

Will Corn Prices Delay US Beef Herd Expansion?

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With corn trading above \$5 per bushel, some wonder if expansion of the US beef herd will be put on hold for another year. Maybe, maybe not. Herd expansion is a function of profitability and profitability is a function of calf prices. Corn may affect calf prices, but it isn't the only driver, and beef demand will play a key role in determining calf prices and the size of the US beef herd going forward.

Calf prices are determined by the price of slaughter (live) cattle and the cost of gain. Other factors come into play, but they are largely overshadowed by these two variables. The simple way to calculate the value of a calf is to subtract the cost of the feed required to get the animal to slaughter weight from its expected value at slaughter. Consider the following example calculating the value of a 750 lb steer when the cost of gain is \$0.50 per lb:

Expected Price at Slaughter (\$/cwt)	\$80.00
Expected Weight at Slaughter (lbs)	<u>1,250</u>
Expected Value at Slaughter	\$1,000.00
Less Cost to Feed from 750 to 1,250	<u>(\$250.00)</u>
Value at 750 lbs	\$750.00
Price at 750 lbs (\$/cwt)	\$100.00

But as the price of corn rises, so does the cost of gain, and if the cost of gain rises while the value of slaughter cattle remains constant, then the value of feeder cattle must fall. Consider the same example, with the cost of gain rising from \$0.50 to \$0.80 per lb.

Expected Price at Slaughter (\$/cwt)	\$80.00
Expected Weight at Slaughter (lbs)	<u>1,250</u>
Expected Value at Slaughter	\$1,000.00
Less Cost to Feed from 750 to 1,250	<u>(\$350.00)</u>
Value at 750 lbs	\$650.00
Price at 750 lbs (\$/cwt)	\$86.67

This is why ranchers grow concerned any time the price of corn begins to move higher.

A Tale of Two Price Spikes

The past two decades have seen two notable occasions with corn prices this high, and the effect on calf prices was strikingly different each time. In 1995 corn prices began to rise in the fall, and continued through the winter and spring, topping out at \$5.54 per bushel in July before coming back to earth later in 1996. Again in 2008, corn prices spiked, this time reaching nearly \$8 per bushel in June before retreating in the fall. But feeder cattle prices took a much larger hit in 1996 than in 2008. In 1996, feeder cattle futures plummeted, dipping into the low 50's for much of the spring, while feeder cattle futures in 2008 dipped no lower than \$107/cwt.

So what was the difference between 1996 and 2008? The live cattle market. In 1996, live cattle were trading in the mid to low \$60's, while live cattle in 2008 jumped up to \$104.50/cwt during corn's ascent. So, while the cost of gain was around \$0.87/lb in 2006 vs. \$1.00/lb in 2008, the value of live cattle kept feeder cattle from falling apart. This is logical when considering the following value calculations:

1996	
Expected Price at Slaughter (\$/cwt)	\$65
Expected Weight at Slaughter (lbs)	<u>1,250</u>
Expected Value at Slaughter	\$812.50
Less Cost to Feed from 750 to 1,250	<u>(\$435.00)</u>
Value at 750 lbs	\$377.50
Price at 750 lbs (\$/cwt)	\$50.33

2008	
Expected Price at Slaughter (\$/cwt)	\$104.50
Expected Weight at Slaughter (lbs)	<u>1,250</u>
Expected Value at Slaughter	\$1,306.25
Less Cost to Feed from 750 to 1,250	<u>(\$500.00)</u>
Value at 750 lbs	\$806.25
Price at 750 lbs (\$/cwt)	\$107.50

So the takeaway is that increasing live cattle prices can offset the negative effect that corn can have on the calf market.

Live Cattle: Can They Stay Strong?

If live cattle continue to trade higher, many cow-calf operations will remain profitable, and as long as they are profitable operators will have incentive to expand. Expansion may be slower, but it will continue. The big question is how much higher can live cattle market prices go?

That depends on beef demand. Live cattle futures for the deferred months are trading between \$100 and \$103 per cwt. At those prices, the choice boxed beef cutout needs to be somewhere between \$165 and \$170. It settled today at \$157.66. Boxed beef traded in the upper \$160's for much of the spring, though, and could easily trade higher this coming spring and summer considering the strength that US beef has seen in exports. Year-to-date exports are already 200 million pounds above last year at this time.

Certainly there are factors that could derail live cattle. Domestic demand continues to fall, and per capita beef consumption in the US will fall below 60 lbs for the first time this year. Exports are picking up, but export demand is largely dependent on the global economy, which is a complete crapshoot. But the US beef herd is historically small, and with any kind of global economic recovery the advantage tips to the bull for cattle. In fact, there could be several dollars more in the live cattle market before it tops out.

Calf Prices: How High is High Enough?

Even at these prices, though, the domestic herd is shrinking, which suggests that margins still aren't attractive enough for cow-calf producers to begin expanding. That isn't too surprising, considering the costs and returns of a typical operation. Raising cattle isn't as expensive as raising kids, but sometimes it feels like it.

The following expenses are typical of a 400-cow northern plains operation that sells 550 lb calves off the cow in the fall:

Expense	\$/Head
Harvested Feed	120
Pasture	162
Labor	100
Fuel	15
Supplies	25
Repairs	15
Bulls	20
Depreciation	40
Vet	15
Operating Interest	15
Total Expenses	\$527

How does a breakeven cost of \$527 per head translate to calf prices? That depends on a number of factors like death loss, pregnancy rate, and weaning weights, but it can be estimated as follows:

Cows	400
Weaning Rate	88%
Calves Weaned	352
Cow Death Loss	2%
Cull Rate	10%
Pregnancy Rate	90%
Heifers Retained	53
Total Calves Sold	299

Sex	Number	Weight	\$/cwt	Total
Steers	176	570	\$115	\$115,368
Heifers	123	530	\$107	\$69,753
Culls	45	1200	\$48	\$25,920
Total Income				\$211,041
Income Per Head				\$527.60

In order to generate \$527 per head, the breakeven price for calves in this scenario is around \$115/cwt. With \$5 corn, the cost of gain is approximately \$0.89/lb, so live cattle will have to be worth over \$101/cwt next June for producers to be able to sell 5-weight calves at \$115/cwt in November (see the following breakdown.) June live cattle futures have traded on both sides of \$100 this week.

Price of 550 lb Steer (\$/cwt)	\$115
Value of 550 lb Steer	\$633
Cost of Gain (\$/lb)	\$0.89
Cost to Feed from 550 to 1,250	\$623.00
Value at Slaughter	\$1,255.50
Price at Slaughter	\$100.44

So at these price levels, cow-calf producers will break even, but that's about it.

If corn goes no higher and live cattle continue to rally, or if corn prices fall and live cattle hold their value, then some herd expansion may begin. Beef supplies will then become even tighter as producers hold heifers back and begin rebuilding herds and the cattle market will find a major boost.

Now back to the question: will expansion be delayed? The answer is still maybe. For expansion to take place while corn is above \$5 per bushel, live cattle prices will have to continue climbing. If live cattle falter, then cattle producers will start losing money and the US beef herd will continue to contract.