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Basis Variability on the Feeder Cattle Contract Versus the Failed Stocker Contract

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Summary

Basis variability was compared in 10 markets for 550 and 750 pound steers using the Chicago Mercantile Exchange (CME) stocker and feeder indexes as a proxy for futures prices. Basis variability for 550 pound steers was significantly greater than basis variability for 750 pound steers. As market volume decreased and as volume variability increased, basis variability also increased. The failed CME stocker contract never attracted enough volume to remain a viable contract. One possible explanation for this contract failure is the basis risk associated with it was large enough to discourage producers from using the contract to hedge calves.

Introduction

The Chicago Mercantile Exchange (CME) first introduced a feeder cattle contract in 1971. It was a deliverable contract for 600-800 lb steers. On Sept. 1, 1986, the contract changed to a cash-settled contract using the U.S. Feeder Steer Price for a settlement. Beginning Jan. 1, 1993 the settlement price was changed to the CME Composite Weighted Average Price for feeder steers. This index had a different regionally and volume-weighted scheme and the weight range was narrowed to 700-800 pounds. In November 1998, the CME introduced a new cash settled stocker contract for 500-600 pound steers. The weight range for feeder cattle was also increased to 700-849 pounds. Each of these changes was designed to reduce hedging risk by reducing basis variability, and thus, to improve the ability of

producers to hedge feeder cattle and stocker cattle.

Feeder cattle prices, and hence basis, varies with cattle type, lot characteristics and location. Producers need to consider these factors when estimating their basis. However, there still remains variability in prices due to volume, or more likely lack of volume, in a particular weight class or in some cases for an entire market. The volume of stocker cattle being traded is quite seasonal in most markets. Feeder cattle volume may also fluctuate seasonally, but generally will not be as extreme as stocker volume. The overall objective of this paper is to analyze stocker and feeder cattle basis variability as a function of the volume of stocker or feeder cattle being sold. Specific objectives are: 1) to compare basis variability across markets, over time, and between stocker (550 lb) and feeder (750 lb) cattle; and 2) to analyze basis variability as a function of market volume and price level.

Procedure

Feeder cattle auction market price and volume data were obtained from January 1993 until September 2001 from the CME for the following markets: Ada, OK; Billings, MT; Clovis, NM; Dodge City, KS; Kearney, NE; La Junta, CO; St. Joseph, MO; Torrington, WY; Vienna, MO; and West Fargo, ND. These auctions contribute to the CME stocker and feeder indexes, occur on Wednesday, and represent a broad range of overall auction volume. Weekly basis was determined for each weight category and market by subtracting the CME stocker index and feeder index from the market price for 500-600 and 700-800 lb steers, respectively.

Basis variability was compared across markets and within markets between the two weight classes. The mean and standard deviation of volume for each market and weight class also were determined. As volume varies considerably throughout the year for some markets and weight classes, the mean and standard deviation of volume were determined on a quarterly basis in addition to the overall mean and standard deviation.

A 10-week rolling average for basis and volume in each market and weight class and the corresponding standard deviation for basis and volume were calculated. The following equation was then estimated for each market and for each weight class using Ordinary Least Squares regression:

$$SDBasis_{ij} = \beta_0 + \beta_1 Cash_{ij} + \beta_2 Volume_{ij} + \beta_3 SDVolume_{ij} + \beta_4 SDWeight + \beta_5 Contract + \varepsilon$$

Where $SDBasis_{ij}$ is the 10-week standard deviation of basis;

Cash is the 10-week rolling average cash price;

Volume is the 10-week rolling average number of head sold;

SDVolume is the 10-week standard deviation of volume;

SDWeight is the 10-week standard deviation of the average weight;

Contract is a 0/1 dummy equal to 1 if the week is in a contract month;

I is the market (Ada, Billings, Clovis, Dodge City, Kearney, La Junta, St. Joseph, Torrington, Vienna, and West Fargo); and

j is the weight class (500-599 and 700-799 lb).

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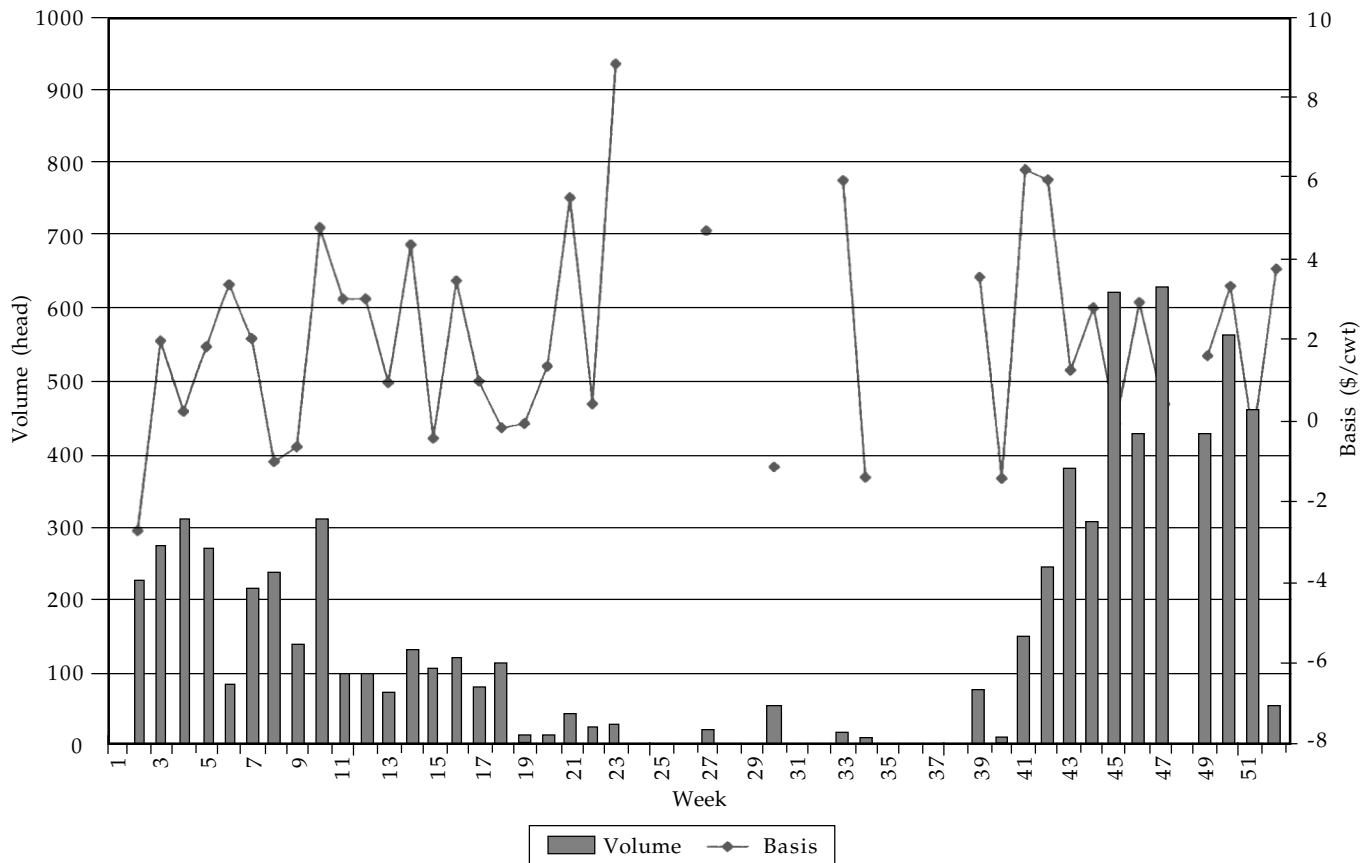


Figure 1. Weekly stocker basis and weekly volume for one market and year.

Results

Samples of the data for one year and one specific market are displayed in Figures 1 and 2. It is apparent that volume varies seasonally for both stocker and feeder cattle and that there is considerable variability in basis week to week. Plots of each market and year would show similarities and differences. The similarities are variability in volume and basis, and differences are in the magnitudes of the variability and the seasonal patterns.

Summary statistics on basis and volume for each market for stocker and feeder cattle are presented in Table 1. In all 10 markets, stocker basis variability exceeded feeder basis variability ($P < 0.05$). There is more risk to producers who hedge stocker cattle than to producers who hedge feeder cattle. Basis variability also differed significantly

Table 1. Basis and volume mean and standard deviation (bottom number) for stocker and feeder cattle in ten different markets from Jan. 1993 to Sep. 2001.

Market	Stocker		Feeder	
	Basis (\$/cwt.)	Volume (head)	Basis (\$/cwt.)	Volume (head)
Ada, OK	-0.99	136.27	-0.94	41.17
	3.2487 ^{ef}	73.3676	2.1291 ^{bc}	38.1525
Billings, MT	0.54	76.01	-0.95	42.86
	3.6607 ^g	90.6556	2.3073 ^{cd}	54.1965
Clovis, NM	-1.98	55.91	-3.01	68.45
	3.5674 ^{fg}	47.6163	2.4311 ^d	72.7774
Dodge City, KS	-0.73	122.76	0.27	122.76
	3.3424 ^{efg}	117.0532	1.6609 ^a	117.0532
Kearney, NE	2.99	180.53	1.98	374.76
	3.4671 ^{fg}	179.3316	1.6382 ^a	317.9758
La Junta, CO	1.39	223.04	-0.69	200.45
	4.1110 ^h	220.7821	2.3391 ^{cd}	192.8533
St Joseph, MO	-0.16	154.42	0.61	207.08
	4.1148 ^h	158.9697	1.9363 ^b	158.4756
Torrington, WY	3.90	396.50	1.58	451.02
	3.1142 ^e	309.7550	2.0775 ^b	315.3478
Vienna, MO	-2.05	56.61	-1.35	22.75
	3.5661 ^{fg}	40.2587	2.4287 ^d	29.6083
W Fargo, ND	-0.19	97.51	0.29	227.14
	3.2935 ^{ef}	106.2327	2.0635 ^b	231.0242

Note: Increasing superscripts (a-h) denotes that basis variability is significantly greater at the 0.05 level of confidence.

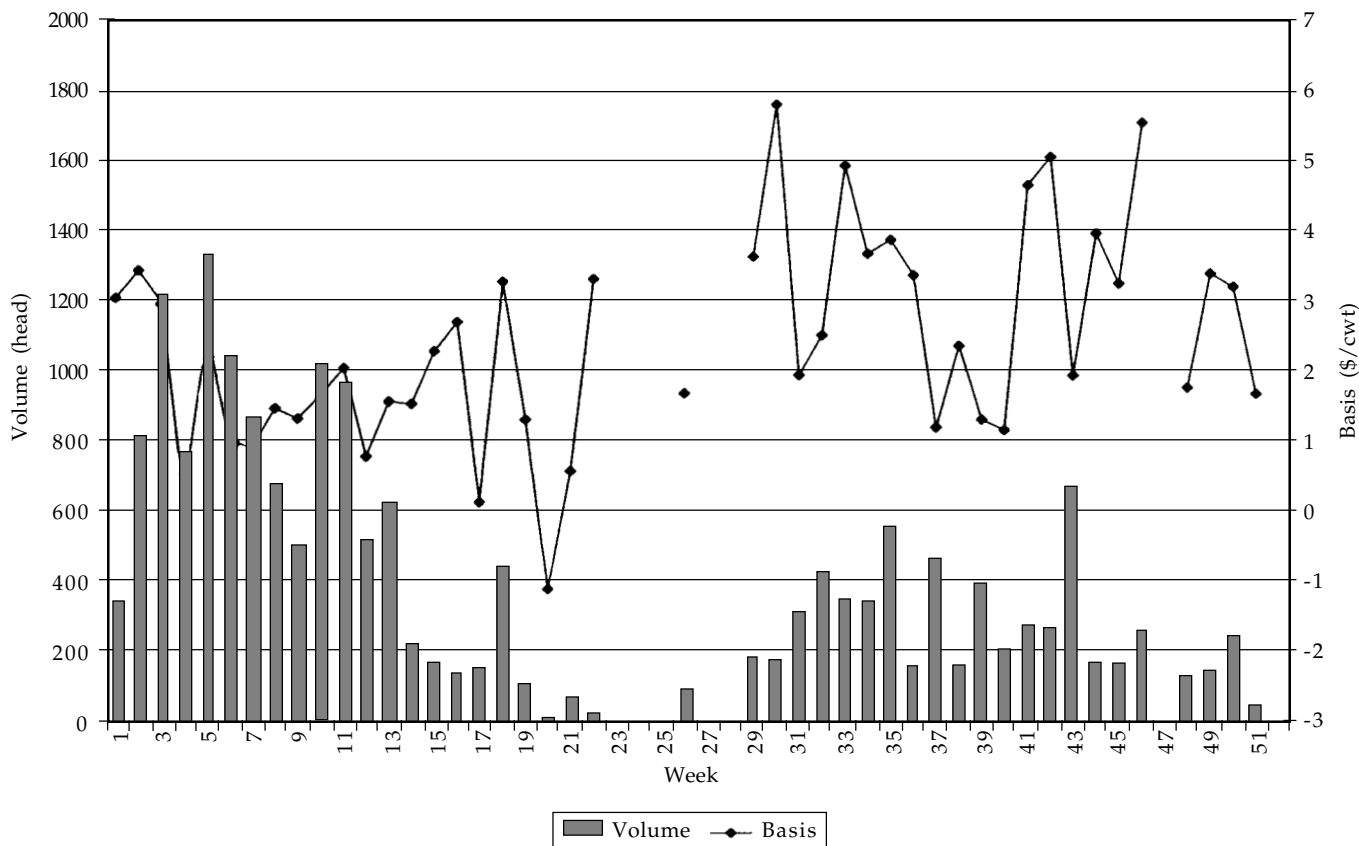


Figure 2. Weekly feeder basis and weekly volume for one market and year.

across markets. Dodge City, KS and Kearney, NE had the least amount of basis variability for feeder cattle. Clovis, NM and Vienna, MO had the greatest amount of basis variability for feeder cattle. However, feeder basis variability in these two markets is still significantly less than stocker basis variability in Torrington, WY, the least variable stocker market. La Junta, CO and St. Joseph, MO, have the greatest amount of stocker basis variability.

Torrington, WY, had the largest average stocker volume which may explain the reduction in basis variability, but this market also has the greatest variability in stocker volume. The two stocker markets with the smallest average weekly volume, Clovis and Vienna, had basis variability in the mid range of all 10 markets. Basis variability for the feeder markets also appears to

be related to the level of volume. Clovis and Vienna are two of the smaller markets and they had the greatest feeder basis variability. Kearney is one of the larger markets with the smallest feeder basis variability.

Results of the regression equation to explain basis variability are displayed in Table 2 for stocker cattle and Table 3 for feeder cattle. The adjusted R² values ranged from 0.13 to 0.36 for stocker cattle and from 0.09 to 0.34 for feeder cattle.

The cash variable was significant and positive in nine out of 10 markets for stocker cattle. The implication is that as the cash market level increases, basis variability increases. Volume was significant and negative in eight markets and standard deviation of volume was significant and positive in seven stocker markets. This would substantiate our hypothesis that as the

level of volume increases, basis variability decreases but as volume variability increases, basis variability also increases. Increases in weight variability led to a significant increase in basis variability in seven markets, as we hypothesized. Basis variability decreased significantly for a stocker contract month in only two markets. Basis variability actually increased significantly for a contract month for one market. The implications are that the effect of contract month on stocker basis variability is inconclusive.

Feeder cattle basis variability increased significantly with a higher cash price level in eight of ten feeder cattle markets. An increase in volume decreased basis variability in six markets while an increase in volume variability only significantly increased basis variability in half of the markets. Basis

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Table 2. Results of regression of selected independent variables on the standard deviation of basis against the CME stocker contract for ten different markets. Standard errors of the estimated coefficients are in parentheses.

	Ada	Billings	Clovis	Dodge City	Kearney	La Junta	St Joseph	Torrington	Vienna	W Fargo
Intercept	-0.717 (0.3860)	1.990* (0.5827)	1.055* (0.4290)	0.275 (0.4627)	-0.195 (0.4342)	0.122 (0.7989)	3.116* (0.7594)	-1.704* (0.4695)	0.236 (0.3101)	0.884* (0.4124)
Cash	0.029* (0.0032)	0.010* (0.0052)	0.023* (0.0039)	0.019* (0.0040)	0.036* (0.0039)	0.028* (0.0070)	0.001 (0.0077)	0.053* (0.0045)	0.028* (0.0028)	0.018* (0.0043)
Volume	-0.000 (0.0010)	-0.016* (0.0037)	-0.009* (0.0041)	-0.008* (0.0023)	-0.004* (0.0009)	-0.006* (0.0015)	-0.002 (0.0024)	-0.003* (0.0006)	-0.016* (0.0038)	-0.004* (0.0014)
SDVolume	0.001 (0.0026)	0.011* (0.0042)	-0.006 (0.0041)	0.007* (0.0022)	0.003* (0.0013)	0.005* (0.0018)	-0.005* (0.0031)	0.002* (0.0008)	0.008* (0.0030)	0.009* (0.0018)
SDWeight	0.030* (0.0148)	0.033* (0.0099)	0.054* (0.0115)	0.074* (0.0121)	0.013 (0.0081)	0.043* (0.0179)	0.049 (0.0260)	-0.017 (0.0092)	0.057* (0.0106)	0.022* (0.0079)
Contract	0.080 (0.0790)	-0.048 (0.1653)	0.148 (0.1275)	0.225 (0.1518)	-0.468* (0.1745)	0.938* (0.2812)	-0.232 (0.3339)	0.267 (0.1688)	0.098 (0.0755)	-0.705 (0.1592)
Adj R ²	0.17	0.20	0.22	0.27	0.36	0.13	0.14	0.35	0.30	0.20

Note: An asterisk denotes the coefficient is significant at the 0.05 level.

Table 3. Results of regression of selected independent variables on the standard deviation of basis against the CME feeder contract for ten different markets. Standard errors of the estimated coefficients are in parentheses.

	Ada	Billings	Clovis	Dodge City	Kearney	La Junta	St Joseph	Torrington	Vienna	W Fargo
Intercept	1.178* (0.2600)	-1.973* (0.3982)	0.562* (0.2484)	0.551* (0.2435)	0.451* (0.2170)	3.124* (0.3552)	0.378 (0.3252)	1.816* (0.4386)	-0.614 (.3279)	-0.613* (0.2638)
Cash	0.008* (0.0029)	0.044* (0.0050)	0.014* (0.0033)	0.012* (0.0029)	0.007* (0.0027)	-0.012* (0.0043)	0.013* (0.0034)	0.006 (0.0045)	0.029* (0.0040)	0.028* (0.0030)
Volume	-0.013* (0.0027)	-0.008* (0.0035)	-0.004* (0.0015)	0.001 (0.0008)	-0.001* (0.0002)	-0.003* (0.0008)	-0.001 (0.0006)	-0.002* (0.0002)	0.003 (0.0060)	-0.000 (0.0004)
SDVolume	0.015* (0.0026)	0.007* (0.0026)	0.004* (0.0017)	-0.003* (0.0010)	0.002* (0.0004)	0.000 (0.0010)	-0.002* (0.0008)	0.001* (0.0004)	-0.002 (0.0042)	-0.000 (0.0006)
SDWeight	-0.004 (0.0042)	0.022* (0.0047)	0.025* (0.0050)	0.004 (0.0066)	0.030* (0.0045)	0.016* (0.0046)	0.036* (0.0065)	-0.005 (0.0059)	0.016* (0.0042)	0.022* (0.0041)
Contract	0.025 (0.0545)	-0.053 (0.1011)	-0.246* (0.0609)	-0.110* (0.0551)	-0.337* (0.0520)	0.010 (0.0904)	0.021 (0.0659)	-0.107 (0.0916)	-0.005 (0.0756)	-0.236* (0.0616)
Adj R ²	0.09	0.22	0.17	0.09	0.34	0.19	0.31	0.15	0.12	0.33

Note: An asterisk denotes the coefficient is significant at the 0.05 level.

variability increased as weight variability increased in seven of the feeder cattle markets. Basis variability during feeder cattle contract months decreased in four of the markets.

Compared to stocker cattle, feeder cattle basis variability appears to be a little less sensitive to volume in some markets. This does not appear to be related to the size of the market.

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