A Comparison of Pricing Structures at Video and Traditional Cattle Auctions

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The number of cattle sold through video auctions has increased dramatically during the past five years. In this study structural differences in pricing between a group of traditional auctions and the nation's largest satellite video cattle auction are examined. A Chow test for structural pricing differences reveals that the influence of lot characteristics, market information, and merchandising strategies on cattle prices are essentially identical at both types of auctions. However, optimal lot size is larger at video auctions than at traditional auctions.

Key words: Chow test, structural differences, video auctions.

Satellite video cattle auctions are rapidly becoming a popular method for selling cattle (Scharlier). For example, Superior Livestock Auction (SLA), the nation's largest satellite video cattle auction, sold more than 450,000 head of cattle in 1989 and over 760,000 head in 1990.

Differences between traditional and video auctions raise questions about methods and strategies that maximize profits in this new type of market. For example, buyers examine a video recording of cattle lots at a video auction rather than viewing the cattle in person. Also, the number of buyers is larger at video auctions than at traditional auctions.[1] In addition, video auction cattle are priced for future delivery, delivery weights are not guaranteed, cattle lots are larger than at traditional auctions, and buyers pay for transportation from the seller's location. These differences require a unique approach to video auction cattle pricing, and buyers and sellers should understand the relative premiums and discounts associated with cattle quality, market information, and merchandising strategies between the two types of auctions.

Several studies have compared relative premiums and discounts at traditional cattle auctions for different cattle characteristics (e.g., Schroeder et al.). Other studies have examined the potential impact of electronic market systems on structure and relative prices (Sporleder; Sporleder and Mahoney; Ward; and others). However, no one has compared the pricing relationships between traditional and satellite video cattle auctions.

This analysis compares factors influencing prices in both types of auctions. This comparison is accomplished by conducting a test for structural pricing differences between markets using pooled data for a set of traditional auctions and the SLA. Sources of structural pricing differences between traditional and video auctions are also identified. This information will help buyers and sellers identify the relative values of different pricing strategies at traditional and video auctions and will also help industry and researchers to better understand the pricing methods at these two types of markets.

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Financial support was provided by the Research Institute on Livestock Pricing and the Utah Agricultural Experiment Station. UAES Journal Paper No. 4066.

Special thanks are extended to the anonymous reviewers, Wade Brorsen, Terry Glover, and Chris Fawson for their helpful comments and suggestions and to Ted Schroeder for providing the Kansas auction data. Any remaining flaws in the paper are the sole responsibility of the authors.

[1] For example, Bailey, Peterson, and Brorsen reported that, on average, 50 major cattle buyers participated at each SLA auction in 1987 while an average of 20 major cattle buyers participated at each Dodge City auction the same year.

Data and Procedure

Video Auction Description

Presentation of cattle for sale at a video auction includes two components—the video or visual component and the sales catalogue or written component. Clarity and precision of these two components are critical if cattle are to be represented adequately. The quality of the visual presentation of cattle sold at the video auction is not examined here. Instead, the seller's description and terms listed in SLA's sales catalogues are evaluated to determine their influence on prices.

Sales catalogue descriptions prepared by the video auction company and the seller are developed when the cattle are videotaped (figure 1). Videotapes are edited to a length of about two minutes and are shown in sequence by lot number during the video sale. An auctioneer solicits bids from buyers as the videotapes are played. Buyers bid either in person or by telephone if viewing via satellite transmission at a remote location.

Buyers register with SLA before each sale and receive a buyer's number after credit has been established. Anonymous bidding is employed during the video auction by using the buyer's number. Sellers may specify reservation prices if desired.

Lot #73	
S&H Ranches, Inc. 100 Heifers Base Weight:	410 lbs.
Location:	75 miles south of Vernal, Utah
Description:	Out of Angus and Hereford base cows--approximately 1/2 Hereford and the balance RWF, Red, Black, and BWF, 20-25% horns
Origin:	Duchesne County, Utah
Flesh:	Thin
Weight Range:	375-475 lbs.
Feed:	Dry hay
Delivery Date:	22-30 January
Weighing Conditions:	Cattle will be gathered into dry lot by 9:00 a.m., hauled 75 miles to Vernal, unloaded, sorted by sex, size, and weight on the ground with no pencil shrink
Slide:	5 cents per pound over 420 lbs.
Comments:	Bangs vaccinated
Represented by:	Jim Wingate

Figure 1. Example of video auction sales catalogue entry—1987

Model Specification and Procedure

Several studies have shown that short-run feeder cattle prices are a function of physical cattle characteristics and market conditions (Buccola; Ernst et al.; Schultz and Marsh; Marsh; Faminow and Gum; Schroeder et al.; and others). These studies examined the influence on price of characteristics such as weight, sex, number in the lot, breed, auction location, lack of horns, lot uniformity, futures prices, and other lot and market characteristics. Several of these studies used pooled data from two or more markets and reported that price differences exist between markets (e.g., Schroeder et al.). However, these studies did not provide information about the sources of price differences as they relate to specific lot and market characteristics and merchandising strategies at the different markets.

Additional merchandising strategies, beyond those typical in traditional auctions, need to be considered when modeling feeder cattle prices at video auctions. These additional strategies are related to sizing lots to fill trucks, estimating delivered weight (and subsequent buyer discounts for incorrect estimates of delivered weight), and determining optimal delivery dates. Although fundamental market measures could be used to model demand in these markets (e.g., feeder and fed cattle supplies, production costs, feedlot capacity, etc.), the present model was designed to examine only short-run factors affecting prices, reflecting lot and market information publicly available to buyers. The model was also used to test for structural differences between the video and traditional auctions. A hedonic price model was selected for this analysis of a form similar to that found in Schroeder et al.:

$$(1)\qquad P_i = a + \sum_{l=1}^{L} b_l LC_{il} + \sum_{k=1}^{K} c_k MC_{ik} + \sum_{j=1}^{J} d_j MS_{ij} + e_i,$$

where P_i is the price in the ith lot of cattle and $i = 1, 2, 3, \ldots, I$ and I is the number of lots in the sample, LC_{il} is the lth lot characteristic, MC_{ik} is the kth market characteristic (exogenous shocks to current or anticipated supply and demand for cattle), and MS_{ij} is the jth merchandising strategy. The merchandising

Table 1. Independent Variables of Data from the Video Auction Used to Estimate the Hedonic Pricing Equation (3)

Binary Physical Characteristic Variables[a]	Market Condition Variables	General Lot Characteristic Variables	Merchandising Variables
Breed:	Futures Price (*Futures*)[b]	Number of Head (*Number*)	*WRISK*[d]
English-Cross			
English-Exotic Cross	Seasonality:	Average Per Head Estimated Weight (*Weight*)	Uniform Lots (*Uniform*)[e]
Exotic Cross	*1st Quarter*	*Steers*[c]	Lots Sorted by Sex (*Unmixed*)[f]
Angus	*2nd Quarter**	*Number Squared*	Days to Delivery (*Date*)
Dairy	*3rd Quarter*	*Weight Squared*	
*Hereford**	*4th Quarter*		
Frame:			
Large			
Medium-Large			
Medium			
*Small**			
Flesh:			
Heavy			
Medium-Heavy			
Medium			
Light-Medium			
*Light**			
Horns:			
No Horns			
Have Horns			
Some Horns			

Note: An asterisk specifies the control category for each binary characteristic; i.e., no dummy variable is included in the regression analysis for the category.
[a] Categories for each characteristic are listed after the colon following the characteristic.
[b] Futures price for futures contract closest to but not preceding delivery.
[c] Binary variable where steers = 1; otherwise = 0.
[d] *WRISK* is the ratio of the acceptable weight limit minus estimated delivery weight and slide specified by the seller.
[e] Binary variable where uniform lots = 1; otherwise = 0.
[f] Binary variable where lots sorted by sex = 1; otherwise = 0.

strategies considered in this study included sorting by sex and weight (uniformity), estimating delivery weight, and selecting the delivery dates. The intercept is represented by a; b, c, and d are parameter estimates; and e is the error term. Table 1 details the lot and market characteristics and merchandising strategies used in this study.

Lot characteristics affect cattle prices since they influence the buyer's profit function and, consequently, the anticipated breakeven price when the cattle are eventually resold (Buccola). For example, large framed, thinly fleshed cattle are expected to gain weight at a faster pace than fatter and/or smaller animals. This reduces the per-pound cost of gain. Due to genetic compositions, different cattle breeds have varying propensities for muscling, bone structure, fat, etc. For instance, Holstein and other dairy breeds, while large framed, have comparatively poor marbling qualities, making their carcasses less desirable as beef cuts. As a result, lower prices are expected for dairy breeds than for, say, English-Exotic crossbreeds.

The number of cattle in a particular lot and their uniformity influence the price buyers are willing to pay since search costs such as travel costs, salaries, subscription fees, etc., are reduced on a per-head basis for larger lots as are post-sale sorting costs (Buccola; Janssen and Shane; Faminow and Gum). For example, buyers at traditional auctions can purchase several lots at the same sale and pool them to fill trucks. It is unlikely that video auction buyers can effectively pool lots for shipment if the lots are in different locations, suggesting buyers would be willing to pay a premium for large lots at video auctions.

Lot size also may influence pricing structures at different auctions if different types of buyers with different cost structures (e.g., small feedlots and large feedlots) are participating in

the different types of auctions. For example, large feedlot operators may be more willing to pay higher prices for large lots of cattle than small feedlot operators simply because the costs associated with handling, sorting, and feeding large lots are different for the two types of buyers.

Futures prices play a central role in price discovery for cattle and other livestock (Hudson) and, as such, are used here as a proxy for current and expected cash market prices. The feeder cattle futures contract price closest to but not preceding delivery of cattle sold at a video auction represents current market expectations for future cash prices corresponding to when the cattle are actually delivered. Using feeder cattle futures contract prices corresponding to video auction delivery dates in equation (1) allows price spreads between the futures contracts to explain price differentials for different delivery dates. The nearby feeder cattle futures contract price was used as a proxy for current cash price levels (and, therefore, supply and demand conditions) for cattle sold at the traditional auctions and for cattle sold at the video auction with deliveries before the expiration of the nearby futures contract.

Lots sorted by sex (*Unmixed*) are expected to receive a premium since post-sale sorting is reduced. Mixed lots sold at traditional auctions can be easily split and sold as separate lots by sex. In a video auction, few mixed lots are split between buyers. Splitting video auction lots would be inefficient, especially for small lots not comprising at least one truckload.

Video auctions are somewhat risky for buyers since average delivered weights are not guaranteed. This is an important consideration since delivery may not occur for several months. Sellers deal with this problem by specifying an acceptable limit by which actual average delivered weight may exceed estimated delivered weight. A slide, or adjustment to price, specified by the seller is initiated if average weights are above this specified limit. For example, a seller might sell calves with an estimated average weight of 450 pounds (lbs.) with a slide of 10¢/cwt. for each pound that actual average weight exceeds 470 lbs. If the actual average weight of the calves were 465 lbs., no adjustment to the bid price would be made. If the calves averaged 480 lbs., \$1/cwt. (10 lbs. × 10¢) would be deducted from the buyer's original bid.

The acceptable weight limit and slide combine to provide some protection for the buyer and should be considered together since they communicate the precision of the seller's weight estimate. A relative measure of the total protection offered by the weight limit and slide, specified as the weight risk (*WRISK*) and calculated as the quotient of the specified acceptable weight limit and the slide, was included as a merchandising strategy in equation (1). In the example above, *WRISK* would be $(470 - 450)/10 = 2$. The expected sign of *WRISK* is negative since increasing the acceptable weight limit relative to the slide should decrease the bid. *WRISK* is surmised to be zero for the traditional auctions in this analysis assuming that no slide is provided the traditional auctions and that buyers can accurately judge weights as cattle pass through the auction ring.

Cattle are usually delivered immediately to buyers at traditional auctions. Consequently, the number of days to delivery (*Date*) is assumed to be zero for traditional auctions. For video auctions, *Date* is the number of days elapsing between the date of the video sale and the midpoint of the delivery period (e.g., 10 October for the 8–12 October delivery period) specified in the video auction sales catalogue. The expected sign of *Date* is unknown since it is determined by price expectations for different future delivery dates. Specifying a particular delivery date or period may be an important strategy at video auctions if price trends can be identified and delivery dates established earlier or later based on those trends.

Adjustment for Transaction Costs

Bailey, Peterson, and Brorsen found that average buyer transaction costs (trucking and shrink) are not equal at video and traditional auctions. Since transaction costs are expected to affect bids offered by buyers, prices were adjusted for relative transaction costs before conducting the test for structural differences. These price adjustments are in the following form:

$$(2) \qquad AP_i = P_i(1 - SA_i) + TC_i + SB_i,$$

where AP_i is the price for the ith lot of cattle adjusted for buyer transaction costs. *SA* adjusts traditional auction prices for the "preshrinking" that occurs as cattle are shipped to the auction from the seller's location. For video auctions, *SA* represents "pencil shrink" or a downward weight adjustment offered by sell-

ers to buyers at delivery to make their cattle equivalent in weight to cattle shipped to an auction.[2]

TC and *SB* are the estimated trucking and shrink costs, respectively, incurred by the buyer when the cattle are shipped in the case of a video auction from the seller's location to the buyer's or for the traditional auction from the auction to the buyer.

Trucking costs during the study period were assumed to be \$2/cwt./loaded mile for distances less than 150 miles and \$1.85/cwt./loaded mile for distances greater than 150 miles (Webb). Shrink (*SA* and *SB*) was calculated using Minish and Fox's shrink equation (p. 161), adjusted for excretory shrink regained either before sale in the case of *SA* or after arrival at the buyer's location for *SB* (see Bailey, Peterson, and Brorsen).

Actual mileage was used to calculate trucking and shrink costs to adjust the price of cattle sold at the video auction. Bailey, Peterson, and Brorsen found that cattle sold at the SLA in 1987 and located within the Dodge City market area and buyers who purchased those cattle were an average distance of 234 miles and 265 miles from Dodge City, respectively. These mileages were used to calculate *SA* (234 miles) and *SB* (265 miles), respectively, for cattle sold at the traditional auctions.[3]

Test for Structural Differences

A Chow test was used to test for structural differences between video and traditional auctions (Chow). This was done by pooling data from video and traditional auctions and estimating the parameters of the following equation:

$$(3)\quad AP_i = a + \sum_{l=1}^{L} b_l LC_{il} + \sum_{k=1}^{K} c_k MC_{ik} + \sum_{j=1}^{J} d_j MS_{ij} + \sum_{m=1}^{M} f_m ZID + \sum_{l=1}^{L} \lambda_l ZLC_{il} + \sum_{k=1}^{K} \mu_k ZMC_{ik} + \sum_{j=1}^{J} \gamma_j ZMS_{ij} + e_i,$$

where $Z = 1$ for video auction lots and zero otherwise (Kmenta, p. 421); *ID* is a series of binary (dummy) variables testing for different intercept values for price between years and between the video and traditional auctions; and f, λ, μ, and γ are parameter estimates. The Chow test was completed by testing the null hypothesis:

$$H_o: \lambda_{il} = \mu_{ik} = \gamma_{ij} = 0,$$

for all i, l, k, and j. The parameter estimates for equation (3) were estimated using ordinary least squares (OLS). An F-test was used to test the null hypothesis that coefficients of the slope dummies are simultaneously equal to zero, in which case the market pricing structures are identical. This test also allows an examination of the sources of deviations between structure at the two types of markets should differences exist.

Reasons exist to expect the pricing structure at video and traditional auctions to be different. Such differences are expected to derive from variations in how cattle are merchandised for sale and from other structural differences, such as the number and types of buyers participating in each type of auction, but not from the physical characteristics of cattle.

Data

Kansas State University provided data for lots of steers and heifers sold at four separate Kansas auction locations (i.e., Dodge City, Pratt, Parsons, and Fort Scott) for sales held during March and April of 1987 (Schroeder et al.). The data include quality information for each lot (breed, frame size, flesh condition, etc.) and prices received. The analysis excluded lots that contained sick cattle since these lots comprise only a small portion of the volume sold at each auction and their prices are not closely correlated to general market information, such as futures prices. Data gatherers did not include lots mixed by sex in the Kansas auction data. Therefore, the price effect for mixed lots is not observed for cattle sold at the traditional auctions.

SLA provided sales catalogue data and accepted bid prices for cattle sold from Kansas and Nebraska during 1987–89 (inclusive). A homogeneous feeder cattle population is found in Kansas and Nebraska, and both states have large and numerous feedlots [U.S. Department of Agriculture (USDA) 1990; Sands]. Includ-

[2] Pencil shrink is specified for each lot in SLA's sales catalogues.

[3] Information was not available for distances cattle were shipped to the Kansas auctions.

ing only lots from Kansas and Nebraska also allows for direct comparisons of pricing structures between SLA and the Kansas auctions since it minimizes the effects of transportation costs, cattle reputation, and other regional differences.

The analysis includes over 63,000 steers and heifers located in Kansas and Nebraska sold at the SLA during 1987–89 and over 32,000 head sold at the traditional auctions during March and April 1987 (table 2). Larger sized lots are sold at the video auction, on average, than at the traditional auctions (table 2). Traditional auctions generally sell cattle in small lots for several reasons including increased uniformity, serviceability to small volume sellers, and the inability to fit large lots in the auction ring (USDA 1989). These practices are reflected in the high degree of uniformity for cattle sold at the Kansas auctions relative to the SLA (table 2).

Cattle sold at the SLA from Kansas and Nebraska were shipped an average of 280 miles for delivery (table 2). Over 76% of the cattle were shipped fewer than 400 miles, and almost 90% were shipped fewer than 500 miles (table 3). This implies local and regional buyers have a competitive advantage when bidding for cattle at video auctions because their transportation costs are comparatively low.

Table 2. Average Characteristics for Kansas Cattle Sold at Traditional and Video Auctions

	Kansas Traditional Auctions	Kansas/ Nebraska Video Lots
Average Weight (lbs.)	594	660
Number of Lots	3,006	427
Average Number in Lot (Head)	11	148
Total Sold (Head)	32,199	63,303
Miles Shipped for Delivery	N/A	280
Percentage over 900 lbs.	0	1.9
Percentage over 600 lbs.	51.0	64.6
Breed	..... (%)	
English-Cross	30.8	23.4
English-Exotic Cross	20.5	65.6
Exotic Cross	21.4	7.3
Angus	10.4	1.4
Dairy	2.8	2.3
Hereford	12.1	2.1
Other	2.0	0
Frame		
Large	10.3	37.5
Medium-Large	77.6	61.8
Medium	11.0	0.7
Small	1.1	0
Flesh		
Heavy	0.2	0.5
Medium-Heavy	12.9	13.6
Medium	75.1	79.2
Light-Medium	10.5	6.6
Light	1.3	0.1
Horns		
No Horns	79.7	69.3
Have Horns	12.5	30.4
Some Horns	7.8	0.3
Merchandising Characteristics		
Uniform Lots	97.9	25.4
Days to Delivery	N/A	35
Lots Sorted by Sex	N/A	88.1

Results

Physical Characteristics and Market Conditions

Table 4 presents the OLS parameter estimates for equation (3) for the overall (pooled) model and separately by sex and weight. The weight categories depicted in table 4 are natural partitions since most steers and heifers weighing over 600 lbs. are placed in feedlots after purchase while most weighing under 600 lbs. are placed on pasture or backgrounded before being placed in a feedlot (USDA 1990).

The signs of the parameter estimates for physical cattle characteristics and market conditions are essentially the same as Schroeder et al. This was expected since the Kansas auction data used in this study were a subset of the Schroeder et al. data set. The parameter estimates for *Number, Number Squared, Weight,* and *Weight Squared* match those reported in Schroeder et al. and are consistent with other past research that determined that prices increase at a decreasing rate as lot size increases and decrease at a decreasing rate as weight increases (Faminow and Gum; Buccola).

The magnitudes of the coefficients for cattle physical characteristics and market conditions differ from Schroeder et al. since the data are more aggregated here than in Schroeder et al. and include data for only two months (March and April of 1987). For example, Schroeder et al. analyzed 10 breed and eight flesh condition categories, while the same data are aggregated into six breed and four flesh categories here. However, the ordering of the parameter esti-

Table 3. Number of Kansas and Nebraska Cattle Shipped by Various Mileage Categories, SLA, 1987-89

Mileage Category	Number of Lots[a]	Percentage of Lots	Number of Head	Percentage of Total Cattle Shipped	Cumulative Percentage
100 miles or less	54	20.2	7,700	21.1	21.1
Between 100 and 200 miles	57	21.3	7,250	19.8	40.9
Between 200 and 300 miles	44	16.5	6,086	16.6	57.5
Between 300 and 400 miles	45	16.9	6,813	18.6	76.1
Between 400 and 500 miles	35	13.1	4,294	11.7	87.8
Between 500 and 750 miles	26	9.7	3,748	10.3	98.1
Over 750 miles	6	2.3	669	1.9	100.0

[a] Of the 427 Kansas and Nebraska lots sold, 160 lots were shipped to unknown destinations and are not included in these calculations.

mates for physical characteristics is consistent with Schroeder et al. across sex and weight categories. For example, this analysis and Schroeder et al. both determined that higher premiums are paid for large-framed cattle weighing under 600 lbs. than for large-framed cattle weighing over 600 lbs.

Breed is an important determinant of price; English Crosses and Exotic Crosses are priced higher while dairy breeds and Exotic/English Crosses are priced lower than Herefords. Angus steers and heifers are priced basically the same as Herefords. These findings correspond closely to past research results (e.g., Janssen and Shane; Faminow and Gum; Schroeder et al.; and others).

Lighter-fleshed cattle with large frames receive higher prices than heavy-fleshed small-framed cattle, as expected, based on the relative feedlot efficiency of these types of cattle. Lots containing cattle with no horns, or only a few head with horns, receive higher prices than lots containing mostly horned cattle. These findings are also consistent with past research.

Merchandising Strategies

Pricing and delivery are joint decisions at traditional auctions (i.e., cattle are priced and delivered the same day). However, pricing and delivery strategies can be planned separately at video auctions. The results show sellers receive premiums for cattle delivered in the future (*Date*) (see table 4). This finding implies prices trended upward during the study period and suggests sellers at video auctions can establish delivery dates based on price trends to increase prices.

No significant difference in price was found between lots sorted and unsorted by sex (*Unmixed*) at the video auction. This suggests that price is not reduced for unsorted cattle. This is somewhat surprising, since cattle mixed by sex must normally be sorted after sale. Only about 1% of the lots were mixed by sex, and this result may not reflect a true market condition since it is based on so few observations.

WRISK has a substantially negative impact on overall prices (table 4) but significantly affects prices within sex and weight categories only for heifers weighing over 600 lbs. This result suggests *WRISK* is more effective in explaining price differentials between sex and weight categories than within these categories and shows the relatively small range that exists for *WRISK* within given weight categories at the SLA.[4]

Test for Structural Differences

The Chow test implies structural pricing differences exist between video and traditional auctions (table 4). However, these differences are minor and appear to be related to pricing based on lot size (see parameter estimates for *Number* and *Number Squared* slope dummies in table 4).[5] This does not represent a clear

[4] While substantial uniformity exists for acceptable weight limits and slides within weight categories, differences exist between weight categories. For instance, in 1988 over 90% of lots with estimated per-head delivery weights under 600 lbs. had an acceptable weight limit equal to 10 lbs. above the estimated delivery weight while approximately 70% of lots with estimated per-head delivery weights over 600 lbs. had acceptable weight limits that were 25 lbs. above the estimated delivery weight. Since 1989, SLA has adopted a policy establishing all acceptable weight limits at 10 lbs. over the estimated average delivery weight (Branch).

[5] A significant pricing difference also was found for large-framed steers weighing under 600 lbs. However, only about 4% of the observations in this category had this particular physical charac-

case for structural differences since the lot size sample means at the video and traditional auctions are different. A separate examination of the parameter estimates of equation (3) using only lots with fewer than 120 head (the largest lot sold at the Kansas auctions was 116 head) reveals that no structural pricing difference exists between the auctions for *Number* and *Number Squared*. This suggests that premiums and discounts for lot size are the same at both types of auctions but the shape (quadratic relationship) of the price function relative to lot size is different because the lot size sample ranges of the two populations differ.

Cattle are sold in larger sized lots, on average, at video auctions than at traditional auctions due to the difficulty of pooling lots for shipment at video auctions and to more efficiently match supply with demand, especially for feedlots (SLA 1988). Therefore, optimal lot size is larger at video auctions than at traditional auctions. For example, the optimal lot size for the Kansas auctions for all weights is between 50 and 55 head and is consistent with past research results (Schroeder et al.; Faminow and Gum). Optimum lot size for the video auction is approximately 240 head. Feedlot operators prefer cattle lots large enough to fill at least one pen (typically between 100–250 head depending on the cost structure of the feedlot) (Reese; Miller Brothers, Inc.). Buying lots large enough to fill feedlot pens isolates health problems that could occur if lots are mixed. It also reduces the logistical problems associated with purchasing cattle numbers to fit pen sizes (Stenquist; Reese).

Because lot sizes are larger and weights heavier at the SLA than at the Kansas auctions, one would expect more large volume buyers to participate at the SLA than at the traditional auctions (table 2). A USDA market reporter estimates that over 75% of steers and heifers weighing over 600 lbs. sold at the Dodge City auction go directly to feedlots after sale (USDA 1990). Over 83% of the cattle located in Kansas and Nebraska that were purchased at the SLA during 1987–89 went directly or indirectly to feedlots (assuming that most cattle purchased by order buyers are for feedlots) (table 5). Average weights are 66 lbs. lighter at the Kansas auctions than at the SLA (table 2) suggesting larger feedlot buyer participation at the SLA than at traditional auctions since feedlot operators prefer cattle weighing over 600 lbs., *ceteris paribus*.

These results suggest traditional and video auctions are competitive markets that offer basically identical premiums and discounts for various physical cattle characteristics and react in the same way to market information (e.g., *Futures*). Video auctions appear to be suited to large transactions. In terms of the types of buyers participating, video auctions are more like private treaties (direct sales) than they are traditional auctions. The high participation by order buyers (table 5) indicates video auctions are an efficient means to fill orders, and order buyers are one of the major participants in direct sale markets.

Beyond simply offering a new pricing alternative for buyers and sellers, video auctions may improve overall market performance. As demonstrated by Bailey, Peterson, and Brorsen, video auctions reduce combined buyer and seller transaction costs. Video auctions may also eventually help regulate grades and standards for feeder cattle since video auctions sell cattle from numerous regions, and pressures for normalization will exist. Beyond these considerations (transaction costs and standardization) video auctions offer a potentially important source of price information for cattle not only in local areas but also in regional and multiregional areas. Many economists have viewed electronic marketing as the best method to increase cattle market efficiency. Video auctions are the most successful form of electronic marketing yet devised.

Summary and Conclusions

The growth in sales volume for video cattle auctions during the past five years has been impressive. Sellers use methods and strategies at video auctions that are substantially different from those used at traditional auctions including selling larger lots for future delivery, providing their own estimates of delivered weight, and overturning transportation costs to buyers. These differences require a unique approach to cattle pricing at video auctions and require buyers and sellers to understand the relative premiums and discounts associated with cattle quality, market information, and merchandising strategies at the different types of auctions.

teristic (large framed), and this result may be due to relatively few observations or simply a problem in classification rather than an actual structural pricing difference.

Table 4. OLS Parameter Estimates for Equation (3) for Pooled Data from the Traditional and Video Auctions

Independent Variable	Overall	Steers under 600 lbs.	Heifers under 600 lbs.	Steers 600 lbs. and over	Heifers 600 lbs. and over
Intercept	17.925	15.362	−41.454	14.826	−20.706
	(1.874)	(0.573)	(−2.065)*	(1.034)	(−0.878)
Physical Characteristics					
Breed					
English-Cross	0.823	1.740	1.165	0.671	−0.263
	(4.090)**	(3.276)**	(3.014)**	(2.582)**	(−0.654)
English-Exotic Cross	−0.823	−2.094	−1.400	−0.153	−0.290
	(−3.513)**	(−3.230)**	(−2.785)**	(−0.540)	(−0.654)
Exotic Cross	1.364	2.129	2.096	1.022	0.759
	(5.834)**	(3.313)*	(4.496)**	(3.564)**	(1.658)
Dairy	−10.154	−11.934	−14.552	−8.257	N/A
	(−20.282)**	(−10.560)**	(−6.591)**	(−16.917)**	
Frame					
Large	12.989	18.705	8.741	9.966	6.380
	(11.869)**	(8.067)**	(4.826)**	(4.882)**	(8.368)**
Medium-Large	12.363	17.322	8.526	9.901	5.821
	(11.701)**	(8.010)**	(5.041)**	(4.903)**	(10.521)**
Medium	8.859	13.856	6.543	6.081	N/A
	(8.321)**	(6.453)**	(3.863)**	(2.988)**	
Flesh					
Medium-Heavy	−1.912	1.573	−3.441	−1.028	−1.009
	(−2.452)*	(0.568)	(−1.823)	(−1.115)	(−0.880)
Medium	−0.782	1.965	−1.095	−0.561	−0.360
	(−1.036)	(0.768)	(−0.608)	(−0.614)	(−0.333)
Light-Medium	−1.563	0.070	−0.361	−0.748	−1.393
	(−1.979)*	(0.027)	(−0.197)	(−0.711)	(−1.061)
Horns					
No Horns	1.154	1.203	0.202	1.490	0.796
	(4.107)**	(1.836)	(0.307)	(4.572)**	(1.319)
Some Horns	1.187	1.488	0.396	1.619	0.250
	(3.380)**	(1.563)	(0.490)	(4.165)**	(0.338)
Market Conditions					
Futures	1.056	1.123	1.815	0.916	0.324
	(7.872)**	(2.988)**	(6.655)**	(5.606)**	(1.262)
1st Quarter	−0.253	−1.385	−0.420	0.442	0.008
	(−0.913)	(−2.030)*	(−0.769)	(1.112)	(0.015)
3rd Quarter	2.066	−0.391	9.252	2.379	2.997
	(2.167)*	(−0.085)	(2.183)*	(2.324)*	(1.573)
4th Quarter	−0.974	−5.387	2.943	2.087	1.763
	(−0.975)	(−1.142)	(0.764)	(1.849)	(0.907)
General Lot Characteristics					
Number	0.201	0.328	0.256	0.132	0.192
	(16.308)**	(6.891)**	(8.339)**	(10.115)**	(9.530)**
Weight	−0.100	−0.100	−0.065	−0.046	0.168
	(−23.878)**	(−3.334)**	(−2.852)**	(−2.043)*	(4.119)**
Steers	5.840	N/A	N/A	N/A	N/A
	(37.786)**				
Number Squared	−0.002	−0.004	−0.002	−0.001	−0.002
	(−11.449)**	(−4.541)**	(−4.988)**	(6.783)**	(−6.783)**
Weight Squared	0.000	0.000	0.000	0.000	0.000
	(16.051)**	(1.341)	(1.203)	(1.388)	(−4.453)**

Table 4. Continued

Independent Variable	Overall	Steers under 600 lbs.	Heifers under 600 lbs.	Steers 600 lbs. and over	Heifers 600 lbs. and over
Merchandising Strategies					
WRISK	−0.516 (−3.671)**	−0.071 (−0.094)	0.477 (0.655)	−0.317 (−1.603)	−0.573 (−2.541)*
Uniform	−0.245 (−0.478)	−0.806 (−0.546)	−0.351 (−0.373)	0.031 (0.051)	0.624 (0.548)
Unmixed	−0.067 (−0.079)	0.266 (0.125)	0.881 (0.340)	3.116 (1.705)	0.590 (0.264)
Date	0.022 (3.053)**	0.020 (0.659)	0.001 (0.024)	0.023 (2.641)**	0.003 (0.321)
Intercept Dummies					
Market[a]	45.333 (3.144)**	25.800 (0.310)	73.829 (1.307)	22.794 (1.018)	76.660 (1.371)
1988[b]	−0.948 (−0.857)	3.588 (0.708)	3.657 (0.819)	−1.121 (−0.861)	−1.876 (−1.138)
1989[c]	−1.179 (−0.882)	2.840 (0.527)	2.357 (0.509)	−1.104 (−0.610)	−0.996 (−0.444)
		Slope Dummies			
Physical Characteristics					
Breed					
English-Cross	−1.779 (−1.455)	−6.656 (−1.518)	−0.570 (−0.139)	0.123 (0.079)	0.258 (0.147)
English-Exotic Cross	0.156 (0.133)	1.148 (0.300)	1.310 (0.362)	1.374 (0.908)	0.196 (0.113)
Exotic Cross	−2.077 (−1.514)	−4.977 (−1.005)	−3.352 (−0.738)	−0.379 (−0.210)	0.152 (0.071)
Frame					
Large	1.750 (0.586)	−4.391 (−2.413)*	−1.940 (−1.030)	−1.194 (−0.395)	1.933 (0.531)
Medium-Large	2.566 (0.868)	N/A	N/A	−1.194 (−0.399)	1.854 (0.542)
Flesh					
Medium Heavy	−2.795 (−1.059)	−4.789 (−0.484)	−2.264 (−0.906)	−1.631 (−0.691)	−4.333 (−1.071)
Medium	−4.667 (−1.836)	−5.898 (−0.764)	N/A	−2.206 (−0.975)	−5.594 (−1.456)
Light-Medium	−3.216 (−1.203)	−3.996 (−0.451)	N/A	−1.785 (−0.711)	N/A
Horn					
Some Horns	−0.159 (−0.289)	1.322 (0.793)	−0.438 (−0.253)	−0.362 (−0.560)	0.338 (0.318)
Market Conditions					
Futures	−0.326 (−1.755)	−0.512 (−0.662)	−0.900 (−1.769)	−0.098 (−0.470)	0.137 (0.384)
1st Quarter	1.012 (1.128)	0.462 (0.116)	4.156 (1.092)	1.486 (1.538)	2.161 (1.193)
General Lot Characteristics					
Weight	0.002 (0.117)	0.172 (0.615)	−0.007 (−0.040)	−0.004 (−0.096)	−0.189 (−1.365)
Number	−0.199 (−15.232)**	−0.306 (−4.695)**	−0.319 (−4.229)**	−0.130 (−9.391)**	−0.189 (−8.427)**
Steers	0.733 (1.549)	N/A	N/A	N/A	N/A

Table 4. Continued

Independent Variable	Overall	Steers under 600 lbs.	Heifers under 600 lbs.	Steers 600 lbs. and over	Heifers 600 lbs. and over
Number Squared	0.002 (11.419)**	0.004 (4.426)**	0.003 (4.979)**	0.001 (6.783)**	0.002 (6.708)**
Weight Squared	−0.000 (−1.652)	−0.000 (−0.739)	−0.000 (−0.011)	−0.000 (−0.096)	0.000 (1.312)
Merchandising Strategies					
Uniform	0.120 (0.165)	0.566 (0.216)	−1.902 (−0.953)	−0.171 (−0.201)	−0.103 (−0.073)
Adjusted R^2	.787	.776	.711	.792	.767
Number of obs.	3,372	705	885	1,144	638
RMSE	4.001	4.990	4.289	2.756	3.154
Model *F* Value	277.783**	58.924**	55.432**	102.289**	53.441**
Chow Test for Structural Differences	25.6188**	3.3822**	2.8802**	9.3281**	6.0050**

Note: *t*-values are in parentheses. An asterisk denotes statistically different from zero at the 5% level; double asterisks denote statistically different from zero at the 1% level. N/A = not applicable.
[a] Binary variable equal to one for video auction lots and zero otherwise.
[b] Binary variable equal to one for lots sold in 1988 and zero otherwise.
[c] Binary variable equal to one for lots sold in 1989 and zero otherwise.

A test for structural pricing differences between video and traditional auctions is presented here using pooled data for four traditional cattle auctions in Kansas and the nation's largest satellite video auction. Premiums and discounts for various cattle quality characteristics and reactions to market information are fundamentally equal at the two different types of markets. However, optimum lot size is larger at video auctions than at traditional auctions due to the inability of buyers to pool video auction lots for shipment and the wish to match lot size with that desired by feedlots.

Merchandising strategies play a key role in cattle pricing at video auctions, and more sophisticated strategies are required to maximize prices at video than at traditional auctions. For example, establishing delivery dates based on price trends can increase prices. An educational effort should be made through the Cooperative Extension Service to inform buyers and sellers how to analyze video auction merchandising methods to determine optimum strategies for this type of market.

Video auctions accommodate large transactions well, unlike traditional auctions that seem to be designed to facilitate relatively small transactions. This suggests that future research

Table 5. Percentage by Volume of SLA Lots Located in Kansas and Nebraska Purchased by Separate Buyer Types, 1987-89

Buyer Type	Year			Total
	1987	1988	1989	1987–89
	Percentage of Volume			
Large Feedlot (over 10,000 head capacity)	18.5	22.3	16.4	18.9
Order Buyers	41.5	56.0	46.4	48.2
Intermediate-Sized Feedlot (between 3,000 and 10,000 head capacity)	1.0	8.0	7.7	6.0
Farmer Feeders (less than 3,000 head capacity)	21.1	3.0	9.7	10.6
Wheat Farmers/Ranchers	7.2	3.2	8.1	6.3
Unknown Buyer Type	10.7	7.5	11.7	10.0

Source: SLA (1990).

regarding relative cattle pricing between video and traditional markets should center on markets where relatively large transactions such as direct sales are occurring. Since video auctions appear to provide an efficient method for pricing large and dispersed lots of cattle, it is likely that the volume of cattle sold at video auctions will continue to increase. Video auctions also may play an important role in improving overall cattle market efficiency by reducing transaction costs, providing additional price information, and possibly acting as a catalyst to improve grades and standards for feeder cattle.

[*Received October 1989; final revision received June 1991.*]

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