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Evaluation of Calf-fed and Long Yearling Production with Increasing Corn Price

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Summary

An economic comparison of calf-fed and long-yearling production was conducted to determine the impact of increasing corn price on steer profitability. Corn prices of $2.50, $3.50, and $4.50/bu were used. With increasing corn price, feeder prices were assumed to decrease which decreased initial cost more for yearlings than calf-feds. Profitability of yearlings versus calf-feds increased $4-6 for each $1/bu increase in corn price.

Introduction

Calf-feds consume more corn than cattle placed in an extensive production system (long-yearlings); therefore, increasing corn prices can have a substantial impact on profitability of calf-feds compared to long-yearlings.

Efficiency of gain has historically favored calf-feds in terms of animal performance; however, this gain is achieved with corn-based diets. Yearling production has focused on gaining weight using feedstuffs other than corn grain, primarily forage resources.

Therefore, the objective of our study was to determine economic differences between calf-feds and long-yearlings with increasing corn prices.

Procedure

Experiments

Data from the University of Nebraska from calf-feeding or yearling grow/finish experiments conducted each year (1996 to 2004) except for 1997, where a different yearling production system was used, were utilized. Calf-finishing trials beginning in the fall each year were selected for comparisons. Calves were sorted from a large pool of animals received during the fall of each year and sorted by weight. Heavier, larger framed steers from this sort were placed into a calf-feeding system. Lighter, smaller framed steers were purchased each year and placed into a yearling finishing system. The calf system represents 804 head of steers fed in 80 pens and the yearling system represents 302 head of steers fed in 18 pens. Feedlot performance is presented in Table 1. For more details on the calf-fed vs. yearling performance comparison refer to *2007 Nebraska Beef Report,* pp. 58-60.

Economics

Historical information does not exist for feeder prices based on corn prices that are predicted to occur. Therefore, to determine initial price paid for each steer, a calf-fed breakeven analysis using data from the *2007 Nebraska Beef Report,* pp. 58-60, was used to determine the amount a producer could pay for cattle in a $2.50, $3.50, or a $4.50/bu corn market and a $90.00/cwt fed cattle price. Average price a producer could pay for a 642 lb steer was determined by averaging the prices determined from the breakeven analysis. Results indicate that base price for a 650 lb steer would be $131.07, $121.24, and $112.31, when corn prices are $2.50, $3.50, and $4.50/bu, respectively. Price slides were not available for varying weight of cattle fed in these corn markets; therefore, price slides, from *Dhuyvetter et al,* 2001 Kansas State University Research Publication MF-2504, were determined to be $9.18, $7.01, and $4.84/cwt for $2.50, $3.50, and $4.50/bu, respectively.

Final live value of steers was calculated using an average fed cattle price of $90.00/cwt and using the USDA 10-year average monthly fed cattle index to determine differences in fed cattle price for the month steers were sold. Calf-feds were sold in May and the average index was 100. Long-yearlings were sold in December and the average index was 100.

The interest rate used was determined using the 7-year average prime interest rate. The interest rate used was equal to prime plus 1% for the months that cattle were owned (7.6%). The interest rate was the same for both calf-feeding and yearling cost. Therefore, all costs are assessed as interest rate of 7.6%.

Calf-fed Economics

Interest was applied to initial cost of the animal over the entire ownership. Health, processing, and implanting were assessed a flat rate of $ 16.66/head. Feed costs for calf-feds were based on the current prices for supplement and alfalfa hay for the months that ingredients were used. Corn was priced into the diet using $2.50, $3.50, or $4.50/bu corn prices, and wet corn gluten feed (WCGF) was priced using 95% the price of the corn used in the diets. Diet costs were $105.77, $141.94, and $178.11/ton (DM-basis) for $2.50, $3.50, and $4.50, respectively. Yardage was charged at a rate of $0.35/head/day. Interest was charged on finishing diet and yardage for half of the feeding period. A 2% death loss was applied to the calf-feds. To calculate breakevens, total cost was divided by final live BW.

Long-yearling economics

The cost of corn residue was charged at a rate of $0.32/head/day. This cost includes $0.12/head/day for the rent of cornstalk residue and $0.20/head/day charged as yardage while steers grazed cornstalk residue. This yardage cost includes the cost of fencing stalk fields and cost of labor

Table 1. Animal performance as a main effect of production system.

Item	Calf-fed	Yearling	SEM
Initial BW, lb	642[a]	526[b]	5
FINT[c], lb	642[a]	957[b]	7
Final BW, lb	1282[a]	1365[b]	8
Feedlot ADG	3.81[a]	4.53[b]	0.04
DOF[d]	168[a]	90[b]	1
DMI, lb/day	21.36[a]	30.56[b]	0.15
F/G	5.63[a]	6.76[b]	0.02
Total Feed[e], lb	3591[a]	2754[b]	32.1

[a,b]Means within a row with different superscripts differ ($P < 0.01$).
[c]FINT = initial BW at the beginning of the finishing period.
[d]DOF = days on feed.
[e]Total Feed = amount of feed consumed during the finishing period.

Table 2. Cost analysis of production systems as an effect of corn price.

Item	Calf-fed	Yearling	SEM
$2.50/bu			
Steer Cost, $	846.13[a]	751.73[b]	4.71
Interest[c], $	30.02[a]	62.14[b]	1.26
Feed Cost, $	189.93[a]	144.20[b]	6.60
Yardage, $	58.94[a]	31.58[b]	1.57
Total Cost, $	1154.31[a]	1193.58[b]	8.32
COG[d], $/cwt	52.56[a]	49.07[b]	1.45
$3.50/bu			
Steer Cost, $	782.59[a]	688.66[b]	4.73
Interest[c], $	28.68[a]	57.40[b]	1.20
Feed Cost, $	254.82[a]	193.51[b]	8.54
Yardage, $	58.94[a]	31.58[b]	1.57
Total Cost, $	1154.28[a]	1189.73[b]	9.80
COG[d], $/cwt	62.19[a]	56.08[b]	1.59
$4.50/bu			
Steer Cost, $	719.07[a]	625.86[b]	4.93
Interest[c], $	27.31[a]	52.58[b]	1.15
Feed Cost, $	319.71[a]	242.83[b]	10.48
Yardage, $	58.94[a]	31.58[b]	1.57
Total Cost, $	1154.26[a]	1185.87[b]	11.35
COG[d], $/cwt	71.85[a]	63.14[b]	1.83

[a,b]Means within a row with different superscripts differ ($P < 0.05$).
[c]Interest is the total amount of interest accrued from the animal and all cost of production.
[d]COG is the cost of gain for the entire production system.

Table 3. Profitability analysis of production systems as an effect of corn price.

Item	Calf-fed	Yearling	SEM
Live Value[c], $	1154.45[a]	1228.09[b]	23.68
$2.50/bu			
Breakeven, $/cwt	90.15	87.54	1.43
Live p/l[d], $/head	0.00	34.56	19.72
$3.50/bu			
Breakeven, $/cwt	90.04	87.16	1.38
Live p/l[d], $/head	0.00	38.41	19.11
$4.50/bu			
Breakeven, $/cwt	90.04	86.88	1.30
Live p/l[d], $/head	0.00	42.28	18.69

[a,b]Means within a row with different superscripts differ ($P < 0.05$).
[c]Live value is based on a live price of $90/cwt for all corn prices.
[d]p/l is profit or loss.

to deliver WCGF and water to the cattle. Steers were supplemented with 5 lb/head/day of WCGF (DM-basis). Steers were assessed a 1.5% death loss during the wintering period. Interest was charged on the WCGF for half of the winter period and the remainder of ownership.

Summer grazing cost was charged using the 7-year average animal unit month (AUM) value of $23.29 for native range. To determine the animal unit equivalent of the steers used in this study the initial weight and weight of cattle when they were removed from grass was averaged and divided by 1,000 lb. Cattle were charged $8.33 for summer health cost and a death loss of 0.3% was assessed during the summer grazing period. Interest was charged for the cost of the AUM and health cost.

Finishing costs for yearlings were similar to calf-feds using the same yardage rate of $0.35/head/day. Feed costs for yearlings were based on the current prices for supplement and alfalfa hay for the months that ingredients were used. Corn was priced into the diet using $2.50, $3.50, or $4.50/bu corn prices, and wet corn gluten feed was priced using 95% the price of corn used in the diets. Diet costs were $104.75, $140.57, and $176.39/ton (DM-basis) for $2.50, $3.50, and $4.50/bu, respectively. A death loss of 0.2% was assessed during the finishing period. Average DMI for each pen was used to determine total feed consumption during the finishing period. Interest was charged on finishing diet and yardage for half of the feeding period. To calculate breakevens, total cost was divided by final live BW.

Profitability for both systems was determined using the final BW multiplied by the calculated fed cattle price for the month cattle were sold, and subtracting all costs from the final value of the animal.

Results

For all economic analyses the same yardage values for each production

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system and the same final values for steers in each production system were used. However, feedlot yardage was $27.36 greater for calf-feds ($P < 0.01$) compared with yearlings because of more days fed and final live value for yearlings was $73.64 greater than calf-feds ($P = 0.02$) because of larger final weights. Cost of gain is represented as the cost of gain for the entire production system.

Cost of production for all corn prices are presented in Table 2. Profitability for each production system with varying corn prices is presented in Table 3.

$2.50/bu corn price

Average initial steer price was calculated to be $142.71/cwt for yearlings and $131.80/cwt for calf-feds, causing steer cost to be $94.40 per steer higher for calf-feds compared with yearlings ($P < 0.01$) because of greater BW. Interest costs were greater for yearlings compared with calf-feds ($P < 0.01$) because of increased length of ownership. Feed cost was $45.75/head higher for calf-feds compared to yearlings ($P < 0.01$). Cost of gain was $3.49/cwt less for yearlings compared with calf-feds ($P = 0.03$). However, total cost of production was $39.27 greater for yearlings compared with calf-feds ($P < 0.01$). Breakevens were $2.61/cwt less for yearlings (P = 0.12) and profit was $34.56 more for yearlings (P = 0.12).

$3.50/bu corn price

Average initial steer price was calculated to be $130.72/cwt for yearlings and $121.80/cwt for calf-feds, causing steer cost to be $93.93 higher for calf-feds compared with yearlings ($P < 0.01$). Interest cost was $28.72 greater for yearlings compared with calf-feds ($P < 0.01$) because of increased length of ownership. Feed cost was $61.31/head higher for calf-fed compared to yearlings ($P < 0.01$). Cost of gain was $6.11/cwt less for yearlings compared with calf-feds ($P < 0.01$). However, total cost of production was $35.45 greater for yearlings compared with calf-feds ($P < 0.01$). Breakevens were $2.88/cwt less for yearlings ($P = 0.08$) and profit was $38.41 more for yearlings ($P = 0.08$).

$4.50/bu corn price

Average initial steer price was calculated to be $118.78/cwt for yearlings and $112.70/cwt for calf-feds, causing steer cost to be $93.21 higher for calf-feds compared with yearlings ($P < 0.01$). Interest cost was $25.27 greater for yearlings compared with calf-feds ($P < 0.01$) because of increased length of ownership. Feed cost was $76.88/head higher for calf-fed compared to yearlings ($P < 0.01$). Cost of gain was $8.71/cwt less for yearlings compared with calf-feds ($P < 0.01$). However, total cost of production was $31.61 greater for yearlings compared with calf-feds ($P = 0.03$). Breakevens were $3.16/cwt less for yearlings ($P = 0.06$) and profit was $42.28 more for yearlings ($P = 0.06$).

As corn price increases the difference in initial animal cost between calf-feds and yearlings increases. For every $/bu increase in corn price the profit for feeding yearlings increased $4 to $6. Because of the increase in the difference between initial animal cost and the difference in the amount of grain consumed by yearlings in the feedlot compared with calf-feds, profitability is shifting from no difference in lower corn markets to yearlings being more profitable in higher corn markets. From this analysis, if corn prices continue to increase, yearlings would be the most profitable type of cattle to produce, however, yearling ownership must be retained through the entire production system for the profit to be realized.

Two factors that affect this relationship are yardage cost and pasture cost. We used yardage cost of $0.35/d but cost may be as high as $0.45/d. This $0.10 difference would increase the yearling advantage by $7.80/head. Alternativley, grass was priced at the 7-year average of $23.39/AUM. The total grazing cost was approximately $90/head. Grass lease rates have incrased over time and may continue to increase. A 10% increase in grass cost would reduce the yearling advantage by $9/head.

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