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# Interest Rates Impact Cattle Cost of Production

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Managing the cost of production is a major component of profitability in the cattle business. Cattle producers routinely evaluate input prices and technologies that increase production efficiency relative to cost. Despite producers having little to no control over input prices, management decisions can influence the cost of production. An input cost with limited management flexibility is capital. Many cattle operations require a substantial quantity of capital to operate. This often results in the need to borrow capital to purchase cattle and inputs, which means interest rates can greatly influence the cost of production for cattle operations.

Since the beginning of the 21st century, interest rates have fluctuated significantly. Interest rates influence the cost associated with land, equipment, cattle and inputs when borrowed money is being used to make the purchase. When money is not being borrowed, the cost of someone using personal capital is considered opportunity cost. In other words, opportunity cost is the value such capital could be earning when invested in something else. Similarly, it is important to consider capital recovery of non-financed assets, because they will depreciate and reach the end of their useful life, which means they will need to be replaced. Thus, every producer, whether borrowing capital or not, incurs a cost when using capital.

As it directly relates to cattle purchase, cow-calf producers may incur an interest expense when purchasing breeding stock while stocker, backgrounding and feedlot operators carry a large interest expense burden when purchasing feeder cattle using borrowed capital. The total interest expense per animal associated with purchasing cattle hinges on the interest rate and the total cost of the animal. Thus, higher interest rates and higher cattle prices increase interest expense while lower interest rates and lower cattle prices decrease interest expense.

The purpose of this publication is to show how interest expense has fluctuated from 2001 through early 2023 for the purchase of stocker and feeder cattle. This should help cattle producers gain a better understanding of how interest rates and cattle prices influence the cost of production. This information can also be beneficial for cow-calf producers as it will help producers understand why cattle buyers have to adjust what they are willing to pay when input costs change. This information should also provide insight into the risk presented by changing interest rates.

## CATTLE PRICE

Weekly average cattle prices for 550- to 600-pound steers from Tennessee (USDA-Market News, 2023a) and 800- to 850-pound steer prices from Oklahoma (USDA-Market News 2023b) were collected from January 2001 through March 2023 and can be seen in Figure 1. Lighter-weight steer prices from Tennessee were used to estimate the interest expense incurred in Tennessee stocker operations while heavier Oklahoma feeder steer prices were used to estimate the interest expense of placing cattle in the feedlot.

## INTEREST RATE

Prime interest rate data was retrieved from the Federal Reserve Bank of St. Louis from January 2001 through March 2023 (Federal Reserve Bank, 2023). The prime interest rate changes intermittently, which is represented in the data. Interest rate data is presented in Figure 1 along with cattle prices. The prime interest rate is typically the interest rate commercial banks charge customers with a good credit history. The prime interest rate does not necessarily represent the interest rate incurred by cattle producers when borrowing money to purchase cattle, but it does provide a consistent interest rate that would reflect the change in interest rate over the time period evaluated. Actual interest rates experienced by producers may vary based on such factors as lending institution, credit score, payment history, term length, amortization, collateral, loan structure, terms and conditions, and economic conditions.

## CALCULATING INTEREST EXPENSE

Producers borrowing money have several loan options, which often depend on what the money is being used for and what the lender is willing to offer the borrower. Some examples include long-term conventional loans, operating loans and fixed-rate versus variable-rate loans. In the following example, a short-term operating loan is the financial instrument being discussed.

Interest expense on the purchase of an animal is determined by the interest rate and the quantity of capital needed to purchase the animal. The total interest expense attributed to an animal would include the capital to purchase the animal and the capital necessary to purchase inputs to get the animal to market. However, for this exercise, the focus is only on the change in interest expense associated with the purchase price of the animal and the interest rate change, assuming all the capital to purchase cattle is borrowed capital. Table 1 presents a comparison of the interest expense per head for two interest rates (3.5 percent and 7 percent) and two prices for a 575-pound steer (\$150 per hundredweight, or cwt, and \$200 per hundredweight) and two prices for an 825-pound steer (\$130 per hundredweight and \$180 per hundredweight). It is intuitive that doubling the interest rate should double the interest expense assuming everything else is held constant, but the comparisons in Table 1 also demonstrate how much impact a change in cattle price can have on the interest expense for stocker producers (a 575-pound steer) and feedlot operators (an 825-pound steer).

**Table 1. Comparison of Interest Expense Due to Changing Interest Rates and Cattle Price**

	575 lb Steer				825 lb Steer				Equation
	575	575	575	575	825	825	825	825	a
Steer weight (lb)	575	575	575	575	825	825	825	825	a
Steer price (\$/cwt)	150	150	200	200	130	130	180	180	b
Total steer value (\$)	863	863	1150	1150	1073	1073	1485	1485	$c = a \times b / 100$
Interest rate (%)	3.5%	7.0%	3.5%	7.0%	3.5%	7.0%	3.5%	7.0%	d
# of days cattle owned	180	180	180	180	180	180	180	180	e
Interest expense (\$/hd)	14.89	29.77	19.85	39.70	18.51	37.02	25.63	51.26	$f = c \times d \times (e / 365)$

Figure 2 presents the interest expense incurred when purchasing 575-pound steers in Tennessee and 825-pound steers in Oklahoma from January 2001 to March 2023. The prime interest rate is also included in this figure to show when a change in the interest rate has a greater influence on the interest expense compared to when a change in cattle price has a greater influence.

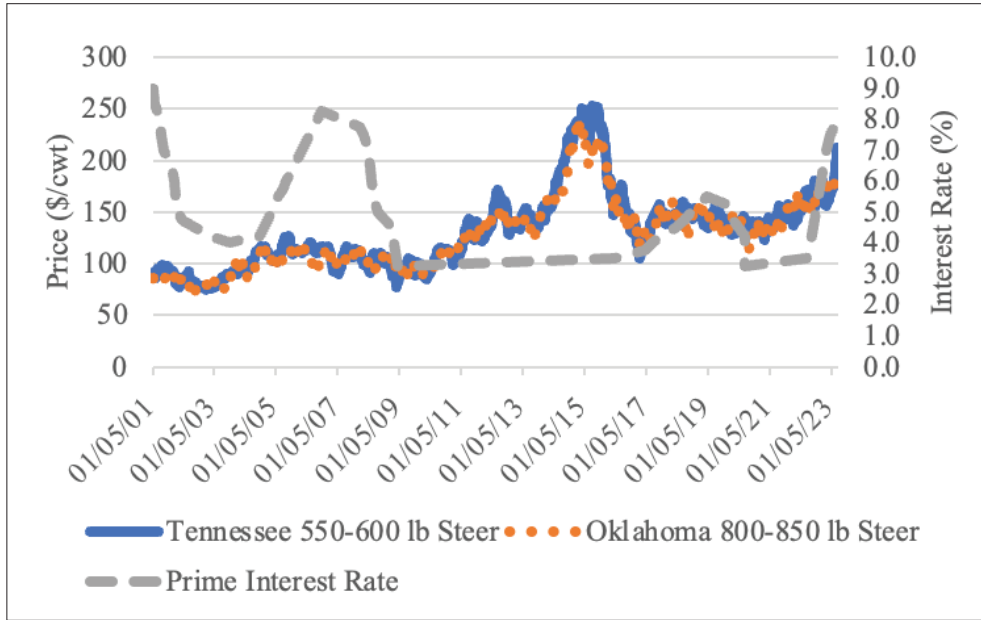
The data shows the per-head interest expense has been between \$10 and \$30 per head during most of the 22-year period. The time periods when interest expense exceeded \$30 per head include periods of relatively high interest rates from 2006 through 2008 and from the middle of 2022 through the end of the time period analyzed. The increase in interest expense from 2006 to 2008 was largely caused by higher interest rates because cattle prices had little variability during this time period. Alternatively, the higher interest expense in the second half of 2022 through the end of the study period was caused by higher interest rates and higher cattle prices. A time period of note is from 2009 through 2016 when interest rates were extremely low and fairly steady. The changes in interest expense during this eight-year period were mostly caused by changes in cattle price, which includes the record high cattle prices in 2014 and 2015.

In order to provide a specific example of the financial risk associated with purchasing cattle, one can compare interest expense for cattle purchased in March 2022 and cattle purchased in March 2023. In 2022, a 575-pound steer in Tennessee had an interest expense of about \$15 per head while an 825-pound steer in Oklahoma had an interest expense of \$20 per head. By March 2023, the interest expense had ballooned to about \$45 and \$60 per head for a 575-pound steer in Tennessee and an 825-pound steer in Oklahoma, respectively, if working solely from borrowed capital. Thus, interest expense tripled because interest rates doubled and cattle prices increased about 25 percent. This increase in interest expense can narrow margins quickly and increase risk because of a higher investment cost. The dynamics between price and interest rate are further amplified when borrowing capital for the purchase of other inputs, which were not considered in this publication.

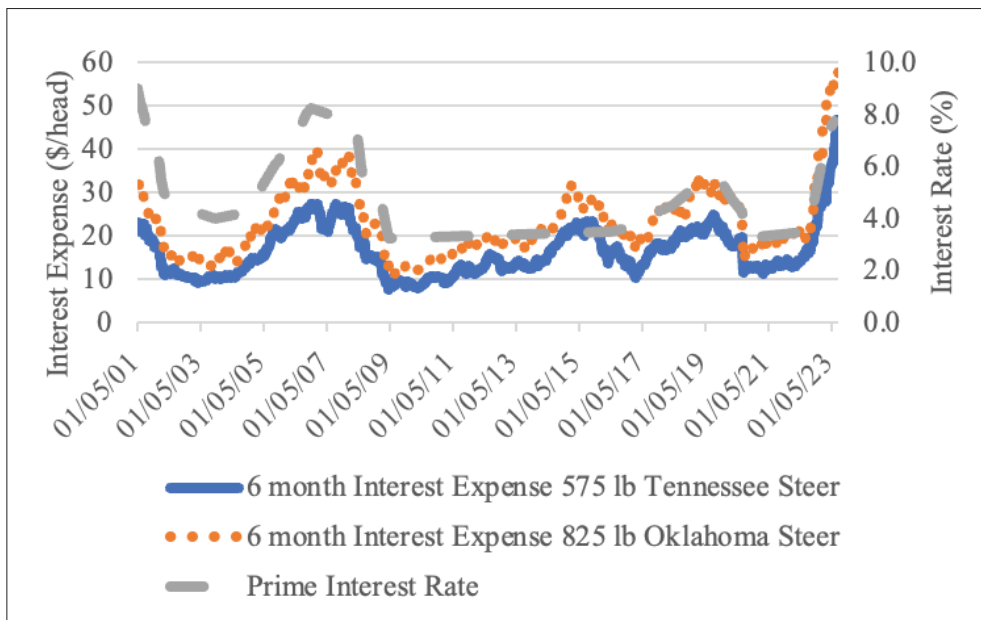
Increasing interest rates do not solely influence the decision to purchase cattle. As interest rates increase, cattle buyers should consider the additional expense. Thus, cattle buyers will likely have to bid less for cattle in times of higher interest rates than during times of lower interest rates, assuming all else is equal. This means interest rates influence the person selling the cattle as well as the person borrowing money to purchase the cattle. The primary way it influences the person selling the cattle is through buyers' willingness to bid on the cattle. When the cost of production increases because of increasing input costs, cattle buyers typically must bid a lower price, which means the seller receives a lower price, and vice versa when the cost of production decreases.

## CONCLUSION

Production costs can be greatly influenced by the interest rate when purchasing cattle with borrowed capital. Higher interest rates and higher cattle prices can quickly increase the cost of production while also whittling away at margins. Similarly, lower interest rates and lower cattle prices can reduce the cost of production and provide room for a larger margin or the ability to bid more for cattle. Cattle producers should be aware of interest expense when purchasing cattle as it can influence profitability. At the same rate, cattle producers should consider the risk incurred with fluctuating interest rates as it should influence what they are willing to pay for cattle.



**Figure 1.** Weekly steer prices in Tennessee and Oklahoma and the prime interest rate from January 2001 through March 2023 (USDA-Market News, 2023a; USDA-Market News, 2023b; Federal Reserve Bank, 2023)



**Figure 2.** Interest expense incurred when purchasing steers in Tennessee and Oklahoma from January 2001 through March 2023 (USDA-Market News, 2023a; USDA-Market News, 2023b; Federal Reserve Bank, 2023)

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