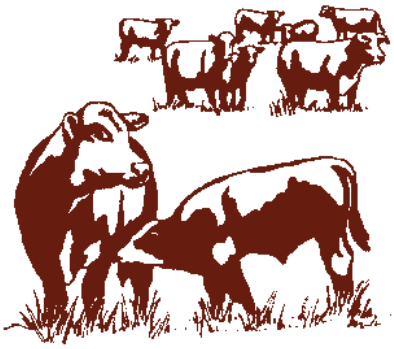
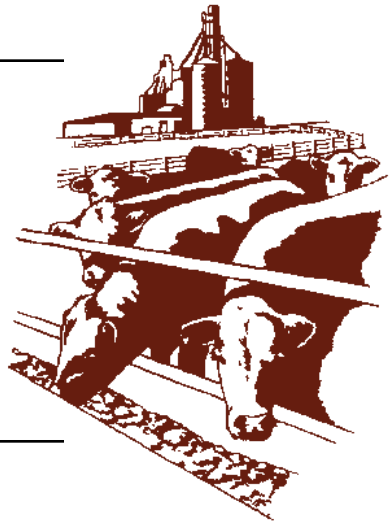


Beef Cattle Handbook



BCH-8050 Product of Extension Beef Cattle Resource Committee

Factors Affecting Cattle Feeding Profitability and Cost Of Gain

Martin L. Albright, Ag Economist, Kansas State University
Michael R. Langemeier, Ag Economist, Kansas State University
James R. Mintert, Ag Economist, Kansas State University
Ted C. Schroeder, Ag Economist, Kansas State University

Cattle feeding is a risky business. The variability in cattle feeding profit for steers in two western Kansas feedyards placed on feed from January, 1980, through May, 1991 is illustrated in Figure 1. Monthly average steer feeding profit ranged from a loss of $100 per head to a gain of $165 per head. The monthly average cost of gain for the same group of steers varied from $38 cwt. to $65 cwt.

Changes in cattle prices, feed prices, and performance are significant factors contributing to fluctuations in cattle finishing cost of gains and profits. Approximately 93 percent of the variability in cost of gain over time can be explained by changes in corn prices, feed conversions, and daily gains (1). Further, 93 to 94 percent of steer feeding profit risk can be accounted for by fed steer prices, feeder prices, corn prices, interest rates, feed conversions, and daily gains (1). Because all of these factors are important in explaining the risks of cattle feeding, producers should consider them when developing budgets, calculating break-even points, or placing cattle on feed.

Feedyard Closeout Study

Results from the recent study (1) conducted at Kansas State University (KSU) can be used to identify the most important factors affecting cost of gain and profitability. This study utilized closeout data on 6,696 pens of steers at two western Kansas custom feedyards placed on feed from January, 1980, through May, 1991. Only pens of steers weighing between 600 and 899 lbs. at placement were used. The steers were divided into three 100-lb. placement weight categories. Information collected from the closeouts included placement date, feeder cattle purchase price, placement weight, days on feed, total gain, daily gain, sale weight, feed conversion (as fed), yardage charges, feed cost, feed consumption (as fed), feeding cost per pound of gain, fed cattle sale price, and processing date. The feeder steer price was not available for all closeouts, so the average Dodge City, Kansas cattle auction price (4) for the week the steers were placed was used. Average corn prices during the placement month were obtained from Agricultural Prices (3). Interest rates on feeder cattle loans were obtained from the Federal Reserve Bank of Kansas City (2).

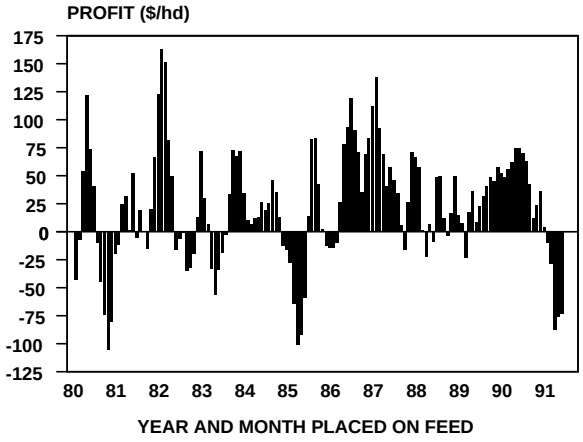


Figure 1. Monthly average steer profit for steers placed at 700-799 lbs.

Profits averaged from $25.38 to $27.28 per head for the three placement weight groups in the KSU study. Feed conversion ranged from 8.24 lbs. of feed for lighter

placements to 8.57 lbs. of feed per lb. of gain for heavier weight placements, reflecting the reduced feed efficiency of feeding heavier weight cattle. The heavier placed steers gained 3.25 lbs. per day, while the rate of gain for lighter placed steers was 3.06 lbs. per head per day. Average feeding cost of gain ranged from $48.66 to $50.08 cwt. for the three placement weight groups.

Cost of Gain

Feeding cost of gain consists of feed costs, veterinary costs, processing and yardage fees, interest charges, and miscellaneous costs. The primary performance factors affecting cost of gain are average daily gain, feed conversion, and death loss. Cattle performance, feed grain prices, and forage prices all influence feed costs—the largest component of cost of gain. Feed costs will rise as a result of higher feed conversion rates or death loss. Conversely, feed costs decline as rate of gain increases. Increases in veterinary costs and cattle health problems both increase feeding cost of gain.

Factors Affecting Variability in Cost of Gain

Approximately 93 percent of the variability in steer feeding cost of gain over time was explained by corn price, feed conversion, and average daily gain. The relative contribution of these factors to the volatility of steer feeding cost of gain are shown in Table 1. Changes in corn prices explained the greatest amount of cost of gain variability for all placement weights. Corn price accounted for 67 percent of the variability in cost of gain for steers placed at 600-699 lbs. and 58 percent for steers placed at 800-899 lbs. Corn price is relatively more important for lighter placed steers as they require more grain to reach processing weight than heavier placed steers.

Feed conversion is the second most important factor in determining cost of gain variability. It explained 23 percent of the variation in cost of gain for lightweight placements and 33 percent for heavier placed steers. Feed conversion is more crucial to heavyweight steers because they are not as efficient as lighter weight steers.

Finally, average daily gain accounted for 2.6 percent to 3.1 percent of the volatility in cost of gain. The daily rate of gain is more important for lighter placed steers as they are on feed for a longer period of time.

Table 1. Percent of Steer Feeding Cost of Gain Variability Over Time Attributable to Selected Factors, January 1980 - May 1991.

Explanatory Variable	Placement Weight 600/699 lbs.	700/799 lbs.	800/899 lbs.
	- - - - - - - % - - - - - - -		
Corn Price	66.9	65.1	58.4
Feed Conversion	22.9	25.7	32.8
Daily Gain	3.1	2.6	2.6
Total Explained[a]	92.9	93.4	93.8
Unexplained Variability[b]	7.1	6.6	6.2

[a] *Total explained variability is cost of gain variability explained by the explanatory variables.*

[b] *Unexplained variability is 100 minus total explained.*

Steer Feeding Profitability

Net returns to steer feeding are susceptible to risks from fluctuating feeder and fed cattle prices, feed prices, cattle performance, and interest rates. These factors should be considered when determining budget projections and contemplating placing cattle on feed. Rising feeder cattle prices, feed grain prices, interest rates, and poor cattle performance increase costs and break-even levels. A depressed fed cattle market will decrease the amount of gross revenue a producer will receive.

The profit distributions across the three placement weight categories for the January, 1980, through May, 1991 placement period are depicted in Figure 2. Profits ranged from a negative $134 per head to a positive $199 per head. Average profits were in the $0 to $100 per head range in approximately 58 to 65 percent of the 137 months in the study.

During 5 percent of the months, steer feeding profits for 600-799 lb. placements averaged more than $100 per

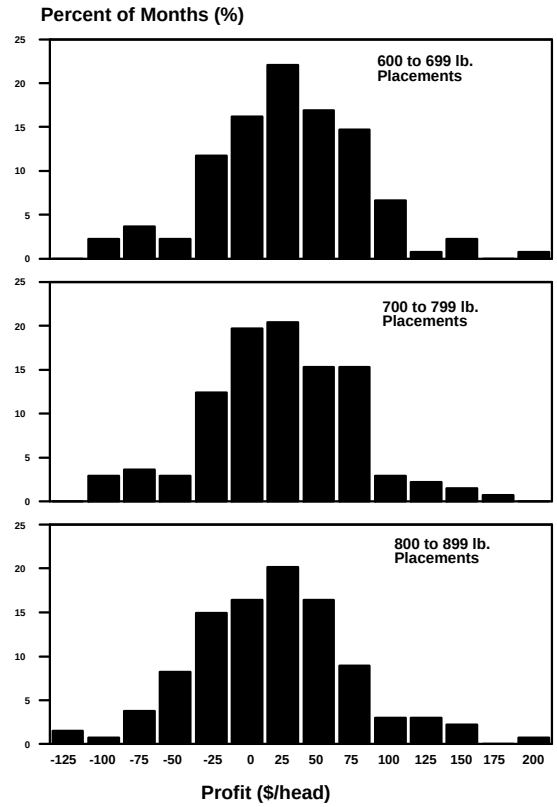


Figure 2. Monthly average fed steer profit distributions by weight category.

head. Profits for 800-899 lb. placements were greater than $100 per head during 7 percent of the months. Downside risk varied among placement weight categories. In 34 percent of the months, 800-899 lb. placements were not profitable; in 32 percent of the months, 700-799 lb. placements realized losses, as did 29 percent of the months for the lightest weight category.

Factors Affecting Profit Variability

About 93 to 94 percent of the variability in steer feeding profit over time was explained by fed price, feeder steer price, corn price, interest rates, feed conversion, and average daily gain. Table 2 reports the relative contributions of these factors to the risks associated with steer feeding profitability by placement weight. Together, fed and feeder steer prices explain 71 to 80 percent of profit risk. This emphasizes the importance producers need to place on cattle prices when developing budgets and preparing procurement and marketing strategies. Further, management of purchase prices is more important for heavyweight steers since the impact of purchase price on profitability increases as placement weight increases. Conversely, the effect of fed cattle price is greater for lighter placements as they require more days on feed, allowing for greater fluctuations in fed cattle price.

The next most important factor in explaining profit risk is corn price. Movements in corn price had the greatest impact on the profitability of lightweight steers, as they will consume more feed during the finishing period than heavyweight cattle.

Feed conversion was the next most important element, accounting for 3 to 5 percent of net return risk. Finally, the combination of average daily gain and interest rates explains 2 to 4 percent of profit variability. Rate of gain is more important for heavier placements as they need to gain the last expensive pounds as quickly as possible.

Management Recommendations

Cattle prices, feed prices, and performance are important in accounting for the risks of feeding cattle. Thus, producers should consider these factors when developing budgets, calculating break-even points, or placing cattle on feed. Break-even price calculations should be calculated for a range of feeder cattle prices, corn prices, and performance measures when placing cattle. The information from this sensitivity analysis can be incorporated into production and marketing plans.

Because 38 to 54 percent of the variation in profits is attributable to movement in sale prices, cattle feeders should consider actively managing fed cattle price risk through forward cash contracts, hedging, or the use of options. Moreover, anecdotal evidence suggests that many cattle feeders do not attempt to manage feeder cattle or feed price risk. Results from the KSU study indicate that 33 to 48 percent of the variation in cattle feeding margins is attributable to movement in feeder cattle prices and corn prices. As a result, cattle feeders should strongly consider attempting to manage their input price risk.

Table 2. Percent of Total Explained Steer Feeding Net Return Variability over Time Attributable to Selected Factors, January 1980 - May 1981.

Explanatory Variable	Placement Weight 600/699 lbs.	700/799 lbs.	800/899 lbs.
	- - - - - - - % - - - - - - -		
Fed Price	54.3	54.2	38.0
Feeder Price	16.9	24.8	41.6
Corn Price	15.9	8.9	6.3
Interest Rate	2.2	1.0	0.0
Feed Conversion	3.1	3.5	4.8
Daily Gain	0.4	1.4	3.7
Total Explained[a]	92.8	93.8	94.3
Unexplained Variability[b]	7.2	6.2	5.7

[a] *Total percentage of variability in net return explained by variability in the explanatory variables.*

[b] *Unexplained variability is 100 minus total explained.*

Acknowledgements

The authors acknowledge the generosity of the two anonymous feedyard managers for providing data.

References

1. Albright, M.L., T.C. Schroeder, M.R. Langemeier, J.R. Mintert, and F. Brazle. 1993. Cattle Feeding Profit and Cost of Gain Variability Determinants. *The Professional Animal Scientist*, 9:138-145.
2. Federal Reserve Bank of Kansas City. Various Issues. *Regional Economic Digest*.
3. Kansas Agricultural Statistics. Various Issues. *Agricultural Prices*.
4. United States Department of Agriculture, Agricultural Marketing Service. Various Issues. *LS-214*, Dodge City, Kansas.

Authors:
Martin L. Albright, Ag Economist, Kansas State University
Michael R. Langemeier, Ag Economist, Kansas State University
James R. Mintert, Ag Economist, Kansas State University
Ted C. Schroeder, Ag Economist, Kansas State University

This publication was prepared in cooperation with the Extension Beef Cattle Resource Committee and its member states and produced in an electronic format by the University of Wisconsin-Extension, Cooperative Extension. Issued in furtherance of Cooperative Extension work, ACTS of May 8 and June 30, 1914.

BCH-8050 Factors Affecting Cattle Feeding Profitability and Cost Of Gain