BEEF CATTLE RESEARCH UPDATE

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Effect of Corn Price on Profitability of Feedlot Cattle Marketed on a Live Weight or Carcass Weight Basis

Over the last few years, the feedlot industry has been marketing greater numbers of finished cattle on a carcass weight basis or individual carcass grid value basis as compared to the traditional live weight basis. This has had a major impact on the industry. The economic signals of carcass weight marketing are dramatically different than for selling live weight, especially at the end of the feeding period. Research has shown that carcass weight gain is typically 75 to 85% of live weight gain at the end of the feeding period.[1] While live weight gain slows, rate of carcass gain remains steady, creating the increase in dressing percentage that occurs as cattle progress through a normal feeding period.

University of Nebraska researchers used data from seven feedlot trials that they had previously conducted (all trials fed similar diets) to evaluate hot carcass weight (HCW) change over the feeding period and to determine the influence of corn price on profit potential on both a finished live body weight (BW) and HCW basis.[2] These seven trials included 298 pens with 2,380 steers. The average initial BW was 767 lb with days on feed ranging from 117 to 159. In all trials, a similar implant strategy was used which was a single Revalor-S (Merck Animal Health) terminal implant. No β-agonists were used in any trial. All diets contained 40 to 75% corn (dry rolled or high moisture) and 0 to 40% corn milling by-product (wet distiller's grains or wet corn gluten feed) on a dry matter basis. In these trials, all cattle were marketed for a projected industry average endpoint of 0.47 inches of backfat and averaged 0.51 inches of backfat across the trials.

These researchers used regression analysis of dressing percentage change over the feeding period to calculate HCW gain and HCW transfer in relation to BW gain. Economics were calculated with diet costs at $3.50, $5.50, and $7.50 per bushel corn price and cattle marketed at 75, 100 (0.47 inches of backfat), and 125% days on feed on both a BW and HCW basis. Using monthly CattleFax data from 2008 to 2012, feeder-calf and live-slaughter price was averaged during months when corn was $3.50, $5.50, and $7.50 per bushel. Feeder-calf price was set at $98.97, $109.79, and $135.73 per cwt and live-slaughter price was adjusted to $87.35, $98.23, and $118.14 per cwt price for changing corn prices ($3.50, $5.50, and $7.50 per bushel), respectively.

This analysis showed that transfer of BW to HCW increased linearly ($P < 0.01$), reaching approximately 90% at final days on feed. In simple terms, one lb of added BW gain corresponded to 0.9 lb of HCW gain. The effect of changing corn price at $3.50, $5.50, and $7.50 per bushel on feedlot steer profitability is shown in Table 1. Profit was maximized at 125% days on feed when corn price was $3.50/bushel, earning $108.44 per head on a HCW basis. Returns for steers sold on a BW basis at 125% days on feed were $58.93 per head. When steers were sold at 100% days on feed, returns were about $39 per head regardless of marketing scheme. However, when steers were only fed for 75% of industry average, profits were only observed for those sold on a BW basis at $8.99 per head, whereas those sold on a HCW basis lost $31.34 per head.

When corn was $5.50/bushel, the only positive returns of $6.38 per head were observed for cattle sold on a HCW basis at 125% days on feed. Steers sold on a BW basis at 125% days on feed lost $49.28 per head. When steers were sold at 100% days on feed, losses were about $43 per head regardless of marketing scheme. When cattle were marketed at 75% days on feed, losses were minimized by selling on a BW basis compared with a HCW basis as $48.63 and $93.98 were lost per head, respectively.

Table 1. Predicted profit or loss of steers fed corn at $3.50, $5.50, and $7.50 per bushel and marketed at 75, 100, or 125% of expected days on feed.

	Marketing date, % of normal to achieve 0.47 inches of backfat		
Item	**75**	**100**	**125**
Corn priced at $3.50/bushel			
Live marketing profit, $	8.99	38.67	58.93
Carcass marketing profit, $	-31.34	38.50	108.44
Corn priced at $5.50/bushel			
Live marketing profit, $	-48.63	-42.78	-49.28
Carcass marketing profit,	-93.98	-42.98	6.38
Corn priced at $7.50/bushel			
Live marketing profit, $	-115.02	-121.47	-143.77
Carcass marketing profit,	-169.56	-121.70	-76.82

Adapted from Wilken et al., 2015

Losses were observed across the board regardless of marketing time and scheme when corn was analyzed at $7.50/bushel. Losses were increased with additional days on feed when marketed on a BW basis, whereas the inverse was observed when selling steers on a HCW basis. Losses were minimized by feeding cattle past industry average and marketing on a HCW basis with negative returns of $76.82 per head compared with the $143.77 lost per head when steers were sold live at 75% days on feed.

These economic analysis showed that regardless of marketing scheme, cattle received similar returns when marketed at 0.47 inches of backfat for all corn prices. Feeding cattle longer and marketing on a HCW basis observed the greatest returns and minimized losses. These researchers concluded that during times of high feed costs and negative feeding margins, it may be beneficial to market steers sold on a live BW basis as early as possible. In contrast, losses are minimized by continuing to feed steers up to 25% longer if they are marketed on a HCW basis. These results support previous studies concluding that it is more beneficial to feed cattle for longer periods of time as greater HCW and USDA Quality Grade premiums will overcome the discounts from overweight carcasses and USDA Yield Grade 4 and 5 carcasses. These results clearly illustrate why cattle feeders are feeding cattle longer and marketing them on a carcass weight basis.

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[1] Streeter, M. N., J. P. Hutcheson, W. T. Nichols, D. A. Yates, J. M. Hodgen, K. J. Vander Pol, and B. P. Holland. 2012. Review of Large Pen Serial Slaughter Trials - Growth, Carcass Characteristics, Feeding Economics. In: Plains Nutrition Council Spring Conference, San Antonio, TX. p. 58-72.

[2] Wilken, M. F., J. C. MacDonald, G. E. Erickson, T. J. Klopfenstein, C. J. Schneider, K. M. Luebbe, and S. D. Kachman. 2015. Marketing strategy influences optimum marketing date of steers in relation to corn price and days on feed. Prof. Anim. Sci. 31: 224-236.