

Beef Cattle Management Update

FACTORS AFFECTING PROFITABILITY IN THE FEEDLOT

**Issue 37
March 1996**

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Introduction

Factors affecting feedlot profitability should be classified as those connected with the economic (outside the feedlot) or management (within the feedlot) environments. Economic factors include purchase and sale prices, feed prices (usually a function of corn prices) and interest rate. Management factors are those that affect average daily gain (ADG) and feed efficiency (FTG). These factors are largely dependent on genetics, nutritional background of the cattle, nutritional management (e.g., feeds used, mixing and delivery method), weather and health. A detailed evaluation of the effects of each factor on feedlot performance is beyond the scope of this paper. However, because cattle feeding is a relatively short-term investment, small changes in some of these factors have a great impact on profitability. Therefore, feedlot operators must always strive to integrate economic and management factors to make decisions that will enhance the profit potential of a cattle feeding venture. In this paper, models were created to highlight effects of various economic and management factors on feedlot profitability.

Feedlot Profitability — The Basics

A feedlot operator is actually performing two functions in the process of taking cattle from a given weight to a slaughter weight endpoint including: 1) purchasing feeder cattle, and 2) marketing fed cattle, a commodity to which he/she has added some value (gain and eating quality). When viewed separately, these functions demonstrate the complexity of a feedlot operation, and they simplify integration of economic and management factors into the profit equation.

Feedlot operators purchase light, “unfinished” pounds of beef at a given price. These pounds, along with additional pounds gained in the feedlot, are later marketed as “finished” pounds. Feedlot operators in the U.S. usually purchase unfinished pounds at higher prices than they market finished pounds. A 500-lb steer calf is sold at \$65 to \$100/cwt, while a 1,250-lb finished

steer is sold at \$60 to \$75/cwt. The difference between purchase price and sale price is called price spread or price margin. Feed, nonfeed [death rate, transportation, shrinkage, medicine and veterinary costs, interest and yardage (fuel, overhead, custom hire, labor, etc.)] and indirect costs are calculated over the entire feeding period and spread over the entire gain (in pounds). These costs are then expressed as dollars per hundredweight (\$/cwt) gain and considered cost of gain. The difference between sale price and cost of gain is known as feeding margin.

Price margin — The difference between purchase and sale price applied to purchased weight. For example, a feeder purchases one hundred 700-lb yearlings for \$70/cwt delivered. After a feeding period of 160 days, the feeder sells 99 1,250-lb fed cattle for \$62/cwt net. The price margin for the 700-lb feeders is a negative \$8/cwt. In other words, the initial 700 lb that the feeder purchased at \$70/cwt are valued at only \$62/cwt when the cattle are finished. The feeder already has a loss of \$56/head to offset.

Feeding margin — The difference between the cost of producing one pound of gain and the selling price. Using the previous example, the cost of gain is calculated at \$40/cwt (this includes all costs from the time of purchase to the time of sale — transportation, shrinkage, veterinary and medicine, death loss, feed, interest and yardage). The feeder, in the example, feeds for 550 lb gain, valued at \$62/cwt at sale time. Therefore, the feeding margin is \$22/cwt. The feeding margin calculated on a per head basis is \$121.

Profit or loss calculation. Adding or subtracting price margin and feeding margin on a per head basis permits calculation of profit or loss. In the example, a negative price margin of \$56/head must be subtracted from a positive feeding margin of \$121/head. The result (\$65/head) is the net profit made by the feeder.

The advantage of separating these functions into a margin for each permits in-depth analyses of factors that affect profits. In addition, this allows a separation of the operator's expertise in purchasing and marketing cattle from cattle feeding and management.

Model Defined

Two models were set up to evaluate effects on profit when various economic and management factors were changed one at a time. The economic factors that were changed include purchase price, sale price, feed cost and interest rate (applied to feeder purchase only). The management factors that were changed included FTG and ADG. A single factor was increased or decreased 10% while all other variables in the model remained constant. A model was set up for 600- and one for 775-lb feeder steers. The complete models and assumptions for the two weight classes are given in Table 1.

Table 1. Model assumptions for 600-lb and 775-lb steers.

Item	600-lb	775-lb
Purchase weight, lb	600	775
Selling weight, lb	1,250	1,325
Purchase price, \$/cwt	70	67.5
Sale price, \$/cwt	62	62
Feed cost, \$/cwt	5	5
Interest rate, % APR	10	10
Dry matter/lb gain, lb	6.5	7
Average daily gain, lb	3	3.3
Overhead cost, \$/hd	4	4
Veterinary/medical, \$/hd	10	7
Facilities, \$/hd/day	.15	.15
Trucking, \$/hd	8	8
Marketing cost, \$/hd	5	5
Death loss, %	1	.5
Sell shrink, %	3	3

Effects of Economic and Management Factors on Profitability

Table 2 lists the results of changing each of the economic or management factors outlined (up or down by 10%) on profit or net breakeven sale price (including death loss and sale shrink). For 600-lb steers, sale price had the greatest impact on profit. A 10% change in sale price had a net impact on profit of \$79/head. Purchase price had the second largest impact on profit. Changing sale price 10% affected profit \$45/head, or breakeven price \$3.71/cwt. Feed cost impacted profit to the same extent as FTG and were both the third largest factors affecting profit. This was expected, as FTG and feed cost are multiplied to generate feed cost of gain. A change of feed cost or FTG of 10% had an impact on profit of \$26.50/head and on breakeven price of \$2.21/cwt. Of the two management factors evaluated, ADG had the least impact on profit. A change in ADG of 10% had an impact on profit of \$6/head and on breakeven price of \$.5/cwt. Interest rate had an impact on profit of \$2.50/head and on breakeven price of \$.21/cwt.

Similar relationships were found for cattle weighing 775 lb when entering the feedlot. Again, selling price had the greatest impact on profit. Changing selling price 10% affected profit \$81/head. Purchase price had a slightly larger impact on profit in 775-lb feeders than in 600-lb feeders. The greater impact of purchase price on profit for heavier feeders can be attributed to the shorter feeding period that heavy steers usually experience — purchase price is spread out over fewer days or pounds. A change in purchase price of 10% changed profit by \$54.50/head or breakeven price by \$4.26/cwt. Feed cost and FTG had the same impact on profit or breakeven price. A change of 10% on feed cost or FTG affected profit \$24/head or breakeven price \$1.88/cwt. Changing ADG 10% had an impact on profit of \$5/head and on breakeven of \$.39/cwt. Changing interest rate 10% had an effect of \$2.50/head on profit or \$.19/cwt on breakeven price.

It is evident from these calculations that, among the economic factors evaluated, sale price has the largest impact on profit followed by purchase price, feed cost and interest rate. Between the management factors evaluated, FTG or ADG, FTG has the greatest impact on profit. This underlines the importance of a marketing plan, and a plan to obtain a consistent supply of fair priced feeders, especially when feeding heavy cattle.

Because feed costs usually total 60 to 70% of the total cost of gain, feed costs or FTG rank third as factors affecting feedlot profitability. The impact of feed cost or FTG is similar for cattle of various weights. Therefore, developing sound feeding programs that maximize gain for a given intake at low costs are the desired strategies to improve profits.

Average daily gain or interest rate affect the total nonfeed costs (usually between 30 and 40% of the total cost of gain). Therefore, the relative impact of ADG or interest rate on profit is small. Indeed, because heavy feeders are fed for shorter periods of time, the relative impact of ADG or interest rate is lower on profit in heavy steers.

Table 2. Effects of changing various economic and management factors on profit when feeding 600-lb steers.

Item	Standard	Purchase price		Sale price		Feed cost		Interest rate		FTG ^a		ADG ^b	
		+	-	+	-	+	-	+	-	+	-	+	-
Purchase price, \$/cwt	70	77	63	70	70	70	70	70	70	70	70	70	70
Sale price, \$/cwt	62	62	62	68.2	55.8	62	62	62	62	62	62	62	62
Feed cost, \$/lb	.05	.05	.05	.05	.05	.055	.045	.05	.05	.05	.05	.05	.05
Interest rate, %	10	10	10	10	10	10	10	11	9	10	10	10	10
FTG ^a , lb	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	7.15	5.85	6.5	6.5
ADG ^b , lb	3	3	3	3	3	3	3	3	3	3	3	3.3	2.7
Expenses, \$/hd													
Purchase	420	462	378	420	420	420	420	420	420	420	420	420	420
Feed	264	264	264	264	264	290	238	264	264	290	238	264	264
Other	84	87	82	84	84	84	84	87	82	84	84	79	91
Total	768	813	724	768	768	795	742	771	766	795	742	763	775
Income, \$/hd													
Gross	744	744	744	819	660	744	744	744	744	744	744	744	744
Profit or loss/hd	- 24	- 69	20	50	-108	- 51	2	- 27	- 22	- 51	2	- 19	- 31
Adj. breakeven, \$/cwt	63.97	67.73	60.31	63.97	63.97	66.23	61.81	64.23	63.81	66.23	61.81	63.56	64.56
Impact ^c on profit, \$/hd		45.0		79.0		26.5		2.5		26.5		6.0	
Impact ^c on breakeven, \$/cwt		3.71				2.21		.21		2.21		.5	

^a Dry matter required/lb gain.

^b Average daily gain.

^c When changing each factor 10%.

Conclusions

Models presented herein demonstrated the importance of economic and management factors in feedlot profitability. These models also demonstrated the importance of integrating two functions in operating a feedlot — marketing and feed management. Some associations between factors studied and profit were derived:

- A change of \$1/cwt purchase price affects profit \$7.14/head.
- A change of \$1/cwt sale price affects profit \$12.90/head.
- A change of \$1/cwt feed cost affects profit \$50/head.

- (Or, a change of \$1/ton feed cost affects profit \$2.50/head.)
- A change in interest rate of 1 percentage point affects profit \$2.50/head.
- A change of 1 lb of FTG affects profit \$37.30/head.
- A change of 1 lb of ADG affects profit \$17.20/head.

Thus, when purchase price is expected to increase \$5/cwt, profit is expected to decrease \$35.70/head. Also, when sale price increases \$5/cwt, profit is expected to increase \$64.50/head. These factors are additive. This means that a feedlot operator facing a year of increased feeder prices (\$5/cwt) and potentially low fed cattle prices (\$3/cwt) must work with his/her nutritionist to reduce feed cost, improve FTG or ADG to offset the combined negative effect of increased purchase price and decreased sale price (\$74.40/head). With the use of alternative feeds, implementation of bunk management strategies and use of approved growth promotants, he/she may expect to lower feed cost \$20/ton (a \$50/head improvement in profit), improve FTG by .5 lb (an \$18.65/head improvement in profit), and increase ADG by .5 lb (an \$8.60/head improvement in profit). The cumulative improvements in profit add up to \$77.25/head, sufficient to offset the negative impact (\$74.40/head) of purchase and sale price on profit.

Approximate equivalent values of profit determinants are:

$$\begin{aligned}
 \$3.50/\text{cwt purchase price} &= \$2.00/\text{cwt sale price} \\
 \$2.00/\text{cwt sale price} &= \$.50/\text{cwt feed cost } (\$10/\text{ton feed cost}) \\
 \$.50/\text{cwt feed cost } (\$10/\text{ton feed cost}) &= 10 \text{ points interest rate} \\
 10 \text{ points interest rate} &= .7 \text{ lb FTG} \\
 .7 \text{ lb FTG} &= 1.5 \text{ lb ADG.}
 \end{aligned}$$

Thus, a feedlot operator can offset changes in any of these factors by adjusting the other(s). For instance, increases in purchase price of \$3.50/cwt would be offset by increasing sale price \$2.00/cwt or decreasing feed cost \$10.00/ton. Similarly, when manipulating diet ingredients to reduce feed cost, one often wonders what loss in feed efficiency can be afforded. Approximate equivalent values indicate that, when all other factors remain constant, reducing feed cost \$10/ton (e.g., by using alternative feeds) will permit a .7 lb lower feed efficiency if necessary.