



# A hedonic analysis of sale lot traits affecting calf prices in Mississippi auction markets

J. A. Parish,<sup>\*1</sup> B. R. Williams,<sup>†</sup> K. T. Coatney,<sup>†</sup> PAS, T. F. Best,<sup>\*</sup> and C. O. Stewart<sup>\*</sup>

<sup>\*</sup>Prairie Research Unit, Mississippi Agricultural and Forestry Experiment Station, Prairie 39756; and <sup>†</sup>Department of Agricultural Economics, Mississippi State University, Mississippi State 39762

## ABSTRACT

The objective of this study was to quantify lot trait influences on calf prices at Mississippi auction markets. From May 2014 to 2015, 21,128 calf lots at 4 auctions were evaluated. With price differentials relative to BCS 1 to 3, premiums ( $P < 0.0001$ ) were \$0.2553/0.4536 kg (BCS 4), \$0.3242/0.4536 kg (BCS 5), \$0.3474/0.4536 kg (BCS 6), \$0.3150/0.4536 kg (BCS 7), and \$0.3094/0.4536 kg (BCS 8 to 9). Calves with branded hides sold for \$0.0170/0.4536 kg less ( $P = 0.02$ ) than unbranded calves. Price per unit BW decreased ( $P < 0.0001$ ) as BW increased. There was a \$0.1652/0.4536 kg premium ( $P < 0.0001$ ) for black hair coat. Horned calves were discounted \$0.1464/0.4536 kg ( $P < 0.0001$ ). Large- and medium-framed calves were priced comparably ( $P = 0.41$ ), but small-framed calves were discounted ( $P < 0.0001$ ) \$0.2023/0.4536 kg. Relative to average gut fill, gaunt or shrunk calves sold for \$0.0839 more ( $P < 0.0001$ ) and full calves for \$0.0278/0.4536 kg less ( $P < 0.01$ ). Price increased ( $P < 0.0001$ ) as muscle thickness increased. Mildly lame or sound calves earned premiums ( $P < 0.001$ ) of \$0.3799/0.4536 kg or \$0.5113, respectively, versus moderate to extremely lame calves. Premiums were \$0.0306/0.4536 kg ( $P = 0.02$ ) and \$0.0402/0.4536 kg ( $P < 0.01$ ) for calm and slightly alarmed calves, respectively, versus moderately alarmed, nervous, or aggressive calves. Cost should be weighed against price differentials to determine profitable trait levels.

**Key words:** calf, price, hedonic, auction market, premium

## INTRODUCTION

Returns from calf sales are the predominant enterprise income source of most commercial cow-calf operations. It is well recognized that variations in sale lot characteristics affect calf prices at public auctions; however, these influences may vary over time (Burdine et al., 2014; Blank et al., 2016) and by geographic location (Blank et al., 2016; Mallory et al., 2016). For example, Arkansas studies showed that the relative premiums and discounts received at auction for calves changed over time with many

discounts notably increasing in just a 5-yr interval from 2000 to 2005 (Troxel and Barham, 2007). Additionally, although relationships between commonly assessed factors such as animal BW, frame size, and muscle score and calf prices are generally understood, implicit market prices have not been previously established for heritable traits, such as temperament, which have practical implications in cow-calf herds. Genetic trends across beef cattle breeds for increased weaning and yearling BW and changing trends in herd breed composition over time warrant a fresh look at price premiums and discounts within current cattle populations. Because market price incentives are dynamic over time, recent results on implicit prices of calf sale lot characteristics are needed to objectively inform the industry on calf characteristics on which future genetic improvement efforts should focus. The objective of this study was to determine the effects of various calf sale lot traits on prices received in Mississippi auction markets during a period of historically high market price levels.

## MATERIALS AND METHODS

By design, this was strictly an observational study of calves being sold at licensed public auction markets. Data collectors visually evaluated cattle from publically available seating during weekly auction market sales and did not influence the care or handling of the cattle offered for sale. Therefore, Institutional Animal Care and Use Committee approval was not sought for this research project.

### Data Collection

To collect calf sale lot prices and traits for hedonic analysis, observers with previous experience in calf grading were trained to record visually and audibly observable trait levels at public auction markets. Observers were provided with a standard key and data-recording format for each trait and its defined levels to ensure consistent data recording. Traits observed were identical across all sale locations and auction dates. Observers worked simultaneously in teams of 2 to 3 persons per sale to record data and maximize the amount of data that could be collected within the constraints of an auction market setting, such as time an animal was in the sale ring.

Data were collected from May 5, 2014, to May 4, 2015, at 4 unique auction markets within Mississippi that sold cattle publically at weekly sales. Reasons for selection of

The authors declare no conflict of interest.

<sup>1</sup>Corresponding author: j.p Parish@msstate.edu

these locations included willingness to participate in the project, volume of cattle sold weekly, and proximity to trained observers. Auction market locations are coded in the data set and results so as not to reveal specific market locations because anonymity was agreed upon before the initiation of data collection with the markets and research sponsors; the hedonic model accounts for market location effects to ensure reliable estimates of the traits of interest. Observers attended these sales in person and were seated in the public seating section in clear view and within audible range of the sale ring in which cattle entered while being auctioned for sale. Data were collected on 21,128 calf sale lots, representing 21,879 calves sold. Data for this study consisted of only calves sold priced per kilogram of BW and not mature cattle or replacement heifers sold priced per animal for breeding herd replacements. Lots containing more than one animal were evaluated by estimating the average phenotype of the lot, for which all traits were recorded.

Detailed variable descriptions used in the hedonic analysis, as well as corresponding means, SD, and percent frequencies, are provided in Table 1. Due to too few observations for statistical inference, some categorical information was aggregated. For instance, the leanest and most obese categories of the BCS data were grouped: BCS 1 to 3 and BCS 8 to 9. The 2 most shrunk gut fill scores were grouped: gaunt to shrunk. Finally, the 2 most aggressive temperament pen scores were grouped: 4 to 5 = very nervous to extremely aggressive. The presence or absence of the following conditions was also recorded: excessive mud on hide, excessive hair, lumps, injuries, stale (exhibited dull or lifeless behavior but was not rated as sick), sick (showed clinical signs of illness such as lethargy, extreme weakness, coughing, runny nose, significant panting, or ears excessively drooping), foot abnormality (excessive toe length, missing toe, or screwclaw), or brands on an animal's hide. However, due to very low incidences of these conditions in the data set, only excessive hair and brand presence or absence were included in the hedonic model.

### Statistical Analyses

Each sale lot represented one observation. The MIXED procedure of SAS was used to estimate the hedonic regression model with sale lot basis price as the dependent variable and lot traits as independent variables (SAS Institute Inc., Cary, NC). The basis price is constructed to control for market fluctuation over time by subtracting the weekly Mississippi average price for a 340-kg steer from the observed auction prices (Williams et al., 2012). Lot size and calf BW were continuous variables. Binary dummy variables were employed to specify categorical data. One variable from each set of dummy variables was dropped to properly estimate the model, with the dropped variables noted as the respective base variables for comparison as described in Table 1. Though a quadratic relationship between lot size and price likely exists (e.g., Bailey

and Peterson, 1991; Coatney et al., 1996; Zimmerman et al., 2012; Williams et al., 2014), a linear specification for lot size was incorporated due to convergence issues in the MIXED procedure. The functional form of the regression model included mean calf BW of the sale lot and its squared term (quadratic specification), as well as and the following interaction terms:  $BW \times \text{bull}$  and  $BW \times \text{heifer}$ .

Because there are a large number of physiological characteristics used in the hedonic regression model, collinearity caused from physical interdependencies may confound some parameter estimates requiring a systems of equation approach (Coatney et al., 1996). For example, the data indicate that 58% of breeds are black and 27% of the data are Black Angus. To minimize the potential for confounding influences between breed and hair color, either a large number of breed categories relative to hair color may be chosen or vice versa. Though hair color is more easily identified by buyers, producers are more likely to make decisions relative to breed. Additionally, black hair color is a requirement for the Certified Angus Beef program, the largest breed-related meat program in the United States. Therefore, this analysis uses more breed categories relative to hair color, with Black Angus as the base comparator in the regression model. A single equation model was deemed sufficient from a pretest ordinary least squares, because collinearity was not problematic as deemed from the size of all nonquadratic variance inflation factors greater than 20 (Greene, 2003, page 58).

Error terms were heteroscedastic in the BW variable as determined by a likelihood ratio test. Therefore, the model was corrected for heteroscedasticity using the repeated statement in the MIXED procedure. Each coefficient measures its corresponding variable's contributory change in price in US dollars per 0.4536 kg. A coefficient was considered to be significant at  $P < 0.05$ .

## RESULTS AND DISCUSSION

Hedonic price model regression estimates are reported in Table 2. Whereas the MIXED model does not report an  $R^2$  value, most coefficients were significant at  $P < 0.01$ , indicating these independent variables were important in explaining calf price fluctuations. The estimated coefficients are the marginal implicit dollar values of the respective calf sale lot characteristics.

### Lot Size

Most calves sold at auction in the Southeast United States are marketed as single animal lots, and Mississippi is no exception to this practice. As lot size increased by one calf, price increased ( $P < 0.0001$ ) by  $\$0.0146 \pm 0.0022$  (Table 2). These results suggest that there is a progressive price incentive to market calves in larger lot sizes.

In comparison, Barham and Troxel (2007) reported a \$0.05 premium for calves sold in groups of 6 or more relative to being sold as singles. Hedonic analysis of feeder

Download English Version:

<https://daneshyari.com/en/article/8503664>

Download Persian Version:

<https://daneshyari.com/article/8503664>

[Daneshyari.com](https://daneshyari.com)