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Factors Affecting Feeder Cattle Prices in Internet Sales

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Poster prepared for presentation at the Agricultural and Applied Economics Association's 2012 Meeting, Seattle, Washington, August 12-14, 2012.

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Background and Motivation for Work

Stakeholder Needs

- Management at Bluegrass Stockyards, LLC approached the author with questions about premiums for Age and Source Verification and Certified Natural.

Traditional Feeder Cattle Pricing Factors

- It has been readily accepted that corn and feeder cattle prices move opposite each other. However, anecdotal evidence suggests this may not always be the case (see chart below).
- Analysis of this relationship with recent data was requested.

Uniqueness of Internet Sale Data

- The uncertainty with respect to weight and other factors in internet sales provided an opportunity to estimate how price slides, shrink, and other factors impact feeder cattle prices.

Previous Work / Literature Review

Premiums for Age and Source Verification

- Surprisingly little work has been published on price benefits of age and source verification
- A 2007 Montana Study found a price benefit of less than \$13 per head for 600# feeder steers (Patterson et al., 2008)
- A late 2010 examination of Oklahoma feeder cattle auctions indicated no price benefit for age and source verification (Williams et al., 2012).

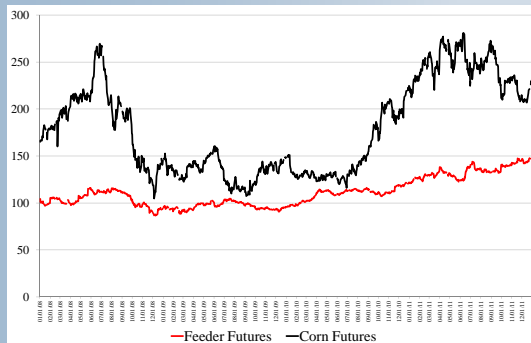
Traditional Feeder Cattle Pricing Factors

- Much past work has established a negative relationship between corn and feeder cattle prices (Buccola, 1980, Anderson and Trapp, 2000, Burdine, 2003, Eldridge, 2005).
- Some recent work cast doubt on this fundamental relationship (Shultz et al., 2010, Tejada and Goodwin, 2011).

Internet Sales and Pricing Factors

- A 2001 study of Superior Livestock Auctions found that price slides were narrow enough to create an incentive for consignors to underestimate weight (Brorsen et al., 2001)
- In those data, offering larger price slides would have improved prices.

Relationship Between Corn and Feeder Cattle Futures (2008 to 2011)



Sources of Data

Bluegrass Stockyards – data file and sale catalogs

- Electronic data files were made available by Bluegrass Stockyards, LLC – lot size, pay weight, final price
- Sale catalogs – electronic files were supplemented by manual data entry from paper sale catalogs – base weight, cattle type, price slide, shrink, location, etc.

Livestock Marketing Information Center

- Feeder cattle, live cattle and corn futures – data drawn from CME Group
- Estimated slaughter weight and average daily gain – database from KSU Focus on Feedlots Survey

Energy Information Administration

- Weekly historical diesel fuel prices

Methodology

- A hedonic model was employed to evaluate the relationship between pricing factors and actual feeder cattle prices
- Hedonic models are often used in the literature to estimate price impacts of feeder cattle traits and fundamental factors (Lawrence and Yeboah, 2002, Bulut and Lawrence, 2007, Shultz et al., 2010)
- Due to the presence of heteroskedasticity and autocorrelation, the following model was estimated using a robust estimator in SAS:

$$\text{Bid price} = B_0 + B_1 \text{ lot size} + B_2 \text{ lot size}^2 + B_3 \text{ base weight} + B_4 \text{ live futures} + B_5 \text{ corn futures} + B_6 \text{ diesel price} + B_7 \text{ heifer} + V_8 \text{ month} + V_9 \text{ location} + B_{10} \text{ slide1} + B_{11} \text{ imp} + V_{12} \text{ cattle type} + B_{13} \text{ mileweigh} + B_{14} \text{ shrink} + B_{15} \text{ PVP} + B_{16} \text{ Nat} + B_{17} \text{ PVPandNat} + B_{18} \text{ PVPxTime} + b_{19} \text{ time}$$

Where *lot size* refers to the number of head offered in the sale lot, *base weight* refers to the advertised weight in the sale catalog, *live futures* refers to the relevant live cattle futures price, *corn futures* refers to the nearby corn futures price, *diesel price* is the price of diesel fuel for that week, *heifer* is a binomial variable for heifers, V_8 month is series of binomial variables for each month excluding January, V_9 location is a series of binomial variables for each state in which cattle originated except Tennessee, *slide1* is the price slide on the first 50 lbs above the *baseweight*, *imp* is a binomial variable for cattle that have been implanted, V_{12} cattle type is a series of binomial variables for each cattle type except *Bbwf*, *mileweigh* is the number of miles the cattle were hauled to be weighed, *shrink* is the pencil shrink, *PVP* is a binomial variable for cattle selling as age and source verified only, *Nat* is a binomial variable for cattle selling certified natural only, *PVPandNat* is a binomial variable for cattle selling as both age and source verified and certified natural, *PVPxTime* is an interaction term between *PVP* and time, and *time* is a continuous variable accounting for days from the first internet sale in the dataset.



Photo from Jim Akers, CEO Bluegrass Stockyards, LLC

Abbreviated Regression Results (\$ per cwt)

Variable	Parameter Estimate	Standard Error
Intercept	20.312***	2.674
Lot size	0.019***	0.0044
Lot size ²	-0.000029***	0.0000090
Base weight	-0.025***	0.0014
Live Futures	1.116***	0.039
Corn Futures	-2.968***	0.273
Diesel Price	-0.756**	0.328
Heifer	-6.988***	0.272
Slide1	0.495***	0.185
Implant	0.394**	0.207
Mileweigh	-0.019**	0.0083
Shrink	0.111	0.117
PVP	1.354*	0.748
Natural	2.176***	0.623
PVPandNat	3.966***	0.717
PVPxTime	0.00102	0.0013
Time	0.00952***	0.00044
R2	91.92%	

Key Findings and Implications

- Moderate premiums found for age and source verification and natural - \$11 per head for age and source, \$17 per head for natural, \$32 per head for both
- Premiums within range of recent work
- Negative relationship between corn price and feeder cattle price found during a volatile period
- Some evidence to suggest a smaller magnitude than past work – heavier average weight of feeder cattle (800 lbs) and much higher average corn price (\$4.56)
- Incentive to underestimate weight (Brorsen et al., 2001) did not exist
- Actual price slide of \$0.025 per cwt compared to typical offered slide of \$4 per cwt suggests cattle bring more when base weight = actual weight

Selected Resources

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