FEEDER CATTLE PRICE DIFFERENTIALS IN GEORGIA TELEAUCTIONS

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Abstract

Three Georgia feeder cattle teleauction markets were analyzed from 1977 to 1988 to estimate the impacts of cattle characteristics and market conditions on prices. Cattle characteristic price impacts were similar to those in previous studies. The impact of feeder cattle futures price on teleauction price was positive but varied across markets. Optimal lot size ranged from 143 to 276 head. In one market, 14 lots were necessary to generate positive price impacts. Additional buyers were estimated to have a $.30/cwt per buyer impact on price.

Key words: feeder cattle, price analysis, teleauctions, electronic marketing

In recent years, increased attention has focused on empirically analyzing the factors that are important in feeder cattle price determination. In general, cattle and market characteristics have been analyzed as the primary influences on price (Buccola 1980, 1982; Schroeder et al.; Lambert et al.). Cattle characteristics have included weight, sex, breed, health treatments, frame, muscle, and fill. Market influences have included lot order in auction, futures prices, lot size, and market location (Schroeder et al.; Lambert et al.). Most feeder cattle price differential studies have utilized data from sale barn auctions. One exception was Mahoney's price analysis of Texas feeder cattle sold through a publicly funded, pilot electronic market program which was discontinued shortly after it began. Data from electronic markets over an extended number of years have not been utilized in a feeder cattle price differential study.

Electronic marketing is defined as "simultaneous trade negotiations among spatially separated buyers and sellers channelled into an interactive central market through electronic communication. Product movement occurs later. Neither traders nor products are physically assembled at a common location; products are sold by description rather than personal inspection by buyers" (Henderson, 1984 p. 1). Many studies (Bell et al.; Ethridge; Baum et al.; Russell and Purcell 1980, 1983; Henderson 1982; Holder; Kazmierczak et al.; Rhodus et al.) have been conducted to determine the benefits which accrue to buyers and sellers participating in electronic markets. Benefits vary depending on location, type of commodity and market structure, and electronic trading system used, but five benefits of electronic markets have been identified—improved market information, increased operational market efficiency, improved pricing accuracy, increased competition, and improved market accessibility for buyers and sellers.

Three methods of electronic marketing of agricultural products, which differ only in the type of communication and electronics used to handle information, are: telephone auctions (teleauctions), video auctions, and computerized marketing systems. In Georgia, three organizations have sponsored teleauctions throughout the 1980s. They all follow similar procedures. Information is gathered on each lot of calves offered for sale. Lot descriptions, provided by each organizer, include number of cattle, sex, estimated weight, location, breed or combination of breeds, shrink, health treatments, frame, and muscling. A prospectus is compiled on all available lots and sent to buyers who bid via a conference telephone network on the day of the teleauction. Descriptions of delivery conditions or allowances are often included on the prospectus, and transaction prices and the identity of buyers is recorded by the teleauction organizer.

Thus, a livestock teleauction is conducted based on information flows. Furthermore, the information on each lot of cattle is separated into its composite parts. This enables the analysis of price determination to focus on the value of each composite part. Since more information is required by teleauction buyers (since they do not see the cattle), teleauction price determination models may explain more of the deviation in cattle price than would regular sale barn price determination models.

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Table 1. Descriptive Data for Georgia Teleauction Organizations

	Teleauction Organization		
Characteristic	Georgia Farm Bureau	Red Carpet Cattlemen's Association	Mitchell Co. Cattlemen's Association
Beginning Date	03-22-79	05-06-76	03-23-78
Ending Date	10-12-88	11-15-88	03-02-88
Years in Study	10	13	11
Number of Teleauctions	71	41	17
Average Number of Teleauctions Per Year	7.10	3.15	1.54
Number of Lots	631	609	140
Average Lots Per Teleauction	8.88	14.85	8.23
Total Head	45,497	30,003	21,108
Average Head Per Teleauction	641	732	1242
Average Head Per Lot	72	49	151
Number of Steers	28,706	20,051	15,118
Number of Heifers	16.791	9,952	5,990
Maximum Head Per Lot	286	236	550
Minimum Head Per Lot	8	4	24
Number of Buyers	90	59	30
Number of Sellers	130	116	31
Average Commission Per Head	$6	$5	$4

The purpose of this study was to identify various factors that influence feeder cattle price differentials in teleauction markets in Georgia. Three different teleauction organizations were included in the study, covering the years 1976 to 1988. Afterward, teleauction results from this study were compared to some previous sale barn price determination studies.

DATA AND PRICE DETERMINATION MODEL

Three organizations conduct teleauctions in Georgia, each within different sections of the state: Red Carpet Cattlemen's Association (RC) in northwest Georgia, Mitchell County Cattlemen's Association (MCCA) in southwest Georgia, and Georgia Farm Bureau (GFB) throughout the state of Georgia (Table 1). Primary data were collected from the three separate teleauction organizers. Secondary data included local auction data collected by the United States Department of Agriculture and futures data from the Chicago Board of Trade and the Chicago Mercantile Exchange as reported in the *Wall Street Journal.*

Recent research on feeder cattle price discovery has followed Buccola (1980) and modeled feeder cattle prices as a function of cattle characteristics and market forces (Schroeder et al.; Lambert et al.). The rationale behind this approach is well documented in Schroeder et al. and recognizes that price reflects the demand for a lot of cattle given the available supply. The price (P) of a lot of cattle (i) at time (t) is related to cattle and lot characteristics (C) and market forces (M) through the functional form:

$$(1)\quad P_{it} = \sum_{k} V_{ikt} C_{ikt} + \sum_{h} R_{ht} M_{ht}$$

where P, C, M, i, and t are defined as above, and k and h represent specific cattle and lot traits, and market influences, respectively. The coefficients V and R represent the value of the trait and the price impact of the market force, respectively. Equation 1 can be used to estimate the marginal implicit values of lot characteristics (Ladd and Martin) and market forces (Mintert et al.).

Cattle and lot characteristics and market influences previously investigated include weight, sex, breed, head per lot, market location (Schwab; Schwab and Rister; Schwab et al.; Schroeder et al.; Lambert et al.; Mintert et al.); weight-squared, head-squared (Menzie et al.; Faminow and Gum; Davis et al.; Schroeder et al.; Lambert et al.; Mintert et al.); muscling, finish, body size, defects, lot uniformity (Sullivan and Linton; Schroeder et al.; Lambert et al.; Mintert et al.); animal appearance (Folwell and Rehberg; Schroeder et al.; Lambert et al.); seasonal factors (Madsen and Liu; Schroeder et al.; Mintert et al.); time of sale (Buccola, 1982; Schroeder et al.; Lambert et al.; Mintert et al.); and feeder cattle futures (Schroeder et al.). Other important factors that could influence price in a teleauction include delivery conditions, input prices, nearby cattle prices, and supply and competitive pressure in the auction. If time series data over a long period were used to estimate V and R of equation 1, then inclusion of a trend variable to account for inflation would be appropriate.

Thus, a general model of teleauction feeder cattle prices was developed. This general model was then used to derive unique models for each teleauction organization depending on the available data. The general model specified was as follows:

(2) $P = f(S_j, FR_j, MSC_j, FL_j, SEX, HEAD, LOTNO, TREND, H_j, B_j, SHR, HAUL, CUTBACK, FCF, CF, BAP, TOTLOT, TOTBUY)$,

where variables are as defined in Table 2. SHR, HAUL, and CUTBACK reflect delivery conditions. SHR and CUTBACK are allowances from the seller to the buyer with respect to shrinkage and culling at shipment and were measured as intercept shifters (0, 1 dummy variables). Though percentage pencil shrink allowed can vary, more than 99 percent of the lots in this study where shrink was allowed (which was 70 percent of the total lots) allowed 2 or 3 percent shrink. Thus, an intercept shifter for shrink was appropriate. HAUL is a description of whether the cattle are to be hauled off the farm to a pick-up point. CF represents the nearby corn futures contract price on the day of the teleauction and is a proxy for an input price. The total number of lots in a particular teleauction (TOTLOT) represents supply, while TOTBUY (the number of different buyers) is a proxy for competitive pressure. The relationships between P and HEAD and P and TOTLOT were hypothesized to be curvilinear, thus necessitating squared terms for both HEAD and TOTLOT in Equation 2. The justification for using quadratic terms for HEAD and TOTLOT relate to investigating optimal lot sizes (HEAD) and number of lots (TOTLOT) in a teleauction. It could be expected that buyers prefer larger lots until some maximum is reached. Furthermore, Schroeder et al., Lambert et al., and Mintert et al. found that a quadratic approach to estimating the impact of lot size was effective. Likewise, some minimum number of lots in a teleauction might exist, before which price decreases, and after which price increases, *ceteris paribus*. The logic behind the investigation for a minimum number of lots in a teleauction is based on the attraction of more buyers as the number of lots for sale increases. In other words, there may be a minimum number of lots necessary to attract enough buyers to have a positive impact on price. The other independent variables and specifications were chosen because they are consistent with economic theory and have been used in previous feeder cattle price determination studies (Lambert et al.; Schroeder et al.). Ordinary least squares was used to estimate the model for each teleauction organization.

The bid prices in Georgia feeder cattle teleauctions were based on written information concerning cattle, lot, and delivery characteristics along with external and internal market conditions. These factors were used to estimate price determination models for feeder cattle over an extended time period. When estimating price determination models, the differences between teleauction organizers becomes apparent. Information was most complete in the GFB auction. The RC teleauction lacked information on certain cattle characteristics and the total number of buyers in each auction (TOTBUY), while information on the total lots in an auction (TOTLOT) and health treatments was deleted from the MCCA model due to multicollinearity problems.

RESULTS

The results are presented as follows. First, parameter estimates from the price determination models are discussed, then the results are compared to other price differential studies. Teleauction price models for sponsoring organizations are addressed individually (Table 3).

The Georgia Farm Bureau Model

The Georgia Farm Bureau (GFB) model explained approximately 88 percent of the variation in teleauction price. The base lot for reference was a medium frame, medium flesh, muscle grade 2 lot of heifers, containing less than 50 percent of any one breed, with no health treatments specified, with an estimated weight of 500-599 lbs., sold in the summer.

All of the included seasonal variables (S_j) were significant at the 0.01 level with the greatest price effect (-\$3.45/cwt.) being in the fall. The least price effect occurred in the spring (-\$2.48/cwt.). Since the seasonal variables were negative, they indicated that summer, followed by spring, was the high-price time for a producer (seller) to market cattle, *ceteris paribus*. One of the frame variables, small (FR_3), had a significant negative effect (0.01 level) on price (-\$6.44/cwt.), while the large and medium frame (FR_1)variable had no significant impact on price. This result implies that medium frame cattle were

Table 2. Variable Definitions for Feeder Cattle Price Determination Model

Variable	Definition	Measurement
P	Teleauction price for a particular lot	($/cwt.)
S_j	Season where j = 1 if winter (January-March) = 2 if spring (April-June) = 3 if summer (July-September) = 4 if fall (October-December)	1 if j 0 otherwise
FR_j	Frame where j = 1 if medium and large = 2 if medium = 3 if small	1 if j 0 otherwise
MSC	Muscle	1 if Grade 1 0 otherwise
FL_j	Flesh where j = 1 if heavy = 2 if medium = 3 if light	1 if j 0 otherwise
EW_j	Weight where j = 1 if 200-299 lbs. = 2 if 300-399 lbs. = 3 if 400-499 lbs. = 4 if 500-599 lbs. = 5 if > 600 lbs.	1 if j
SEX	Sex	1 if steers 0 if heifers
HEAD	Number of cattle in lot	Actual number
HEAD2	Number of cattle in lot squared	Actual number
LOTNO	Order of the lot in the teleauction	Ascending
TREND	1, ... , N where N = number of auctions in data set	Actual number
H_j	Health Treatment where j = 1 if cattle were dewormed = 2 if cattle were treated for external parasites = 3 if cattle were given a growth stimulant = 4 if cattle were treated for a specific disease = 5 if cattle were dehorned, tattooed, etc. = 6 if cattle were weaned = 7 if cattle were described as preconditioned; common interpretation includes multiple health treatments and feed management practices.	1 if j 0 if otherwise
B_j	Breed where j = 1 if Hereford or Hereford dominant cross = 2 if Angus or Angus dominant cross = 3 if Brahman or Brahman dominant cross = 4 if Exotic or Exotic dominant cross = 5 if Dairy = 6 if Mixed	1 if j is greater than 50% of lot 0 if otherwise
SHR	Shrinkage allowed	1 if shrink allowed 0 otherwise
HAUL	Cattle were to be hauled to pick-up point	1 if cattle hauled off farm 0 otherwise
CUTBACK	Buyer has right to cull specified percentage of cattle at shipping	1 if cutback allowed 0 otherwise
FCF	Closing feeder cattle futures price for the nearby contract on the day the teleauction occurred	$/cwt.
CF	Closing corn futures price for the nearby contract on the day the teleauction occurred	$/bu.
BAP	Nearby sale barn price for similar cattle, day before the teleauction occurred	$/cwt.
TOTLOT	Total number of lots in the teleauction	Actual number
TOTLOT2	TOTLOT squared	Actual number
TOTBUY	Total number of different buyers in the teleauction.	Actual number

Table 3. Parameter Estimates for Georgia Feeder Cattle Teleauction Price Determination Models

Independent Variables	Parameter Estimates (t-values)		
	Sponsoring Organization		
	Georgia Farm Bureau	Red Carpet	Mitchell County
	$/cwt		
Intercept	-13.9519	-4.2721	-20.3930
	(-4.444**)	(-1.952**)	(-2.128*)
S_1 (Winter)	-3.1847	-0.0438	-0.6669
	(-5.592***)	(-0.063)	(-0.784)
S_2 (Spring)	-2.4812	0.3002	
	(-4.210***)	(0.446)	
S_4 (Fall)	-3.4516	1.0747	
	(-5.803***)	(1.737*)	
FR_1 (Med. & Large)	-0.4992		-0.0514
	(-1.332)		(-0.067)
FR_3 (Small)	-6.4481		
	(-3.811***)		
MSC_1 (Heavy)	0.3714		2.7701
	(0.251)		(2.887***)
FL_1 (Heavy)	-1.5517		
	(-0.428)		
FL_3 (Light)	0.6102		
	(1.459)		
EW_1 (200-299)	2.9431		
	(1.118)		
EW_2 (300-399)	5.4859	-0.2290	
	(5.093***)	(-0.225)	
EW_3 (400-499)	1.8461	1.2506	-9.4644
	(3.341***)	(2.561***)	(-4.779***)
EW_5 (600-699)	-2.6241	-2.6161	-0.8974
	(-5.967***)	(-6.548***)	(-1.497)
SEX (Steers)	6.8047	4.4876	4.8299
	(20.375)	(9.789***)	(6.500***)
HEAD	0.0545	0.0358	0.0132
	(4.370***)	(2.469***)	(2.165**)
HEAD2	-0.00019	-0.00009	-0.000024
	(-3.851***)	(-1.097)	(-2.043**)
LOTNO	-0.1048	-0.0616	0.0824
	(-3.152***)	(-2.546***)	(1.549)
TREND	0.0653	0.0205	0.4352
	(4.522***)	(0.692)	(2.904***)
H_1 (dewormed)	0.0714	-0.7252	
	(0.200)	(-1.074)	
H_2 (parasites)	-0.1572	1.0259	
	(-0.426)	(1.236)	
H_3 (growth stim.)	-0.3496	-0.3199	
	(-0.965)	(-0.555)	
H_4 (diseases)	0.4548	1.7816	
	(0.804)	(3.743***)	
H_5 (dehorned, etc.)	1.1033	-0.8032	
	(1.216)	(-0.344)	
H_6 (weaned)	-0.4896	-0.0419	
	(-0.718)	(-0.070)	
H_7 (preconditioned)	1.4397	1.9209	
	(1.481)	(2.635***)	
B_1 (Hereford)	0.1850	0.03614	0.6758
	(0.381)	(0.071)	(1.073)
B_2 (Angus)	0.6514	0.4234	-0.0164
	(1.772*)	(1.057)	(-0.033)
B_3 (Brahman)	-0.0423	0.9791	-1.1205
	(-0.063)	(1.365)	(-1.644*)
B_4 (Exotic)	-0.2740	0.5661	-3.0080
	(-0.530)	(1.091)	(-3.641***)
B_5 (Dairy)	-10.6781		0.0393
	(-6.230***)		(0.074)
B_6 (mixed)	0.8860	0.3154	0.4985
	(1.378)	(0.600)	(0.253)
SHR	1.0826	-0.0977	2.3092
	(1.048)	(-0.271)	(2.156**)
HAUL	-0.4991		
	(-0.352)		
CUTBACK	-0.2584	1.9357	0.8584
	(-0.732)	(1.148)	(1.278)
FCF	1.0119	0.6820	0.8556
	(35.435***)	(15.629***)	(14.958***)
CF	-0.8713	-1.4313	-1.2058
	(-2.580**)	(-4.181***)	(-1.078)
BAP	0.0544	0.3542	0.1995
	(3.371***)	(7.980***)	(2.651***)
TOTLOT	-0.3504	0.0744	
	(-3.573***)	(0.802)	
TOTLOT2	0.01248	-0.0033	
	4.454***	(-1.480)	
TOTBUY	0.0366		0.5787
	(2.387**)		(0.980)

Summary Statistics			
R^2	0.8915	0.8999	0.9790
Adj. R^2	0.8842	0.8946	0.9725
F-value	122.214***	169.934***	150.994***
Dependent Mean	63.5955	60.9886	67.2107
N	619	597	89

* = significant at the .10 level.
** = significant at the .05 level.
*** = significant at the .01 level.

preferred in the GFB teleauction. The muscle variable (MSC) was not significant at the 0.10 level. Neither of the flesh variables (FL_j) had a significant (0.10 level) effect on price. The base flesh category was medium. Of the estimated weight variables (EW_j) tested, three were significant (0.01 level) relative to the base category of 500-599 lbs. The light weights had a positive influence on price while the heaviest weight had a -$2.62/cwt. effect on price. The steer (SEX) variable was significant at the 0.01 level. Steers brought a premium of $6.80/cwt. over heifers. HEAD and HEAD2 were significant at the 0.01 level. Indications are that GFB teleauction price reaches a maximum at a lot size of about 143 head, *ceteris paribus*. However, the effect of LOTNO indicated a discount of -$0.10/cwt. and was significant at the 0.01 level. LOTNO is an important variable in this model because of the general hypothesis of downward trending prices in auctions (Buccola). This hypothesis was confirmed because as lot number increased by one, teleauction price decreased by 10 cents per hundredweight. The trend variable was significant at the 0.01 level and indicated a positive trend over time of $0.06/cwt. per auction. This reflects the price inflation over the sample time period.

None of the health treatment variables (H_j) were significant at the 0.10 level. Lots with no health treatments served as the base lot. Of the breed variables (B_j), only two were significant at the 0.10 level. Angus and Angus crosses (B_2) had a premium of $0.65/cwt. while lots with a majority of dairy cattle (B_4) had discounts of -$10.67/cwt. None of the delivery variables (SHR, HAUL, and CUTBACK) were significant at the 0.10 level.

The three external market variables were significant at the 0.05 level and all had appropriate signs. Two of the variables, feeder cattle futures (FCF) and before-auction price, had a positive effect on teleauction price with the largest influence being associated with nearby feeder cattle futures contract price ($1.01/cwt.). Nearby corn futures price (CF) had a negative effect on price of -$0.87/cwt. The parameter estimate for FCF indicates an almost one to one change with GFB price.

All of the internal market variables included in the GFB model were significant at the 0.05 level or lower. The TOTLOT and TOTLOT2 variables indicate that up to 14 lots, price decreases as number of lots increased while after 14 lots, price increases with additional lots, *ceteris paribus*. Thus, it appears that 14 lots attract enough buyers to begin to have a positive impact on price. Each additional buyer (TOTBUY) had the impact of increasing the bid price by $0.30/cwt.

The Red Carpet Cattlemen's Association Model

The Red Carpet Cattlemen's Association (RC) price model explained approximately 90 percent of the variation in teleauction price. The base lot for reference was a lot of 500-599 lb. heifers sold in the summer. Only one seasonal variable, fall (S_4), was significant at the 0.10 level. It has a positive effect on teleauction price of $1.07/cwt. Red Carpet teleauctions reported no frame, muscle, or flesh information on the teleauction prospectus, so these factors were not included in the analysis. Two of the three weight categories (EW_j) tested were significant at the 0.05 level with the largest discount (-$2.61/cwt.) occurring in the over 600 lbs. category. The 500-599 lbs. category was used as the base. The greatest premium ($1.25/cwt.) was for 400-499 lbs. cattle.

The SEX variable was significant at the 0.01 level and steer lots increased price by $4.48/cwt. HEAD was also significant at the 0.01 level and indicated that as lot size increased by one head, price increased by $.03/cwt. HEAD2 was not significant at the 0.10 level which implies that a positive linear relationship existed between lot size and price. LOTNO indicated a discount of -$0.06/cwt., again supporting the hypothesis of price decreasing during the auctions. The TREND variable was not significant at the 0.10 level.

Two of the health treatment variables (H_j) were significant at the 0.01 level. Specific disease treatment (H_4) and pre-conditioning (H_7) had positive effects on price with the largest influence ($1.92/cwt.) associated with pre-conditioning. This implies that buyers are willing to pay premiums for cattle that have been treated for specific disease such as blackleg and TB or have been pre-conditioned. None of the breed variables (B_j) tested were significant at the 0.10 level. Again, neither of the delivery variables, SHR and CUTBACK, was significant at the 0.10 level. It should be mentioned that most of the RC lots were brought to a central location for loading.

All three of the external market variables were significant at the 0.01 level. Feeder cattle futures (FCF) and before-auction price (BAP) had positive effects on price with the largest influence ($0.68/cwt.) associated with feeder cattle futures. Corn futures (CF) had a negative effect on price with a discount of -$1.43/cwt. All of the parameter estimates for the external market variables had the expected signs. Neither of the internal market variables (TOTLOT and TOTLOT2) tested were significant at the 0.10 level. The total number of lots in an auction did not appear to have a significant linear or curvilinear relationship with price.

The Mitchell County Cattlemen's Association Model

Parameter estimates for Mitchell County Cattlemen's Association (MCCA) teleauction price are also shown in Table 3. This model explained approximately 97 percent of the variation in teleauction price. The base lot was a lot of medium frame, muscle grade 2, 500-599 lb. heifers sold in the spring.

Since MCCA conducted teleauctions during two seasons, only one season, winter (S_1), was included in the model. The other season, spring, served as the base. Season had no significant effect on teleauction price. Frame size (FR_j) likewise had no significant effect. Muscle grade 1 (MSC) was significant at the 0.01 level and had a positive impact on price of $2.77/cwt. relative to muscle grade 2. One of the weight categories, 400-499 lbs. (EW_3), had a significant discount (-$9.46/cwt.). This result is most likely due to the small number of observations in this category relative to the other categories and the time period when these cattle were sold. Over 80 percent of the cattle marketed in the MCCA teleauctions were over 600 lbs.

The SEX variable indicated that steers sold for a premium of $4.82/cwt. The signs and magnitude of HEAD and HEAD2 indicated that price reached a maximum at a lot size of about 276 head, *ceteris paribus*. This is almost twice the size of the GFB optimal lot size. The parameter estimate for LOTNO was not significant at the 0.10 level, indicating that price was not affected by when the lot was sold in the MCCA auction. This result is contrary to most published results (Buccola; Lambert et al.) and may be peculiar to the large and few lots characteristic of MCCA teleauctions.

The TREND parameter estimate indicated a significant positive trend of $0.43/cwt. per auction. Only two of the breed variables (B_j) were significant at the 0.10 level. Brahman and Brahman crosses (B_3) and Exotic and Exotic crosses (B_4) had negative effects on price with the largest discount accruing to the Exotic breeds of -$3.00/cwt. Of the delivery variables tested, SHR was significant at the 0.05 level and had a positive impact of $2.30/cwt. on price, *ceteris paribus*.

Two of the three external market variables, feeder cattle futures (FCF) and before-auction price (BAP), were significant at the 0.01 level. Corn futures (CF) had no significant effect on price. A $1.00/cwt. increase in feeder cattle futures had the effect of increasing the MCCA price by $0.85/cwt. Before-auction price also had a positive effect of $0.19/cwt. on price. The total number of buyers (TOTBUY) in an auction was not a significant explanatory variable in the MCCA model.

Summary and Comparisons

Similar results across all three models related to external market conditions. The impact of nearby feeder cattle futures contract price to teleauction price ranged from $1.01/cwt. in GFB, to $0.68/cwt. in RC. The implication is that the GFB teleauction prices respond in an almost proportional manner to futures prices, while the other two organizations have less direct responses. One possible explanation for these observed differences is that national buyers may respond to futures prices quicker than local buyers, and most of the cattle sold over GFB and MCCA leave Georgia for feedlots while many lots of RC cattle are sold to local buyers.

Corn futures price effects on feeder cattle price ranged from -$0.87/cwt. (GFB) to -$1.43/cwt. (RC) across the three organizations, which is consistent with the notion of one rising input price (corn) affecting adversely the price of another input (feeder cattle). Again, the variation in the magnitude of the estimates for corn futures price could be attributed to national versus local buyers. The effect of before-auction price was slight ($0.05/cwt., GFB) to strong ($0.35/cwt., RC). These results further substantiate the strong local buying pressure in the RC teleauctions.

The internal market variables tested have some similarity across teleauctions. The optimal lot size ranged from 143 head in GFB to 276 head in MCCA while RC exhibited a linear relationship between lot size and price. The difference in optimal lot size is, in part, a function of the GFB and MCCA teleauctions. MCCA is operated by a local cattlemen's association and the number of head per lot there averaged 151 as compared to an average lot size of 72 for GFB and 49 for RC. The order of the lot in the teleauction had a negative impact in GFB and RC, but no impact in MCCA. The total number of lots had a curvilinear effect in the GFB teleauction and implied that a minimum of 14 lots was necessary before a positive impact on price resulted. Delivery conditions had a significant impact only in the MCCA model, where allowing shrinkage increased price by $2.30/cwt.

A comparison of the price differential model results here to two other feeder cattle studies is presented in Table 4. Because of differences in objectives, methods, measurements, and time periods, comparisons of the parameter estimates from the different studies must be done with caution.

Table 4. Comparison of Significant (0.10 level) Results of Feeder Cattle Price Differential Studies

Item	Different Studies		
	Georgia Teleauctions	Schroeder et al.	Lambert et al.
Cattle Characteristics			
Frame Small	-6.44	-9.80 to -4.10	-8.38
SEX	4.48 to 6.80 (Steers = 1) (Heifers = 0)		-13.274 (Steers = 0) (Heifers = 1)
Breeds			
Angus (+ crosses)	0.65	-1.74 to -0.946	-6.232
Exotic (+ crosses)	-3.00		0.886 to 1.045
Dairy	-10.67	-10.10 to -7.31	-8.53
Lot Characteristics			
HEAD	0.054 to 0.013	0.131 to 2.82	0.086
HEAD2	-0.00019 to -0.000024	-0.00305 to -0.00101	0.000795
Internal Market Conditions			
Lot order	-0.11 to -0.05	0.838 to 2.470	-0.22 to -0.67
External Market Conditions			
Futures	0.68 to 1.01	0.314 to 0.983	
Summary Statistics			
R^2 (adjusted)	0.89 to 0.97	0.71 to 0.74	0.69
RMSE	1.72 to 3.57	3.31 to 5.14	7.40
Observations	89 to 619	2,172 to 5,574	11,953

Small frame cattle are discounted heavily in all three studies. The studies also indicate that lighter weight feeder cattle bring premiums. Heifers were discounted more in Lambert et al. than in this study. With respect to breeds, differences existed across studies except with respect to dairy cattle, which were discounted heavily across all studies. Angus and Angus crosses brought premiums in this study while this breed was discounted in the other studies. The opposite occurred with Exotic crosses, which brought a premium in Lambert et al. and a discount in this study. Possible explanations for this incongruent result could relate to length (10 weeks vs. 10 years) of the respective time series and the time periods (1981 vs. 1976-1988) examined, and the location of cattle (Kansas vs. Georgia).

Lot size and lot size squared were included in the other studies, along with this study. Parameter estimates were of similar size and sign. If one computes optimal lot sizes for these three studies, the differences are noticeable. The optimal lot size for this study was 143 to 276, depending on the organizer. For the Schroeder et al. study, the optimal lot size ranged from 46 to 64, while for Lambert et al. the optimal size was 54. Though caution should be used in interpreting the above optimal lot sizes, indications are that teleauctions have larger optimal lot sizes.

Raising the number of the order of a lot in an auction usually had a discounting impact on price. This result occurred here, in Lambert et al., and Buccola. The exception was in Schroeder et al., where the opposite occurred.

Schroeder et al. and this study included futures as an influential factor with similar results. One interpretation of this parameter estimate is to view it as a proxy for the responsiveness of a local market to a national market. The closer the parameter estimate is to 1, the more efficiently the local market incorporates information from the national market. Summary statistics for the studies indicate that the models presented here explain more of the price variation with more efficiency.

IMPLICATIONS

Electronic marketing of feeder cattle in Georgia has been a relatively minor marketing alternative in terms of cattle volume. Yet, three organizations have offered this alternative to Georgia producers throughout the 1980s. Electronic marketing appears to be a viable alternative for feeder cattle producers.

The internal market factors hypothesized to affect teleauction price were, in most cases, significant. In both the organizations (GFB and MCCA) where the total number of buyers in an auction could be tested, an additional buyer increased price. This result supports one motivation behind the electronic marketing concept, attracting more potential buyers.

With respect to optimal lot size, results indicated that this was teleauction-specific and varied from 143 to 276 head. Information on optimal lot size can be valuable to teleauction operators when they advise producers on market strategies.

It appears that the order of a lot in teleauctions has a less depressing effect than in sale barn livestock auctions. Of course, the larger lot sizes and large number of buyers could contribute to the neutralization of lot order.

Tests on the curvilinear relationship between the number of lots in a GFB teleauction and price revealed a minimum at 14 lots. That is, price decreased until, and increased beyond, 14 lots, *ceteris paribus*. One explanation of this result relates to the notion that more lots for a sale attract more buyer interest. It appears that for the GFB teleauction, a minimum of 14 lots attracts enough buyer pressure to generate a positive impact on price. Furthermore, this result would tend to support the notion of greater producer advantage associated with multiple lot (greater than 14 in the GFB case) teleauctions.

The external market factors hypothesized to influence price were significant in almost all cases and consistent for all markets tested. It can be argued that the relationship between teleauction price and nearby feeder cattle futures price is a measure of the teleauction's ability to transmit price information. This study illustrated that this ability varies by teleauction operator and might be directly related to buyer composition. That is, national buyers are more likely to transmit futures information than are local buyers.

The effect of local auction prices on teleauction prices also was investigated and found to vary depending on operator. The prices for the two teleauctions organized by local producer groups (RC and MCCA) were influenced more by local auction prices than were those in the statewide teleauction (GFB). The rationale behind this result is similar to that associated with feeder cattle futures. Buyers transfer the pressure that is exerted on them. If the pressure is local, then local influences (i.e., local prices) will be passed on.

Overall, this research has contributed to learning more about the important factors that determine feeder cattle price. The microdata available from teleauctions should open several research avenues. These include feeder cattle differentiation by buyer type and the effect of reputation trading on price. Both of these research activities could help teleauction operators develop strategies to increase market share and help producers with their marketing decisions.

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