use in practice.

Lenders often indicated the premium cost was excessive for the level of protection. In particular, the premium for more-distant months was thought to be too high, suggesting an inflated time value of options. Too often, even break-even protection cannot be obtained at a reasonable cost. Options users then must lock in a small loss and hope the market advances above the loss or breakeven level.

Lenders were concerned that options on a futures market contract expire prior to the corresponding futures market contract and prior to when cattle might be delivered. Thus, cattle feeders may be left for a period without price protection and experience indicates prices can move sharply upward or downward in even a week or two. Options were understandable to some lenders but not all. Several lenders thought options were difficult to understand and that they required a higher level of knowledge and understanding to use effectively than do forward contracts or futures market hedging. While liked by many lenders, one lender summarized the views of many by saying options are not a panacea.
Futures market hedging enables cattle feeders to lock in a known price and profit according to lenders. Thus, hedging also limits lenders' risk. Lenders see futures market hedging as being a flexible alternative because borrowers can change their hedge position during the feeding period. Cattle feeders and lenders can develop a marketing plan and then execute the plan as market conditions allow. Lenders indicated hedging required only a minimal cost and no premium as with options. Lenders thought futures market hedging was simple and easy to use.

Futures market hedging may be understandable to some lenders, but other lenders thought many borrowers did not understand hedging. As a result, and because hedging allows users to change positions, many hedgers have historically become speculators. Some lenders believe too many borrowers lack the self discipline required to use futures market hedging effectively. Too often, margin calls and emotions stemming from margin calls lead to misuse of futures markets. Lenders cited the cost of hedging as a disadvantage, particularly the interest on margin accounts. Therefore, a margin cost should be considered when comparing basis contracting with hedging.

A frequently-mentioned disadvantage was basis risk. Futures market hedging can fix a selling price but it does not provide basis risk protection. Lenders saw the inflexibility of hedging, in terms of not allowing a hedger to benefit from a price rise, as another disadvantage. Price and profit were locked in at a given level. Often, only a small profit can be hedged. Thus, lenders thought hedging fit the objectives of larger feeders better than smaller feeders. Larger cattle feeders could lock in a small profit per head, then market large numbers of cattle to reach a total profit objective. Lenders indicated hedging was expensive if cost of production was significantly higher than anticipated. Effective hedging also requires a reliable broker, according to lenders.

Lenders noted correctly that basis forward contracts lock in a basis and eliminate basis risk. Basis contracts allow feeders to lock in the basis when the contract is signed and offers the flexibility to lock in the selling price during the feeding period before the cattle are delivered. Basis contracts thus do not block the benefits from upward price moves.

Lenders indicated that basis contracts initially only fix one component of price. Therefore, lenders believed basis contracts gave false assurance to cattle feeders of price risk protection. Basis contracts give feeders a marketing commitment but no price protection. Only after the settlement price is determined do feeders have both price risk and basis risk protection. Basis contracts do not protect borrowers from seasonal or unexpected price swings. Until the settlement price is chosen, feeders have unlimited downside price risk. Feeders must watch for pricing opportunities. A problem noted was that cattle feeders were too optimistic and often missed pricing and profit opportunities that should have been seen as acceptable or that feeders simply failed to fix a settlement price when the futures market price was favorable. The result could be a favorable basis but an unfavorable price.

Many feeders do not understand basis or basis contracts according to lenders. Lenders indicated that basis contracting requires the joint use of futures market hedging with its concomitant advantages and disadvantages.

Implications for Forward Contracting

Results of this analysis, combined with comments from cattle feeders and lenders, provide additional insight into forward contracting of fed cattle. Selected findings are reported here.

Extent of Non-Dairy Contracting

This research was undertaken because research comparing forward contracting with futures market hedging was thought by the authors to be an issue among cattle feeders. In particular, basis contracts were viewed as potentially controversial. However, when soliciting data from cattle feeders, several feeders expressed little interest in the study. Therefore, fewer data could be collected on contracted cattle than had been planned.

Also, several cattle feeders indicated they had forward contracted cattle during the 1988-90 period but that most were Holstein cattle. A higher-than-expected level of disinterest in this research and collecting fewer data than planned may have resulted from an incorrect assumption regarding available forward contracting data. Ward and Bliss found that 12.7 percent of fed cattle marketed in 1988 were forward contracted, but they did not collect contracting data by cattle breeds, specifically beef vs. dairy breeds. Figure 3 shows an estimated range for the supply of dairy animals available for feeding, based on dairy herd inventory, calf crop, and calf slaughter numbers, and assumptions regarding dairy herd replacements, etc. Assuming the actual number falls near the mid-point of the range, about 3.6 million dairy animals were potentially fed in 1988. Based on the Ward and Bliss survey, about 3.4 million fed cattle were forward contracted in 1988. Some packers or packing plants are believed to forward contract a high percentage of Holstein cattle purchased, but no percentage estimate is available. Even if the percentage of Holstein contracting across plants is as low as 25 percent, then the Ward and Bliss estimate of forward contracting for non-dairy cattle drops to 9.2 percent, or 2.5 million cattle. If the percentage of dairy cattle contracting is as high as 75 percent, then the Ward and Bliss estimate of non-dairy contracting declines to 2.6 percent, or 700,000 cattle. A potentially lower-than-expected level of contracting for non-dairy fed cattle might be a contributing factor to collecting fewer data than anticipated for this analysis.

In addition, if the percentage of non-dairy contracting is significantly lower than the Ward and Bliss finding, then perceived benefits of contracting for feeders can be better understood. Some packers do not slaughter significant numbers of Holstein cattle. Packers that do slaughter Holstein cattle may want them forward contracted to control delivery. Therefore, cattle feeders may be more concerned about contracting to lock in a known buyer for the cattle than about contracting for downside price protection.

Contracting Rules of Thumb

In many cases, feeders expressed relatively strong opinions regarding fed cattle contracting. Examples include: (1) forward contracting never works; (2) forward contracting only works if you can peg the settlement price on the same day you contract; (3) forward contracting always works if packers offer a positive $1/cwt. basis; (4) forward contracting never works if hedging doesn't work; and (5) packers always include some basis gains for themselves which the cattle feeder can gain by not contracting.

This study attempted to address these and other concerns expressed by the industry. Results and implications indicate that rules of thumb are often only correct "on the average." For example, the presence of seasonality in fed cattle basis suggests that a required basis may be correct, on average annually, but that there is a need for within-year adjustments depending on time of year. In addition, with knowledge of possible year-to-year basis fluctuations, basis can be adjusted to compensate for market factors unique to a particular year. This adjustment is important with both hedging and forward contracting as both marketing alternatives require accurate basis forecasting. Without essential adjustments, successful risk management is less likely and the resulting risk from hedging or forward contracting can approach the risk associated with cash marketing. If a packer retains some basis, it becomes a risk premium, the "price" or cost paid by the feeder to avoid facing basis risk and having the packer deal with it. An adverse error in basis forecasting can increase the risk premium. Conversely, with improved basis forecasting, a cattle feeder can concede a basis amount equivalent to the risk involved and reduce the potential of giving up excessive basis to the packer. Contract basis analysis implied that the packer did not always retain an excessive amount of basis to compensate for assuming the basis risk. Therefore, careful planning can help eliminate excessive basis transfer to the packer and possibly increase returns for the feeder by reducing the risk premium without increasing risk.

To state that one marketing alternative is better than the other or that one never works unless the other does is also not supported by the results. Forward contracts are variable as to what contract specifications and rules can be waived. As stated earlier, transportation and margin costs are significant factors determining which alternative is better. A significantly higher net price can be obtained by either alternative depending on required transportation costs and expected margin cost levels. The current market trend can also affect which alternative will result in a higher net price and thus less forfeited basis. In an upward trending market, a basis forward contract reduces marketing risk by eliminating basis risk, but price level risk remains until settlement. Therefore, basis forward contracting does not limit upside potential, and it is not always appropriate to "pull the trigger" (establish the settlement price) the same day the forward contract agreement

is initiated. Hedging is not an attractive alternative with an upward trending market, but in a downward trending market, hedging is more attractive. Basis

contracts in which the settlement price is fixed when the contract is initiated, or flat price contracts, are more favorable alternatives in downward-trending markets than upward-trending markets.

"Never" and "always" are seldom appropriate regarding marketing alternatives. Some feeders mentioned that historical basis did not communicate anything about the basis in the future. Historical basis data provide a base of information and should not be disregarded. Nevertheless, each marketing situation is unique in some regard and current conditions should be considered and adjustments made before decisions are made. The acceptable level of risk has to be determined before an acceptable basis can be determined. However, with marketing alternatives such as forward contracting and hedging, a thorough understanding of basis and variability of basis is equally important if a feeder is going to make correct decisions. Therefore, it may be advantageous for feeders to keep accurate basis records to make appropriate within-year adjustments. Comments such as, "futures are $1 to $2 under cash today, and a $2 under forward contract basis added to that starts you out $3 to $4 behind," reveal misunderstanding about the use of these alternatives. The level of futures market prices relative to the cash market is irrelevant when a basis contract or hedge is initiated. The relevant basis is the one at time of delivery.

Contrary to some feeders' beliefs, the lender survey did not indicate that lenders were forcing or even strongly recommending basis forward contracting, or any specific alternative. However, there was evidence that some lenders provided incentives in the form of lower interest rates and equity requirements if some method of risk management was employed. Lenders' responses also indicated that not all lenders fully understand the four risk management tools. Feeders may need to provide lenders with a detailed marketing plan when securing needed financing which may persuade lenders to make loan concessions for using specified risk management tools. Some lenders understand certain risk management tools better than others, and some lenders provide significant incentives for cattle feeder-borrowers who use price-risk management alternatives. Therefore, cattle feeders are encouraged to shop for the lender who can best serve their needs.

Research and Education Needs

This and previous work on forward contracting of fed cattle indicate gaps in knowledge and the need for continued education. An obvious gap in knowledge pertains to the extent of forward contracting, especially between dairy and beef breeds of fed cattle. Reasons for forward contracting each type of cattle may differ and the degree of concern expressed about forward contracting may vary according to the level of contracting for dairy and beef breeds.

Additional educational programs are needed for lenders regarding all price risk management alternatives. Lenders frequently indicated a preference for a given type of risk management tool, but later comments suggested a relatively low level of knowledge concerning the effective application of that particular risk management tool. There is some confusion regarding use of risk management tools for "risk" protection versus for "pricing" livestock.

There is confusion by cattle feeders and lenders regarding basis and its behavior. Research to better forecast within-year basis relative to historical basis would be useful to cattle feeders and lenders wishing to use basis forward contracts, futures market hedges, and options on futures.

References

Elam, Emmett. Cash Forward Contracting vs. Hedging of Fed Cattle and the Impact of Cash Contracting on Cash Prices. Western Journal of Agricultural Economics. 17(1992) (in process).

Ward, Clement E. and Timm J. Bliss. Forward Contracting of Fed Cattle: Extent, Benefits, Impacts, and Solutions. Virginia Tech, Res. Inst. Lvstk. Pricing, Res. Bul. 4-89, December 1989.
6(1990):1 65-73.

Ward, Clement E. "Re-Examining Fed Cattle Pricing Models after a Decade of Structural and Behavioral Changes in Meatpacking." Invited paper for the Western Agricultural Economics Association meetings, Portland, OR, July 1991a.

Ward, Clement E. "Closeout Basis Risk for Fed Cattle." Current Farm Economics. 64(1991b):27-37.

Appendix Figures and Tables