

# Factors Affecting the Selling Price of Market Cows Sold at Arkansas Livestock Auctions<sup>1</sup>

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## Story in Brief

Data were collected from 15 Arkansas livestock auctions (n = 13,147 cows) to determine the factors affecting market cow selling price. Data collected included pregnancy status, breed or breed type, color, horn status, frame score, muscle thickness, fill, USDA quality grade for market cows, number of brands, brand location, health, BW, age, and price. Mean selling price for market cows was  $\$39.22 \pm \$0.08$  (dollars/cwt.). Market cows in their first ( $\$40.19 \pm \$0.29$ ), second ( $\$40.18 \pm \$0.27$ ), and third trimesters ( $\$39.86 \pm \$0.68$ ), and not pregnant ( $\$39.50 \pm \$0.13$ ) sold for the same price ( $P > 0.10$ ), and all prices were greater than the price received for market cows not checked for pregnancy ( $\$38.98 \pm \$0.10$ ;  $P < 0.01$ ). Market cow buyers paid more for Continental breeds or breed types than for cows of English, Longhorn, or dairy breeds or breed types. The selling prices of large- ( $\$40.19 \pm \$0.13$ ), medium- ( $\$39.07 \pm \$0.12$ ), and small- ( $\$35.28 \pm \$0.25$ ) frame market cows were different from each other ( $P < 0.001$ ). Results indicate that a number of management and genetic factors affect the selling price of market cows.

## Introduction

The sale of cull cows accounts for 15 to 20% of the yearly gross revenues of cow-calf operations. The NAHMS Beef study (1997) reported that, of the cows culled in 1996, 39.8% were culled because of old age or bad teeth, 25% were sold because of pregnancy status, and 18.5% were sold for economic reasons (drought, herd reduction or market conditions). Only 5.7% of cows were culled for poor production. The 1999 National Market Cow and Bull Quality Audit (1999) reported that producers lose approximately \$68.82 of potential revenues per non-fed animal slaughtered in the United States. Very little information is available to help cow-calf producers implement management practices that might improve the value of market cows sold at livestock auctions. When buyers at a livestock auction view market cows, they must appraise phenotypic characteristics (muscle thickness, frame score, breed composition, etc.) as predictors of quality and adjust their bids accordingly. Many of these factors such as breed or breed type are very subjective. Therefore, the objective was to determine the factors that affect the selling price of market cows in Arkansas weekly livestock auctions.

## Experimental Procedures

Five USDA-certified livestock market reporters collected data from 15 weekly livestock auctions in Arkansas from March 1, 2001 to May 31, 2001 and September 1, 2001 to November 30, 2001. The livestock auctions were located in Ash Flat, Charlotte, Conway, Fort Smith, Glenwood, Green Forest, Harrison, Hope, Marshall, Morrilton, Ola, Ozark, Pochontas, Ratcliff, and Springdale. All cows were sold as individuals. During the six reporting months in 2001, data were randomly collected on 13,147 animals

Data collected included pregnancy status (not checked, not pregnant, or first, second or third trimester), breed or breed type, color, horn status (polled or horned), frame score, muscle thickness,

fill (gaunt, shrunk, average, full or tanked), USDA quality grade (Canner, Cutter, Utility, or Commercial), number of brands, brand location (ribs, shoulder or hip), health (dead hair, stale, sick, bad eye(s), lame or healthy), BW, age, and price. Cows were classified as market based on visual appraisal and buyer identification. A veterinarian employed by the livestock auction examined cows for pregnancy by rectal palpation. Pregnancy status was either written with a paintstick or a tag glued to the hip. Frame score was defined as large (over 1,100 lb), medium (900 to 1,100 lb) and small (less than 900 lb) frame based on the expected BW when cows were carrying 0.2 cm fat cover at the 12th rib. Muscle scores were determined using the 1, 2 and 3 scale with "1" being the thicker-muscled cows and "3" the thinner-muscled cows. Healthy cows showed no signs of sickness, lameness or any other unhealthy condition. Dead hair cows demonstrated a "lack luster" hair coat that could have indicated a heavy internal parasite load. Cows classified as stale had lost their effervescence and were apathetic in appearance. Sick cows showed signs of a sick condition (coughing, running nose, water eyes, etc.). Cows that had spot(s) in their eyes (bovine ocular squamous cell carcinoma) were noted as well as cows that demonstrated lameness on any leg. A livestock auction employee examined the teeth and estimated the cow's age. When the animal entered the auction ring, the livestock market reporters evaluated each cow just as a buyer must do before determining a bid.

*Data analyses.* Percentage of cows within pregnancy status, breed or breed type, color, horn status, frame score, muscle thickness, fill, USDA quality grade, number of brands, brand location, age and health were determined by the frequency procedure of SAS (SAS Inst., Inc., Cary, NC). Due to the unbalanced nature of the data, the month, sale barn, and cow characteristics were analyzed as independent variables. The model included week, age, and body weight as covariates. Sale price was the dependent variable. All other variables contributed to the error sum of squares. When analysis of variance was performed for month of sale, week was excluded as a covariate. The analysis of variance was performed with the General Linear Model procedure of SAS (SAS Inst., Inc., Cary, NC). Least-

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squares means were generated and separated using the PDIFF option. Both are reported throughout this discussion. Since all colors are not represented within each breed or breed type, color and breed or breed type data are somewhat inherently confounded. All selling prices reported are in dollars/cwt.

## Results and Discussion

The mean selling price for market cows was  $\$39.22 \pm \$0.08$ . For market cows, the selling prices for March ( $\$41.24 \pm \$0.22$ ) and April ( $\$40.87 \pm \$0.18$ ) were not different ( $P > 0.10$ ) but the selling prices for the remaining months (May, September, October and November) were different from each other ( $\$42.97 \pm \$0.16$ ,  $\$39.54 \pm \$0.21$ ,  $\$36.00 \pm \$0.16$  and  $\$34.32 \pm \$0.18$ , respectively;  $P < 0.01$ ). As selling BW increased for market cows, price per lb increased ( $P < 0.001$ ). The positive relationship between BW and price per lb for cows is opposite of the relationship between BW and price per lb for feeder cattle (Troxel et al., 2001). Cows that weighed less than 700 lb had an average selling price of  $\$27.54 \pm \$0.73$ , whereas the selling price for 700 to 899, 900 to 1,099, 1,100 to 1,299, and 1,300 to 1,499 lb was  $\$33.74 \pm \$0.15$ ,  $\$38.01 \pm \$0.11$ ,  $\$39.85 \pm \$0.14$  and  $\$39.91 \pm \$0.26$ , respectively.

Market cows in their first ( $\$40.19 \pm \$0.29$ ), second ( $\$40.18 \pm \$0.27$ ), and third trimesters ( $\$39.86 \pm \$0.68$ ) and not pregnant ( $\$39.50 \pm \$0.13$ ) sold for the same price ( $P > 0.10$ ), and all prices were greater than the price received for cows not checked for pregnancy ( $\$38.98 \pm \$0.10$ ;  $P < 0.01$ ).

Twenty-six breeds or breed types represented 99.0% of the total cows sampled (Table 1). The breed or breed types were based upon common industry perception rather than actual knowledge of the breed composition. This, however, is what a buyer must do before a selling price can be offered. The price spread from the highest to lowest priced breed or breed type for market cows was  $\$5.09$ . It was reported that the price spread between the highest to lowest breed or breed type for feeder cattle was  $\$23.44$  (Troxel, et al., 2001). Market cow buyers paid more for the Continental breeds or breed types than they did for cows of English, Longhorn or dairy breeds or breed types. This may be due to increased muscling, frame score, carcass weights and dressing percentages from Continental breeds or breed types compared to English or dairy breeds or breed types.

Eleven colors represented 99% of the total population (Table 2). Many of the cow colors selling prices were very similar with a range of  $\$2.13$  between the highest and lowest prices.

The selling prices of market cows across muscle scores were all different from each other ( $\$40.23 \pm \$0.11$ ,  $\$38.76 \pm \$0.12$ , and  $\$36.77 \pm \$0.22$ , for muscle scores 1, 2, and 3, respectively;  $P < 0.001$ ). Muscle thickness is a major pricing concern when cows are purchased for slaughter. The National Market Cow and Bull Quality Audit (1999) reported a loss of  $\$18.70$  per marketed cow due to inadequate muscling. With a  $\$3.46$  difference between muscle score 1 and 3 market cows, a pricing incentive exists to encourage cow-calf producers to increase muscling in the cowherd.

The selling price between polled or horned market cows (Table 3) was not different ( $P > 0.10$ ). At this pricing level for market cows, there is no price incentive to encourage cow-calf producers to eliminate horns. There may, however, be other incentives for producers to eliminate horns (management and safety concerns, etc.).

When buyers were purchasing market cows, large-framed cows received the greatest selling price (Table 3). Selling prices of large-, medium- and small-frame market cows were different from each other ( $P < 0.01$ ).

The selling prices for tanked and shrunk market cows (Table 3)

were not different ( $P > 0.10$ ). The selling price for shrunk market cows was not different from the selling price of average fill market cows ( $P > 0.10$ ), but average fill market cows was less than the selling price for tanked market cows ( $P < 0.01$ ). The selling prices for full and gaunt market cows were not different ( $P > 0.10$ ) but were less than the selling prices for tanked, shrunk and average fill market cows.

Most of the market cows (91.7%) were not branded. The selling price of market cows was greater ( $P < 0.01$ ) for cows with one and two or more brands (Table 3) than it was for market cows with no brands. There was no difference in selling price of market cows based on brand location. Branding costs the industry  $\$3.10$  per marketed cow (National Market Cow and Bull Quality Audit, 1999), but during the 2001 study of price structure for brands, there was no financial encouragement for Arkansas producers to change their branding practices.

For market cows, healthy, lumps, lame, sick cows, and bad eyes cow prices were all different from each other ( $P < 0.01$ ; Table 3).

The percentage of market cows that were indicated USDA Commercial, Utility, Cutter and Canner were 11.3, 11.3, 37.8 and 39.6%, respectively. The average BW for USDA Commercial, Utility, Cutter, and Canner was  $1,128 \pm 233.2$ ,  $1,159 \pm 169.1$ ,  $1,028 \pm 151.2$ , and  $887 \pm 181.6$  lb, respectively. The selling price across USDA Quality grade tended to be significant ( $P < 0.06$ ). The selling price for USDA Utility cows tended to be greater ( $P < 0.02$ ) than the selling price for USDA Commercial, Cutter and Canner (Table 3). The reported selling price by USDA quality grades followed the 26-yr average price trend reported in Arkansas livestock markets (U. S. Department of Agriculture, 2000). The average selling price for market cows decreased with age (Table 4).

## Implications

A number of factors (health, perceived breed or breed type, muscle thickness, frame score, fill, horn status, color, and USDA quality grade) affect the selling price of cows. Once the impact of these factors are identified and understood, cow-calf producers can make cost-effective management changes that can improve cow and total returns.

## Literature Cited

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**Table 1. Selling price of market cows based on breed or breed type.**

Breed or Breed Type <sup>a</sup>	n	Selling price <sup>b</sup>
Lm	598	\$41.80 ± 0.34 <sup>c</sup>
CLm	156	\$41.24 ± 0.66 <sup>cd</sup>
CB	171	\$40.55 ± 0.62 <sup>cd</sup>
ContBq	206	\$40.38 ± 0.58 <sup>cd</sup>
Cont	166	\$40.32 ± 0.64 <sup>d</sup>
AH	806	\$40.32 ± 0.29 <sup>d</sup>
CBq	294	\$40.27 ± 0.46 <sup>e</sup>
HBA	236	\$40.16 ± 0.57 <sup>f</sup>
Bx	156	\$40.11 ± 0.68 <sup>f</sup>
AB	724	\$40.03 ± 0.31 <sup>f</sup>
HB	390	\$39.93 ± 0.43 <sup>f</sup>
C	807	\$39.90 ± 0.29 <sup>f</sup>
B	390	\$39.91 ± 0.42 <sup>f</sup>
AHBq	142	\$39.81 ± 0.69 <sup>fg</sup>
Sm	609	\$39.65 ± 0.34 <sup>fg</sup>
Bq	1,828	\$39.63 ± 0.20 <sup>fg</sup>
EngBq	575	\$39.60 ± 0.34 <sup>fg</sup>
HC	271	\$39.29 ± 0.50 <sup>fg</sup>
ABq	578	\$39.25 ± 0.34 <sup>fg</sup>
HLm	255	\$39.22 ± 0.53 <sup>fg</sup>
AC	223	\$38.95 ± 0.56 <sup>fg</sup>
EngCont	358	\$38.91 ± 0.43 <sup>fg</sup>
A	927	\$38.18 ± 0.27 <sup>g</sup>
Lg	183	\$38.05 ± 0.65 <sup>gh</sup>
H	1,084	\$36.99 ± 0.26 <sup>gh</sup>
Dairyx	832	\$36.71 ± .36 <sup>h</sup>

<sup>a</sup> Breed type = A - Angus, AB - Angus x Brahman, ABq - Brangus, AC - Angus x Charolais, AH - Angus x Hereford, AHBq - Angus x Hereford x 1/4 Brahman, B - Brahman, Bq - 1/4 Brahman x other crosses, Bx - Brahman x other crosses, C - Charolais, CB - Charolais x Brahman, CBq - Charolais x 1/4 Brahman, CLm - Charolais x Limousin, Cont- other Continental breeds, ContBq - other Continental breeds x 1/4 Brahman, Dairyx - Dairy crosses, EngBq - other English breeds x 1/4 Brahman, EngCont - other English x other Continental crosses, H - Hereford, HB - Hereford x Brahman, HBA - Hereford x Brahman x Angus, HC - Hereford x Charolais, HLm - Hereford x Limousin, Lm - Limousin, Lg - Longhorn, Sm - Simmental.

<sup>b</sup> Least-squares mean ± SE (dollars/cwt.).

<sup>c,d,e,f,g,h</sup> Means within columns without a common superscript differ (P < 0.01).

**Table 2. Selling price of market cows based on color.**

Color	n	Selling price <sup>a</sup>
Brown and brown white face	164	\$40.51 ± 0.74 <sup>b</sup>
Yellow	720	\$40.26 ± 0.31 <sup>b</sup>
White	766	\$40.14 ± 0.31 <sup>b</sup>
Red	1,869	\$39.84 ± 0.19 <sup>b</sup>
Yellow-white face	540	\$39.78 ± 0.35 <sup>b</sup>
Gray	542	\$39.59 ± 0.35 <sup>bc</sup>
Black	2,870	\$39.29 ± 0.16 <sup>bc</sup>
Gray-white face	231	\$39.11 ± 0.56 <sup>bcd</sup>
Black-white face	1,416	\$38.69 ± 0.23 <sup>cd</sup>
Spots or striped	1,477	\$38.57 ± 0.24 <sup>cd</sup>
Red-white face	2,527	\$38.38 ± 0.17 <sup>d</sup>

<sup>a</sup> Least-squares mean ± SE (dollars/cwt.)

<sup>b,c,d</sup> Means within columns without a common superscript differ (P < 0.01).

**Table 3. Selling price of market cows based on frame score, body fill, brands and health.**

Item:	n	Selling price <sup>a</sup>	Item:	n	Selling price <sup>a</sup>
Frame score:			Brands:		
Large	6,388	\$40.19 ± 0.13 <sup>b</sup>	None	12,057	\$39.11 ± 0.08 <sup>b</sup>
Medium	5,251	\$39.07 ± 0.12 <sup>c</sup>	One	858	\$40.32 ± 0.19 <sup>c</sup>
Small	1,465	\$35.28 ± 0.25 <sup>d</sup>	Two or more	229	\$40.98 ± 0.54 <sup>c</sup>
Body fill:			Quality Grade:		
Gaunt	1,449	\$38.29 ± 0.23 <sup>b</sup>	Utility	5,137	\$37.28 ± 0.36 <sup>g</sup>
Shrunk	5,320	\$39.50 ± 0.12 <sup>cd</sup>	Commercial	1,458	\$36.33 ± 0.27 <sup>h</sup>
Average	4,422	\$39.24 ± 0.13 <sup>d</sup>	Cutter	4,904	\$36.12 ± 0.34 <sup>h</sup>
Full	1,593	\$37.42 ± 0.22 <sup>b</sup>	Canner	1,460	\$36.02 ± 0.43 <sup>h</sup>
Tanked	359	\$40.65 ± 0.50 <sup>c</sup>			
Health:					
Healthy	12,144	\$39.86 ± 0.08 <sup>b</sup>			
Lumps	274	\$34.47 ± 0.48 <sup>c</sup>			
Lame	234	\$32.89 ± 0.60 <sup>d</sup>			
Sick	216	\$25.50 ± 0.64 <sup>e</sup>			
Bad eyes	279	\$25.31 ± 0.55 <sup>f</sup>			

<sup>a</sup> Least-squares mean ± SE (dollars/cwt.).

<sup>b,c,d,e,f</sup> Means within columns within item without a common superscript differ (P < 0.01).

<sup>g,h</sup> Means within columns within item without a common superscript differ (P < 0.02).

**Table 4. Selling price of market cows based on age.**

Age (yr)	n	Selling price <sup>a</sup>
2	31	\$43.24 ± 1.39 <sup>b</sup>
3	83	\$41.84 ± 0.85 <sup>bc</sup>
4	216	\$41.17 ± 0.53 <sup>bcd</sup>
5	984	\$39.94 ± 0.25 <sup>cde</sup>
6	1,058	\$39.87 ± 0.24 <sup>de</sup>
7	1,595	\$39.51 ± 0.20 <sup>e</sup>
8	3,344	\$38.43 ± 0.13 <sup>f</sup>
> 8	4,035	\$35.69 ± 0.12 <sup>g</sup>

<sup>a</sup> Least-squares mean ± SE (dollars/cwt.).

<sup>b,c,d,e,f,g</sup> Means within columns without a common superscript differ (P < 0.01).