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Profit Variability for Calf-Fed and Yearling Production Systems

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Summary

Profitability of calf-fed and backgrounding yearling systems was determined based on actual production data and prices from 1996 to 2007, and variability across years was compared. The two systems exhibited similar profits, on average, but the calf-fed system showed less profit variability, suggesting there is more risk inherent in a yearling backgrounding and finishing system. Also, profitable years were more apt to have less variable corn prices.

Introduction

Lightweight calves are more valuable relative to heavyweight calves when corn prices are low, suggesting it is more profitable to feed calf-feds in years with low corn prices (Dhuyvetter, Schroeder and Prevatt, "Managing for Today's Cattle Market and Beyond," March 2002). Therefore, due to the current high corn prices, it may be more beneficial to background calves on cornstalks and/or pasture and place feeder cattle in the feedlot as yearlings. It is important for producers to consider which beef production system is most appropriate for their operation and which offers less profit risk during times of high market price variability.

A previous study evaluating the differences in carcass characteristics, performance and profitability between calf-fed production systems and yearling production systems from 1996 to 2005 concluded that yearlings, although less efficient in the feedlot, were more profitable, on average, compared to calf-feds (Griffin et al., *2007 Nebraska Beef Report*, pp. 58-60). That analysis used seven-year averages of economic variables that affect cattle feeding profitability, which masked the yearly variation in returns and potential risks to producers. This study identifies the magnitude of year-to-year variability in profits within each system and examines the determinants of profit variation.

Procedure

Production data from Griffin et al. (*2007 Nebraska Beef Report*, pp. 58-60) were used to create calf-fed and yearling system budgets for 1996-2005, and the data in Adams et al. (*2008 Nebraska Beef Report*, pp. 70-71) were used to develop budgets for 2006-2007. All years included both a calf-fed system and a long yearling system, with the exception of 1997, for which only calf-fed production data were available, and 2005, for which only yearling production data were available. Calf-fed systems had heavier steers entering the feedlot after fall weaning. Yearling systems were comprised of lighter steers backgrounded on cornstalks and summer pasture and then placed in the feedlot the following fall (Griffin et al., *2007 Nebraska Beef Report*, pp. 58-60).

The rations for all production systems were held constant through the 12 budgeted years in order to compare the cost of a common diet, given varying feed costs from November 1995 until January 2008. All other production variables (i.e., days on feed, average daily gain, dry matter intake, etc.) and most input costs (i.e., ration costs, cornstalk and summer pasture rental rates, finishing death loss, finishing veterinary and medical expense, interest rates, etc.) varied according to actual prices for each respective year.

The finishing diet (DM basis) included 47.5% dry rolled corn, 40% wet corn gluten feed (WCGF), 7.5% alfalfa hay and 5% supplement. Dry-rolled corn was priced using weekly Omaha cash corn prices averaged over the feeding period. A processing charge of $1.44/ton (DM basis) was added to the corn price to cover processing costs (Macken, Erickson and Klopfenstein, 2006, *The Professional Animal Scientist*, 22:23-32). The delivered price of WCGF was 95% of the weekly Omaha cash corn price (DM basis) averaged across the feeding period. The budgets reflected an average alfalfa hay price for the feeding period as reported by Mark and Malchow (2007*, Crop and Livestock Prices for Nebraska Producers*, EC883), plus an assumed processing and shrink fee from Jose (1996-2008, *Nebraska Farm Custom Rates — Part II).* A yardage cost of $0.35/head/day, for the finishing period was indexed across years using Northern Plains feedlot data provided by Professional Cattle Consultants (1995-2008). Calf-feds were fed an average of 170 days from approximately mid-November to late April or mid-May, while yearlings were fed in the feedlot for an average of 98 days from approximately mid-September to December or January.

In addition to grazing cornstalks, the winter diet for the yearling system included WCGF (5 lb/head/day DM basis), which was priced as described previously, and supplement. Average cornstalk rental rates from surveys of producers in Dawson, Custer and Buffalo counties were used (Treffer, 1996-2007; Plugge, 2005-2007; Walz, 2003-2008), and $0.20/head/day, which was also indexed across years as described above, was assumed as the winter grazing yardage charge to cover management, labor, feeding, watering and other costs.

Summer grazing costs on an animal unit month (AUM) basis were determined using annual data from Johnson (*1996-2007, Nebraska Farm Real Estate Market Developments*). Yearlings grazed brome pasture an average of 21 days from late April

until the middle of May before being moved to Sandhills pasture, where they grazed native range until they entered the feedlot in September. Similar to methods used by Griffin et al. (*2007 Nebraska Beef Report*, pp. 58-60), the total cost of summer grazing included determining an AUM steer equivalent (dividing average summer grazing BW of steers by 1,000 lb) and multiplying that by the average AUM rental rates for 1996 through 2007. Additionally, this analysis accounted for differences in AUM rental rates in the two regions where the cattle grazed. Note also that transportation costs were based on a hauling distance of 60 miles (Jose, 1996-2008, *Nebraska Farm Custom Rates—Part II*).

Dressed cattle sales prices ($/cwt) were determined using a grid price with the base grid using a USDA yield grade 3, low Choice carcass. Premiums and discounts were based on weekly average premiums and discounts reported by USDA. The feeder cattle purchase price was calculated using a price slide based on weekly USDA Agricultural Marketing Service (AMS) reported Nebraska cash prices for feeder steers placed in the fall of 1999 to 2006. Because the AMS Nebraska feeder steer price series goes back only to 1999, the study used estimated Nebraska prices for the fall of 1995 to 1998 based on AMS reported prices for Torrington, Wyo.

Similar to Griffin et al. (*2007 Nebraska Beef Report*, pp. 58-60), yearly veterinary and medical expenses for the calf-fed and yearling production systems were assumed to average $16.66/head. To reflect the variability in these prices across years, veterinary and medical expenses were also indexed to actual veterinary and medical expense data from Northern Plains feedlots (Professional Cattle Consultants, 1995-2007). Death loss in the winter and summer grazing periods for the yearling system averaged 1.8%. The average death loss in the finishing phase was 2.0% and 0.2% for the calf-fed and yearling systems, respectively. Death loss variability across years was also indexed using Professional Cattle Consultants data. The average marketing cost was $15.89/head and $17.28/head, respectively for calf-feds and yearlings and was indexed to USDA's National Agricultural Statistics Service (NASS) data. Quarterly farm operating loan interest rates reported in the Survey of Agricultural Credit Conditions were used to calculate interest costs (Federal Reserve Bank of Kansas City, 1995-2007; available at *http://www.kc.frb.org*). Full interest was charged on the feeder cattle purchase price. Interest also was charged on half the feed and variable costs incurred by both production systems during ownership. The calf-fed system averaged 170 days of ownership, consisting of the finishing period only, while the yearling system averaged 388 days of ownership, which includes the period from purchase in the fall until the cattle were marketed the next winter.

Table 1. Profit/loss for calf-fed and yearling production systems from 1996 to 2007.[a]

Year	System	Profit/Loss ($/hd)	Fed Cattle Price ($/dressed cwt)	Feeder Cattle Price[b] ($/cwt)	Corn Price[c] ($/bu)
1996	Calf-fed	-101.82	92.17	69.49	3.68
	Yearling	146.78	119.81	71.18	2.96
1997	Calf-fed	68.58	111.49	72.05	2.68
	Yearling	NA	NA	NA	NA
1998	Calf-fed	-107.66	103.86	86.99	2.46
	Yearling	-162.61	93.85	92.38	1.91
1999	Calf-fed	13.73	99.94	78.00	1.97
	Yearling	34.26	99.43	85.74	1.72
2000	Calf-fed	48.81	111.45	90.86	1.95
	Yearling	-26.28	112.92	99.18	1.77
2001	Calf-fed	36.37	121.23	97.41	1.91
	Yearling	-111.74	100.89	106.70	1.84
2002	Calf-fed	-28.28	103.34	89.21	1.88
	Yearling	-110.07	105.16	98.37	2.49
2003	Calf-fed	144.43	123.75	85.68	2.29
	Yearling	361.36	153.17	102.31	2.20
2004	Calf-fed	175.06	146.13	107.24	2.66
	Yearling	123.86	138.34	122.44	1.77
2005	Calf-fed	NA	NA	NA	NA
	Yearling	169.82	151.93	127.78	1.65
2006	Calf-fed	-100.33	130.96	124.98	1.92
	Yearling	-92.57	139.99	143.79	3.14
2007	Calf-fed	36.28	148.92	111.09	3.61
	Yearling	-69.50	144.89	123.59	3.86
Average[d]	Calf-fed	11.66	118.18	94.10	2.43
	Yearling	9.38	120.87	104.57	2.37
Maximum[d]	Calf-fed	175.06	148.92	124.98	3.68
	Yearling	361.36	153.17	143.79	3.86
Minimum[d]	Calf-fed	-107.66	92.17	69.49	1.88
	Yearling	-162.61	93.85	71.18	1.72
Standard development[d]	Calf-fed	98.98	19.46	16.49	0.69
	Yearling	160.84	21.60	20.86	0.73

[a]The years in the budgets are labeled according to the time calf-feds and yearlings were marketed as live cattle for 1996-2007.
[b]Average weight at purchase for the calf-fed and yearling systems was 643 lbs and 523 lbs, respectively.
[c]Corn price ($/bushel) is an average weekly Omaha cash price on an as-is basis and does not include a dry rolled corn processing fee.
[d]Excludes 1997 calf-fed data and 2005 yearling data.

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Results

Table 1 reports profits of each system from 1996 to 2007. It also includes some of the main price variables (i.e., fed-cattle, feeder cattle and corn prices) that affect profits. The calf-fed system had a higher profit or smaller loss relative to yearlings for six out of the ten years.

However, yearlings were more profitable in 1996, 1999, 2003 and 2006. In 1996 and 1999, corn prices were high during the calf-fed finishing period. Furthermore, the fed cattle prices were low when calf-feds were marketed in 1996. Greater returns for the yearling system relative to the calf-fed system in 2003 are attributed to historically high fed-cattle prices in November of 2003 when yearlings were marketed. Table 1 also shows that in 2006, yearlings were sold at a higher price than calf-feds, and despite higher corn prices for yearlings, they were more profitable. Cattle and corn prices influence the relative profit of each system, not just through relative highs or lows, but because of seasonal changes in these markets that correspond to different feeding and marketing times for the two systems.

On average, both production systems reported profits for the years evaluated in the budgets. The calf-fed systems showed an average profit of $2.28/head more than the yearling systems' average profit (Table 1). Note that the calf-fed 1997 data and the yearling 2005 data were not included in the averages, ranges or standard deviations at the bottom of Table 1 in order to more accurately compare the two systems. The calf-fed systems showed a smaller range of profits relative to the yearling systems, as profits were more variable for yearlings as indicated by the standard deviation in Table 1.

The variability in each system's profits is partially the result of fed-cattle, feeder cattle and corn prices. The calf-fed production systems were characterized by a lower maximum, minimum, and average fed-cattle price as compared to the yearling production systems. Furthermore, when converted to a $/head basis, the calf-fed systems' average, maximum, and minimum feeder cattle prices were greater than those in the yearling systems. The calf-fed production systems had a higher average and minimum corn price but lower maximum corn price as compared to the yearling production systems.

While these results provide mixed conclusions about which system is more profitable based on the average and range of the three price variables considered, variability in profits is likely driven by the price variables' standard deviation. Yearling system profits were influenced by fed-cattle, feeder cattle and corn prices that had more variability than they did for calf-feds, which are marketed about 220 fewer total days post-weaning. Another cause for the yearling variability as well as the difference in average profits between the two systems is the low grass gains of yearlings in 2007. These low gains caused compensatory gains in the feedlot, which consequently caused higher finishing costs to be incurred. Had 2007 yearling grass gains been similar to 2006 grass gains, average yearling profits would have increased to $12.93/head, and the average profit difference between the systems would be $1.27/head, with yearlings being the more profitable system. For these reasons, yearling system profits were more variable, suggesting that with yearling systems there may be more risk of loss. Producers should consider this greater variability associated with yearling systems when using backgrounding systems.

Each system also was evaluated by profitable and unprofitable years. While the range and average prices of fed cattle, feeder cattle and corn are not surprising, the corn price standard deviation was much larger in unprofitable years than in those years when a profit was made. This variability suggests corn prices may be the variable creating a proportion of the risk affecting profits, regardless of which production system is used.

The results indicate both systems, on average, exhibit a profit across the years included in the analysis, with calf-fed systems being, on average, more profitable than yearling systems. Overall, the calf-fed systems were $2.28/head more profitable than the yearling systems. Profit differences between the two systems should be relatively small. Based on economic theory, profit differentials would eventually be eroded if profits were significantly higher in one system relative to another. If greater profits were available under one production system, producers would have an economic incentive to produce cattle under that method until the larger supply of cattle from that system decreased selling prices during the corresponding marketing period.

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