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Summary

Four years of data from calf-fed steers were utilized in determining factors that affect profitability of cattle marketed at an optimum endpoint. Profitability was evaluated on a live weight basis assuming $112/cwt selling price and $180/cwt dressed price. Profit was compared as corn price and Choice-Select spread increased. Overall, carcass weight was the dominant factor in determining profitability. However, at $7 corn, feed efficiency had the most influence on profit. As expected, yield grade decreased and marbling score increased in importance as Choice-Select spread increased. Under these scenarios, profitability was greatly affected by hot carcass weight, with efficiency being the most important at higher corn prices.

Introduction

Previous research has compared profitability using varying input costs, diets, endpoint target dates, genetics, Choice-Select spreads (Ch-Se), and marketing strategies. Profitability at the individual animal level was observed with cattle marketed at one endpoint and showed HCW accounted for 21% of the variation in profitability (*Professional Animal Scientist,* 21:380). It also has been found that discounts impact profitability more than premiums and removing the bottom 10% of carcasses by sorting improves the economic value approximately $20 per animal. The objective of this analysis was to quantify the effect of performance and carcass measurements on profitability of cattle harvested at an optimum endpoint across varying corn price and Ch-Se spread.

Procedure

Four years of data were collected (2006-2009) utilizing 1,488 Simmental, Angus, or Simmental-Angus crossbred steers. Individual intakes were obtained for all steers using the Growsafe automated feeding system. Final individual animal ADG and G:F were calculated based on carcass adjusted final BW. Steers in this analysis had endpoints designed to optimize carcass value. To predict optimum endpoint, steer weight and ultrasonic measurements of back fat thickness and marbling score were recorded every 28 days or 42 times throughout the feeding period. Cattle were harvested based on two factors of endpoint criteria: (1) minimum 0.4 in of BF or (2) BW greater than 1,285 lb; and after initial slaughter groups were removed, remaining steers were all marketed at one time. Days on feed (DOF) ranged from 120 to 195.

Five-year average price data (2003 to 2007) were collected for feedstuffs, and grid premiums and discounts. Because the price relationship of WDGS and DDGS relative to corn has ranged from 65 to over 100% (*2009 Nebraska Beef Cattle Report,* p. 50), dry byproducts were calculated at 90% the value of corn, and wet byproducts were calculated at 90% the value of dry byproduct (all on DM basis). Price for corn silage was calculated based on corn price using the following equation: [(6.5 * price/bu) + $5/t harvest and storage cost)/35% DM]. Live cattle price was $112/cwt and average dressed beef price was $180/cwt. Input costs included veterinary, medical, labor, and transportation costs ($50/steer), yardage ($0.35/steer/day), and feed markup ($24.20/t). Interest was assessed at 8% on calf purchase price and 50% of feed consumed per steer. Steer purchase price was $132/cwt, based on a 500 lb animal with a $1.50 slide per 25 lb. Carcass value was calculated for each animal using actual hot carcass weight (HCW) and associated premiums and discounts for carcass merit. Profit was defined as the difference between carcass value and total input costs per steer. Multiple regression models were constructed using the MIXED procedure. Importance of each variable within the model was ranked using standardized beta coefficients (STB).

Results

Standardized beta coefficients were used to compare factors on an equivalent basis of influence on profitability. For example, when corn is $4 and Ch-Se spread is $4, one standard deviation (SD) change in HCW changed profit by 0.78 SD (0.78 *$74.77 = $58.32/steer; Table 1). This means that HCW has a positive effect on profit which would be expected as more weight is sold with all other factors held constant. However, the variation in HCW was narrowed by sorting and as a dominant factor influencing profit, the SD of profit does not increase and remained relatively unchanged. Influence of HCW on profitability decreased as Ch-Se spread increased. Influence of marbling increased with increased Ch-Se spreads, and at $7 corn with Ch-Se spread of $12/cwt, became competitive with HCW in influencing profitability. The negative SD for YG is due to lower values being desired. Yield grade coefficients were unchanged as corn price increased but decreased as Ch-Se spread increased having less influence on

Table 1. Standardized betas for regression variables across varying corn prices and Choice-Select spreads.

	Corn Price[1]				
Item	$3	$4	$5	$6	$7
Choice-Select Spread, $4/cwt					
Std. Dev., Net Return	$75.79	$74.77	$74.12	$73.86	$74.48
	-----standardized beta coefficient[2,a] -----				
HCW	0.86	0.78	0.70	0.62	0.48
Marbling Score	0.12	0.12	0.12	0.12	0.11
Yield Grade	-0.31	-0.31	-0.32	-0.32	-0.31
Initial Weight	-0.23	-0.18	-0.11	-0.05	0.05*
Gain:Feed	0.37	0.43	0.48	0.54	0.63
Choice-Select Spread, $8/cwt					
Std. Dev., Net Return	$77.44	$76.36	$75.63	$75.27	$75.71
	-----standardized beta coefficient[2,a] -----				
HCW	0.85	0.77	0.69	0.61	0.48
Marbling Score	0.22	0.22	0.22	0.22	0.22
Yield Grade	-0.26	-0.26	-0.26	-0.27	-0.26
Initial Weight	-0.23	-0.17	-0.12	-0.06	0.04*
Gain:Feed	0.35	0.41	0.47	0.52	0.61
Choice-Select Spread, $12/cwt					
Std. Dev., Net Return	$82.17	$81.11	$80.38	$80.01	$80.28
	-----standardized beta coefficient[2,a] -----				
HCW	0.84	0.77	0.69	0.61	0.47
Marbling Score	0.31	0.31	0.31	0.31	0.31
Yield Grade	-0.23	-0.23	-0.24	-0.24	-0.24
Initial Weight	-0.22	-0.21	-0.11	-0.05	0.04*
Gain:Feed	0.33	0.38	0.44	0.49	0.57

[1]Corn price/bu.
[2]Represents the change in profit per standard deviation as each independent variable change.
[a]All values are significant ($P < 0.0001$) unless marked with asterisk.

profitability (-0.31, -0.26, and -0.24, respectively). Efficiency increased in influence as corn price increased and decreased as Ch-Se spread increased (approximately 0.3 to 0.6).

The results from this analysis indicate that factors affecting profitability of cattle harvested at optimum endpoint are complex and vary depending on input costs like corn price or market factors like Ch-Se spread. Initial weight was an important variable at low corn price and Ch-Se spreads and declined markedly as corn price increased. Marbling score was a more competitive factor for influencing profit at high Ch-Se spreads. Carcass weight was the most significant variable affecting profit in this population at low Ch-Se spreads and corn prices, even though variation in HCW was minimized by sorting. If cattle would not have been sorted before harvest, HCW would have been even more important due to variation in weight and resulting premiums or discounts. However, the importance of HCW declined as Ch-Se spread and corn price increased. Feed efficiency became the most important variable over HCW when corn price reached $7 within each Ch-Se spread comparison. Understanding these relationships would allow feedlot owners and operators to adjust their management and marketing strategies to accurately account for these variables as corn price and Ch-Se spread change.

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