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# ECONOMIC EVALUATION OF AN ALTERNATIVE MARKETING SYSTEM FOR FEEDER CATTLE IN ALABAMA

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### INTRODUCTION

Marketing systems for livestock in the United States have evolved with structural changes in the industry over the last 80 years. Marketing channels for cattle have shifted from delivery to large terminal centers to more decentralized markets because of changes in transportation and processing technology (Rhodes, p. 174; Sporleder, p. 101). With changes in structure, vertical coordination between the stages in the marketing channels increased. Market information about product supplies in breed and form of cattle preferred at each stage of production and processing has increased (Purcell, 1980).

Alabama, with over one million head of cattle, has become a major supplier of stocker and feeder cattle because of year-round available forage production. The traditional marketing channel for cattle has been through local auction markets. Even though these country auction markets provide a service to small producers, they can be costly and inefficient (Purcell, p. 148; Sporleder, p. 101). Sales volume and prices can be low at local markets, and producers can incur higher costs when selling. Cattle can be resold several times before final shipment to a feedlot which reduces the performance of the animals.

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### MARKETING BOARD ASSOCIATIONS

An alternative market channel to auction markets has developed in Alabama. Groups of commercial producers have formed Marketing Board Associations with assistance from the Alabama Cooperative Extension Service. The objective of Marketing Boards is similar in principle to electronic-marketing programs being developed in Texas for feeder cattle (Glazener; Sporleder) and in Virginia for slaughter cattle (Russell and Purcell). The first Marketing Board in Alabama was established in 1970 for feeder cattle; by 1980 there were five boards comprising 76 producers selling cattle valued at approximately \$4 million.

Membership in a Marketing Association has been made up of commercial producers who raise stocker cattle on high-quality, cool-season forages. Sales for all Associations occur during a 5-week period in April and May at a central location capable of accommodating all sellers and buyers. Cattle are sold by lots based on descriptions provided by the producer. Cattle buyers have the opportunity to visit a farm to inspect the cattle before a sale. Advertising of sales is done by each Association with most advertising in popular trade magazines. Immediately following a sale, contracts are signed and cattle are paid for by check. Pickup of cattle at the farm is agreed upon at the time of the sale.

### **OBJECTIVES**

An important objective of this study was to test for significant differences in prices and costs between Market Board Associations and auction market sales. The amount of difference would indicate the level of market efficiency between the two market channels. Because the marketing system of Marketing Associations relies on information provided by producers, testing the influence of producer-supplied information on final price received for their cattle was examined to determine the effect of information. To test for relative price efficiency in the two markets, prices were compared with the Kansas City feeder cattle market.

With cattle buyers having an opportunity to inspect cattle before a sale, characteristics about each lot of cattle not advertised by producers could affect price received. If these important animal characteristics were identified, this information could be incorporated into future Market Board sales. Marketing efficiency and vertical coordination between sellers and buyers could be enhanced.

### **METHODOLOGY**

To test the difference between the two market channels. data from nine Market Board sales were collected for 1979 and 1980. Prices and costs for each Market Board sale were compared to the average weekly market price at the Montgomery market (Alabama Department of Agriculture and Industries). The Montgomery market is the largest in the State, with two auction markets daily. As a delivery point for the Chicago Mercantile Exchange for feeder cattle, the market price is representative of national prices. Prices at the country auction markets, however, are slightly lower than the Montgomery prices because of smaller volumes and fewer buyers. Personnel at the Montgomery auction markets were contacted for information on marketing charges and fees. Conservative estimates on shrinkage and transportation to the auction markets were estimated. Statistical methods were used to test differences in results between the two market channels. To test for relative price efficiency, the Market Board and Montgomery prices were compared to the weekly average Kansas City price for feeder cattle (USDA). The relative differences would indicate how local prices compared with the price in a major buying market.

Price paid for each lot of cattle was regressed on lot characteristics supplied by each producer. Analysis would indicate the magnitude of influence of each factor on price paid. To test for lot characteristics not supplied by producers, but available if buyers visited the farm, 10 farms in the Southeast Marketing Association were visited and 27 lots of cattle were examined. Each lot of cattle was scored on muscling, frame size, finish, defects, USDA grade, uniformity in the lot, and accessibility to cattle on the farm. Age of cattle in a lot was determined from the producer. Correlation and regression analyses were used to test for relationships and effect of animal scores on price received.

### **RESULTS**

The five Market Board Associations are listed in table 1. Each Association had less than 30 members with each member selling, on the average, 219 head. Producers grouped their

Table 1: Characteristics of Marketing Board Association in Alabama for 1979-1980

	No. of p	roducers	No. of	No. of	No. of	
Association —	1979	1980	lots	head	head/lo	
Wiregrass	0	17	30	2,566	86	
West Central	11	29	60	6,630	111	
Southeast	18	18	78	10,478	134	
(North Central)	8	10	36	4,045	112	
North Alabama	2	2	17	1,490	88	
Total	39	76	221	25,209	114	

cattle into smaller lots, averaging 114 head per lot for the nine Market Board sales. The number of producers in the Association rose from 1979 to 1980 by 94 percent indicating an increase in participants for the 2 years of study.

# **Evaluating Pricing and Operational Efficiencies**

Results in comparing differences in prices and costs between the two market channels are listed in table 2. Average price for the Board sales was \$69.25 per hundredweight for 1979 and 1980. Within the same weight range and sex of cattle, the average Montgomery price was \$66.11 per hundredweight, a \$3.14 difference. The gross price margin was significantly different statistically at the 1 percent level. The Montgomery auction market was visited each week of a Board sale. No difference in the quality of animals being sold was observed between auction markets and Board sales. The only difference observed was that the number of cattle sold in each lot in auction sales was much smaller than in the Board sales.

Marketing cost in selling feeder cattle was an indicator of operational efficiency, table 2. Market charges, insurance, transportation to market, and liveweight shrinkage were calculated for each market. Total marketing cost at the auction markets was four times greater than marketing costs at the Board sales. Thus, the net difference in prices received at Market Board sales increased to \$7.62 per hundredweight above the Montgomery market. The price difference was significant at the 1 percent level.

The difference in the net price received after marketing cost indicated cost inefficiencies between the two market systems. Using a conservative estimate of 5 percent in liveweight shrinkage, loss in value of the animal produced was \$3.31 per hundredweight for the auction markets. From personal observations, even higher shrinkage percentages are believed to

Table 2. Prices and Costs for Feeder Cattle at Market Board Sales Versus MONTGOMERY AUCTION MARKET, 1979-1980

Revenues	Marketing board sales	Auction market	Difference	Std. error of difference in price
Price received	Dol./cwt. 69.25	Dol./cwt. 66.11	Dol./cwt. 3.14**	Dol./cwt. .9008
Marketing charge Shrink <sup>1</sup>	.15 1.39	$\frac{1.86}{3.31}$	$\frac{1.71}{1.92}$	_
Insurance Transportation <sup>2</sup>	_	.57 .28	.57 .28	_
Total	$\frac{1.54}{67.71}$	$6.02 \\ 60.09$	$\frac{4.48}{7.62**}$	.8640

<sup>&</sup>lt;sup>1</sup> Five percent was used to calculate auction market shrink. This is considered a conservative estimate with shrink believed to range from 6-8 percent. Sellers in the Associations take a 2 percent pencil shrink.

Transportation charge from farm to auction market estimated at \$2.00 per head.

\*\* Significance at the 1 percent level.

occur. With the addition of an auction market sales charge of 2.80 percent of the gross sale value per head, these two costs explained 81 percent of the net difference in marketing costs between the two markets. In contrast, the Marketing Board had low overhead costs, keeping operating costs to a minimum, approximately 15 cents per hundredweight.

To test relative differences in pricing efficiency, prices for medium No. 1 cattle for the two markets were compared to the weekly average price for feeder cattle in Kansas City, table 3. For steers, the price at Board sales was higher than the Montgomery auction markets for all weight classes except the 500-600 pound weight range. The average price for medium No. 1 steers was highest in the Kansas City market with the price of Board sales \$4.71 per hundredweight and the Montgomery price \$7.47 per hundredweight, respectively, lower than the Kansas City price. For medium No. 1 heifers, the same pattern followed as for steers except the Board sales' average price was higher for each weight class than the auction

Table 3. Average Prices for Medium No. 1 Feeder Cattle in Three Markets. BY SEX AND WEIGHT, 1979 AND 1980

		Heifers				
Weight	Market board	Montgomer market	Kansas <sup>Ty</sup> City market	Market board	Montgome market	Kansas <sup>ry</sup> City market
	Dol./cwt.	Dol./cwt.	Dol./cwt.	Dol./cwt.	Dol./cwt.	Dol./cwt.
500-600 lb	75.77	76.33	85.33	59.89	59.59	64.99
600-700 lb	71.42	67.26	74.75	60.50	57.64	62.01
700-800 lb	68.91	64.22	70.13	63.80	58.25	64.40
Av	72.03	69.27	76.74	61.40	58.49	63.80

market prices. The magnitude in price differentials relative to the Kansas City market, however, was smaller than for steers. Comparison of price differentials indicated higher pricing efficiency with Market Boards compared to the auction markets.

### Price Differences Between Market Board Sales

Price received for feeder cattle varied among Marketing Associations during 1979 and 1980. In the spring of 1979, live price for feeder cattle was in the low \$80's range. In 1980, spring feeder cattle prices dropped to the middle \$60's range. The average prices received for the 2 years by the five Associations are illustrated in table 4. The Wiregrass Association had the lowest price received and was under the Montgomery auction price for the same week by \$3.66 per hundredweight before marketing charges. From Duncan's test, this was significantly lower than the four other Associations. The reason for the low price at this Board sale was the small number of major buyers. Most of the major buyers were attending a larger auction sale which had previously been scheduled for that day.

The highest price difference occurred in the North Alabama Association which received a gross price difference of \$7.25 per hundredweight and \$11.24 per hundredweight after all costs were included. The Southeast and Coosa Valley associations were not significantly different in average price received from the North Alabama Association. The West Central Association was not significantly different from the Coosa Valley Association in the gross price received. There are two reasons for the North Alabama Association having a higher average price. First, it has been the last Board sale of each year in late May when prices would be slightly higher. Second, because of this Association's northern location in the State, transportation

Table 4. Price Difference Between Individual Marketing Board Sales and the Montgomery Auction Market for 1979 and 1980

Association	Av. Duncar price multiple received test <sup>1</sup>		Montgomery av. price received		Difference after mkt. charges
	Dol./cwt.		Dol./cwt.	Dol./cwt.	Dol./cwt.
Wiregrass	. 58.79	C	62.45	-3.66	04
West Central	67.84	В	65.53	2.30	6.07
Southeast	72.69	Α	66.85	5.85	9.68
Coosa Valley					
(North Central)	71.21	AB	66.88	4.32	8.17
North Alabama		A	69.86	7.25	11.24
Av	69.25		66.11	3.14	7.62

<sup>&</sup>lt;sup>1</sup>Duncan Multiple Range Test identifies significant differences between the mean values for classes for a variable (A = class 1, B = class 2, C = class 3).

savings would be reflected in the price received if cattle were shipped to the Midwest.

### The Effect of Animal Characteristics on Prices Received

Marketing efficiency can be enhanced if information is being transmitted between buyer and seller about the product being demanded. Vertical coordination in the marketing channel can be improved if prices are reflecting types of product needed in the cattle feeding industry. Data on characteristics of each lot being sold were collected for each Association's sale and analyzed in a regression model in equation 1.

where:

Y = price per hundredweight received for a lot of cattle

 $X_1$  = number of cattle in a lot

 $X_2$  = homogeneous breed in the lot (1 = homogeneous, 0 = mixed lot)

X<sub>3</sub> = pure breed angus in the lot compared to mixed lot with no British breeds

 $X_4$  = pure breed hereford in the lot compared to mixed lot with no British breeds

X<sub>5</sub> = pure breed angus, pure breed hereford, and angus crossed hereford — "black baldies" compared to mix lot with no British breeds

X<sub>6</sub> = British breeds mixed with other exotic breeds compared to mix lot with no British breeds

 $X_7$  = steers in the lot (1 = steers, 0 = heifers)

X<sub>8</sub> = USDA feeder grade — large No. 1 compared to medium No. 1 cattle

 $X_9$  = USDA feeder grade—large No. 2 compared to medium No. 1 cattle

- \*10 percent level of statistical significance
- \*\*1 percent level of statistical significance

Number of cattle and homogeneity of lot had significant positive impacts. Buyers preferred a homogeneous lot to a mixed lot paying a premium of \$3.26 per hundredweight. Lots of cattle that had British crosses of angus and herefords received a premium of \$7.36 per hundredweight above lots without any British breeds, and lots of steers received a premium of \$8.97 per hundredweight compared to heifers. Lots of cattle that graded USDA large No. 1's and 2's were paid \$6.48 and \$9.42 per hundredweight, respectively, less than medium No. 1. Livestock buyers at the Market Board sales preferred homogeneous lots of British crossed steers grading medium No. 1's.

# Price Comparisons Between Markets by Breed and Sex Types

Variation in prices paid was found between lots by breed and sex for the 221 lots sampled, table 5. Price comparisons between the two types of markets indicated higher prices for steers than heifers by breed types. The steer price differential of \$3.68 per hundredweight was three times greater than the heifer price differential of \$1.15 per hundredweight. Using Duncan's statistical test, the price differential for breed type 3 (British breed crosses mixed with their straight British breeds) was significantly different from other breed types with a \$5.10 per hundredweight differential between the two market channels. The price differential between the two markets for breed type 3 of heifers was also significantly different with a differential of \$6.40 per hundredweight. British crosses are the preferred breed type by feedlots and, consequently, received higher net prices.

# Farm Survey of Animal Characteristics

Commission-order buyers had opportunities to visit farms to view cattle before a sale. To test whether information obtained from their farm visits influenced price, researchers made visits to the farms to evaluate condition of the cattle. Twenty-seven lots of cattle were judged on muscling, body size, age, finish, health, defects, and uniformity. Health, defects, and uniformity did not significantly influence price and were excluded from further analysis. All lots were in excellent health with

Table 5. Prices Received by Breed Type and Sex of Cattle Between Market Board Sales and the Montgomery Auction Market, 1979 and 1980

Marketing board sales					Montgomery auction market					Difference between markets			
Breed	$\overline{\mathbf{S}}$	Steers Heifers		rs Heifers Steers Heifers			Duncan <sup>2</sup>		Duncan <sup>2</sup>				
Type	Lots	Price	Lots	Price	Lots	Price	Lots	Price	Steers	test	Heifers	test	
	No.	Dol./cwt.	No.	Dol./cwt.	No.	Dol./cwt.	No.	Dol./cwt. l	Dol./cwt.		Dol./cwt.		
1	5	74.15	0		5	69.30	0		4.85	В			
2	13	69.70	1	58.00	13	65.28	1	59.50	4.42	В	-1.50	В	
3	66	72.58	12	64.88	66	67.48	11	58.48	5.10	Α	6.40	A	
4	63	67.69	20	59.35	59	65.13	19	58.26	2.56	В	1.09	В	
5	21	65.20	3	55.75	17	63.72	3	57.17	1.48	В	-1.42	В	
Av.	168	69.86	36	59.50	160	66.18	34	58.35	3.68		1.15		

<sup>&</sup>lt;sup>1</sup> Breed types are: 1, Angus; 2, Hereford; 3, Angus, Hereford and Angus x Hereford; 4, Groups 1, 2, and 3 plus other breeds; 5, other crosses, e.g., Brahman, Charolais.

<sup>2</sup> Duncan Multiple Range Test identifies significant differences between the mean values for classes for a variable (A = class 1, B = class

<sup>2).</sup> 

Table 6. Simple Correlation Between Animal Characteristics for 27 Lots OF CATTLE<sup>1</sup>

Characteristics	Price	Muscle	Frame	Age	Finish	Weight	Breed	Grade
Price	1.0	-0.02	0.22	-0.36*	0.52**	-0.56**	-0.39**	0.16
Muscling		1.0	0.11	-0.22	0.44**	-0.41	0.14	0.28
Frame			1.0	-0.62*	0.01	-0.60**	0.46*	0.95**
Age				1.0	-0.38*	0.79**	0.10	-0.60**
Finish					1.0	-0.57**	0.19	0.05
Actual weight .						1.0	0.11	0.65**
Breed							1.0	-0.47
USDA grade								1.0

<sup>&</sup>lt;sup>1</sup>Muscling scores: 1 to 6, very thick to very thin, respectively. Frame size: 1 to 3, large to short frames, respectively. Finish: 2 to 4, wasty to thin.

very few defects. Because of the size of lots being sold, variation in uniformity among cattle was difficult to measure.

Partial correlation coefficients between the remaining variables are shown in table 6. Age, finish, actual pay-weight, and breed were characteristics that had a significant influence on price received. The older the animals in a lot and the heavier the payweight, the lower the price received per hundredweight for cattle. The finish on cattle had a positive influence (.52), with thinner cattle receiving a higher price compared to fatter cattle. The negative influence of breed type in the farmsurveyed lots of cattle was consistent with results for the larger population of 221 lots. Muscling, skeletal frame scores, and estimated USDA feeder grade had no significant effect on price.

Animal characteristics of the farm-surveyed lots were correlated and consistent with each other. Finish and muscling scores were correlated as expected. Frame size was significantly correlated with age, actual payweight, breed, and grade of cattle, but not with price. Baquet and Anderson showed justification for three frame scores for feeder cattle grading, but this analysis indicated that frame size had no direct correlation with price. The results would indicate that buyers were more interested in weight of cattle and their finish condition than either frame size or muscling of cattle.

Results of the regression analysis for variables with significant partial correlation coefficients on price are presented in equation 2.

Breed: 1, angus; 2, hereford; 3, angus, hereford and their crosses; 4, groups 1, 2, 3 and other crosses; and 5, other breeds and their other crosses.

USDA Grade: 1, large no. 1; 2, large No. 2; 3, large no. 3; and 4, medium No. 1.

<sup>\* 5</sup> percent statistical significance level.

<sup>\*\* 1</sup> percent statistical significance level.

$$R^2 = .72, F = 4.50 < 1\%$$
  
(t-values)

where:

Y = price per hundredweight received for a lot of cattle

 $X_1$  = age of cattle in the lot (range from 11 to 24 months)

 $X_2$  = finish of cattle: wasty cattle compared to slightly thin cattle

 $X_3$  = finish of cattle: moderately fat cattle compared to slightly thin cattle

X<sub>4</sub> = finish of cattle: very thin cattle compared to slightly thin cattle

 $X_5$  = actual payweight recorded for cattle after sale (range 498 to 1,107)

X<sub>6</sub> = pure breed angus in lot compared to a mixed lot with no British breeds

 $X_7$  = pure breed herefords in lot compared to a mixed lot with no British breeds

 X<sub>8</sub> = angus, hereford, and angus cross hereford cattle in lot compared to a mixed lot with no British breeds

X<sub>9</sub> = angus crossed hereford breeds with other exotic breeds compared to a mixed lot with no British breeds.

\* 10 percent statistical confidence level

\*\* 5 percent statistical confidence level

The regression equation explained 72 percent of the variation in price. Actual payweight recorded after sale had a \$.02 negative effect on price. Commissioned buyers were responding more to visual estimates from farm visits prior to sale rather than the producer's advertised estimated weights.

Two levels of finish scores were significant at the 5 percent level on price when compared to the base of slightly thin cattle. Buyers paid \$6.37 and \$3.12 less, respectively, for wasty and moderately fat cattle compared to slightly thin cattle. Consistent with results for the total sample, British crosses of angus and hereford breeds were significant at the 10 percent level with a premium paid of \$3.07 per hundredweight com-

pared to mixed lots of exotic breeds. Results in table 6 indicated that some degree of multicollinearity existed in the model between age, weight, and finish causing reduction in the precision of the estimates (Kmenta, pp. 388-389). However, the results substantiate what has become common knowledge in the livestock industry in the Alabama that buyers prefer cattle of British crosses of angus and hereford breeds, paying a premium for slightly thin cattle.

### MARKETING EFFICIENCY

The justification for Marketing Boards as a viable marketing alternative for feeder cattle in Alabama was measured by the costs and benefits in the market (Kohls and Uhl, pp. 37-38). If Alabama producers can ensure an adequate quantity of feeder cattle sold at the proper time and with characteristics demanded by feedlots, then efficiency can be maximized. Cattle, which are "farm fresh" and ready for the feedlot with minimum stress, have a higher value in the marketing system.

Results of the analysis indicate that marketing costs are minimal compared to marketing costs in an auction market. Benefits to producers with higher prices and to buyers with a quality product maximize efficiency of this market system. For this market alternative to remain viable, producers will need to estimate weight and grade of their cattle with some accuracy. The actual average payweight on 44 lots of cattle, including lots of cattle in the farm survey, was 694 pounds. Producers' estimated average weight for the same lots was 700 pounds; the difference between the averages was not significant. However, differences in the variances between the producers' estimate and the actual weights of cattle were significantly different at the 1 percent level. This difference implies a wide dispersion in producers' estimated weights on an individual lot basis. The variance of actual weights was five times greater than the variance of producers' estimated weights. The extreme case was a producer's estimated delivery weight of 850 pounds, but the actual payweight was 1,107 pounds. This lot of cattle went directly for slaughter instead of to feedlot. Producers will need to improve the accuracy of their weight estimates when regionally advertising for a sale, when some buyers would be unable to make farm inspections. An alternative would be for each Marketing Association to employ a skilled person to independently inspect and grade each lot of cattle in a sale. This procedure would remove any suspicion by buvers to the accuracy of the information on each lot.

### CONCLUSION

Marketing Board Associations in Alabama are proving to be a viable alternative as a marketing channel for feeder cattle for some producers. In 1979-80, Marketing Association members received an average net-price differential of \$7.62 increase compared to if they sold through auction markets. Producers are supplying "farm fresh" cattle with minimum shrink and stress on animals. The analysis indicated that Associations provided only minimal information about their cattle offered for sale. Of the information provided by producers, breed and sex had the most significant influence on price. Buyers generally paid a higher price for steers than for heifers (\$8.97 per hundredweight), and they preferred British crosses.

A field survey of farms indicated that buyers visited the farms before a sale. Twenty-seven lots of cattle were surveyed before a sale, and the results indicated that breed, age, and finish influenced the price received. Actual payweight recorded after the sale was more highly correlated with price paid by buyers. On-farm inspection provided buyers a better estimate of weight than that of producers'. Incorporating more information about the finish of cattle in a lot can improve the marketing effectiveness of the sales. Marketing Associations have opportunities to perform more marketing services instead of what is currently only a selling function. More off-farm advertising and better on-farm display of cattle for buyers are simple ways that marketing techniques can be used. With savings in marketing costs accrued by producers, each Association could spend more money on effective promotion and advertising for their sales.

Results showed that Marketing Boards for feeder cattle in Alabama are an alternative to the traditional system of auction barn sales. Auction markets in Alabama will need to become more aggressive and innovative to remain competitive with the advance of Marketing Associations. Opportunities do exist for Marketing Associations and local auction markets to cooperate in marketing functions. Advertising, promotion, and the use of established facilities could be initial avenues for collaboration. As electronic market systems evolve in other states, Alabama Marketing Associations with or without the cooperation of auction markets can even increase their market exposure. More research is needed on market information and services which can continue to enhance the operational and pricing efficiency for marketing feeder cattle in Alabama and the Southeastern United States.

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