



Cow-calf profitability – What drives variability?

(and some other cow-calf related stuff along the way...)

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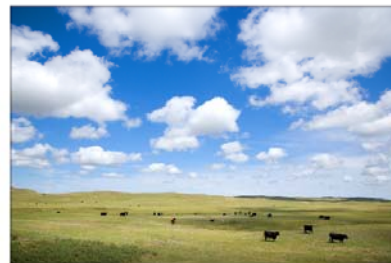


Presented to GENAG 200 -- Profitability in Livestock Enterprises. 3:30-4:20, 104B Waters Annex, Kansas State University, Sep 26, 2011.



Cow-calf profitability drivers...

- **Analysis of KFMA cow-calf enterprise analysis returns**
 - 1979-2010 all operations (examine time effect)
 - 2006-2010 operations with at least three years of data (examine producer effect)
- **Paper available on web (www.agmanager.info)**



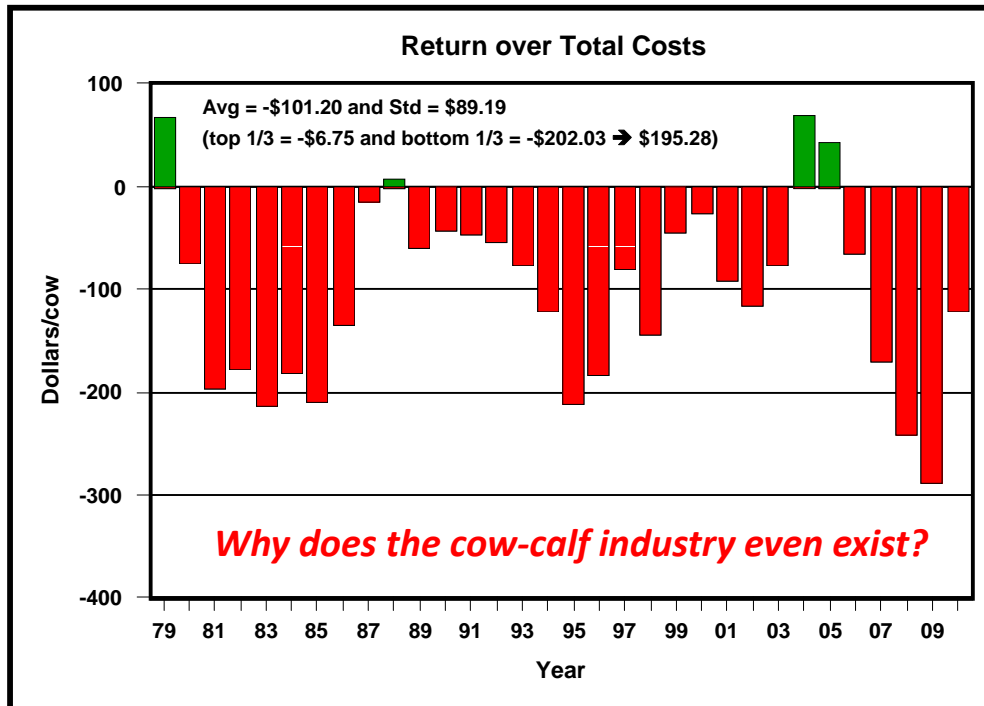
Differences Between High-, Medium-, and Low-Profit Producers:
An Analysis of the Kansas Farm Management Association
Beef Cow-Calf Enterprise

Kevin C. Dhuyvetter
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June 2011



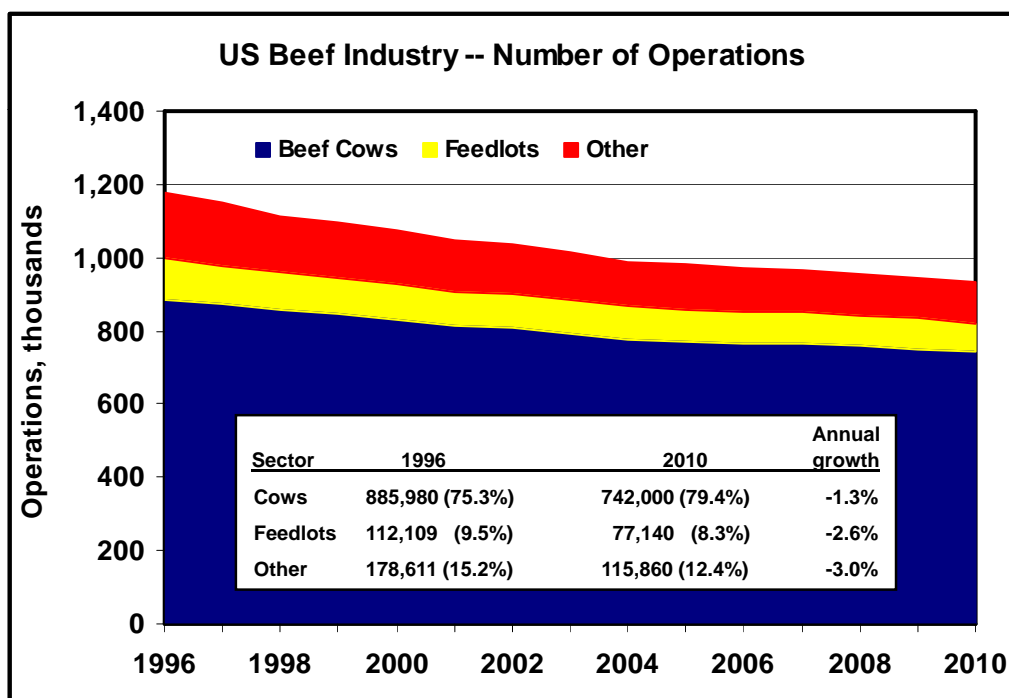


Average returns are highly variable over time...



Source: Kansas Farm Management Association (KFMA) Annual Enterprise Analysis Reports

Fewer operations in all sectors of the beef industry...



Financial importance of cow-calf operation...

Contributions to Income and Labor Input

Reason	Percent of Operations				
	Herd Size (Number of Beef Cows)				
	1-49	50-99	100-199	200+	All
Primary source of income	5.3	24.1	42.8	65.0	14.3
Supplemental source of income	78.0	68.3	50.9	31.7	71.9
Other	16.7	7.6	6.3	3.3	13.8

Source: USDA NASS APHIS, Beef 2007-08, NAHMS report.

One of the characteristics of the beef cow-calf industry slowing consolidation is that many participants are not necessarily motivated by economics...

Average herd size and distribution

Average beef cow herd size increased from 40.4 in 2000 to 42.3 in 2010, but averages can be somewhat deceiving...

Farm size (cows/farm)	Percent of operations		Percent of inventory	
	2000	2010	2000	2010
1-49	78.8	79.2	29.5	28.0
50-99	12.0	11.1	19.1	17.4
100-499	8.5	8.9	36.7	38.0
500+	0.7	0.8	14.7	16.6

Roughly 10% of the operations control over 55% of the cows (diverse cow-calf sector)



Returns are more variable across producers...

Beef Cow-calf Enterprise, 2006-2010 (min of 3 years)*

	All Farms	Profit Category			Difference between High 1/3 and Low 1/3		
		High 1/3 Head / \$	Mid 1/3 Head / \$	Low 1/3 Head / \$	Absolute	%	
Number of Farms	88	29	30	29			
Labor allocated to livestock, %	36.9	47.3	32.0	31.5			
Number of Cows in Herd	134	187	131	85	103	121%	
Number of Calves Sold	122	173	118	77	96	126%	
Weight of Calves Sold	576	587	570	573	14	3%	
Calf Sales Price / Cwt	\$105.99	\$107.19	\$105.07	\$105.73	\$1.46	1%	
Gross Income	\$517.70	\$561.41	\$525.20	\$466.24	\$95.16	20%	
Feed	\$353.91	\$306.48	\$361.24	\$393.76	27.6%	27.6%	34.9%
Interest	\$123.81	\$106.20	\$124.66	\$140.53	-\$34.33	-24%	13.7%
Vet Medicine / Drugs	\$18.99	\$18.25	\$17.92	\$20.84	-\$2.60	-12%	1.0%
Livestock Marketing / Breeding	\$13.01	\$10.86	\$13.24	\$14.93	-\$4.07	-27%	1.6%
Depreciation	\$34.39	\$25.53	\$33.96	\$43.71	-\$18.18	-42%	7.3%
Machinery	\$71.05	\$56.93	\$72.72	\$83.46	-\$26.54	-32%	10.6%
Labor	\$107.81	\$86.28	\$91.21	\$146.52	-\$60.24	-41%	24.1%
Other	\$36.20	\$25.87	\$40.22	\$42.38	72.4%	-39%	6.6%
Total Cost	\$759.19	\$636.40	\$755.16	\$886.14	-\$249.74	-28%	
Net Return to Management	-\$241.48	-\$74.99	-\$229.97	-\$419.89	\$344.90		

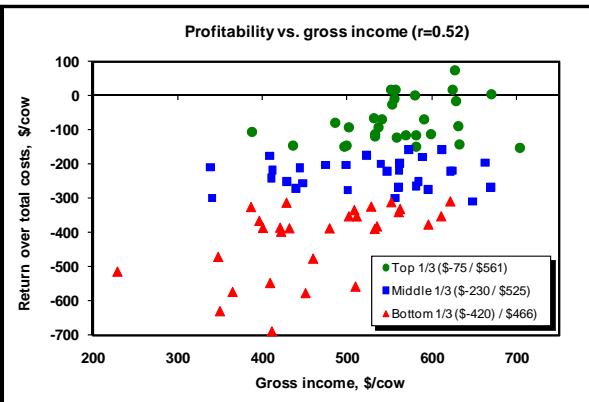
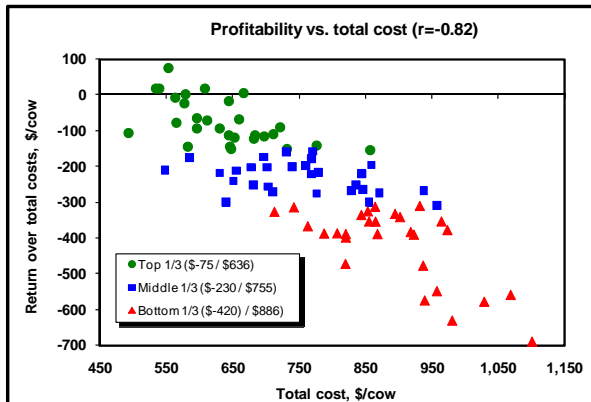
* Sorted by Net Return to Management (Returns over Total Costs) per Cow

Compared to \$195 between top and bottom third years.



Cow-calf profitability drivers...

- Returns are more variable across producers at a point in time than they are on average over time (i.e., even in "hard times" some producers are profitable)
- Cost differences explain a bigger portion of profitability differences across producers than does income differences





Considerable variability unexplained...

Regression Results for Profit and Cost Models

Variable	Profit (\$/cow)		Cost (\$/cow)	
	Coefficient	p-value*	Coefficient	p-value*
<i>Intercept</i>	-4776.64	(0.059)	3441.48	(0.130)
<i>Cows</i>	0.9704	(0.032)	-0.6963	(0.084)
<i>Cows</i> ²	-0.00126	(0.109)	0.00080	(0.254)
<i>Weight</i>	0.2954	(0.272)	0.5233	(0.020)
<i>Price</i>	1.6046	(0.454)	n/a	n/a
<i>Feed%</i>	6.1424	(0.008)	-4.2328	(0.041)
<i>Labor</i>	1.7289	(0.025)	-1.1505	(0.094)
<i>Years</i>	934.585	(0.141)	-692.726	(0.220)
<i>Years</i> ²	-57.981	(0.141)	44.597	(0.203)
R-square**	0.3569		0.2765	

* p-values associated with hypothesis test that coefficient is significantly different from zero. A value of 0.05 implies we are 95% confident that value is significantly different from zero.

** R-square represents the proportion of variability in the dependent variable (*Profit* and *Cost*) that is explained by variation in the independent variables.



Considerable variability unexplained...

Regression Results for Profit and Cost Models

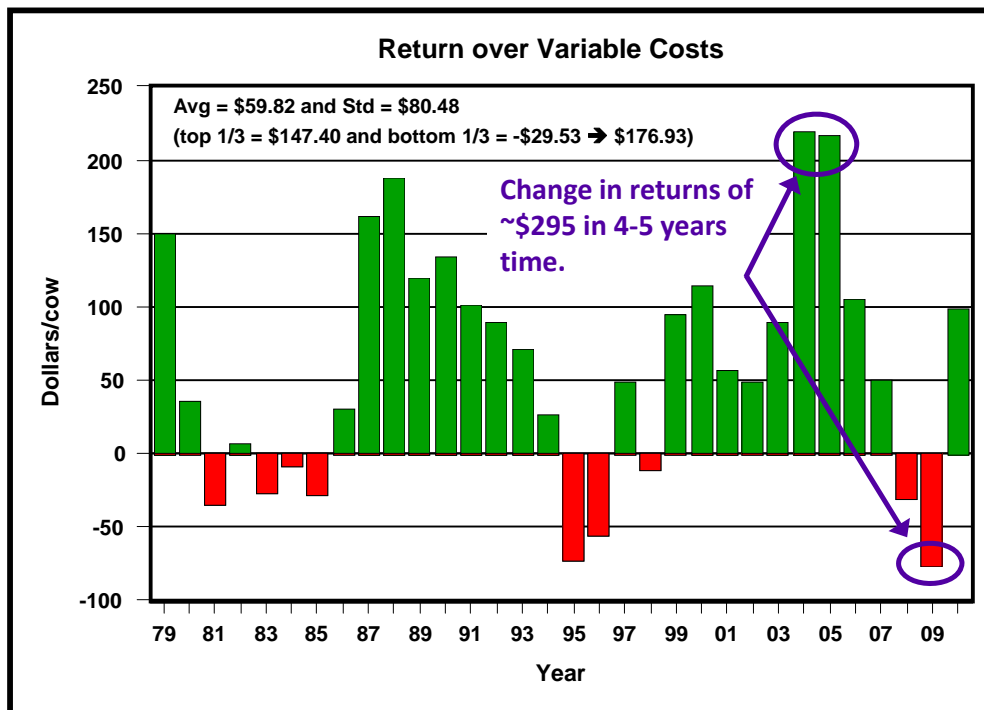
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<i>Feed%</i>	Gross income is highly significant	(0.008)	-4.2328	(0.041)
<i>Labor</i>	(R-square increases to -0.46)	(0.025)	-1.1505	(0.094)
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** R-square represents the proportion of variability in the dependent variable (*Profit* and *Cost*) that is explained by variation in the independent variables.



Big changes can occur quite rapidly...



Source: Kansas Farm Management Association (KFMA) Annual Enterprise Analysis Reports



Returns over VC are slightly less variable...

Beef Cow-calf Enterprise, 2006-2010 (min of 3 years)*

	All Farms	Profit Category			Difference between High 1/3 and Low 1/3		
		High 1/3 Head / \$	Mid 1/3 Head / \$	Low 1/3 Head / \$	Absolute	%	
Number of Farms	88	29	30	30			
Labor allocated to livestock, %	36.9	46.2	39.0	25.3			
Number of Cows in Herd	134	165	124	114	51	45%	
Number of Calves Sold	122	153	114	101	51	51%	
Weight of Calves Sold	576	595	570	565	29	5%	
Calf Sales Price / Cwt	\$105.99	\$106.24	\$106.95	\$104.74	\$1.51	1%	
Gross Income	\$517.70	\$567.55	\$532.72	\$452.31	\$115.24	25%	
Feed	\$353.91	\$307.04	\$367.32	\$386.91	43.8% -\$79.87	-21%	54.0%
Interest	\$28.12	\$20.39	\$27.77	\$36.20	-\$15.81	-44%	10.7%
Vet Medicine / Drugs	\$18.99	\$16.93	\$18.53	\$21.53	-\$4.60	-21%	3.1%
Livestock Marketing / Breeding	\$13.01	\$11.18	\$11.78	\$16.13	-\$4.95	-31%	3.3%
Depreciation	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	n/a	0.0%
Machinery	\$71.05	\$56.61	\$74.54	\$81.89	-\$25.27	-31%	17.1%
Labor	\$10.72	\$11.73	\$5.71	\$14.91	-\$3.18	-21%	2.2%
Other	\$36.20	\$27.06	\$40.19	\$41.22	56.2% -\$14.16	-34%	9.6%
Total Variable Cost	\$532.02	\$450.94	\$545.85	\$598.78	-\$147.85	-25%	
Return over Variable Costs	-\$14.31	\$116.61	-\$13.12	-\$146.47	\$263.08		

* Sorted by Net Return to Management (Returns over Variable Costs) per Cow

Compared to \$175 between top and bottom third years.



Feed costs

Pasture vs. Purchased Feed



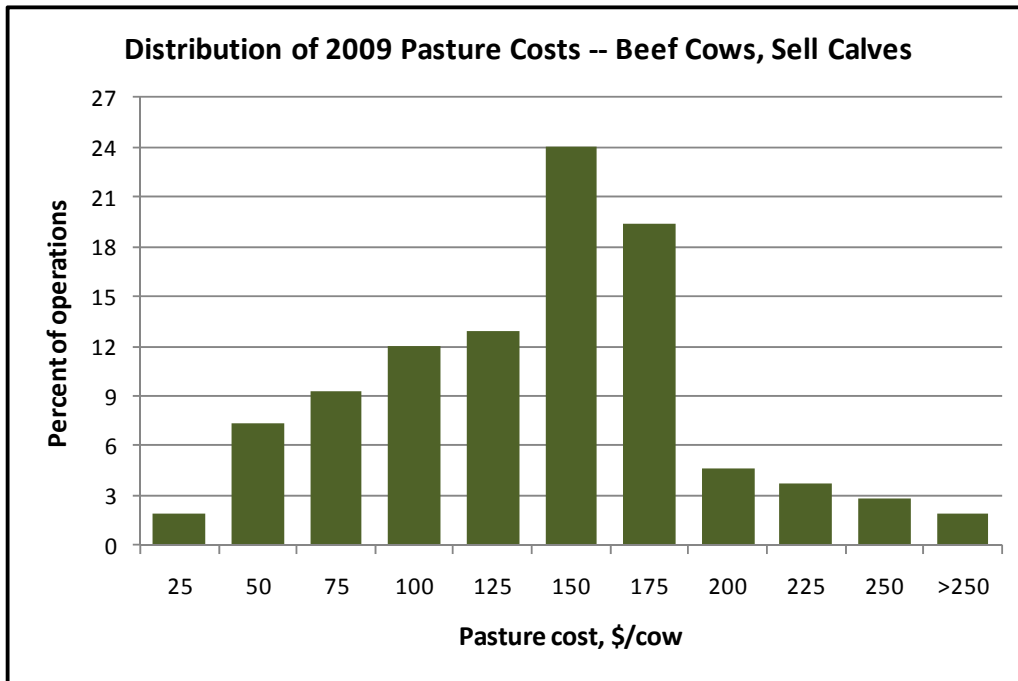
2009 Cow-calf enterprise budget



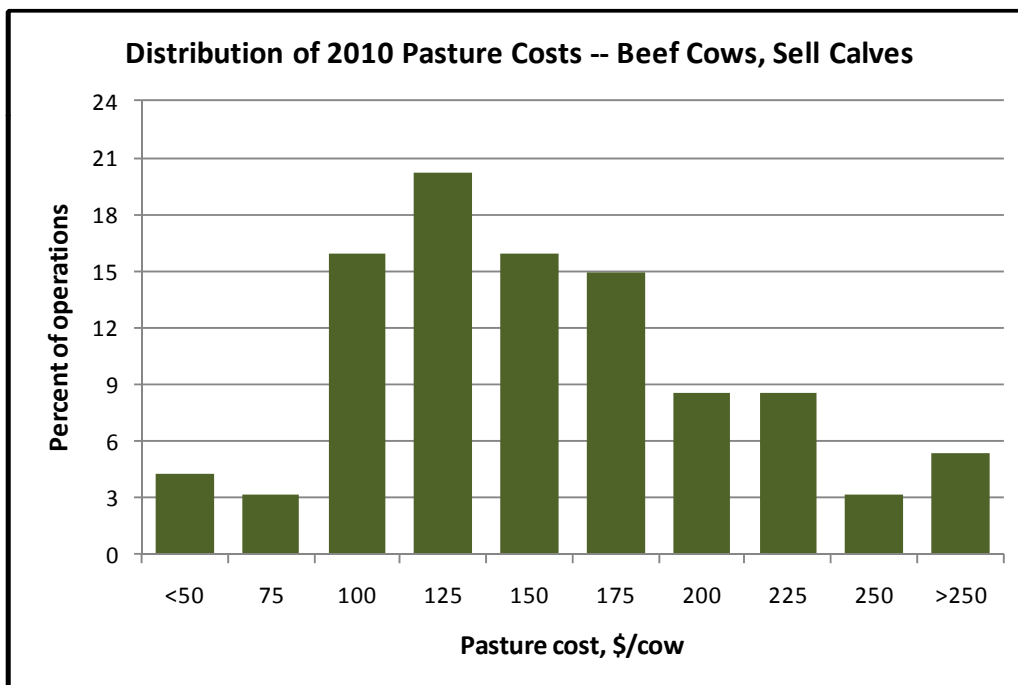
**KANSAS FARM MANAGEMENT ASSOCIATION
PROFIT CENTER ANALYSIS: 5-YEAR AVERAGE & 2009
BEEF COWS, SELL CALVES: STATE AVERAGES**

	2004-2008 Average			2009		
Number of Farms		104			108	
Number of Cows in Herd		121			127	
Number of Calves Sold		102			107	
Average Weight Calves Sold		581			566	
Calf Selling Price / Cwt		\$110.61			\$96.94	
Gross Income / Cow		\$569.95			\$462.60	
Feed Cost / Cow		\$303.29			\$367.37	
Nonfeed Cost / Cow		\$334.61			\$381.93	
Pounds Beef Produced / Cow		572			546	
GROSS INCOME	\$69,191.60	\$99.61	\$569.95	\$58,750.14	\$84.79	\$462.60
EXPENSES:						
Labor Hired	\$1,781.34	\$2.56	\$14.67	\$2,091.63	\$3.02	\$16.47
General Machinery Repairs	3,916.24	5.64	32.26	4,874.27	7.03	38.38
Interest Paid	3,137.28	4.52	25.84	3,859.23	5.57	30.39
Feed Purchased	36,819.92	53.01	303.29	29,202.31	42.14	229.94
Pasture	-	-	-	17,454.24	25.19	137.43
Machine Hire - Lease	301.06	0.43	2.48	311.97	0.45	2.46
Farm Org Fees / Travel / Publ	591.65	0.85	4.87	688.33	0.99	5.42
Vet Medicine / Drugs	1,825.05	2.63	15.03	2,240.85	3.23	17.64
Livestock Marketing / Breeding	1,283.63	1.85	10.57	1,536.50	2.22	12.10
Gas / Fuel / Oil	2,593.65	3.73	21.36	3,077.38	4.44	24.23
Personal Property Tax	210.43	0.30	1.73	232.13	0.34	1.83
General Farm Insurance	963.90	1.39	7.94	1,007.12	1.45	7.93
Utilities	1,358.38	1.96	11.19	1,441.19	2.08	11.35
Auto Expense	413.82	0.60	3.41	435.55	0.63	3.43
TOTAL VARIABLE COSTS	\$55,196.33	\$79.46	\$454.66	\$68,452.70	\$98.79	\$539.00
RETURN ABOVE VARIABLE COSTS	\$13,995.27	\$20.15	\$115.28	(\$9,702.56)	(\$14.00)	(\$76.40)
Depreciation	\$3,626.85	\$5.22	\$29.88	\$4,286.61	\$6.19	\$33.75
Real Estate Tax	624.97	0.90	5.15	557.98	0.81	4.39
Unpaid Operator Labor	8,134.53	11.71	67.01	11,126.84	16.06	87.61
Interest Charge *	9,858.77	14.19	81.21	10,737.62	15.50	84.55
TOTAL FIXED COSTS	\$22,245.11	\$32.02	\$183.24	\$26,709.05	\$38.55	\$210.31
TOTAL EXPENSE	\$77,441.44	\$111.48	\$637.90	\$95,161.75	\$137.34	\$749.31
NET RETURN TO MANAGEMENT	(\$8,249.83)	(\$11.88)	(\$67.96)	(\$36,411.61)	(\$52.55)	(\$286.71)
NET RETURN TO LABOR-MGT	\$1,666.03	\$2.40	\$13.72	(\$23,193.14)	(\$33.47)	(\$182.62)

Starting in 2009, total feed costs are classified as "Pasture" and "Feed Purchased."



Total of 108 farms (avg = \$127; range = \$19-\$327) – 96 farms between \$50-\$250 (avg \$133)



Total of 94 farms (avg = \$144; range = \$30-\$335) – 85 farms between \$50-\$250 (avg \$140)



Type of Lease	Lease Price Range per Head for Full Season (Dollars)							Price for Pastures Rented on Per Acre Basis
	Steers and Heifers				Cow/Calf Pairs			
	Under 500 Pounds	500-699 Pounds	Under 700 Pounds	700 Pounds Or More	With Fall Calves	With Spring Calves	Average For Pairs	
14 COUNTY BLUESTEM PASTURE AREA								
With Service	60-122	50-153	50-153	58-187	50-185	90-225	50-225	13-27
Without Service	25-100	25-100	25-100	25-120	25-300	25-245	25-300	10-30
Combined Average Lease Rate	25-122	25-153	25-153	25-187	25-300	25-245	25-300	10-30

¹ Zones are defined on the Kansas Bluestem Pasture map. ² Insufficient reports to publish.

Wide range across all cow/calf lease types surveyed.

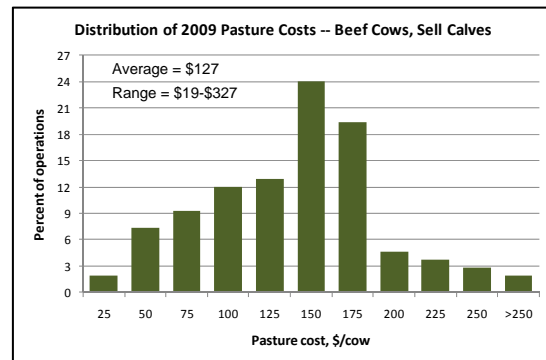
Bluestem Report (combined average lease rate)

Average with fall calves = \$127.60

Average with spring calves = \$131.30

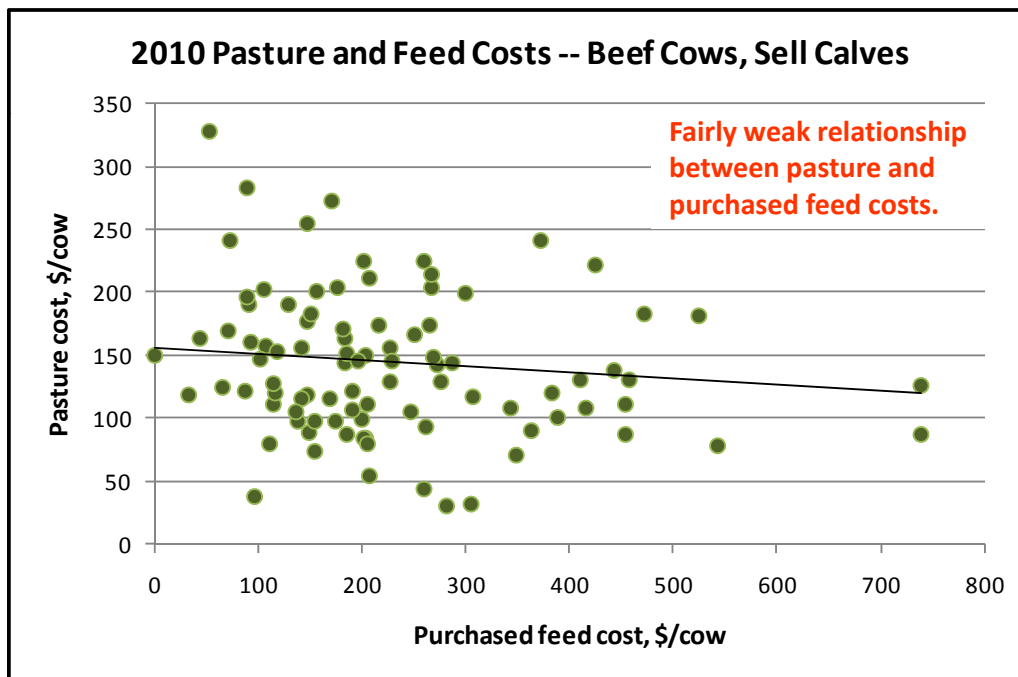
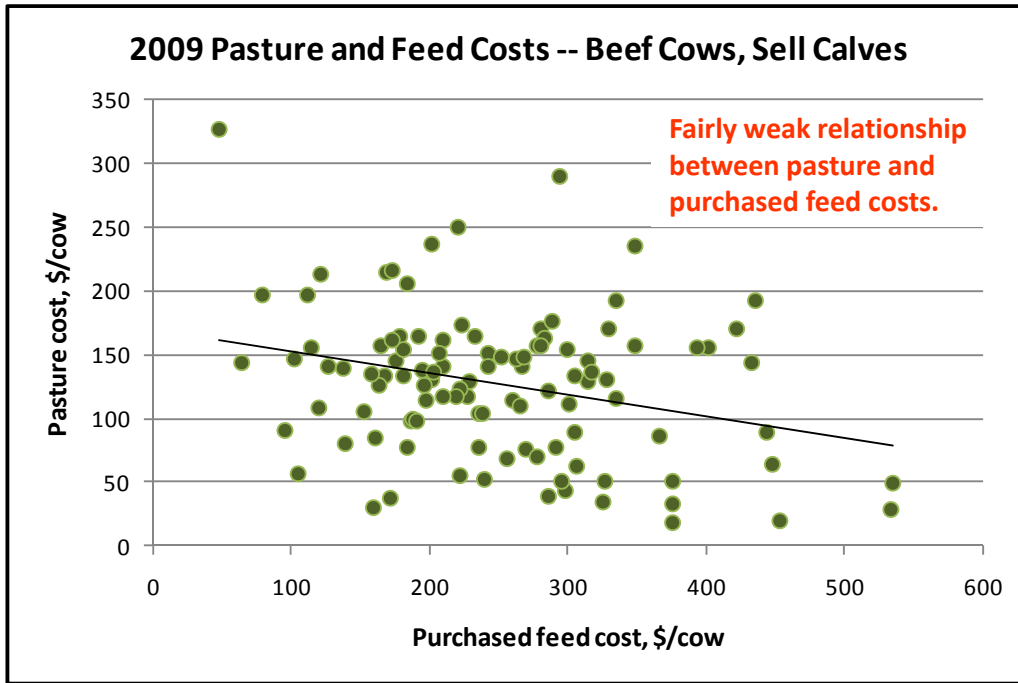
Overall average = \$130.10

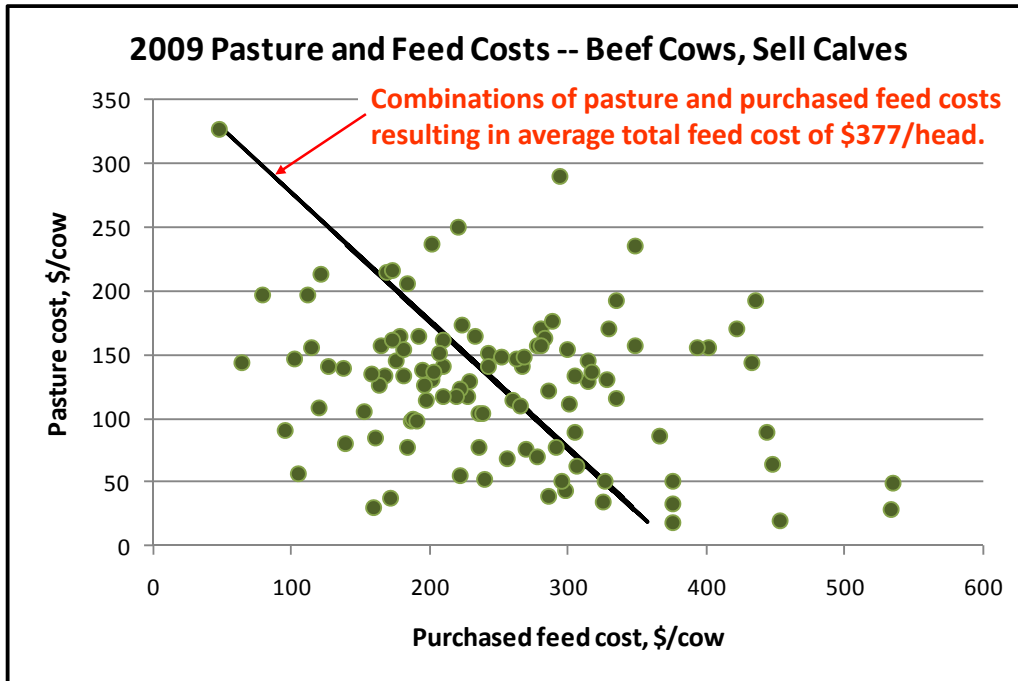
KFMA producer enterprise data and Bluestem survey data match up quite well!



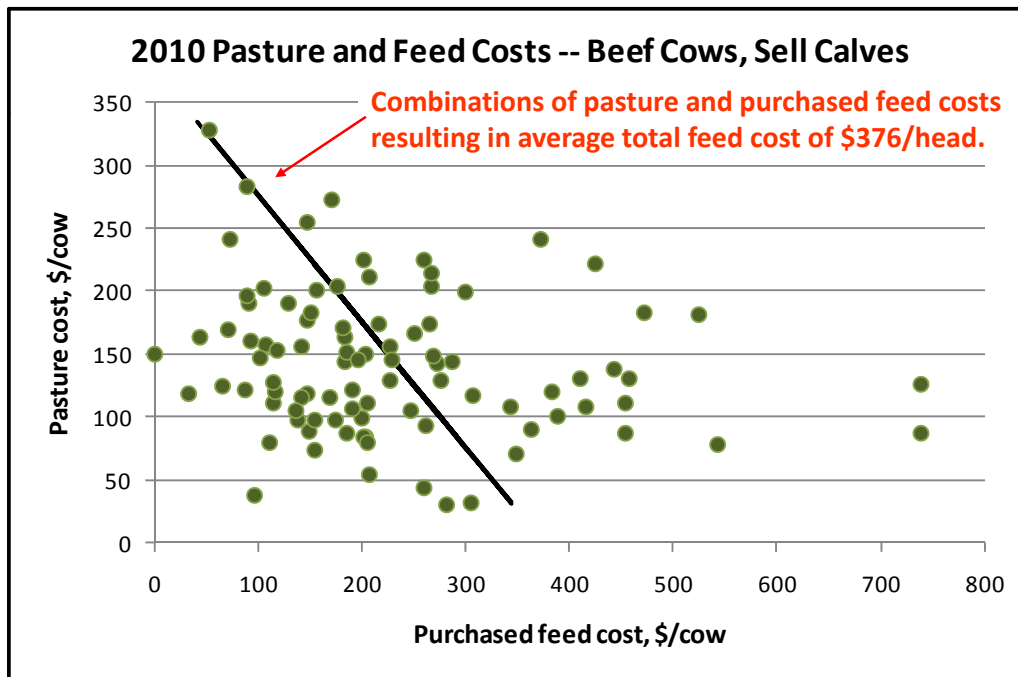
What is driving variability across producers?

- Length of grazing season
 - Trade-off between pasture cost and purchased feed cost
 - Ability to graze stalks in late fall/winter
- Pasture management / intensity
 - Rotational grazing
 - Pasture size / efficiency of use
- Lease rate paid
- Other?

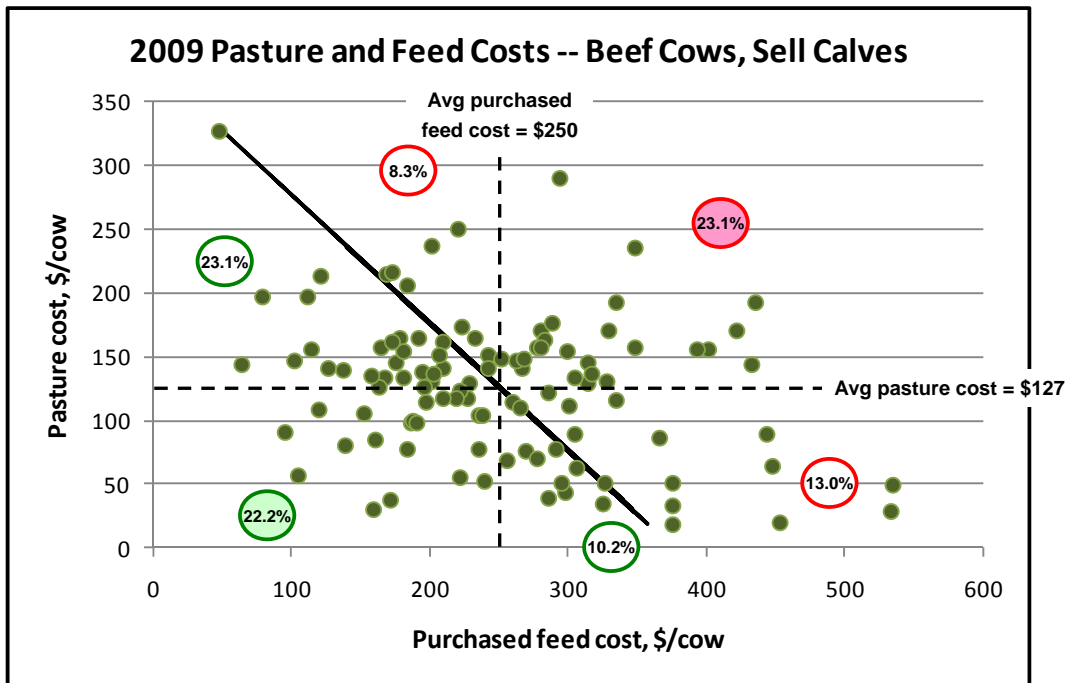




60 of 108 (55%) operations are to the left of the line and 48 (45%) are to the right of the line.



56 of 94 (60%) operations are to the left of the line and 38 (40%) are to the right of the line.

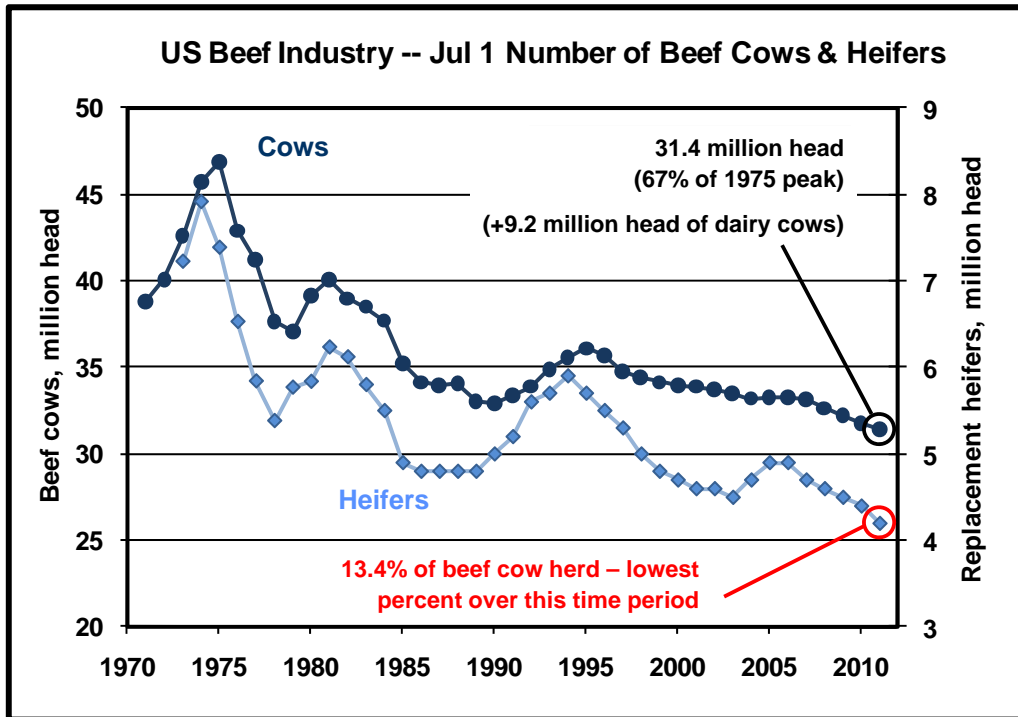


Identifying where your farm falls on this figure (and why) is an important benchmark.

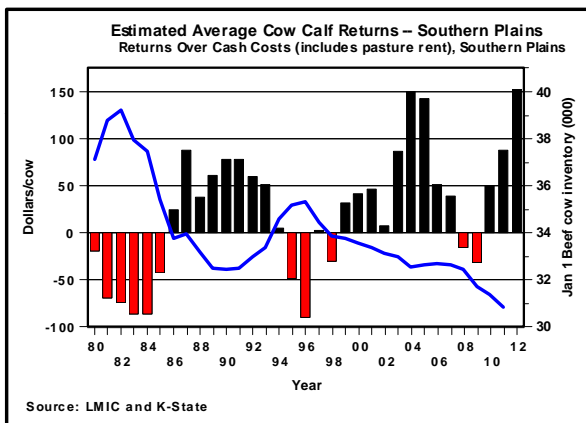
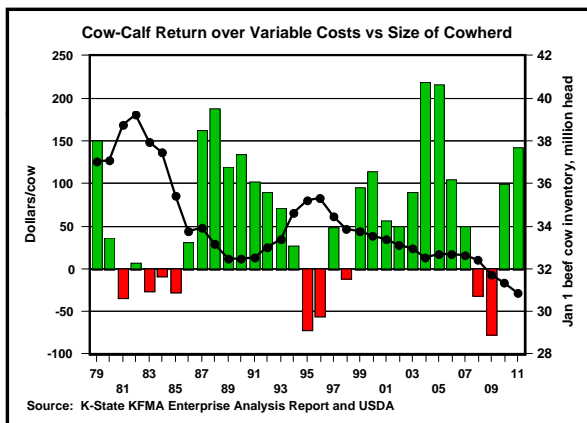


***Importance of knowing costs
(and how you compare to average)***

U.S. beef cow inventory is at lowest level in 40+ years, is now the time to be expanding?



Outlook for cow-calf sector...

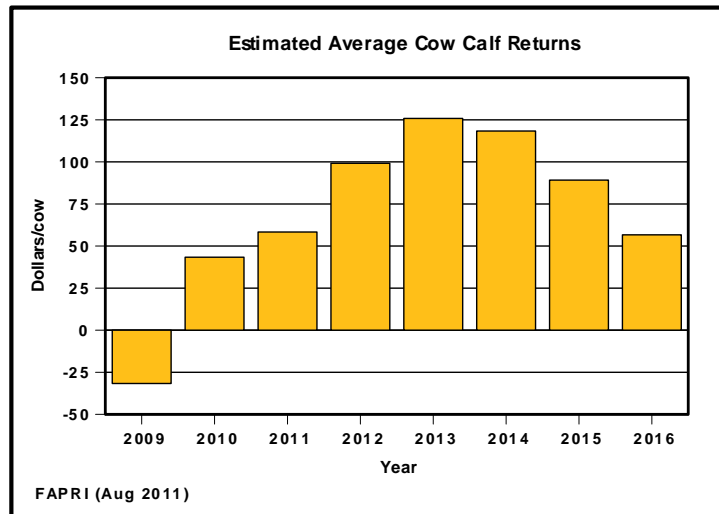


While absolute values for cow-calf returns vary based on source/methodology, projections for 2011 suggest returns will be up considerably from 2010 and projections for 2012 are better yet...

Outlook for cow-calf sector...



Things look quite positive for the cow-calf sector beyond 2012...



So the question is, how much can I pay for a replacement?

KSU-Beef Replacements.XLS [Compatibility Mode] - Microsoft Excel

Home Insert Page Layout Formulas Data Review View Developer Add-Ins Acrobat

I33

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KSU-Beef Replacements.xls --- A spreadsheet program to evaluate the economic value of purchasing beef replacements females.


Version 8-17-11

INPUTS vs CALCULATED VALUES
In the *Price and weights* and *Net Present Value* tabs all **blue** numbers are inputs and all black numbers are calculated from these inputs.


DESCRIPTION OF INPUTS:
Several input cells (i.e., **blue number**) have a **red diamond** in the upper right hand corner of the cell. By moving your

What all needs to be factored into determining how much can be paid for replacement heifer or cow?

Developed by:
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Introduction Prices and weights Net present value

Ready 100%

How much can I pay for a heifer/cow if I want to expand?

Input Assumptions

Number of replacements purchased	100	Percent marketable calves (1 - death loss)	97.0%
Year of purchase	2012	Annual cow death loss	0.5%
First year for calf sales	2012	Cows culled for non-breeding reason (health)	3.5%
Cull cow weight, lbs/hd	1,250	Annual inflation rate on costs	1.0%
Annual cow costs, \$/year	\$600	Annual increase in average weaning weight	0.0%
Price scenario to use (1-4) (FAPRI (adjusted))	4	Discount rate (interest rate)	6.5%
Weaning weight scenario to use (1-3)	1		

Net Present Value Analysis

Year	Cows at		Prices, \$/cwt		Calf Income	Cull Income			Cost	Cost Adj.	Net Income	Discount factor	NPV**
	BOY*	Calf	Calf wt	Calf		Cull	Health	Quality					
2012	100.0	1	542	\$140.28	\$66.43	\$738	\$29.06	\$797	\$600	\$0	\$167	1.0000	\$964
2013	96.0	2	552	\$143.57	\$67.80	\$738	\$28.47	\$780	\$582	\$0	\$185	0.9390	\$1,072
2014	92.2	3	562	\$145.61	\$68.85	\$732	\$27.76	\$757	\$564	\$0	\$195	0.8817	\$1,180
2015	88.5	4	567	\$141.97	\$66.03	\$691	\$25.56	\$702	\$547	\$0	\$169	0.8278	\$1,233
2016	84.9	5	572	\$139.01	\$63.20	\$655	\$23.49	\$648	\$530	\$0	\$148	0.7773	\$1,271
2017	81.5	6	572	\$136.65	\$60.90	\$618	\$21.73	\$594	\$514	\$0	\$126	0.7299	\$1,293
2018	78.3	7	567	\$135.48	\$60.03	\$583	\$20.56	\$563	\$499	\$0	\$105	0.6853	\$1,317
2019	75.1	8	565	\$134.82	\$59.13	\$555	\$19.44	\$532	\$483	\$0	\$91	0.6435	\$1,333
2020	72.1	9	562	\$137.29	\$59.61	\$540	\$18.81	\$514	\$469	\$0	\$90	0.6042	\$1,355
2021	69.3	10	559	\$137.29	\$59.61	\$516	\$18.06	\$492	\$454	\$0	\$79	0.5674	\$1,369

* BOY = Beginning of year

** Net present value if replacement is sold in this year

How much can I pay for a heifer/cow if I want to expand?

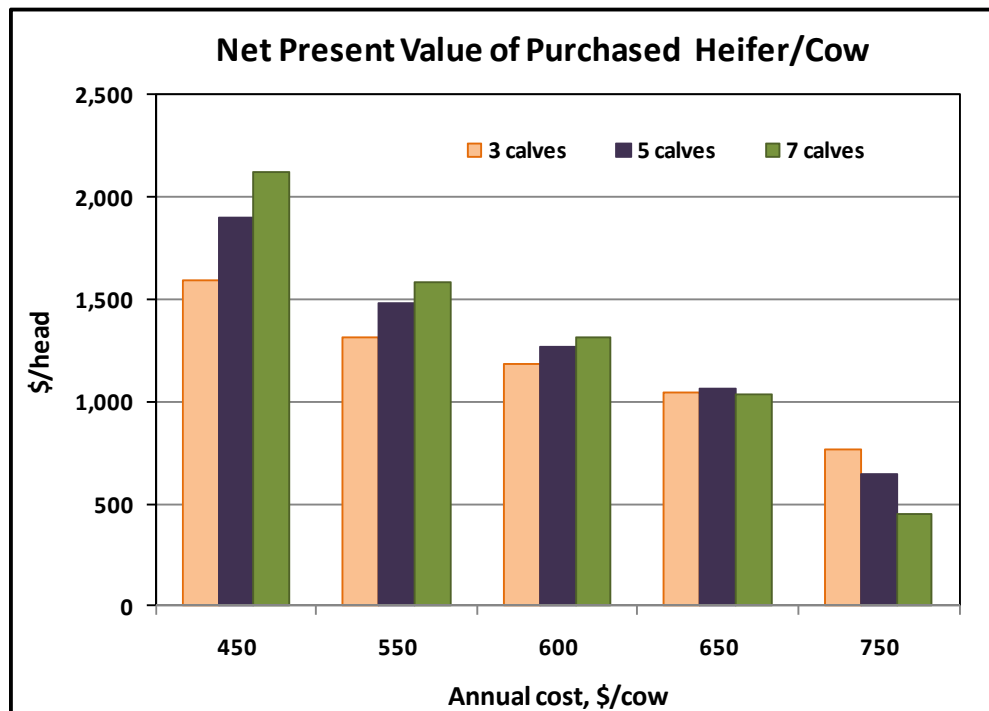
Net Present Value Analysis

Year	Calf	Annual cost = \$450		Annual cost = \$550		Annual cost = \$650		Annual cost = \$750	
		NPV*	Calf 2 NPV diff**	NPV*	Calf 2 NPV diff**	NPV*	Calf 2 NPV diff**	NPV*	Calf 2 NPV diff**
2012	1	\$1,114	-\$245	\$1,014	-\$154	\$914	-\$63	\$814	\$28
2013	2	\$1,359	\$0	\$1,168	\$0	\$977	\$0	\$786	\$0
2014	3	\$1,591	\$232	\$1,317	\$149	\$1,043	\$66	\$769	-\$17
2015	4	\$1,757	\$399	\$1,408	\$240	\$1,059	\$82	\$709	-\$76
2016	5	\$1,898	\$540	\$1,480	\$313	\$1,062	\$86	\$644	-\$141
2017	6	\$2,014	\$655	\$1,533	\$366	\$1,053	\$76	\$572	-\$214
2018	7	\$2,124	\$765	\$1,586	\$418	\$1,048	\$72	\$511	-\$275
2019	8	\$2,217	\$858	\$1,627	\$460	\$1,038	\$62	\$449	-\$337
2020	9	\$2,310	\$952	\$1,674	\$506	\$1,037	\$60	\$400	-\$385
2021	10	\$2,388	\$1,029	\$1,708	\$541	\$1,029	\$52	\$349	-\$436

* Net present value if replacement is sold in this year

** Difference in NPV between selling in this year versus after the second calf

How much can I pay for a heifer/cow if I want to expand?



Summary...

- **More variability in returns between producers at a point in time than on average for an industry over time**
 - ➔ **management is more important than “cycles”**
- **Most of the variability in returns is explained by cost differences as opposed to revenue differences**
 - ➔ **Feed is big driver – important to know why they are low**
 - ➔ **Fixed costs are important – driven by economies of size**
- **Knowing where one stands relative to average regarding costs is important to make sound management and investment decisions.**



For more information and decision tools related to farm management, marketing, and risk management go to www.AgManager.info



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