

Cow/Heifer Investment Decision Discounted Cash Flow¹

A Farm Planning/Decision Tool for Louisiana Cow/Calf Producers



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Current calf prices and rising input costs are limiting opportunities for profitability for producers. Uncertainty about demand is putting downward pressure on cattle prices at all levels of production (fed, stocker, and cow/calf). A declining beef cow inventory is expected through at least 2010 and this has positive implications for price in the longer term once demand is stabilized. Expansion of the beef herd may result from increased prices. Producers who wait until prices increase to expand their herds risk price decreases due to the length of time it takes to get a calf to market. By the time a calf is sold, what was a potentially profitable investment is no longer the case.

With the current situations cattle producers are facing, making decisions based on economic data should be a priority for producers. Producers that have or can get resources needed for production (pasture, labor, money, and management) still have the potential to earn a profit. Purchase of bred heifers in the current economic climate is a risky proposition. By projecting net cash income into the future and adjusting for the time value of money and risk, producers can determine if the potential returns justify the expenditure.

In order to project into the future, assumptions about average calf prices, sale weights, weaning percentages, sales expense, cost of production, productive life of the cow and salvage value of the cow at the end of her productive life must be made. This allows net cash income from operations to be estimated. Different assumptions will give different results. After the annual net cash incomes are estimated, the future incomes are adjusted by the discount rate. The discount rate should be viewed as the rate of return from the next best investment alternative. Discount rates reflect the time value of money as well as how risky the potential investment is.

The discounted cash flow (DCF) is the value in today's dollars of the cumulative net cash from operations plus the salvage value of the cull.

¹ This is an updated version of a paper first done by Dr. Kenneth Wegenhoft, Professor Emeritus, Department of Agricultural Economics and Agribusiness, LSU Agricultural Center in August 2004.

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The DCF is the maximum amount that can be paid for a cow or heifer and earn the discount rate. An amount paid less than the DCF will result in higher profits while paying more than the DCF will reduce profits.

Figure 1 shows the Excel spreadsheet used to calculate the values in the following examples.

Three examples involving the purchase of a bred heifer that will be in production eight years are presented in Table 3 below. The numbers presented in the examples are based upon cost estimates presented in the *2009 Beef, Dairy and Forage Production Costs in Louisiana* published by the LSU Agricultural Center A.E.A. Publication 256. This is available at:

http://www.lsuagcenter.com/en/our_offices/departments/Ag_Economics_Agribusiness/extension_outreach/budgets/.

Total cash costs for a small herd with semi-improved pastures are estimated to be \$481.28 per cow. Cash costs have been rising since 2003 with yearly percentage increases since 2007 being greater than 20 percent according to LSU AgCenter beef enterprise budgets. A modest increase of 5 percent in cash costs from year to year is consistent with the most recent cash cost increases from the Standardized Performance Analysis program at Texas A&M and average increases in LSU AgCenter enterprise budgets excluding observed increases from 2007 to 2009. Other assumptions in this analysis are that weaning percentage is 87% and marketing fees of five percent. A salvage value (the value of a cull cow) of \$450 is assumed. A discount rate of 6.25% is used reflecting the time value of money and potential risk associated with the investment in a bred heifer.

Table 1 below presents the current USDA Baseline National Farm Calf projection for prices to 2018. This projection represents steers and heifers of all grades and types. The average for Louisiana steers and heifers for 450-500 from 2001-08 was about \$1.03 per pound.

Table 1. USDA Beef Baseline National Farm Calf Prices, \$/Cwt

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Price	122.43	119.72	129.87	137.91	141.81	145.93	144.32	142.62	140.64	139.70

The assumed calf weight distribution for three weight classes of calves is in Table 2 below. The weights represent the average weight of steers and heifers.

Table 2. Calf Average Weights

Calf	1	2	3	4	5	6	7	8
Heavy	500	525	550	550	550	550	550	525
Average	450	475	500	500	500	500	500	475
Light	400	425	450	450	450	450	450	425

Prices, calf weights, productive life of the animal and the cost of maintaining her are critical to determining the amount that can be paid for a bred heifer or young cow.

Figure 1. Example Excel Spreadsheet

**Cow/Heifer Investment Decision
Discounted Cash Flow**

	1	2	3	4	5	6	7	8
Calf Weight	500	525	550	550	550	550	550	525
Price	1.2243	1.11972	1.2987	1.3791	1.4181	1.4593	1.4432	1.4262
Marketing Fees %	5%	5%	5%	5%	5%	5%	5%	5%
Weaning Percentage	87%	87%	87%	87%	87%	87%	87%	87%
Net Income	\$ 505.94	\$ 485.86	\$ 590.36	\$ 626.90	\$ 644.63	\$ 663.36	\$ 656.04	\$ 618.85
Cash Cow Expense/Year	\$ 481.28	\$ 505.34	\$ 530.61	\$ 557.14	\$ 585.00	\$ 614.25	\$ 644.96	\$ 677.21
Expense Increase/Yr.	5.00%							
Net Cash from Operations	\$ 24.66	\$ (19.48)	\$ 59.75	\$ 69.76	\$ 59.63	\$ 49.11	\$ 11.08	\$ (58.36)
Cummulative Net Cash from Ops.	\$ 24.66	\$ 5.18	\$ 64.92	\$ 134.69	\$ 194.32	\$ 243.43	\$ 254.51	\$ 196.15
Salvage Value of Cull								\$ 450.00
Discount Rate	6.25%							
Disc. Cash Flow								\$437.06

Table 3. Estimated Discounted Cash Flows for Cows Produced Different Weight Calves by the Number of Calves Produced

Calf	1	2	3	4	5	6	7	8
Heavy	\$446.74	\$404.57	\$430.93	\$463.30	\$486.87	\$501.46	\$490.31	\$437.06
Average	\$399.12	\$315.96	\$297.58	\$285.53	\$265.52	\$238.19	\$188.03	\$98.49
Light	\$351.50	\$227.35	\$164.23	\$107.46	\$44.17	(\$25.07)	(\$114.25)	(\$240.08)

More can be paid for a cow which will produce heavier calves because they generate a significantly larger cash income. Cows producing heavy calves (approximately 550 pounds) generate \$437.06 while cows producing average weight calves (approximately 500 pounds) generate \$98.49 for a difference of \$338.57. Light calf producing cows cost the operation \$240.08 due to the rate at which costs are assumed to increase. The above analysis assumes cows stay in the herd for eight years.

Cows expected to stay in the herd for shorter periods of time do not generate as much income. In the examples presented above, cash costs at the end of the period rise fast enough to lower the price a producer could pay for a bred heifer at the beginning of the period. Cash costs exceed the revenues associated with lightweight calves in all years and five of the eight years for average weight calves.

Also, expected prices are critical to the amount that can be paid. Table 4 below presents the estimated discounted cash flows for average weight calves at the 2001-08 average price of \$1.03 per pound. Based on the assumptions listed above and calves selling for \$1.03 per pound, the net value of the cow was negative indicating that the returns from the investment are less than the expenditures associated with the investment (in today's dollars).

Table 4. Estimated Discounted Cash Flow for Average Weight Calves at \$1.03 per pound.

Calf	1	2	3	4	5	6	7	8
Average	\$331.11	\$216.75	\$105.79	(\$19.46)	(\$157.91)	(\$308.55)	(\$470.42)	(\$655.73)

The amount that can be paid for a bred heifer depends upon the individual producer's situation. His forage and feed base determine to a great degree the sale weight of the calf. Prices received generally will reflect the weight and quality of the calf. A good cow with a sorry bull will not give a high value calf. The amount spent in the maintaining the cow and the years of life in the herd also influence the amount that can be paid.

Herds that produce heavy, high quality calves and keep their costs down can pay more for a bred heifer than herds with lighter weight, lower quality calves. Producers that have herds averaging longer productive cow life can pay more for a cow, assuming the producer has cash costs that are less than the example above.

The Discounted Cash Flows are estimates of the maximum amount that can be paid and earn the discount rate. Paying less will generate higher returns, while paying more will reduce returns or create losses.

In the past year, calves that are marketed at heavier weights have retained their value better than smaller calves. The final example assumes calves are marketed at 550 and 575 pounds in the first two years, 600 in years three through seven and 575 in year eight. Prices used are from the USDA Baseline National Farm Calf Projections in Table 1.

Table 5. Estimated Discounted Cash Flow for 600 Weight Calves at USDA Baseline Prices.

Calf	1	2	3	4	5	6	7	8
Weight	550	575	600	600	600	600	600	575
DCF	\$494.36	\$493.18	\$564.28	\$641.67	\$708.22	\$764.72	\$792.59	\$775.63

In this example, the heifer investment decision is profitable if the calf is marketed at 600 pounds in years three through seven. A producer should make sure resources within the operation will support retaining calves to heavier weights prior to marketing those calves.

A final example illustrates the difference in discounted cash flows when the discount rate is altered. The assumptions that generated the discounted cash flows in Table 3 are used, except the discount rate is varied. A discount rate of 3.25% and 9.25% is used for average weight calves in addition to the base discount rate of 6.25%.

Table 6. Estimated Discounted Cash Flow for Average Weight Calves at Varying Discount Rates.

Calf	1	2	3	4	5	6	7	8
3.25%	\$410.72	\$335.32	\$327.55	\$325.92	\$314.34	\$293.03	\$242.52	\$140.37
6.25%	\$399.12	\$315.96	\$297.58	\$285.53	\$265.52	\$238.19	\$188.03	\$98.49
9.25%	\$388.16	\$298.20	\$270.93	\$250.68	\$224.60	\$193.53	\$144.98	\$66.67

Varying the discount rate alters the amount that can be paid for a bred heifer. The change in the discount rate reflects a change in the desired rate of return and/or a change in the perception of how risky the investment is. As the discount rate increases, the amount that can be paid for a bred heifer decreases due to decreases in profitability associated with the investment.