

The Role of Transaction Costs in Market Selection: Market Selection in Commercial Feeder Cattle Operations

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Abstract

A survey of commercial feeder cattle operations in Utah revealed that explicit transaction costs such as transportation, shrink, and commissions can not fully explain how marketing alternatives are selected. Implicit transaction costs appear to play a critical role in the determination of market selection. For example, the level of trust between buyer and seller and the socio-economic characteristics of market participants are determinants of which marketing method will be used to sell feeder cattle.

Key Words: Transaction costs economics, feeder cattle, traditional markets, electronic markets

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Introduction

The potential for reducing transaction and processing costs are commonly cited as important economic incentives driving change in cattle markets. For example, Bailey, Peterson, and Brorsen suggest that transaction costs can be reduced by using electronic markets, such as video and internet auctions, and these markets have become important methods for selling feeder cattle. Although electronic markets reduce some transaction costs, traditional methods for marketing feeder cattle, such as ring auctions and direct sales remain very important, even dominant, methods for marketing feeder cattle.¹

If transaction costs play a fundamental role in market selection, an examination of how transaction costs affect the behavior of buyers and sellers in feeder cattle markets is important. Some transaction costs are explicit and relatively easy to observe such as trucking, shrink, and commission charges. Other transaction costs are implicit and difficult to observe but also play an important role in determining the method sellers select to market cattle. Implicit costs are related to the level of information and trust between an individual buyer and seller when they complete individual transactions. Models incorporating transaction cost economics (TCE) require the inclusion of both explicit and implicit transaction costs as determinants of market selection (e.g., Williamson (1975) and (1986)).

¹ Van Dyke estimates on a nationwide basis that between 50%-55% of all feeder cattle are marketed using traditional “ring” auctions, about 30% using direct sales, about 15% using video auctions, and less than 5% (probably 2%) using internet auctions. In the western United States, Van Dyke estimates that about 40% of feeder cattle are sold using traditional auctions and 40% using direct sales.

Further, implicit transaction costs relate to real and perceived risk buyers and sellers face when completing market transactions. These costs are difficult to measure because they are incurred during events that are somewhat rare and vary greatly in severity (such as the cost of enforcing contract terms when the trading partner is perceived to have violated an agreement to sell/purchase), and because each market participant places his or her own subjective probability distribution on the likelihood and costliness of these events. This suggests that perceived risks associated with different types of marketing methods are idiosyncratic to market participants and could be influenced by experience or demographic characteristics. Consequently, individual producer characteristics should at least partially explain why similar producers choose to market their cattle by different methods.

The purpose of this paper is to examine explicit and implicit transaction costs associated with marketing feeder cattle by different methods and, as a result, offer possible explanations for why different producers select different methods for marketing their cattle. The analysis focuses on producers' decisions to use either traditional or electronic marketing methods to price feeder cattle. We choose these classifications because electronic markets may significantly reduce explicit transaction costs and have become an important method for marketing feeder cattle. However, electronic markets still represent a small part of total feeder cattle sales compared to traditional methods like direct sales and ring auctions (Van Dyke). Our findings suggest that explicit transaction costs such as trucking, shrink, and commission charges cannot fully explain the sellers' choice of a marketing method. Our results also indicate that relationships of trust matter

when completing transactions in feeder cattle markets and that these relationships appear to change only when a problem with an incumbent marketing method occurs.

A Case Study of Electronic Marketing

Superior Livestock Auction (SLA) is a satellite, video cattle auction headquartered at Brush, Colorado. It is the largest cattle auction of any kind in the United States and offered over 2 million head of cattle for sale in 2001. SLA is owned by Jim Odle. Odle's involvement in cattle auctions began in the early 1960s when he took a job sorting cattle at a local sale barn after his farm experienced two consecutive crop failures due to hail. In 1965, Odle purchased the sale barn where he was working and by 1971 he had sold the original facility and purchased another cattle auction.

During the mid-to-late 1970s Odle helped pioneer video auctions, through his company Odle Auction. The original version of video auctions consisted of cattle being video taped on the farm or ranch where they were located. These videotape "clips" of cattle, together with written descriptions, were then shown to potential buyers at central locations and an auction was held. Odle held centralized, video auctions in Denver. During this period, Virginia Tech and Texas A&M University formed an advisory panel of market participants, including Mr. Odle, to advise them on how best to develop electronic markets. Some of Odle's initial ideas about video auctions were generated from his involvement on this advisory panel.²

Odle Auction's 1986 merger with Amarillo Livestock Video Auction (ALVA) formed SLA. ALVA's experience with satellite, video auctions provided the means for SLA to become a serious, nationwide player in markets using satellite technology to

² Virginia Tech and Texas A&M were early pioneers in developed telephone and computer -based marketing systems for lambs and cattle, respectively.

market cattle.³ Odle developed a successful model for satellite video auctions. His basic marketing strategy was to not change the way buyers and sellers were accustomed to completing transactions. Cattle were viewed, described, and auctioned immediately following the ring auction model. Buyers were informed if their bid was accepted immediately following the last bid on a particular lot of cattle. Sellers maintained control of the cattle prior to sale. They helped develop the description of their cattle used during the sale and they could choose to reject a bid (no sale) their cattle. Consignment representatives were required to be honest and the forward contract specifications for each lot were strictly enforced. Odle saw the need to educate buyers and sellers about the new technology SLA was using so he sponsored public seminars, satellite downlinks, and trained consignment representatives in public relations. As a result, within five years of the merger, SLA became the dominant satellite, video auction in the country.

SLA and other satellite, video auctions successfully applied new technology to reduce transaction costs and buyers and sellers responded in large numbers. However, the market share for video and other electronic markets has grown only slowly in recent years. The slow growth in market share for electronic markets appears to contradict their ability to reduce transaction costs. One possible explanation is that electronic markets reduce only some transaction costs while not reducing or perhaps even increasing others for some market participants. Our analysis uses transaction cost economics to identify the different explicit and implicit costs associated with completing transactions in traditional and electronic markets and consequently to offer possible explanations for why similar producers use different methods to market their feeder cattle.

³ For a more detailed description of SLA's satellite, video auction see Bailey, Peterson, and Brorsen.

Transaction Cost Economics

Transaction cost economics (TCE) stems from Coase (1937), who noted that exchange should be organized within markets until the (transaction) cost of using the market outweighs the cost to organizing the same exchange within a firm. Williamson ((1975) and (1985)) further developed Coase's idea and created a justification for and classification scheme of transaction costs. According to Williamson, transaction costs consist of the costs of finding a bargaining partner, negotiating a sale agreement, and monitoring/enforcing performance of the terms of trade. This is the classification scheme used by Hobbs (1997) who divided transaction costs into three broad categories—information costs, negotiation costs, and monitoring costs. Shelanski and Klein (1995) divide transaction costs into uncertainty about future conditions, complexity of the transaction, and the frequency of trade. These costs could conceivably be fit into Hobbs' scheme, with uncertainty increasing information, negotiation and monitoring costs, complexity increasing negotiation and monitoring cost, and frequency of trade reducing information and negotiation costs. This is the tactic we use, as we follow Hobbs (1997) classification scheme in our survey and analysis below.⁴

In addition to the costs identified above, transportation costs are also often included in transaction costs, since transportation costs borne by the seller are a transaction-specific investment not necessarily related to production. Transportation costs are shown by Joskow (1988) to be a key explanation for the marketing method used in coal markets in the United Kingdom (UK). Hobbs includes cost of transporting cattle

⁴ This classification scheme is not without controversy. Indeed, defining transaction costs turns out to be somewhat problematic. Cheung (1998) adopts a much broader definition, noting that transaction costs include “. . . just about all the conceivable costs in society except those associated with the physical processes of production” (p. 515), although he does not include transportation costs in transaction costs.

to an auction or to a meat packer when she estimates the effect of transaction costs on fed cattle sales methods in the UK. However, she ultimately concludes that transportation costs are not a significant predictor of the marketing method selected.

Besides Hobbs, other studies of agricultural markets using the TCE paradigm include Frank and Henderson (several agricultural industries in the United States); Wilson (New England fresh fish market); and Acheson (Maine lobster market). This paper applies TCE to decisions by feeder cattle producers in one western state to explain market selection decisions. Feeder cattle producers have a number of potential methods for marketing cattle. The reasons for selecting a particular method are of interest since they at least partially explain why different market segments exist and also give information to sellers and buyers to make their marketing decisions more efficient.⁵

Methodology

The existence of different cattle marketing methods suggests that the market is segmented and different alternatives are needed to address the different characteristics and needs of feeder cattle producers. Factors leading to market segmentation are probably economic and socio-economic. As mentioned above, significant new cattle marketing methods have emerged during the last 10-15 years and have broadened the choices available to feeder cattle producers. This paper focuses on explaining the selection between traditional and electronic marketing methods since electronic markets have shown promise in reducing some transaction costs (Bailey, Peterson, and Brorsen).

⁵ Understanding the motivations for marketing using a particular method may provide buyers and auction owners with information about why some feeder cattle producers market through them while others do not. It also helps sellers to understand the motivations associated with market selection of other sellers.

During the summer of 2001, approximately 350 surveys were mailed to feeder cattle producers and auction owners in Utah asking them to describe their perceptions of four different marketing methods. A total of 159 useable surveys were returned. The survey focused on “commercial” operators, since those receiving the survey were active participants in the Utah Cattlemens’ Association.

Commercial operators were the focus of the survey since they market most feeder cattle⁶ and represent producers having a substantial commitment to the cattle business and who are not just “hobby” farmers or ranchers. For example, about half of the survey respondents marketed fewer than 100 calves during the year 2000 (48.4%) while about 90% of Utah cattle producers as a whole marketed fewer than 100 calves according to the *1997 Census of Agriculture* (USDA, NASS). Respondents marketing more than 500 calves in 2000 comprised 18.2% of the sample but only about 1% of all producers marketing calves in Utah according to the *1997 Census of Agriculture* (USDA, NASS). While the average size of these operations is considerably larger than the general ranching population, it is not atypical for commercial ranching operations in the western United States.

Respondents were asked to indicate their perceptions of the transaction costs incurred in using four different types of pricing methods—traditional auctions, direct sales to buyers, video auctions, and internet auctions. The participants were asked to respond to all questions for all pricing types even if they had not used one or some of the different methods.⁷ These marketing methods were selected for analysis because they

⁶ Approximately 80% of cattle and calf sales in Utah are from farms and ranches selling more than 100 head (*1997 Census of Agriculture*).

⁷ This provided respondents’ perceptions regarding each of the marketing methods that were used to identify why they did or did not use a particular method to market their feeder cattle.

represent the principal methods for marketing cattle in the United States and because they can be divided into traditional methods (traditional auctions and direct sales) and new and emerging methods (video and internet auctions). Some questions elicited respondents' perceptions of explicit transaction costs for each method while some questions determined perceptions of implicit costs for each marketing alternative.

We follow Hobbs (1997) who divided transaction costs into three broad categories—information costs, negotiation costs, and monitoring costs. The survey was designed specifically to elicit feeder cattle producers' perceptions of costs for each marketing method in each of these three categories.

Table 1 lists the variables used to measure transaction costs in the survey and also describes these variables as measuring either information, negotiation, or monitoring costs. Variables measuring the socio-economic characteristics of respondents are also described in Table 1.

Information costs are costs associated with sellers obtaining information about markets and providing information to buyers before cattle are sold (Hobbs). In this study they are measured by survey responses for the following variables: 1) uncertainty prior to the sale about the price that will be received using a particular selling method (*UCPRICE*), 2) whether or not buyers obtain enough information prior to the sale to place an accurate bid for the cattle (*INFOBUY*), and 3) whether or not there are enough potential buyers bidding on the cattle to ensure a competitive price (*COMPETE*).

Negotiation costs are costs associated with the give and take between buyers and sellers as they decide the terms of a transaction (Hobbs). Negotiation costs are measured by survey questions as: 1) trucking costs which are measured using the miles the seller

ships the cattle using each selling method as a proxy variable (*MILES*), 2) the percentage shrink the cattle incur in transit while in the sellers' possession using each method (*SHRINK*), 3) the sellers' perception of whether commission costs are high or low for each method (*COMMISS*), 4) the seller's perception of the risk the cattle will be "no sold" using each method, 5) whether or not the seller believes his/her cattle are properly handled between the time they leave the ranch and when the buyer takes possession (*HANDLE*), 6) whether or not the market is held frequently enough to met the seller's needs (*MARKFREQ*), and 7) the amount of time spent in hours to complete one transaction using each of the different marketing methods (*TIME*) (Table 1).

Monitoring costs are the costs of supervising the terms and conditions of the sale after it is completed (Hobbs). In the survey, monitoring costs are measured as: 1) the respondent's perceptions of whether or not full payment is received quickly after the sale (*SPEED*) and 2) the level of trust the seller has that the buyer will fully meet all the terms and conditions of the sale (*TRUST*). The socio-economic characteristics of the respondents may influence their perceptions of the transaction costs associated with each marketing method. The socio-economic characteristics collected from the respondents are the following: 1) whether or not the respondent considered himself/herself a rancher, auction owner/employee, cattle buyer, purebred operator, or a combination of these categories (*RANCHER*), 2) the size of the operation (*SMALL*, *MEDIUM*, or *LARGE*), 3) the respondent's level of experience in the cattle business (*EXPER*), 4) the respondent's age (*AGE*), and 5) respondent's level of formal education (*HIGHSCH*, *SOMECOL*, *COLLEGE*, or *POSTGRAD*) (Table 1). The level of influence each of the variables described in Table 1 exerts on the selection of a particular marketing method is measured

by a linear regression of the proportion of cattle sold (calves and yearlings) by each method on transaction costs and socio-economic characteristics. The regression equation for each marketing method was specified as the following:

$$(1) \\ P_{ijk} = \alpha_j + \sum_{l=1}^3 \beta_{jl} IC_{ijl} + \sum_{m=1}^7 \delta_{jm} NC_{ijm} + \sum_{n=1}^2 \varphi_{jn} MC_{ijn} + \sum_{p=1}^8 \gamma_{jp} SOC_{ijp} + \lambda_j YEARNING_{ijk} + \varepsilon_{ijk}$$

where P_{ijk} is the proportion of cattle sold by the i^{th} seller in the j^{th} market type ($j =$ traditional auctions, direct sales, video auctions, and internet auctions)⁸ for the k^{th} cattle type ($k =$ calves, yearlings). IC , NC , and MC are the respondent's attitudes about informational costs, negotiation costs, and monitoring costs, respectively ($l = UCPRICE$, $INFOBUY$, and $COMPETE$; $m = MILES$, $SHRINK$, $COMMISS$, $NOSALE$, $HANDLE$, $MARLFREQ$, and $TIME$; and $n = SPEED$ and $TRUST$). SOC represents the socio-economic characteristics of the respondent ($p = RANCHER$, $MEDIUM$, $LARGE$, $EXPER$, AGE , $SOMECOL$, $COLLEGE$, and $POSTGRAD$). $YEARNING$ is a dummy variable equal to one if k equals yearling and zero otherwise. The α s are constants; β , δ , φ , γ and λ are parameter estimates; and ε is the error term. Since the P s are proportions, the error terms of the four models are expected to be correlated, the parameters of equation (1) were estimated using the seemingly unrelated regression (SUR) routine in the PROC MODEL statement of SAS.

Sellers might choose a marketing method either because they are satisfied with that alternative or because they are less satisfied with other alternatives. To test sellers' relative level of satisfaction with different marketing alternatives we compared the

⁸ Separate models are run for each market type.

average survey responses given by traditional marketers⁹ about traditional markets and electronic markets to the survey responses given by electronic marketers about traditional markets and electronic markets. A t-test for differences between mean responses was performed. The appropriate specification for the t-test depends on whether the variances of responses were the same for both groups, so an F-test was first used to determine whether variances of responses were the same and then the appropriate t-test was applied (Steel and Torrie).

Results

Table 2 reports respondent estimates of some of the explicit transaction costs incurred using each marketing method. These include the number of miles cattle are shipped at seller expense, shrink, and time required to complete one transaction. The numbers reported in Table 2 suggest that, on the average, respondents believe that explicit transaction costs could be reduced by using either video or internet auctions rather than traditional auctions or direct sales. The figures in Table 2 are not reported on a per-unit (per-animal) basis but would likely be even more unfavorable for traditional auctions on a per-unit basis since later on our results indicate that smaller producers tend to use traditional auctions.

Table 3 provides the average percentage of cattle sold by respondents during 2000 by each method. Clearly traditional methods dominate in terms of market share in this sample both in terms of number of respondents using each marketing method and in number of cattle marketed using each method. These results, along with those reported on Table 2, suggest that explicit transaction costs can not fully explain the market

⁹ Traditional marketers marketed more than 50% of their calves sold using either traditional auctions or direct sales in 2000 while electronic marketers marketed more than 50% of the calves using either video

selection process for our sample. On the average, less expensive alternatives, in terms of explicit costs (i.e., video and internet auctions) are not preferred by most respondents.

Table 4 provides selected average characteristics of survey respondents that sold 50% or more of their calves using one of the marketing alternatives during 2000.

Traditional auction sellers tended to be part-time, small operators. And, not surprisingly, traditional auction sellers also ship their cattle farther incurring more shrink loss than sellers that primarily use one of the three other methods. Sellers using primarily direct sales tend to be larger, full-time operators compared to those primarily using other selling methods. Video auction sellers also tend to be full-time operators but are somewhat better educated, on the average, than direct sellers.

There are too few observations of persons selling primarily using internet auctions to interpret the numbers in Table 4 for internet sellers with confidence. However, the internet sellers responding to the survey were mostly small operators with fewer years of experience than sellers primarily using one of the other three methods. Also, only half of the internet sellers consider themselves ranchers (i.e, they consider themselves either cattle buyers, purebred operators, or auction employees/owners).

Parameter estimates for equation (1) are found in Table 5 and provide some additional insights about the determinants of market selection. Information costs appear to be a relatively more important determinant of sellers using traditional auctions than for those using other marketing methods. The perceived level of competition is a statistically significant influence on sellers choosing to market their cattle through traditional auctions

auctions or internet auctions during 2000.

(*COMPETE* in 2nd column of Table 5). The level of sales at internet auctions¹⁰ can also be partially explained by the seller's perception of the level of competition at the auction.

INFOBUY is a statistically significant determinant of sales at traditional auctions and *UCPRICE* is close to being statistically significant for the traditional auction model. This suggests that, traditional auction sellers appear to be confident about the price they will receive at traditional auctions but are uncertain about buyers receiving enough information about their cattle to place an accurate bid. Conversely, direct sellers have confidence that buyers are able to inspect their cattle well enough to place an accurate bid (*INFOBUY*). This may suggest that sellers using the two different methods (traditional auctions or direct sales) have different perceptions about the quality of the cattle they are selling. Those believing they have superior cattle may choose to have a detailed, close-up inspection by a buyer while those believing their cattle to be of only average or even below average quality would select traditional auctions as a selling method.¹¹

Negotiation costs appear to also play an important role in market selection. Convenience is an important determinant since market frequency (*MARKFREQ*) is statistically significant for sellers using direct sales and video auctions. Both of these methods (direct sales and video auctions) are relatively infrequent¹² compared to traditional auctions. However, most cattle producers also sell infrequently (perhaps once per year) so a regularly held market may be less important to many sellers than a market that is held at a convenient time.¹³ Internet sellers appear to have confidence that they

¹⁰ Results for internet auctions should be interpreted with caution since only 36 observations were made.

¹¹ Bailey, Peterson, and Brorsen also suggest that cattle sold at traditional auctions are lower quality, on the average, than cattle sold through video auctions.

¹² Video auctions are typically held monthly or biweekly and direct sales are typically at arranged times.

¹³ Many direct sales occur in the fall in the western states and video auctions increase their frequency during the fall calf run.

will not need to reject a buyer's bid. Conversely, the risk of rejecting a bid appears to reduce the number of cattle sold at video auctions (*NOSALE*). Video auctions sometimes have a significant percentage of rejected bids when market prices are declining since sellers' price expectations are not met (Odle). Since internet sales are not instantaneous like video auctions, sellers' expectations have more time to adjust and may account for this result. *SHRINK* was a significant determinant of sales at video auctions. Video auction sellers tend to ship their cattle less distance than sellers using other methods (Table 4) which explains the negative, significant coefficient for *SHRINK* in the video auction model.

Our results also suggest that monitoring costs play an important role in market selection for feeder cattle. *TRUST* is a significant, positive determinant of sales at both traditional and video auctions. Initially the parameter estimate for *TRUST* in the direct sales model was negative and significant. Further investigation revealed that while both medium and large-sized operations using direct sales had higher scores for *TRUST* in direct sales than those selling less than 50% of their calves using direct sales, medium-sized operations using direct sales still scored *TRUST* lower than large operations using direct sales did.

The reason for this result may be that large operations develop closer relationships with buyers than do smaller operations. This is a result of economies of size that make it more advantageous for buyers to develop close relationships with large sellers than with smaller sellers. The result may be a higher level of *TRUST* by large operations in the buyers they deal with than for smaller operators and their buyers. Once an interaction

term between medium-sized operations and *TRUST (MEDTRUST)* is added, the parameter estimate for *TRUST* for direct sellers becomes insignificant

The parameter estimates for the socio-economic characteristics of the respondents reveal that large operators tend to be direct sellers while smaller operators tend to use traditional auctions and, in a few cases, internet auctions. This is also demonstrated by the results reported in Table 4. Besides having incentives to build and maintain close relationships with large sellers, buyers may also enjoy scale economies in shipping large lots of cattle from a large ranch to a single feedlot. Direct sales are likely more efficient than traditional auctions and perhaps even video auctions for these types of transactions.

Cattle traders and others not classifying themselves as ranchers tend to sell larger proportions of their cattle through traditional and video auctions than ranchers do (*RANCHER*). The reason for this is not completely clear but it may be that auctions are well suited for cattle to be regrouped and packaged for sale than direct sales are.

In general, education level does not have much of an impact on which marketing method is used except in the case of internet auctions where more education contributes to their use. This is not surprising since persons with more formal education probably feel more comfortable with computer technology than those with less formal education.

Table 6 presents comparisons between survey responses of traditional marketers and electronic marketers using paired t-tests. When scoring the marketing methods they actually use, traditional and electronic marketers appear to be equally confident before selling their cattle about the price they will receive (*UCPRICE*), the information buyers receive prior to sale (*INFOBUY*), the frequency with which the market is held (*MARKFREQ*), the potential they will need to refuse a winning bid (*NOSALE*), the level

of commissions they will need to pay (*COMMISS*), the speed with which payment will be received (*SPEED*), and the level of trust they have that the transaction will be carried out properly (*TRUST*). Electronic marketers are more confident than traditional marketers that there are enough buyers participating in their market to ensure it is competitive (*COMPETE* t-test in 4th column of Table 6). However, electronic marketers are less sure that their cattle are handled properly in shipment. This is likely because electronic marketers typically lose title of their cattle prior to shipment and consequently monitor handling during shipment less than traditional marketers.

When scoring markets that are not their primary method for selling their cattle, traditional marketers have more negative attitudes about electronic markets in terms of the information buyers receive prior to sale (*INFOBUY*) and the frequency with which electronic markets are held (*MARKFREQ*) than electronic marketers have about traditional markets. Traditional marketers also have less trust (*TRUST*) in electronic markets than electronic marketers have in traditional markets (last column of Table 6). Not surprisingly, all of the scoring tends to be higher for markets that are the primary marketing method used compared to scoring for non-primary methods. But traditional marketers have more reservations about electronic markets than electronic marketers have about traditional markets. This suggests that experience and knowledge play a role in market selection since electronic marketers probably have experience selling in both traditional and electronic markets and, as a result, have a better attitude about both than do traditional marketers that may have experience only with traditional markets. Our results indicate that implicit transaction costs are important determinants of market

selection and that implicit costs are affected by the socio-economic characteristics of feeder cattle sellers.

Conclusions

The development of electronic marketing methods for feeder cattle has the potential to reduce both the transportation cost and shrinkage that cattle incur when they are sold. Reduction in these two costs led to a fairly rapid development of electronic marketing methods when they were first developed. Recently, however, the growth of electronic markets has slowed, and both internet and video auctions account for only a small portion of the cattle marketed in the United States. This suggests that cattle producers consider other costs in determining which market to use. Among these costs are the costs of providing information to potential buyers and ensuring that the marketing method chosen is competitive, assessing the risks involved in using each of the various marketing methods, developing trust in the buyers using each method, and ensuring that payment is made quickly. We grouped these transaction costs into information, negotiation and monitoring costs, and surveyed a group of commercial Utah cattle producers about their assessments of each of them. Our results suggest that relationships and experience play a critical role in market selection. Also, explicit transaction costs cannot fully explain why one marketing method is selected over another. Convenience, size of operation, and the level of trust the seller has that transactions will be carried out properly also influence market selection.

Table 1. Variables Used in the Market Selection Models.

Variable	Designation	Description in Survey/Specification in Regression^a
Information Costs		
Price Uncertainty	<i>UCPRICE</i>	How confident are you prior to selling your cattle about the price you will receive using each selling method? 1=not at all confident, 5=very confident. If score \geq 3 then <i>UCPRICE</i> =1
Information buyer receives prior to sale	<i>INFOBUY</i>	Do buyers receive enough information about the quality of your cattle so that they can place an accurate bid? 1=yes, 2=no, 3=uncertain. If score=1 then <i>INFOBUY</i> =1
Competitive market	<i>COMPETE</i>	Are there enough buyers to ensure the market is competitive? 1=yes, 2=no, 3=uncertain. If score=1 then <i>COMPETE</i> =1
Negotiation Costs		
Shipment Costs	<i>MILES</i>	What is the average distance in miles you will need to ship your cattle at your cost using each method?
Shrink Costs	<i>SHRINK</i>	What is the approximate percentage shrink your cattle will incur before the buyer takes delivery using each method?
Commission Costs	<i>COMMISS</i>	How do you rate the cost of commissions charged by each method? 1=too low, 5=way too high. If score \leq 3 then <i>COMMISS</i> =1
Risk of No Sale	<i>NOSALE</i>	How much risk is there that the price offered for your cattle will be so low that you will need to “no sale” the cattle? 1=not much risk to 5=quite a bit of risk. If score \leq 2 then <i>NOSALE</i> =1
Cattle handling	<i>HANDLE</i>	Do you believe your cattle will be properly transported and handled between the time they leave your ranch and when the buyer takes possession of the cattle? 1=yes, 2=no, 3=uncertain. If score=1 then <i>HANDLE</i> =1
Market frequency	<i>MARKFREQ</i>	Is the market held frequently enough to meet your particular needs? 1=yes, 2=no, 3=uncertain. If score=1 then <i>MARKFREQ</i> =1
Time Spent	<i>TIME</i>	How much time (in hours) do you believe you invest in terms of travel, time spent in negotiations, time spent at the auction, etc. to complete a transaction using each method?

Variable	Designation	Description in Survey/Specification in Regression^a
Monitoring Costs		
Speed of Payment	<i>SPEED</i>	Please rate the speed at which you receive full payment for your cattle using each method. 1=payment too slow to 5=payment received very quickly. If score \geq 3 then <i>SPEED</i> =1
Trust in buyer	<i>TRUST</i>	Please rate the level of trust you have that when you sell your cattle using each of the methods that the transaction will be carried out honestly, accurately and fairly. 1=not much trust to 5=complete trust. If score \geq 4 then <i>TRUST</i> =1
Socio-Economic Characteristics		
Type of Operation	<i>RANCHER</i>	<i>Rancher</i> =1, auction owner/employee, cattle buyer or purebred operator=0
Size of Operation	<i>SMALL</i>	=1 if Fewer than 100 calves marketed in 2000
	<i>MEDIUM</i>	=1 if Between 100 and 500 calves marketed in 2000
	<i>LARGE</i>	=1 if 500 or more calves marketed in 2000
Experience	<i>EXPER</i>	Number of years in the cattle business
Age	<i>AGE</i>	If under 50 then <i>AGE</i> =1
Education	<i>HIGHSCH</i>	=1 if High school graduate or less
	<i>SOMECOL</i>	=1 if attended some college
	<i>COLLEGE</i>	=1 if college graduate
	<i>POSTGRAD</i>	=1 if completed post-graduate work

^a Binary variables are indicated in the table by specifying when the variable was equal to 1, otherwise the value of the variable was 0.

Table 2. Producer-Estimated Average Transaction Costs Associated with Different Marketing Methods.

Method	Shipping Distance (Miles)	Shrink (%)	Time Required to Complete One Transaction (Hours)
Traditional Auction	86	4.12	11
Direct Sale	46	2.93	6
Video Auction	33	1.47	5
Internet Auction	20	1.30	3

Table 3. Average Percent of Cattle the Sample Sold by Different Methods During 2000.

Method	Calves		Yearlings	
	Respondents' %^a	Cattle %^b	Respondents%	Cattle%
Traditional Auction	26	11	37	10
Direct Sales	48	60	51	69
Video Auction	7	6	1	6
Internet Auction	2	1	2	0 ^c
Retained Ownership	16	23	10	15

^a Number of respondents in category divided by the total number of all respondents

^b Estimated using the midpoint of the number of head sold category.

^c Less than one-half of 1% sold by this method.

Table 4. Selected Average Characteristics for Market Participants Selling More than 50% of Their Calves Using Just One of the Marketing Method During 2000.

Characteristic	Traditional Auction	Direct Sales	Video Auction	Internet Auction
N	27	72	10	4
<i>P</i>	93	87	84	85
<i>MILES</i>	80	34	8 ^a	22
<i>Shrink (%)</i>	6.30	3.67	1.56	1.75
<i>TIME (hours)</i>	14	7	5	5
<i>EXPER (years)</i>	31	35	33	20
<i>RANCHER (%)</i>	78	93	100	50
<i>Large (%)</i>	0	28	0	0
<i>Medium (%)</i>	26	42	70	25
<i>Small (%)</i>	74	29	30	75
Under Age 50 (%)	44	42	40	25
Part-time Operators (%)	56	29	30	50
College Graduate or Above (%)	37	25	40	25

^a One outlying observation was eliminated before this calculation.

Table 5. Seemingly Unrelated Regression Parameter Estimates for the Market Selection Models (Equation (1)).

Independent Variable	Traditional Auction Model	Direct Sales Model	Video Auction Model	Internet Auction Model
Constant	34.366 (1.32)	-18.516 (-0.55)	32.141 (1.54)	2.890 (0.25)
<i>UCPRICE</i>	9.288 (1.55)	15.415 (1.17)	3.117 (0.44)	-0.973 (-0.20)
<i>INFOBUY</i>	-10.669 (-1.69)*	24.965 (1.97)**	5.129 (0.78)	-0.432 (-0.09)
<i>COMPETE</i>	14.500 (2.41)**	10.568 (1.41)	0.937 (0.13)	8.551 (1.80)*
<i>MARKFREQ</i>	-2.361 (-0.13)	19.306 (1.87)*	18.377 (2.60)**	2.050 (0.34)
<i>NOSALE</i>	4.443 (0.80)	1.391 (0.19)	-19.121 (-1.91)*	15.265 (2.16)**
<i>MILES</i>	-0.016 (-0.46)	-0.052 (-1.44)	0.019 (0.99)	0.013 (1.18)
<i>SHRINK</i>	0.257 (0.63)	-1.723 (-0.67)	-5.700 (-2.50)**	-1.362 (-0.82)
<i>COMMISS</i>	-4.731 (-0.82)	7.993 (0.66)	2.917 (0.47)	2.777 (0.62)
<i>HANDLE</i>	7.954 (1.22)	-12.988 (-0.97)	-3.691 (-0.49)	-8.698 (-1.64)
<i>SPEED</i>	5.496 (0.52)	23.677 (1.42)	0.237 (0.03)	-1.211 (-0.19)
<i>TRUST</i>	12.218 (2.16)**	-12.335 (-0.93)	20.059 (2.90)**	7.532 (1.21)
<i>TIME</i>	0.201 (1.31)	-0.105 (-0.39)	-0.065 (-0.45)	0.164 (0.32)
<i>RANCHER</i>	-25.168 (-2.57)**	3.333 (0.28)	-23.844 (-2.30)**	2.695 (0.35)
<i>MEDIUM</i>	-12.524 (-2.02)**	33.848 (1.99)**	18.903 (1.97)**	-13.223 (-2.28)**
<i>LARGE</i>	-37.683 (-5.60)**	29.626 (3.50)**	-4.008 (-0.51)	-5.521 (-0.95)
<i>EXPER</i>	0.074 (0.36)	0.041 (0.15)	0.248 (0.91)	-0.204 (-0.92)
<i>AGE</i>	-3.441 (-0.55)	-2.276 (-0.27)	9.826 (1.29)	-7.188 (-1.55)
<i>SOMECOL</i>	11.367 (1.53)	-7.509 (-0.79)	-37.830 (-3.12)**	12.286 (1.76)*
<i>COLLEGE</i>	1.498 (0.20)	-12.979 (-1.24)	-20.987 (-1.78)*	13.800 (2.05)**
<i>POSTGRAD</i>	-0.187 (-0.02)	-21.957 (-1.39)	-18.246 (-1.34)	18.305 (1.95)*
<i>YEARLING</i>	6.245 (1.24)	5.197 (0.81)	0.674 (0.12)	-3.076 (-0.94)
<i>MEDTRUST</i>		-15.861 (-0.87)		
N	178	152	81	36

t-values are in parentheses.

* Indicates statistically different than zero at the 10% level of confidence or better.

** Indicates statistically different than zero at the 5% level of confidence or better.

Table 6. Test for Differences in Selected Average Attitudes Between Sellers Using Primarily Traditional Electronic Markets.

Variable	Traditional Sellers Average Score for Traditional Markets (A)	Electronic Sellers' Average Score for Electronic Markets (B)	T-Value (A-B)	Traditional Sellers' Average Score for Electronic Markets (C)	Electronic Sellers' Average Score for Traditional Markets (D)	T-Value (C-D)
<i>UCPRICE</i> ^a	3.93	3.71	1.114	2.61	2.60	0.024
<i>INFOBUY</i> ^b	1.24	1.50	-1.386	2.20	1.50	4.562**
<i>COMPETE</i> ^b	1.52	1.00	7.788**	2.12	1.90	0.934
<i>MARKFREQ</i> ^b	1.09	1.14	-0.379	1.96	1.43	2.992**
<i>NOSALE</i> ^c	1.96	2.43	-1.509	3.09	2.70	1.056
<i>COMMISS</i> ^a	3.10	3.14	-0.192	3.66	3.25	1.565
<i>HANDLE</i> ^b	1.13	1.45	-2.055**	2.45	1.60	2.086**
<i>SPEED</i> ^a	4.45	4.42	0.134	3.11	3.45	-0.916
<i>TRUST</i> ^a	4.20	4.17	0.219	2.86	4.00	-3.746**

^a Likert scale ranking from 1 to 5 with 1 being the *least* favorable score and 5 the *most* favorable score.

^b Scored as 1=yes, 2=no, 3=uncertain.

^c Likert scale ranking from 1 to 5 with 1 being the *most* favorable score and 5 the *least* favorable score.

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