W1397

Understanding Cost of Gain and Value of Gain in Cattle

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Cattle production is often segmented into three distinct sectors: cow-calf, stocker/backgrounder (henceforth "stocker") and feedlot. While all three sectors aim to generate profit, the way profitability is determined differs because each relies on different and distinct cost structures. The cow calf sector serves as the "factory" of the beef industry, where calves are produced, so its profitability depends on how many calves are successfully raised and marketed each year. In contrast, the stocker and feedlot sectors operate as margin based enterprises, where cattle and feed are the primary input costs and profits hinge on managing buy sell margins and the cost of gain. This effectively means managing the cost of placing weight on cattle while also managing the value of each additional pound of weight added to the animal.

Cost of gain (COG) and value of gain (VOG) are often associated with the stocker and feedlot phases of production. This is because they are margin businesses, and their profit potential is influenced by the cost of putting weight gain on animals and ensuring the value of that weight gain is more valuable than the cost. However, cow-calf producers should not overlook COG and VOG when making marketing decisions because there are instances when cow-calf producers could generate more profit by continuing to add weight to calves and other times when adding additional weight costs more than its value.

Due to common misperceptions and inappropriate comparisons of COG and VOG in certain media, it is prudent to provide a simple and clear comparison of how COG and VOG are calculated and their use in decision making in a cattle operation. Thus, the objectives of this publication are to:

1. Define COG and VOG as it relates to cattle production,
2. Illustrate how to calculate COG and VOG, and
3. Demonstrate how COG and VOG work in tandem to determine profit when growing calves.

Defining COG and VOG

Cost of gain is defined as the cost of placing one pound of weight on an animal. There are many different methods of feeding cattle, but most revolve around the animal grazing forage or consuming mechanically harvested feedstuffs such as hay, corn or a byproduct feedstuff. Each feeding program may differ by the rate at which cattle gain weight and by the cost of placing that weight on the animal. Additionally, the COG is rarely constant when growing calves because they will have time periods when they are less efficient, or more efficient, at converting pounds of feed into pounds of gain. As an example, most cattle are more efficient converting pounds of feed into weight gain when the ground is dry and the temperature is neither hot nor cold. However, the same cattle will be less efficient converting feed into weight gain when it is cold and they are having to walk through considerable mud, which results in expending more energy when walking.

Value of gain is defined as the value of placing one pound of weight on an animal. Value of gain is typically not constant, and it is rarely equal to the price per pound received for the animal being marketed. It is important to remember the price per pound of calves and feeder cattle typically declines as the weight of the animal increases. Thus, the value of gain is generally less than the price per pound being received when marketing cattle.

Calculating COG and VOG

Feed COG

Calculating the feed COG is typically easier when cattle are being fed in a dry lot than in a grazing operation, but it can be calculated in either situation. Table 1 contains a brief COG comparison for cattle on full feed versus cattle on pasture. Based on Table 1, if an operation is paying $300 per ton for feed, then each pound of feed consumed by a calf cost $0.15 ($300/ton ÷ 2000 lbs/ton = $0.15/lb of feed). If a calf is expected to gain one pound for every seven pounds of feed, then the COG is $1.05 per pound (7 lbs feed x $0.15/lb of feed = $1.05/lb of gain). Similarly, if an operation can graze one acre for 150 days with a total gain of 450 pounds per acre and the pasture cost was $250 per acre, then the COG on grazing pasture would be $0.50 per pound of gain ($250/ac ÷ 450 lbs/ac = $0.50/lb).

Table 1. Feed cost of gain calculation for cattle on full feed and pasture

Full feed COG	
Commercial feed price ($/ton)	300
Commercial feed price ($/lb)	0.15
Feed:Gain ratio	7:1
Cost of gain ($/lb)	1.05
Pasture COG	
Pasture cost ($/acre)	250
Total gain (lb/acre)	450
Cost of gain ($/lb)	0.50

VOG

The calculation of VOG is dependent on the price and weight at which an animal is purchased and the price and weight at which the animal is sold. The basic formula for calculating value of gain is:

$$\text{VOG} = \frac{\text{Calf sell weight} \times \text{Calf sell price} - \text{Calf purchase weight} \times \text{Calf purchase price}}{\text{Calf sell weight} - \text{Calf purchase weight}}$$

Thus, if a person purchases a 500-pound steer for a price of $500 per hundredweight and sells an 800-pound steer for a price of $350 per hundredweight then the VOG calculation is as follows:

$$\text{VOG} = \frac{800 \text{ lbs} \times \$350/\text{cwt} - 500 \text{ lbs} \times \$500/\text{cwt}}{800 \text{ lbs} - 500 \text{ lbs}} = \frac{\$2800 - \$2500}{300 \text{ lbs}} = \frac{\$300}{300 \text{ lbs}} = \$1.00 \text{ lb/VOG}$$

It is important to note again, the selling price ($350/cwt) is not the VOG ($100/cwt or $1.00/lb), because as the weight of feeder cattle and calves increase, the price generally decreases. The only instance in which VOG is the same as the selling price is if the purchase price and selling price are the same.

How COG and VOG Work Together

The terms COG and VOG in cattle production can be discussed separately, but they are generally discussed together since they both influence the profit objective. Thus, one could have an objective of minimizing COG in a cattle operation. The obvious way of minimizing COG is to not feed any cattle, but this results in a small probability of making a profit. Similarly, a person could attempt to maximize VOG, but if VOG is less than COG then the outcome is worse than not feeding cattle. Thus, it is necessary to consider both COG and VOG when making cattle growing decisions.

Typically, a producer growing cattle will consider the COG and VOG over an entire anticipated feeding period. It is important to consider the price seasonality of cattle (Bowling, 2026) and feed (Griffith, 2013) when estimating COG and VOG because the price of feed and cattle varies throughout the year. For instance, the price of 500-pound calves tends to be highest in the early spring and lowest in the fall months. Similarly, 800-pound feeder cattle prices tend to be lowest in early spring and peak in late summer. On the feed side, most commodity feed prices decline during the forage growing season when grass is readily available while commodity feed prices tend to seasonally increase during the winter months when forage production declines. Thus, it is often advantageous to consider seasonal price trends as these generalities can often result in improved decision making.

The seasonal price trends of cattle and feed impact COG and VOG. Similarly, COG is influenced by what an animal is fed. In general, COG is higher when animals are fed mechanically harvested feedstuffs and lower when grazing. At the same time, VOG may be increasing or decreasing on a specific weight class of animal for a specific time of year. Thus, there are times when it may be beneficial to provide a feed that results in a greater daily rate of weight gain that may have a higher COG in order to capitalize on a greater VOG by marketing cattle sooner rather than later. Similarly, there are times when it is more profitable to settle for lower daily rates of weight gain because the VOG is expected to be greater with a later marketing time frame.

Example

Table 2 contains an example of returns to feeding in 2024 and 2025 from purchasing a 550-pound steer calf in either March or April and selling an 850-pound calf in either July or August. Table 2 includes a comparison of growing cattle at a rate of 2 pounds per day or 2.5 pounds per day with a cost of gain of $0.90 per pound and $1.00 per pound, respectively. Both years had abnormally high VOG and returns to feed cost. However, the example demonstrates how COG and VOG must both be managed to maximize the profit on a group of cattle.

In this example, cattle purchased in March 2025 and sold in August 2025 had the highest VOG and return to feed cost. Part of this was due to the assumption of a lower COG at $0.90 per pound compared to $1.00 for the other alternatives, but even if the COG for the March through August alternative was $1.00, it would still have the highest VOG and return to feed cost. Despite this fact, some operations may still benefit from one of the other options if it means they can grow more cattle over a period of time.

Table 2 is used to demonstrate how calculations are performed when making management decisions when growing cattle. The results could be drastically different if the market was declining over the time period instead of increasing. In other words, if cattle prices would have been steady or declining, then VOG values would have been much closer to the COG and resulted in much smaller returns. These are calculations that must be performed regularly to determine the opportunity for a profit. The only way for a producer to guarantee a COG is to have all feed purchased at the beginning of the feeding period. Similarly, the only method for a producer to guarantee a specific VOG is to use price risk management to lock in a sell price or at a minimum set a sell price floor.

Table 2. Return to feed cost of buying and selling steer calves in Tennessee in 2024 and 2025

	2024			2025			
Purchase month	March	March	April	March	March	April	
Purchase weight (lbs)	550	550	550	550	550	550	a
Purchase price ($/cwt)	250	250	242	336	336	357	b
Calf purchase value ($)	1375	1375	1331	1848	1848	1964	c = a x b
Average daily gain (lb/day)	2.5	2.0	2.5	2.5	2.0	2.5	d
Days owned	120	150	120	120	150	120	e
Total weight gain (lbs)	300	300	300	300	300	300	f = d x e
Sell month	July	August	August	July	August	August	
Sell weight (lbs)	850	850	850	850	850	850	g = a + f
Calf sell price ($/cwt)	246	233	233	320	346	346	h
Calf sell value ($)	2091	1981	1981	2720	2941	2941	i = g x h
Buy-sell margin	716	606	650	872	1093	978	j = i - c
Value of gain ($/lb)	2.39	2.02	2.17	2.91	3.64	3.26	k = j ÷ f
Total cost of gain ($)	300	270	300	300	270	300	l
Feed cost of gain ($/lb)	1.00	0.90	1.00	1.00	0.90	1.00	m = l ÷ f
Return to feed cost ($)	416	336	350	572	823	678	n = j - l

The example provided in Table 2 is focused on growing calves from weaning weight to a weight in which they are ready to enter the feedlot. Cow-calf producers can use this same methodology to determine if it is feasible to continue growing calves prior to weaning. An example may be determining if calves should be sold at 475 pounds or if growing them to 575 pounds would be a better option. The same statement holds for determining if cow-calf producers should consider growing calves after weaning also.

Conclusion

Feeding and growing cattle in a profitable manner is a goal of most operations. To be successful, growers must manage the COG and the VOG simultaneously. This information will help producers make purchasing and selling decisions as well as the rate at which they should be growing cattle during a certain timeframe. This simple analysis does not take everything into account, but it does provide a starting point and a method to assist decision making.

References

Bowling, B. 2026. Seasonal Prices for Tennessee Feeder Cattle and Cows. University of Tennessee Extension publication D39. Online: tiny.utk.edu/D39

Griffith, A.P. 2013. Seasonal Prices for Feedstuffs Commonly Utilized in the Midsouth. University of Tennessee Extension publication W296. Online: tiny.utk.edu/W296



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