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The Value of Electronic Marketing -- Some Empirical Evidence

by

Dennis P. Helmreich, James E. Epperson
and Chung-Liang Huang

Department of Agricultrual Economics
Georgia Experiment Station
Experiment, GA 30212

Univ.

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Abstract

Georgia feeder cattle teleauction prices are determined to have been significantly greater than sale barn prices in 1979. Enhanced pricing efficiency in cattle marketing is indicated by results of the analysis. Further suggested are improvements in physical efficiency.

Introduction

There appears to be a new and dramatic surge in research concerned with improving the economic efficiency of agricultural markets. A major thrust in this direction has centered on the possible use of electronic marketing exchanges. Electronic devices used for this purpose include telephone, teletype, and computer systems.

This new direction has been based largely on theory. Several authors have espoused the theoretical merits of electronic marketing for improving pricing and operational efficiency (Johnson; Henderson et al.; Epperson and Moon). Commodities such as cattle, hogs, poultry, sheep, meat, cotton, and fresh produce have been identified as likely candidates for electronic exchanges because of thin markets (Johnson; Henderson et al.; Boggs; Holder; Kohler; Schrader et al.; Epperson and Moon).

In recent years electronic exchanges have developed in the U.S. and a few other countries. These are identified by Henderson et al., Russell and Purcell.

Since electronic marketing is relatively new, there is not a great deal of empirical evidence to support or refute theoretical

claims. However, studies completed thus far seem to support the merits of electronic markets. Studies showing improved pricing efficiency have been reported by Wen-Fong Lu, Lowe, Chang-Mei Lu, Henderson et al. and Holder (1979). Studies revealing possible physical efficiencies were reported by Johnson, Holder, and Henderson et al.

The purpose of this paper is to present empirical findings which add to the body of knowledge concerning the merits of electronic marketing. The avenue here is a study to ascertain possible pricing and physical efficiencies associated with teleauctions (telephone auctions) now operational in Georgia.

The aim in initiating teleauctions in Georgia was to increase significantly the number of buyers participating in an auction via a conference telephone medium. In order to encourage buyer participation large lots of feeder cattle of relatively uniform quality are organized prior to the sale. Thus, buyers bid, via a conference telephone network established for the auction, on the basis of lot descriptions which are designed to accurately convey attributes of the cattle.

Feeder cattle are not brought to a central location but remain on the farm or local pooling locations for direct delivery to feed lots or backgrounding operations. Operational efficiencies are expected from this procedure since there is less cross hauling, handling and comingling of cattle. This should result in less shrink, sickness, crippling, and death loss.

Pricing efficiencies should result from a balancing of market power between buyers and sellers. With many buyers participating in a

teleauction, spatial monopsonies or oligopsonies are reduced or eliminated. Spatial restrictions on arbitrage of price are lessened or negated through expansion of the market region via teleauction.

Teleauctions in Georgia

A Georgia feeder cattle teleauction typically begins with the sponsoring organization (or individual) gathering information about each lot of calves being offered for sale. The name, address and telephone number of each consignor is listed along with a description of each lot of calves being sold. Descriptions include sex, estimated weight, location of cattle, breed or color of the calves as well as when the buyer may pick up the calves, where the calves will be weighed, amount of shrink and number of cut-backs (cull of undesired calves) allowed. Generally included is a list of medications applied, other preconditioning practices performed and grade(s) assigned.

Once this information is compiled, it is printed in a prospectus and mailed to cattle buyers, known to sale sponsors, who may be interested in buying these calves. Buyers are encouraged to go to the farms and inspect calves prior to the sale. On sale day all buyers are connected on a conference telephone call with the auctioneer. Usually the sellers are included in the telephone hook up as well as a member of the cooperative extension service. This allows for dialogue between buyers and sellers and includes an impartial observer to answer any questions about the calves being auctioned.

Data and Price Comparisons

Teleauction sales appear to be tailored to meet the needs of today's feeder cattle buyers without inconveniencing sellers. This

suggests that calves sold in this manner will be more valuable to buyers. These buyers are expected to effectively communicate this increased value to sellers through stronger price signals. That is, teleauction prices are expected to exceed sale barn prices. Furthermore, with more buyers and sellers involved, more market information should be present when prices are established.

Prospectus information was gathered for 150 lots of feeder calves sold through 12 teleauctions held in Georgia in 1979. Included is the price actually paid for each lot. These prices are compared with prices paid for feeder cattle of similar size and same sex sold through Georgia sale barns in the weeks corresponding to each teleauction. Teleauction prices are hypothesized to be greater than sale barn prices, reflecting an increased efficiency with which these calves are being marketed.

Weekly averages of Georgia sale barn prices are reported for calves of various weights for choice and good grades. These grades were changed during the year to medium frame, numbers 1 and 2, respectively. Teleauction lots often included both good and choice cattle. In these instances, sale barn good and choice prices were correspondingly weighted to produce a meaningful comparison price.

Some lots offered for sale through teleauctions did not have a grade included with a description of the calves. These lots could not be included in the comparison. Necessarily excluded from the comparisons as well were heavier teleauction calves for which no corresponding sale barn prices were reported; i.e. choice steer calves over 800 pounds, good steer calves over 700 pounds, and good and

choice heifer calves over 600 pounds. These deletions resulted in a comparison of 73 teleauction prices with sale barn prices.

A null hypothesis postulating no difference between teleauction and sale barn prices may be stated as

$$H_o: \mu_T = \mu_{SB}$$

where μ_T = average of teleauction prices = \$83.1658/cwt.
μ_{SB} = average of sale barn prices = \$78.9606/cwt.

The calculated test statistic is $t = \frac{\bar{d}}{S_d} = 5.79 > t_{(.01,72)} \simeq 2.65$,

where:

$\bar{d}$ = average difference between teleauction and sale barn prices

S_d = standard deviation of difference between teleauction and sale barn prices.

This highly significant calculated t allows us to reject the null hypothesis that there is no difference between the two sets of prices. This suggests that prices paid through teleauctions are significantly greater than prices paid at sale barns, ceteris paribus. Calves sold through teleauctions are indicated to be differentiated in the minds of buyers to be significantly better in terms of possessing the attributes or qualities these buyers desire. Furthermore, it appears that quality and availability of information is enhanced, and prices more accurately reflect value differences due to quality, location, lot size, etc.

Higher average teleauction prices also suggest greater physical efficiency via teleauction. Sizeable lots of sexed feeder cattle of uniform size and quality are sold together through teleauctions and grouped at one point. They are ready to be loaded, weighed, and shipped directly to the location of the next production phase. This staging obviates the need for multiple stops by a trailer truck and

indicates a potential savings in transportation expense. Similarly, this implies that calves are not shipped as far, resulting in less shrink. Another benefit should be reduced chances for injury and transmission of communicable diseases as fewer lots are comingled. Better organization, reduced duplicity of handling, and reduced hauling should result in higher prices for sellers, given sufficient buyer competition.

Gains in efficiency, both physical and pricing, should be reflected in the premiums paid for teleauction feeder cattle. Accepting this price difference as an accurate indicator of increased efficiency, it is hypothesized that determinants of this difference are proxies for efficiency gains. Variations in characteristics of cattle sold through teleauctions may explain variations in the premium paid for these calves over sale barn prices. Hypothetically, explaining variations in, or predicting, this premium is tantamount to explaining efficiency gains resulting from adopting this marketing alternative.

Variables suggested by logic and economic theory are employed as independent variables in a multiple regression model explaining variations in the differences between teleauction prices and sale barn prices. The model is:

PD = f(Sex, Calf Wt., Load, Black X, Black, Other, Shrink)

where

PD = teleauction price - sale barn price in dollars per cwt.

Sex = 1 if lot is composed of steers

= 0 if lot is composed of heifers

Calf Wt. = estimated average calf weight in that lot, in lbs.

Load = Calf Wt. x number of head in that lot, in tons

Black X = percentage of the lot composed of Angus crossbred calves

Black = percentage of the lot composed of straightbred Angus

Other = percentage of the lot composed of calves which are not Angus or Angus crossbred

Shrink = shrink allowed on the lot, in percentage.

At different points in the cattle cycle, values of cattle vary according to sex and weight. Changing present and expected future values result in changes in price differentials between heifers and steers and among animals of different weights. In 1979, cattle buyers, through more conventional marketing avenues, discriminated against heifer feeder calves. It is expected that buyers through teleauctions will more strongly signal to producers, through prices, their preference for steer calves. A positive coefficient is expected here, associating steer calves with greater premiums paid for teleauction cattle.

Similarly, lighter calves were, in 1979, more valuable to buyers than heavier calves on a per weight basis. Differences in values based on weights should be more accurately reflected in teleauction prices. When lighter feeder calves, marketed in any fashion, are more valuable, this difference should be magnified by a more efficient marketing method, i.e., teleauction.

As load approaches trailer truck size, or multiples thereof, value of that lot should increase as savings from reduced shrink and hauling expense are expected. Correspondingly, an increase should be seen in the premium paid for teleauction calves in these larger lots. Buyers can effectively communicate through prices to sellers their

preference for larger lots of feeders. For these reasons, estimated load size is expected to be positively correlated with teleauction price premium.

Breed categories are included in the model since buyers are expected to communicate their preferences in this respect to sellers. Black crossbred calves are expected to be associated with premiums paid over sale barn prices. These calves are thought to have adequate frame size and "growthiness" (aided by heterosis) and desirable carcass quality. Straightbred Angus calves are typically thought of as being smaller framed and are apparently not as desirable to buyers. The Black X variable is expected to be positively related to teleauction premium while the Black variable should have a negative coefficient. The "Other" variable contains other straightbred calves and all crossbred calves which did not specifically include Angus blood. These calves are expected to be larger framed and "growthier" than straightbred Angus. This indicates that this variable will be positively correlated with price premium.

The amount of shrink allowed per lot varied from zero to three percent. This variable was expected to be positively related to the premium over sale barn price paid for teleauction cattle. As the allowed shrink increases, there is a corresponding decline in the net price paid for the calves.

Results

Results of the regression analysis are presented in Table 1. Since the three breed categories sum to 100, one of them had to be omitted from the initial run to prevent singularity. A second run was made with a zero intercept so that the full effects of each of the three breed variables on the dependent variable could be examined.

As expected, steer calves sold through teleauctions are significantly associated with positive premiums over sale barn prices for steers. This premium varied $5.12 per cwt. between heifers and steers, ceteris paribus, suggesting that buyers of calves through teleauctions are better able to indicate their preference for steer calves.

The negative coefficient on calf weight indicates that heavier feeder cattle brought less of a premium through teleauctions than the lighter calves. As with the sex variable, the coefficient's difference from zero is highly significant.

The coefficient on the load variable falls just short of being significantly different from zero. However, the positive sign reinforces expectations and suggests that larger lots lend themselves to greater efficiency in marketing. That is, larger lots are associated with greater premiums paid for teleauction calves.

Table 1. Coefficient Estimates and t-statistics for Two Equations Estimating Difference Between Teleauction Price and Sale Barn Price, in Dollars per Cwt., Georgia, 1979

	Equations			
	Coefficient	t-statistic	Coefficient	t-statistic
Intercept	10.404	(3.05)	0	-
Sex	5.119	(3.07)	5.119	(3.07)
Calf weight	-.021	(-3.13)	-.021	(-3.13)
Load	.061	(1.95)	.061	(1.95)
Black X	.018	(.78)	.122	(3.57)
Black	-.075	(-3.03)	.029	(0.80)
Other			.104	(3.05)
Shrink	.617	(0.98)	.617	(0.98)
R^2	.28			

Examining the results of the model with the zero intercept indicates that both the "Black X" variable as well as the "Other" variable are significantly related to a premium paid over sale barn prices. The positive coefficients on these variables appear to indicate a willingness by teleauction cattle buyers to pay a premium for calves which are not straightbred Angus. Angus calves are apparently not as desirable to these buyers. While this variable also is positively correlated with premium over sale barn prices, the coefficient is not significantly different from zero.

The positive coefficient on the shrink variable is as expected. However, the calculated t statistic suggests that the magnitude of this coefficient is insignificant. Surprisingly, buyers seem to be discounting in large part the amount of shrink allowed and disregarding this important bit of information as they bid through teleauctions.

Summary and Conclusions

Feeder calves sold through teleauctions in Georgia in 1979, brought significantly higher prices than calves of comparable quality sold through sale barn auctions during the same time periods. This difference is thought to be a reliable indicator of the increased efficiency with which these cattle are being marketed.

Economic theory suggests that greater price variability indicates greater pricing efficiency. Weekly averages of sale barn prices were used for comparisons with prices for individual lots of teleauction cattle. This dissimilarity precludes directly testing for differences in price variability in the two marketing methods. However, results of regression analysis tend to support the idea that greater price

variability is inherent in teleauction prices. That is, in terms of sex, calf weight, and breed categories, teleauction prices seem to more actively fluctuate as buyers are better able to articulate their demands for input characteristics.

Gains in physical efficiency, while not as powerfully supported by the analysis, seem to be present as well. Decreased costs of assembly and transportation are fairly strongly suggested.

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