

# ECONOMICS OF ADDED GAIN

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## Introduction

Recent events in the cattle industry have provided an economic incentive for producers to market heavier feeder cattle. As a result, many cattlemen are seriously considering ways that they can add weight and value to their weaned calves.

The following discussion is designed to offer a model for evaluating the economics of adding weight to calves. To make the discussion more applicable, an example is developed and utilized throughout the remainder of this paper.

## Example

This example follows the decision-making process of a rancher with 100 calves that will be marketed in May weighing 450 pounds versus keeping this group and selling them in September weighing 750 pounds. A 2% death loss is assumed.

The 2% death loss is an important number because many cattle producers fail to include this number in their calculations. As a result, net sales weights will usually be lower than many producers expect, simply due to death loss.

## Economic Concepts

Fundamentally, the decision to add weight after weaning is no different than trying to decide on retaining ownership through the feedlot or stockering. In essence, it is retaining ownership because producers are holding on to the cattle longer than they normally would.

In short, retaining ownership or adding weight will be profitable if the ending value is greater than the beginning value plus the cost of gain. A simple form is included at the end of this proceeding (Figure 4).

Another way to determine profitability is to see if the Cost of Gain (COG) is less than the Value of the Gain (VOG). COG and VOG are two of the most utilized and misunderstood terms in the beef industry today. The short formula for COG is:

$$\text{COG} = \frac{\text{Total cost of adding weight}}{\text{Pounds of additional gain}}$$

The Total Cost (TC) of adding weight does not include the value of the animal but it does include the additional feed, vet & meds, labor, trucking, etc. that is required to place the additional weight on the animal. The pounds of additional weight gain (WG) is merely the final sales weight minus the beginning weight. WG will capture death loss, Average Daily Gain (ADG) and the number of head placed.

Using the example, if the producer estimates feeding, processing and additional labor costs at \$180 per head, his TC would be \$18,000. If he assumes a 2% death loss and an average gain of 300 pounds per head that is marketed, his total WG will be 28,500 pounds. This will result in a COG of \$63.16/Cwt. Of course this number could be off slightly depending on when exactly the deaths occurred (dead calves don't eat any feed).

**Table 1**  
**COG Calculation for Example**

COG Calculation	
Cost/head for additional weight	180.00
Head Placed	\$ 100.00
Total cost of weight gain	\$ 18,000.00
Net weight gain	285.00
COG	\$ 63.16

In order for this to be a profitable venture, the COG must be less than VOG. In this example, the VOG must be greater than \$63.16 for it to be profitable to place additional weight on the calves.

A common misconception among many cow-calf producers is that VOG is the same as sales price-that is not true.

VOG is a number that reflects the value of the additional pounds that are added. Since heavier animals are usually priced less per pound than lighter ones, VOG is usually less than the sales price. The only time VOG is equal to the sales price is when the beginning and ending prices are the same. In those rare instances where the sales price is higher than the beginning price, VOG will actually be higher than the sales price.

VOG is an important number to know because it also the breakeven COG.

$$\text{VOG} = \frac{\text{Ending Value} - \text{Beginning Value}}{\text{WG}}$$

$$\text{VOG} = \frac{(\text{EW} \times \text{EP}) - (\text{BW} \times \text{BP})}{\text{WG}}$$

Where, EW = ending weight  
 EP = ending price  
 BW = beginning weight  
 BP = beginning price

**Table 2**  
**VOG Calculation for Example**

VOG Calculation	
Total Beginning Weight (Cwt.)	450
Beginning Price (\$/Cwt.) <sup>1</sup>	\$100.00
Total Beginning Value	\$ 45,000.00
Total Ending Weight (Cwt.)	735
Ending Price (\$/Cwt.) <sup>2</sup>	\$79.00
Total Ending Value	\$ 58,065.00
Net Value Increase	\$ 13,065.00
Net Weight Gain	285
VOG	\$ 45.84

<sup>1</sup>\$100/Cwt. assumed for clarity. Actual market price for this week was closer to \$105.00/Cwt.

<sup>2</sup>\$79.00/Cwt. based on Beefbasis.com report (Figure 3).

In this instance, the VOG is less than the COG. As a result, adding the additional weight would not be profitable. However, if the producer can determine some way to get COG lower than \$45.84 then he should consider putting on the additional weight.

### Calculating Beginning and Ending Prices

Assigning a beginning value and estimating an ending value may seem like a daunting task. However with a little market knowledge and some 3<sup>rd</sup> grade arithmetic, most cattlemen will be able to calculate these values with little or no trouble.

Beginning values can be determined by applying a current price to the calves in question. Current prices can be gathered from local auction markets, video sales or direct sales. If there are no local auction markets or producers have little or no information about their local prices, they can obtain market information from the USDA Agricultural Marketing Service (USDA-AMS). An example report for Florida Auction Markets for the week ending April 24, 2009 is given below in Figure 1.

Readers are reminded that many of the sales reported in weekly auctions are single-head lot sales, so if said calves would normally be marketed in truckload-lots then the appropriate price differential should be applied.

Regardless of the price used, cattlemen should be sure and apply the appropriate shrink and marketing cost to arrive at a net value per calf. For instance, if calves would normally be sold straight off the cow at a local sale barn with a 4% commission, the producer should take the ranch weight adjusted for shrink (6%-10%), minus the commission and any hauling or yardage charges to arrive at a net value per animal. In the example provided in this paper, it is assumed that all of these costs have been deducted.

To predict the ending value cattlemen will need to know the ending weight and price.

Estimating ending weights usually does not pose a problem, but the ending price usually causes some consternation among producers.

Ending values can be estimated by looking at forward contract prices from buyers or through markets that offer future delivery such as Superior Auction or other marketing agencies. An excerpt from the USDA-AMS report for Superior sales east of the Mississippi River is given below in Figure 2.

One problem with cash contract prices may be lack of reported prices for desired date or incomplete information about the type of cattle sold. If this is the case, producers can use a futures based price predictor such as the one found at [www.beefbasis.com](http://www.beefbasis.com) to estimate the local price for a specified time. Again readers are reminded that many sales in Southeastern livestock barns are single-head sales so if cattle will be marketed in larger groups, the basis (cash-futures) estimates should be adjusted upward to yield a higher price. Of course other adjustments for quality, breed, etc. should also be made.

Finally, the ending sales value should also be adjusted to reflect shrink, commission, check-off, etc.

One final number the producer may want to calculate is the breakeven price (BE). The breakeven price is the price that the producer will need to cover the original cost of the calves plus the feeding cost and including death loss.

$$BE = \frac{BV + TCWG}{EW}$$

Where, BV = Beginning Value  
 TCWG = Total cost of weight gain  
 EW = Total ending weight

Following our example, if the calves in question have a beginning value of \$450 per head and the producer estimates he can add the additional 300 pounds for \$180, then his breakeven price is \$85.71/Cwt.

**Table 3**  
**BE Calculation for Example**

<b>Breakeven Cost Calculation</b>	
Total Beginning Value	\$ 45,000.00
Total cost of weight gain	\$ 18,000.00
Total Costs	\$ 63,000.00
Total sales weight	735
Breakeven Price	\$ 85.71

By knowing the BE price, VOG and COG an interested cattle producer can now evaluate the additional weight decision using several different measures before finally making a management decision.

### Summary

The decision to add weight to weaned calves is a little more involved than many people believe. However, it is not unmanageable. Just by knowing a few key numbers, cattlemen can make informed management and marketing decisions.

**Figure 1**  
**Weekly Florida Cattle Auctions Report**

OR\_LS145  
Bartow, FL      Fri Apr 24, 2009      USDA-FL Dept of AG Market News

Florida Cattle Auctions Weekly Summary

Feeder Steers and Bulls Medium and Large 1-2			
Wt Range	Avg Wt	Price Range	Avg Price
200-245	220	122.00-138.00	128.79
250-295	271	115.00-132.50	122.30
300-345	320	108.00-126.00	117.93
350-395	372	100.00-124.00	112.80
400-445	422	100.00-118.00	108.42
450-495	466	97.00-114.00	104.68
500-545	518	93.00-107.00	98.31
550-595	572	89.00-101.00	95.24
600-640	620	87.00-103.00	91.74
660-690	673	86.00-88.00	86.80

Source: Florida Dept of Ag-USDA Market News Service, Bartow, FL  
Terry Harris OIC Phone (229) 226-1641  
[http://www.ams.usda.gov/mnreports/or\\_ls145.txt](http://www.ams.usda.gov/mnreports/or_ls145.txt)

**Figure 2**  
**Report from Superior Livestock Video Auction**

AM\_LS753  
 St. Joseph, MO      Fri Apr 24, 2009      USDA-MO Dept of Ag Market News

Superior Livestock Video Auction  
 Feeder Cattle Weighted Average Report for 04/24/2009  
 Offerings: 37,200

Preliminary report as of 4:30 PM Friday April, 24th. The final and complete report will be released Monday April 27th. **\*\*PLEASE NOTE:** These head counts and prices are subject to change on the final report.

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 Eastern States: All states east of the Mississippi  
 Louisiana and Arkansas.  
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Feeder Steers Medium and Large 1-2						
Head	Wt Range	Avg Wt	Price Range	Avg Price	Delivery	
52	410	410	114.00	114.00	Current	
85	580	580	101.50	101.50	Current	
73	675-690	682	93.60-98.75	96.25	Current	Part Loads
37	720	720	92.00	92.00	Current	Part Loads
120	825	825	93.60	93.60	Current	
169	850-875	858	89.00-93.50	90.49	Current	
34	940	940	83.50	83.50	Current	Part Loads
100	500	500	110.50	110.50	May	
160	600	600	100.50	100.50	May	
73	670	670	98.00	98.00	May	
32	750	750	93.25	93.25	May	Part Loads
60	825	825	94.10	94.10	May	
30	825	825	91.35	91.35	May	Part Loads
55	850	850	94.00	94.00	May	
87	550	550	94.00	94.00	Jun	
425	600-625	623	88.50-91.25	89.77	Jun	Calves
30	600	600	97.50	97.50	Jun	Part Loads
225	650	650	100.10	100.10	Jun	
45	700	700	94.85	94.85	Jun	Part Loads
458	750	750	96.50-98.35	98.04	Jun	
479	800-840	821	92.75-95.50	94.22	Jun	
208	450-475	462	100.00-104.75	102.38	Jul	
97	500	500	98.00	98.00	Jul	
88	550	550	94.00	94.00	Jul	
120	800	800	95.10	95.10	Jul	
107	450	450	101.25	101.25	Aug	
54	450	450	99.00	99.00	Aug	Part Loads
501	550-590	570	92.00-95.00	94.07	Aug	
44	570	570	94.50	94.50	Aug	Part Loads
154	625	625	84.50-86.50	85.50	Aug	
30	625	625	86.00	86.00	Aug	Calves
47	525	525	88.00	88.00	Sep	Part Loads
79	615	615	89.50	89.50	Sep	

Source: USDA-MO Dept of Ag Market News Service,  
 Corbitt Wall/Greg Harrison, Market Reporters 816-238-0678  
 24 Hour Market Report 1-573-522-9244  
[www.ams.usda.gov/mnreports/AM\\_LS753.txt](http://www.ams.usda.gov/mnreports/AM_LS753.txt)

**Figure 3**  
**Cash Price Estimator from BeefBasis.com**



### Feeder Cattle Basis Forecast

State: Florida	Location: Ocala	Date: 9/30/2009
Sex: Steer	Frame: Lg & Med/Lg	Class: 1-2
Weight: 750 lbs/head	Head: 98	
Feeder Cattle Futures Price: 100.25 \$/cwt	Live Cattle Futures Price: 86.2 \$/cwt	Corn Futures Price: 4.02 \$/bu
Reference Contract: Oct 2009 Transaction Date: Apr 27, 2009	Reference Contract: Oct 2009 Transaction Date: Apr 27, 2009	Reference Contract: Dec 2009 Transaction Date: Apr 27, 2009

Model-estimated feeder cattle basis values (1)	Results
Model-estimated feeder cattle basis, \$/cwt	-21.30
Confidence interval for basis, \$/cwt (3)	-22.48 to -20.12
Expected cash price, \$/cwt	78.95
Confidence interval for expected cash price, \$/cwt (3)	77.77 to 80.13
Optimal hedge ratio (4)	0.7541
Number of calves hedged per contract (5)	88

Feeder Cattle Model											
C O R N	3.22	-17.19	-17.68	-18.17	-18.66	-19.15	-19.64	-20.14	-20.63	-21.12	
	3.42	-17.72	-18.21	-18.71	-19.20	-19.69	-20.18	-20.67	-21.16	-21.66	
	3.62	-18.26	-18.75	-19.24	-19.73	-20.22	-20.72	-21.21	-21.70	-22.19	
	3.82	-18.79	-19.28	-19.78	-20.27	-20.76	-21.25	-21.74	-22.24	-22.73	
	4.02	-19.33	-19.82	-20.31	-20.80	-21.30	-21.79	-22.28	-22.77	-23.26	
\$/Bu	4.22	-19.86	-20.36	-20.85	-21.34	-21.83	-22.32	-22.82	-23.31	-23.80	
	4.42	-20.40	-20.89	-21.38	-21.88	-22.37	-22.86	-23.35	-23.84	-24.33	
	4.62	-20.94	-21.43	-21.92	-22.41	-22.90	-23.39	-23.89	-24.38	-24.87	
	4.82	-21.47	-21.96	-22.46	-22.95	-23.44	-23.93	-24.42	-24.91	-25.41	
		92.25	94.25	96.25	98.25	100.25	102.25	104.25	106.25	108.25	
		Feeder Cattle \$/Cwt									

(1) Model-estimated feeder cattle basis is based on the current Chicago Mercantile Exchange (CME) feeder cattle contract specifications.  
 (2) The basis forecasting model is based on nearby feeder cattle and corn futures price and other variables  
 (3) Confidence interval represents the range actual basis and expected cash price is expected to fall in 68% of the time  
 (4) For additional information and explanation, please see the About Forecasting page.  
 (5) The number of calves hedged per contract for the Feeder Cattle - Based Model is based on the 50,000 pound feeder cattle contract



**Figure 4**  
**Sample Template for Analyzing Profits from Adding Weight**

<b>ITEM</b>	<b>Total Dollars</b>
Final Value of Feeders (Price X Sales Weight X Number Sold)	
- Marketing Costs	
<b>Net Final Value (NFV)</b>	
Initial Value of Calves (Price X Sales Weight X Number Sold)	
- Marketing Costs	
<b>Net Beginning Value (NBV)</b>	
<b>Additional Costs</b>	
Pasture (seed, fertilizer, fuel, etc.)	
Feed	
Hay	
Vet & mineral (implants, vaccines, etc.)	
Repairs	
Additional labor	
Land rent	
<b>TOTAL ADDITIONAL COSTS (TAC)</b>	
<b>Profits (NFV-NBV-TAC)</b>	