An Analysis of Factors Affecting Oklahoma City Feeder Cattle Basis

by

James Trapp and Fred Eilrich

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Feeder cattle producers and buyers have an interest in understanding the relationship between feeder cattle cash prices and futures prices. Knowledge of this price difference, i.e basis, is critical to executing a well conceived hedging plan. Variation in the basis between the Oklahoma City market cash price for feeder cattle and the Chicago Mercantile Exchange (CME) feeder cattle contract over the past four years has been large enough to have a significant impact upon profits from hedging cattle, i.e. the standard deviation of the basis for different weights of feeder cattle during the contract delivery month ranged from approximately \$4 for 4-500 pound feeder cattle to approximately \$1 for 7-800 pound feeder cattle.[1] A basis standard deviation of just \$1 is economically significant since it implies an impact upon profit per head of \$7-8. Profit per head for feeder cattle is often of this same order of magnitude. Despite the volatility of the feeder cattle basis, the CME feeder cattle contract continues to be an effective risk management tool given that the standard deviation of cash feeder cattle prices in the Oklahoma City market over the past four years has been approximately \$14 for 4-500 pound feeders and \$9.50 for 7-800 pound feeders. Improved knowledge of the feeder cattle basis could however make the CME Feeder Cattle contract an even more effective risk management tool. The objective of this study is to determine what, if any, systematic intertemporal relationships exist in the basis between cash and futures prices for feeder cattle.

Relevant Literature

Controversy exists in the literature as to whether any definable intertemporal relation exits between cash and futures prices for nonstorable commodities such as feeder cattle and livestock in general. Literature during the 70's in the area of basis analysis concluded that no relationship existed between two intertemporal prices of nonstorable commodities (Ehrich; Futrell; Leuthold 1977). These studies were heavily influenced by Working's 1949 and 1953 studies on the theory of the price of storage. Working's theory indicates that for storable commodities the basis between cash and future delivery prices is determined by the cost of storage. No comparable theory of basis for nonstorable commodities has evolved.

Research published in 1979 and 1980 investigating livestock basis began reporting intertemporal relationships between cash and nearby futures prices (Purcell, Flood, and Plaxico; Leuthold 1979; Tomek; Kendall). More recently Naik and Leuthold (1988) reported finding intertemporal price relationships in the both beef and hog markets

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*Professor of Agricultural Economics and Graduate Research Assistant, respectively, Oklahoma State University. Financial support was provided by the Oklahoma State University Agricultural Experiment Station.

beyond one month (i.e. current cash price is related to contracts expiring a month or more in the future). This study will lend further support to the contention that cash and futures prices for nonstorable commodities are intertemporally related by showing that feeder cattle cash and futures prices basis vary systematically (for periods up to five months in length) in response to changes in live cattle futures prices and cash corn prices.

The approach taken in this study is similar to that of Leuthold in his 1979 study of live cattle basis. In that study Leuthold (p. 52) concluded "that a high proportion of the variation in the live-beef cattle basis, anywhere from two to seven months prior to contract delivery, can be explained by factors which determine and shift the supply curve (for beef)." He argues that the live cattle basis "reflects the expected change in cash prices from the current time until the relevant futures contract matures." More specifically he finds live cattle basis to be significantly related to cattle on feed numbers, feeder cattle prices and corn price. This study will take an approach similar to Leuthold by hypothesizing that feeder cattle basis are related to live cattle futures prices, corn prices and seasonality.

The rationale advanced for explaining why and how live cattle futures prices, and corn prices influence the feeder cattle basis reflects the same logic as developed by Buccola in his 1980 AJAE article on the analysis of feeder cattle price differentials. In that study Buccola (p.579) concludes that "break-even analysis can be used to successfully clarify our understanding of market price differentials between different lots (weights) of feeder cattle." Break-even analysis basically reflects the theory of derived demand. Thus this study will parallel Leuthold's (1979) study in contending that factors which shift the derived demand for feeder cattle influence the feeder cattle basis.

Theoretical Underpinnings

A simple break-even analysis (of much less detail than that presented by Buccola) suffices to explain the hypothesized relationships expected to exist between feeder cattle cash prices for various weights of feeder cattle and feeder cattle futures contract prices for contracts maturing up to five months in the future. The analysis will also suggest which basis are likely to be the most volatile.

Table 1 below presents a simple break-even analysis for feeder cattle. Briefly its elements and rationale are as follows. Revenue from the slaughter of feeder cattle purchased today must be estimated using a planned slaughter weight and expected slaughter cattle price. Buccola's study, as well as others, have indicated that the live cattle futures price for a month near the projected slaughter date of the feeder cattle in question serves as a good proxy of the expected future slaughter price. Expected revenue is adjusted to consider death losses before determining gross revenue. Budgeted costs consist mainly of feeding costs and financing costs. The feeding cost depends primarily upon the placement weight, pounds of gain planned, and the feed conversion efficiency of the animal (see Buccola). For budgeting purposes a typical feed conversion efficiency is assumed. Likewise feed conversion efficiency is assumed to be the same irrespective of the placement weight or amount of gain budgeted. Given these assumptions the cost of gain becomes directly related to the price of feed. Finally some allowance must be made in the budgeting process for financing cost. This is done by assuming the amount to be financed is proxied by the gross revenue projected to be earned. This amount must be financed over the expected feeding period. The expected feeding period is found by assuming an average growth rate of three pounds per day and observing that 450 pounds of growth are required. Thus the expected feeding period is 150 days or 41 percent of a year. This information coupled with an assumed interest rate and percent equity yields the expected financing cost. Finally, the break-even price is determined by dividing the budgeted net returns by the placement/purchase weight of the feeder cattle in question.

Table 1. Example Feeder Cattle Break-even Analysis

Gross Revenue	
(Slaughter Weight x Slaughter Price) x (1 - Death Rate)	
(1150 x .78) x (1 - .01)	$888.03
Costs	
Feeding Cost	
(Slaughter Wt. - Placement Wt.) x Cost of Gain/lb.	
(1150 - 700) x .48	-$216.00
Finance/Opportunity Cost	
Revenue x (150/365) x Interest Rate x (1 - % Equity)	
$888.03 x .41 x .12 x (1 - .25)	-$32.77
Net Return	$639.26
Feeder Cattle Break-even Price ($/cwt.)	
Net Return / (Placement Wt./100)	
$639.26 / (700/100)	$91.32

Buccola argues that the budgeted break-even price and actual cash price for feeder cattle will equal each other in a perfectly competitive market in the long-run, i.e. at the market equilibrium. While markets are not always in equilibrium they tend to be close to equilibrium most of the time, especially if they are as competitive as the feeder cattle market appears to be. Thus Buccola goes on to hypothesize that the budgeted impact of changes in either live cattle futures prices or feed prices upon feeder cattle prices reflects the equilibrium tendencies of the feeder cattle market and the general actual response of cash market prices. Empirical work by Buccola supported his hypothesis with the exception that the actual changes observed in feeder cattle prices in response to live cattle and corn price changes were only about one third as great as the budgeted responses. However the directions and relative magnitudes of the price changes between different weights of feeder cattle were consistent with those derived from break-even analysis.

Testing of alternative expected slaughter prices and feed prices in the feeder cattle breakeven budget leads to the following key relationships. First, increases in the cost of feed lower the break-even/cash price for feeder cattle. More critically, the lighter the placement weight the more impact a given change in feed costs (i.e. cost of gain per pound) will have on the break-even price for feeders. This results from the fact that light weight cattle require more feed and that the increased cost resulting from a higher feed price is divided over fewer pounds when a light weight animal is purchased, thus causing a given change in feeding cost to have a bigger impact per pound of animal purchased. Secondly, increases in the expected slaughter price will increase the expected break-even price of feeder cattle. Again and more critically, changes in expected slaughter price will have a larger impact upon break-even prices for lighter weight cattle. This follows from the fact that the planned slaughter weight remains effectively the same for a large range of placement weights. Thus a given change in the expected slaughter price causes the same change in budgeted net revenue for any placement weight. But with light placement weights the resulting net revenue change caused is divided by a smaller number (weight), thus resulting in a larger change in the per pound break-even price.

The above arguments lead to the conclusion that the price of feed has an influence upon the basis between live cattle futures prices and feeder cattle cash prices.[2] This relationship was demonstrated by Buccola and was also found by Leuthold (1979). However changes in live cattle futures prices and feed prices systematically having different impacts on different weights of feeder cattle implies that feeder cattle prices must also have systematic relationships between weights and over time. This point was not directly addressed by either Buccola or Leuthold (1979). As an example, consider that an increase in a distant live cattle futures price would have an impact upon light weight feeder cattle but would have no impact upon heavier weight feeder cattle expected to be slaughtered before the live cattle contract in question expired. Thus the basis or difference between these two feeder cattle prices would change as a result of a change in the live cattle contract in question.

The above logic suggests that changes in selected live cattle futures contracts will cause changes in the feeder cattle futures contract prices for given months while they will not influence others. Likewise a change in any live cattle futures contract price, with the possible exception of the current month contract, will have an impact upon the cash price of some weight of feeder cattle. Thus systematic intertemporal changes between cash and futures prices for feeder cattle will occur as a result of a change in a given live cattle futures price. More specifically, the feeder cattle contract weight is specified as 600-800 pounds. Thus the live futures price that should have the most impact upon it is approximately 150 days, or five months forward of the feeder cattle futures contract month. This same contract should also have an influence upon 600-800 pound cash feeder cattle prices, but should have very little influence upon say 400-500 pound feeder cattle cash prices. The live cattle contract influencing 400-500 pound feeder cattle would be the contract expiring approximately seven months into the future. The relationship hypothesized here between the feeder cattle basis and live cattle futures price is perhaps complex at first consideration, but the key is that it should be systematic. If it is systematic it is explainable through regression models.

By a similar and more direct line of logic current cash feed prices should have an impact upon the basis between cash prices of light weight feeder cattle and the feeder cattle contract price. Light weight cash feeder cattle prices will react more to a given change in feed price than the cash or futures price for heavier weight feeder cattle. This follows directly from Buccola's work and the logic presented above.

Before leaving this theoretical discussion one other related point will remains to be developed. Live cattle contract prices and cash feed prices are continually changing. Because the impact of these changes is larger on light weight feeder cattle, the basis between light weight feeder cattle (4-500 pounds) cash prices and feeder cattle futures prices should be more volatile than the basis between heavier weight feeder cattle (5-600 or 6-700 pounds) and the feeder cattle futures price. By analogy, breakeven budgeting sensitivity analysis shows the effect of changes in live cattle futures prices and corn prices to impact cash feeder cattle prices much like the shaking of a rope from one end. The oscillations generated start small but expand as they carry further from the point of origin. So it is with feeder cattle prices, heavier feeder cattle react very little to changes in market prices for slaughter cattle and feed, but lighter weight cattle react significantly. Thus basis for light weight feeder cattle can be expected to be more volatile than the basis for heavier weight feeder cattle.

Data Used

Data used spanned the period from September of 1986 to June of 1990. The starting point of the data period is based on the fact that the specification of the CME feeder cattle contract was changed at this time to a cash settlement contract. Data were collected over this period on a weekly basis by either averaging prices over the week or using the price for a specific day during the week. The feeder cattle contract data used were obtained from Agricultural Futures, a daily CME information bulletin. The Tuesday closing feeder cattle contract price was used to reflect the weekly feeder cattle contract price. Cash feeder cattle prices collected were average weekly prices reported for the Oklahoma City Feeder Cattle market in the USDA weekly summary and statistics bulletin titled Livestock, Meat and Wool Market News. Prices for four weight categories were collected (400-500, 500-600, 600-700 and 700-800 pounds). The basis as defined and used here is calculated as the average weekly cash price for a given weight of feeder cattle minus the Tuesday closing CME feeder cattle price. Feed cost were proxied by average weekly southwest Kansas corn prices as reported in Grain and Feed Market News. Southwest Kansas corn prices were felt to adequately proxy the cost of feed in the Oklahoma City feeder cattle market area.

Analysis Results

The basis for different weights of feeder cattle for the contract expiration month as well as other months were regressed against selected live cattle futures contract prices, cash corn prices, and a set of seasonal dummy variables. The general form of the equations estimated was as follows;

1) $$BASIS_{wt,t} = a + b*LCFP_s + c*CCP_m + d*MarchD + e*AprilD + f*MayD + g*AugD + h*SeptD + i*OctD + j*NovD$$

Twenty-four feeder cattle basis equations of the above form were estimated. The specification of twenty-four separate basis equations arose from the following considerations. The basis for four weight groups of feeder cattle were consider (400-500, 500-600, 600-700 and 700-800 pounds). For each of these weight groups six equations were estimated to reflect the basis in different sales months, including sale during the contract expiration month. An example of a contract expiration month basis would be a January basis calculated as the difference between an average weekly cash price in January minus the January futures contract price during the same week in January. An example of a "one month prior basis" would be a basis calculated as the difference between an average weekly cash price in December and the January futures contract price as priced on the CME during the same week in December. Two month, three month, four month and five month prior basis were calculated in a similar manner. Thus the notation $BASIS_{45,0}$ denote a current month basis for 400-500 pound feeder cattle, and the notation $BASIS_{67,3}$ would denote a three month prior basis for 600-700 pound feeder cattle. The main rationale for looking at one month and two month prior basis periods is that in some cases feeder cattle must be hedged for sale in non-contract months, thus a "prior basis" must be used. During the summer months of the year it maybe necessary to use as much as a three month prior basis to hedge cattle due to the fact that no feeder cattle contract exists for both June and July.

The variables on the right-hand-side of equation #1 are defined as follows. $LCFP_s$ is the <u>l</u>ive <u>c</u>attle <u>f</u>utures <u>p</u>rice for a selected contract month s month into the future and CCP_m is the <u>c</u>ash <u>c</u>orn <u>p</u>rice m months into the future. The live cattle contract month selected for inclusion was the live cattle contract whose expiration date was nearest the expected slaughter date for the weight of feeder cattle being considered. The corn price used was the average monthly corn price during the planned sales month for the feeder cattle in question. The variables MarchD, AprilD, etc. represent dummy variables for each of the CME feeder cattle contract months. January is omitted and is thus the base month.

The live cattle and corn price parameter values estimated for each $BASIS_{wt,t}$ equation are reported in Table 2. The value below each parameter in parenthesis is the t-values of the parameter estimate. Only one parameter in the table exhibits a sign inconsistent with that hypothesized in the break-even analysis discussion (i.e. a positive sign was hypothesized for the live cattle futures prices variable and a negative sign was hypothesized for corn price as a proxy for cost of gain per pound). The inconsistent parameter is the current month live cattle price response parameter for 700-800 feeder cattle. However, this parameter is also insignificantly different from zero given its standard deviation, and as will be discussed presently, it can be hypothesized to have an insignificant magnitude.

Table 2. Estimated Feeder Cattle Basis Equation Parameters[a]

	Feeder Cattle Weights							
	400-500		500-600		600-700		700-800	
Basis Period	Live Cattle	Corn	Live Cattle	Corn	Live Cattle	Corn	Live Cattle	Corn
Current Month	.71 (7.9)	-2.81 (2.3)	.29 (4.8)	-0.29 (.35)	.07 (1.7)	-0.23 (0.4)	-.01 (0.3)	-0.57 (1.3)
1 Month Prior	.78 (7.8)	-4.00 (3.2)	.37 (5.3)	-2.20 (2.6)	.19 (4.8)	-2.38 (4.0)	.08 (2.0)	-2.13 (4.2)
2 Month Prior	.80 (8.9)	-4.54 (3.9)	.47 (7.8)	-3.26 (4.5)	.25 (6.3)	-3.39 (5.9)	.15 (3.0)	-3.18 (5.2)
3 Month Prior	.77 (7.7)	-5.27 (4.0)	.47 (6.7)	-3.54 (3.8)	.33 (6.6)	-4.61 (5.6)	.20 (4.0)	-3.58 (5.2)
4 Month Prior	.96 (9.6)	-7.66 (5.7)	.62 (8.9)	-5.42 (5.6)	.48 (8.0)	-6.28 (8.1)	.36 (7.2)	-5.76 (7.9)
5 Month Prior	.94 (8.5)	-6.69 (4.5)	.53 (6.6)	-4.11 (3.8)	.37 (6.2)	-4.90 (6.0)	.28 (4.7)	-5.29 (6.3)

[a]There were approximately 130 observations for each equation estimated, thus the following t-values are associated with the following significance levels: 2.36--.01; 1.64--.05; 1.29--.1.

Parameter Patterns Observed

The pattern of the magnitudes of the parameters reported in Table 2 is consistent with the relations derived from the break-even analysis. The parameters for both live cattle futures prices and cash corn prices become progressively larger (with only a few exceptions) as feeder cattle weight becomes lighter. This is consistent with the break-even analysis findings that a given change in live cattle or corn prices will have a greater impact on light than heavy weight feeder cattle prices. In fact, given that the feeder cattle contract weight spans both the 600-700 and 700-800 pound weight range it is reasonable to expect that for the current month basis any changes in live cattle or corn prices would have approximately the same effect upon cash feeder prices as upon the CME feeder cattle contract price. This is confirmed by the fact these four parameters (the current month 600-700 and 700-800 weight group parameters) have relatively small values and large standard errors, and thus are not significantly different form zero.

A parameter magnitude pattern also exists in Table 2 with respect to the basis period. This pattern is not as strong as the pattern associated with weight. In general the parameters increase as the months prior to the expiration increase. The pattern appears slightly stronger for heavy weight feeder cattle than light weight feeder cattle. The rationale for this pattern is not as clear as that for the parameter pattern with respect to weight. However it is the same pattern as found by Leuthold (1979) for live cattle. One exception to the general pattern is that the magnitude of the parameters for the 5-month prior basis are all smaller than those for the 4-month prior basis.

The relationship exhibited in Table 2 between parameter magnitudes and the basis period indicates that prior month basis become increasingly sensitive to live cattle and corn prices the more months prior to the contract expiration the basis is for. Leuthold (1979) contends in the case of live cattle that this is logical for a basis model designed to depict the impacts of shifts in supply upon basis. He argues the basis in the contract expiration month should become highly random because the cash and futures commodity become nearly interchangeable. However in months prior to the contract's expiration this does not necessarily hold. The same basic rationale follows for feeder cattle except that the two lighter weight groups of feeder cattle considered here can not be considered as identical commodities to the futures contract commodity even in the delivery month.

A technical explanation may exist for the relationship observed between parameter magnitude and basis period. The live cattle futures price being used in each equation is the contract associated with the expected slaughter date of the feeder cattle being hedged. For example, if a group of 700-800 pound feeder cattle were hedged for sale in June with the August contract, a 2-month prior basis would be used. The live cattle futures contract used would be the December contract since this is the live cattle contract closest to the expected eventual slaughter date of the feeder cattle in question. However this is not the live cattle contract closest to the expected slaughter date of the cattle specified in the August feeder cattle contract (600-800 pound cattle). Their expected slaughter date would be later and the closest live cattle contract would be the February contract in the following year. Thus the live cattle futures price in the basis model would be expected to exert a stronger influence upon the cash price versus the futures price in the basis. Such a bias would tend to reinforce the magnitude of the parameters estimated. However if this were the case several of the prior month basis should not show this bias. These would include basis for weights of feeder cattle expected to be sold at a weight the same as the contract weight specification (i.e. 600-800 pounds). Specifically they would be the 1-month prior 600-700 pound basis, the 2-month prior 500-600 pound basis, and the 3-month prior 400-500 pound basis. Review of the parameters for these basis does not appear to show any deviation from the general pattern. Thus it would appear that Leuthold's logic explaining why the basis parameters increase for prior month contracts may be as good as any. More research regarding this relationship would appear warranted.

The reason the parameter magnitudes decline for the 5-month prior basis is likely due to this period reaching beyond the typical feeding length for slaughter cattle production. Thus no actual production decisions involving the futures price and cash prices present in the basis would actually ever be made.

Coefficient of Determination (R^2) Patterns

The coefficients of determination derived for the twenty four models estimated also display a distinct pattern. This pattern is consistent with insights gained from the break-even analysis discussion presented earlier. The R^2 values of the twenty four equations estimated are reported in Table 3.

Table 3. Estimated Coefficients of Determination (R^2) of the Basis Equations

Basis Period	Feeder Cattle Weights			
	400-500	500-600	600-700	700-800
Current Month	.72	.75	.48	.29
1-Month Prior	.67	.69	.56	.46
2-Month Prior	.64	.69	.53	.36
3-Month Prior	.58	.61	.50	.42
4-Month Prior	.65	.71	.58	.51
5-Month Prior	.66	.68	.51	.47

The magnitude pattern displayed by the R^2 values is similar to the pattern displayed by the parameters, but is less consistent. The R^2 values tend to rise as the feeder cattle weight declines. However the largest R^2 values in every case are for the 500-600 pound feeder cattle weight class. Consistent with previous discussion is the fact that the weakest R^2 value is for the 700-800 pound basis in the contract expiration month. The R^2 value for the 600-700 pound basis in the contract expiration month is also relatively weak. Both of these R^2 values were expected to be weak since the cash market commodity in this case is basically the same as the futures market commodity.

No clear pattern appears to exist between the set of R^2 values and the number of months prior to the contract expiration month the basis is for. The highest degree of explanatory power found for any of the basis equations was for the current month basis for 400-500 and 500-600 pound feeders.

Basis Volatility Patterns

Table 4 shows the standard deviations of the basis by weight and months prior to contract expiration. Two patterns appear to exist in the table. First basis volatility consistently increases as weight declines. This pattern is perhaps the strongest for the current month basis. However it holds across basis periods with the exception of the 2-month prior basis where the 600-700 pound basis volatility is slightly less than the 700-800 pound volatility. The second pattern observed is that basis volatility for the 600-700 and 700-800 pound feeders gradually increase the more months prior to the contract expiration the basis is for. This pattern is however not noticeably present for the 400-500 and 500-600 pound feeder cattle basis.

Table 4. Basis Volatilities as Measured by Their Standard Deviations

Basis Period	Feeder Cattle Weights			
	400-500	500-600	600-700	700-800
Current Month	4.28	2.51	1.36	1.08
1-Month Prior	4.39	2.54	1.62	1.42
2-Month Prior	4.19	2.46	1.67	1.73
3-Month Prior	4.09	2.63	2.07	1.89
4-Month Prior	4.35	2.95	2.36	2.16
5-Month Prior	4.52	2.81	2.16	2.20

Given the feeder cattle contract specifications, it is logical that the least volatile basis would be for current month 600-700 and 700-800 pound feeder. As argued before, at these weights and during the contract delivery month the cash commodity and futures contract commodity are nearly identical, thus their prices should move together and be influenced by a similar set of factors. The increase in basis volatility as weight declines follows from the relationships developed in the break-even analysis and is confirmed by the parameter magnitude patterns reported in Table 2, i.e. given changes in live cattle futures prices and corn prices influence the price of light weight feeder cattle more than they do heavy weight feeder cattle. Thus the basis between light feeder cattle prices and the futures contract price for 600-800 pound cattle will be more volatile than the basis between heavier weight feeder of similar weight to the futures contract specifications.

Intuitively one would expect a prior month basis to be subject to more volatility that a current month basis. Given the increased time between sales and the futures contract month that exist with prior month basis, one would expect more opportunity for combinations of market adjustments to occur which would differentially affect the cash price and futures price in question, thus causing the prior month basis in question to be more volatile. Thus it is surprising to note in Table 4 that the degree of increased basis volatility is small as the basis period is extended, especially for light weight feeders. The implication of this fact is that using a one, two or even three month prior basis to hedge cattle does not increase basis risk that much when light weight cattle are being hedged. Thus producers should feel free when hedging light weight cattle to pick the most favorable basis among the current and prior month basis irrespective of when they expect to sell their cattle since their basis risk will be approximately the same.

Conclusions and Summary

The contention that no systematic intertemporal basis pattern exists for non-storable commodities would appear to be untrue. Livestock, specifically feeder cattle, may not be technically storable. But there is a definable economic relationship between a feeder animals value at one point in time versus another, just as there is for stored grain. Granted, grain does not significantly change in physical form over time, thus the intertemporal prices relationship for grain is perhaps simpler. Feeder cattle do change form over time, but the nature of that change in form is highly predictable, thus the price of a given animal at one point in time is related to its price at another and is predictable when the change in form as well as the passage of time are both considered. This predictability follows from the theory of derived demand.

This study found that statistically significant intertemporal relationships between the cash minus futures price basis for feeder cattle and live cattle futures prices and corn prices. Live cattle and corn price changes have a significantly larger impact upon the cash/futures price basis for light weight feeder cattle than they do for heavier weight feeder cattle. Futhermore, the impact of live cattle futures prices and corn prices upon "prior" month cash minus futures price basis became greater the longer the time period by which the feeder cattle cash price preceded the futures price contract month. The volatility of the basis for light weight cattle (as measured by the standard deviation of the cash minus futures price basis) was greater for light weight cattle than heavy weight cattle. However, the volatility of prior month basis was not greatly different than for current month basis, especially for light weight feeder cattle.

Footnotes

[1]Variation in the basis over the last four years is of particular interest since a new feeder cattle contract was specified in September of 1986, or approximately four years ago.

[2]By the same rationale interest rates would have an influence upon the

relationship between live cattle futures prices and cash feeder cattle prices. However the impact of interest rates would be much smaller than that of feed. Because of this interest rates have not been considered in this study.

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