2014

Buyer Beware: What is the Breakeven Value of Beef Replacement Heifers?

Matthew Stockton
University of Nebraska-Lincoln

Kathleen Brooks
University of Nebraska-Lincoln

Roger K. Wilson
University of Nebraska-Lincoln

CORNHUSKER ECONOMICS

University of Nebraska–Lincoln Extension

June 4, 2014

Institute of Agriculture & Natural Resources
Department of Agricultural Economics
http://agecon.unl.edu/cornhuskereconomics

Buyer Beware: What is the Breakeven Value of Beef Replacement Heifers?

Market Report	Yr Ago	4 Wks Ago	5/30/14
Livestock and Products*, *Weekly Average			
Nebraska Slaughter Steers, 35-65% Choice, Live Weight	$125.75	$148.00	$143.09
Nebraska Feeder Steers, Med. & Large Frame, 550-600 lb	147.33	222.00	+
Nebraska Feeder Steers, Med. & Large Frame 750-800 lb	138.07	195.68	+
Choice Boxed Beef, 600-750 lb. Carcass	208.32	231.87	233.44
Western Corn Belt Base Hog Price Carcass, Negotiated	93.04	112.31	108.72
Pork Carcass Cutout, 185 lb. Carcass, 51-52% Lean	93.89	114.60	115.46
Slaughter Lambs, Ch. & Pr., Heavy, Wooled, South Dakota, Direct	110.00	145.50	156.00
National Carcass Lamb Cutout, FOB	280.08	369.29	361.04
Crops*, *Daily Spot Prices			
Wheat, No. 1, H.W. Imperial, bu	7.07	7.52	6.38
Corn, No. 2, Yellow Nebraska City, bu	7.07	4.75	4.43
Soybeans, No. 1, Yellow Nebraska City, bu	14.95	14.65	14.81
Grain Sorghum, No. 2, Yellow Dorchester, cwt	12.32	8.30	7.70
Oats, No. 2, Heavy Minneapolis, MN , bu	3.99	4.05	4.09
Feed			
Alfalfa, Large Square Bales, Good to Premium, RFV 160-185 Northeast Nebraska, ton	+	190.00	220.00
Alfalfa, Large Rounds, Good Platte Valley, ton	225.00	115.00	120.00
Grass Hay, Large Rounds, Good Nebraska, ton	217.50	205.00	105.00
Dried Distillers Grains, 10% Moisture, Nebraska Average	220.00	222.50	185.00
Wet Distillers Grains, 65-70% Moisture, Nebraska Average	91.00	70.00	57.00

+ No Market

Each individual cow-calf producer will have a different answer to this question. The diversity of the results is inherent in the complexity of the question, which depends on a deceptively simple mathematical relationship. That relationship is known as the profit equation or function: profit is the difference between revenues and costs. This seems basic, as the only information one has to know is the revenues and costs associated with a particular animal. Once this is known, finding the value of that heifer can be mathematically computed.

The complexity comes in determining answers to both the basic biological and economic questions. These questions include information about how long this animal will be productive, how many calves will she produce and of what size, and what and how much will she eat? The economic question will include both costs and revenue items such as what will these calves sell for, what will her salvage value be, if any, and what are the chances she will die? As if that isn't enough, all of this occurs in some future time period, further complicating the issue.

It would be easy to conclude when considering the complexities of answering the above questions, that guessing or using some simple rule of thumb is the only way to make this decision, since it may appear that any reasonable calculations seem very involved and difficult. This is false, of course, just like eating an elephant, it can be accomplished just "one bite at a time." Taking the challenge personally, the authors have created an electronic tool, a decision aide to achieve this. While not quite ready for public release, some initial work with the base tool has been completed and merits reporting.

With the limited amount of space available in this brief report, little will be said about the inner-workings and assumptions of this tool, which include forecasted information used to create and operationalize it. However, the authors are willing to share this tool, and have available a much longer version of the results reported

here. These are available upon request. Please note that this work is preliminary and is only made available due to its time sensitive nature. Additionally, please be aware that the results are limited in scope relative to the data upon which they are based. All of the cattle production and cost values are based on information that is forecast, and is therefore no better than the accuracy of those forecasts.

A limited knowledge of the base model is necessary to contextualize the results. Cattle prices used in the model were simulated using five different price cycles. Scenario 1 is historical, representing one similar to the World War II era. Scenarios 2, 3 and 4 are mathematically created from the upward, neutral and downward trending portion of a simulated price series. Data for the simulation, collected by the United States Department of Agriculture (USDA), were observed from 1910 to 2006 for 500 pound steers. Scenario 5 is a constant series of prices, where prices were left unvaried and held at the current market price. The model was initiated using the October prices at four different times or initiation points along the natural course of each series segment or cycle (10, 34, 70 and 94 months).

Three cost levels obtained from the Kansas State Farm Management Report for 2008 – 2012 were used to represent low ($595.83), medium ($722.61) and high ($935.05) cost production.

The projected purchase prices for heifers were randomly generated using a normal distribution that ranged from $1500/hd to $2200/hd, and averaged $1850/hd. Calf prices were initiated at current USDA reported values for 500 lb calves, and contain no slide or gender differences. Cull cow values were set as a fixed portion of calf value, with some added random variation.

Animal production data came from the University of Nebraska's Gudmundsen Sandhills Laboratory, located in the Central Nebraska Sandhills.

In Table 1 (on next page), sixty different instances of breakeven values of various combinations of costs, price scenarios and initiation of heifer purchases are listed. Of these, fifty one are unique since the fifth price scenario, constant price, does nothing to change the results. These breakeven results are average values, and are to be interpreted as the price that could be paid for a heifer that would result in no loss or gain in profits. For example, an average breakeven value of two thousand dollars would indicate the producer would neither make any excess profit nor have any loss for all heifers on average purchased at that price, based on an infinite number of repetitions.

As expected, the results reported in Table 1 make it clear that both costs and revenues play a critical role in determining heifer breakeven values. Also evident is the fact that assumptions about the price cycle, price trend and the point in the cycle that a heifer was purchased results in vast differences in breakeven values. Figure 1 (on next page) illustrates prices for all five scenarios in one of the initiation periods, Month 34. This initiation period is the only period where Scenario 2 had a higher breakeven value than Scenario 1.

Results from Scenario 5 will be used to illustrate the effect of the three cost levels on breakeven prices. Costs do not have a one-to-one relationship with breakeven value. The breakeven value of the high cost production, which averaged $935.05 resulted in an average value of $1,215.53, but was $1,917.00 for the medium production costs that averaged $722.61. In contrast, the low cost production, which averaged $595.83 resulted in an average breakeven value of just over $431 more at $2,348.36. This general relation holds for all of the other scenarios, providing evidence that knowing the cost relative to the purchase price of the animals is an important consideration and deserves close scrutiny. Another relationship worthy of note relates to the effects of market timing or price initiation. For those scenarios that vary in prices, there is as much as $2,055.93 difference in breakeven value, (Scenario 2), and as little as $863.02 (Scenario 1), depending on the initiation month the heifer is purchased. Many more things can be said about the effects of costs, price trends, price cycles and initiation periods, but this is left to the reader to discover for themselves by studying the table of results or requesting more information from the authors in the form of the complete report.

Matthew Stockton, (308) 696-6713
Agricultural Economist, Assistant Professor
West Central Research and Extension Center
University of Nebraska-Lincoln
mstockton2@unl.edu

Kathleen Brooks, (402) 472-1749
Assistant Professor and
Extension Livestock Marketing Specialist
Department of Agricultural Economics
University of Nebraska-Lincoln
kbrooks4@unl.edu

Roger Wilson, (402) 472-1771
Farm Management/Enterprise Budget Analyst
Department of Agricultural Economics
University of Nebraska-Lincoln
rwilson6@unl.edu

Table 1. Average Breakeven Points Calculated Using Five Simulated Price Scenarios. Values are Designated by Scenario, Cost Level and Month of When the Price Series was Initiated (when heifer was purchased)

Scenario #	Average Cost	Month 10	Month 34	Month 70	Month 94
1	$595.83	**$3,729.11**	$2,915.23	**$3,306.55**	**$2,866.09**
2	$595.83	$3,057.89	**$3,673.82**	$2,077.83	$1,617.89
3	$595.83	$2,661.66	$2,818.32	$1,867.04	$1,645.56
4	$595.83	$2,538.37	$2,525.19	*$1,604.31*	*$1,449.47*
5	$595.83	*$2,348.36*	*$2,348.36*	$2,348.36	$2,348.36
1	$722.61	**$3,295.50**	$2,481.62	**$2,872.94**	**$2,432.48**
2	$722.61	$2,635.00	**$3,250.93**	$1,654.94	$1,195.00
3	$722.61	$2,264.50	$2,421.16	$1,469.88	$1,248.40
4	$722.61	$2,120.70	$2,107.52	*$1,186.64*	*$1,031.80*
5	$722.61	*$1,917.00*	*$1,917.00*	$1,917.00	$1,917.00
1	$935.05	**$2,598.14**	$1.784.26	**$2,175.58**	**$1,735.12**
2	$935.05	$1,951.50	**$2,567.43**	$971.44	$511.50
3	$935.05	$1,557.34	$1,714.00	$762.72	$541.24
4	$935.05	$1,406.48	$1,393.30	*$472.42*	*$317.58*
5	$935.05	*$1,215.53*	*$1,215.53*	$1,215.53	$1,215.53

Numbers in *Italics* represent the lowest breakeven point for each cost level and price initiation point.
Numbers in **Bold** represent the highest breakeven point for each cost level and price initiation point.

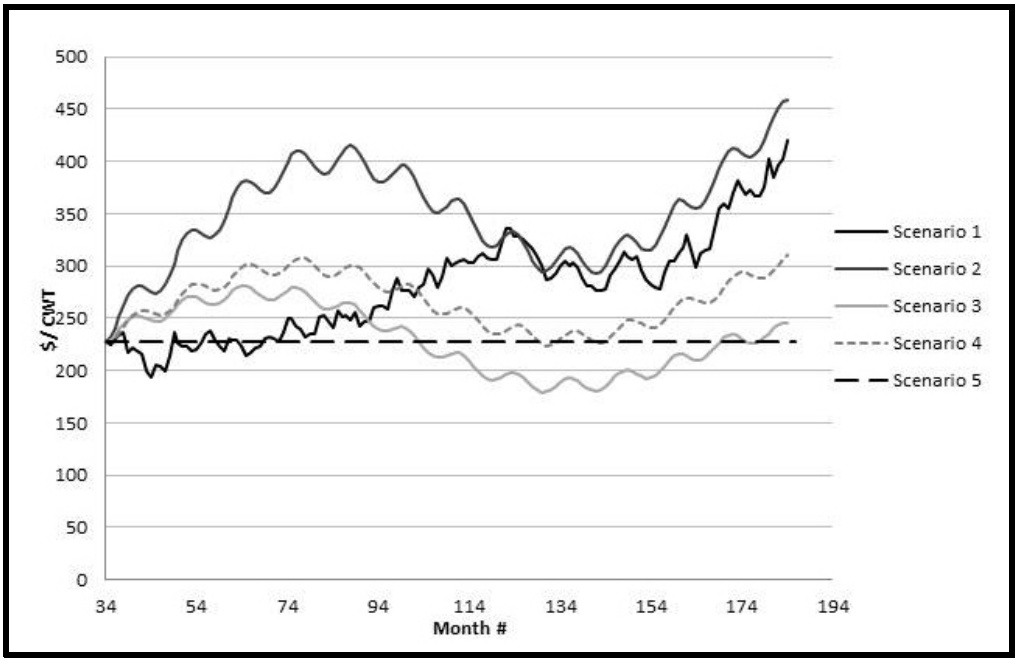

Figure 1. Prices of 500 Pound Calves, by Scenario, Initiated on the 34 Month of a 126 Month Price Cycle

Cornhusker Economics

Subscription Rates Prorated by Month
(Subscriptions run from July 1 – June 30)
2014 - 2015

Full Subscription Fee (July 1 - June 30)	**$30.00**
Subscription as of July 1	30.00
Subscription as of August 1	28.40
Subscription as of September 1	26.80
Subscription as of October 1	25.20
Subscription as of November 1	23.60
Subscription as of December 1	22.00
Subscription as of January 1	20.40
Subscription as of February 1	18.80
Subscription as of March 1	17.20
Subscription as of April 1	15.60
Subscription as of May 1	14.00
Subscription as of June 1	12.40

Enclosed is my check for $_____ made payable to the **University of Nebraska**. Please begin my subscription to *Cornhusker Economics* for _____ months through June 30, 2015.

Name _____

Address _____

Mail with your payment to:
Sandy Sterkel, 303 Filley Hall, Department of Agricultural Economics
University of Nebraska-Lincoln, Lincoln, NE 68583-0922.
Phone: (402) 472-1742