

CATTLE CRUSH SPREAD: A HEDGING TECHNIQUE AND RETAINMENT DECISION AID TOOL

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OVERVIEW

Stocker and feedlot operations are subject to great economic uncertainty due to rapid changes in corn and/or cattle prices. Successful risk management and decision strategies are critical for operations to remain profitable today and in the future. While many techniques exist for cattle producers to protect against price risk, the cattle crush spread is a unique risk management technique that enables cattle feeders to protect their gross feeder margin. Gross feeder margin (GFM) is the difference between revenue from fed cattle and the input costs associated with the sold fed cattle. The cattle crush spread technique is accomplished by trading futures contracts for primary inputs – feeder cattle and corn – while simultaneously trading live cattle futures contracts. In addition to its function as a hedging tool for cattle feeders, the technique can also be utilized as a decision-making strategy by stocker cattle producers. One important management decision made by stocker operators is choosing whether to market their calves in the feeder market before they enter the feedlot or to retain ownership through the feedlot and market them as fed cattle. For these producers, the cattle crush spread has application in retention decisions as a tool to measure whether retaining ownership is profitable in futures markets. In this article, we explain the concept behind the cattle crush spread, provide an analysis of its usefulness for reducing input and output price risk, and examine how stocker operators can best incorporate this technique into retained ownership strategies.

HOW CATTLE CRUSH WORKS

The cattle crush is a hedging strategy designed to reflect and protect the gross margin for feedlot operations. It consists of taking “long” positions in the feeder cattle and corn futures markets, and a “short” position in the live cattle futures market. Taking a long position means that the cattle feeder buys the feeder cattle and corn futures contracts for the month they intend to purchase the cattle and corn on the cash market. They do so with the intention of selling these contracts when it is time to purchase these corresponding inputs. The “long” hedge serves to protect the producer against futures market price increases for key inputs. Taking a short position means selling live cattle futures contracts with the intention of buying them back, ideally in the same month as the cattle are sold in cash markets. The short hedge serves to protect the producer against a futures market price decrease for live cattle. It should be noted that this is a futures market strategy and does not mitigate basis risk for inputs or outputs, such as basis differences between East and West Tennessee (i.e., location and fuel costs).

The ideal ratio of futures contracts to form the optimal cattle crush spread combination is determined by the future contract size, the cattle weight in question and the amount of corn the feeder anticipates the cattle will require to reach market weight. For example, a single feeder cattle futures contract represents 50,000 pounds of feeder cattle. If we assume an average weight of 800 pounds per head, one contract equates to approximately 63 feeder calves. Similarly, the size of each live cattle futures contract is 40,000 pounds. If we assume an average finishing weight of 1,350 pounds per head, one contract covers 30 live cattle. Additionally, one corn futures contract is 5,000 bushels (or 280,000 pounds; assuming 56 pounds/bushel) of corn. If we assume each feeder calf will need approximately 65 bushels of corn to reach finishing weight, one corn contract will cover approximately 77 feeder calves. Given these quantities, we conclude that a ratio of 1 feeder cattle, 1 corn and 2 live cattle futures contracts is the optimal combination for an effective cattle crush spread.

CATTLE CRUSH EXAMPLE

The following cattle crush example is adapted from Steiner (2014). A feedlot operator plans to purchase one load of feeder calves averaging 800 pounds in the spring of 2023 and intends to sell these calves in two loads at an average mature weight of 1,350 pounds at the end of August 2023. The operator also expects to feed an average of 65 bushels of corn per calf between the date

of purchase and marketing. While average daily gain (ADG) can range from 3 to 5 pounds, it is assumed that the cattle in this example will have an ADG of 4 pounds. Consequently, the operator's end target of 550 pounds gained for these calves necessitates a period of approximately 4-5 months on feed to reach mature weight. Therefore, the feedlot operator determines to purchase the load of feeder calves in April and immediately purchases an April feeder cattle futures contract to protect against the risk of a price increase.

The corn futures contract purchased should have an expiration month in between that of the feeder cattle and live cattle contracts. Remember, it is best to purchase these contracts for the month that the producer will be purchasing the inputs. Intuitively, the cattle feeder will purchase most corn needed to finish the cattle after the cattle are purchased and before the animals are marketed. Accordingly, the feedlot operator purchases a May 2023 corn futures contract. To complete the cattle crush spread, the operator takes a short position in live cattle by selling two futures contracts expiring in August, the same month in which the cattle will be marketed.

We use the closing prices on March 7, 2023, for relevant futures contracts for calculations in this example. These futures contract prices are as follows:

- August 2023 Live Cattle: \$160.100/hundred weight (cwt)
- April 2023 Feeder Cattle: \$198.675/hundred weight (cwt)
- May 2023 Corn: \$6.3425/bushel

The values of the feeder cattle and corn contracts bought by the feedlot operator are \$99,337.50 and \$31,712.50, respectively. While the producer locks in a total value of \$128,080 for the cattle by selling the two live cattle futures contracts. After calculation, we find that the cattle crush spread for August 2023 live cattle is -\$2,970. See the cattle crush formula below. The negative value indicates that finishing beef calves in this timeframe has a negative return to the futures market hedger, because the value secured in the futures market for inputs exceeds the futures market value secured from the live cattle. If the gross feeder margin is positive, then larger is more favorable.

Cattle Crush = (2 Live Cattle contracts*400 cwt*\$160.10) – (1 Feeder Cattle contract*500 cwt *\$198.675) – (1 Corn contract*5,000 bushels* \$6.3425) = - **\$2,970**

USING CATTLE CRUSH TO MAKE RETAINMENT DECISIONS

Although the cattle crush spread is primarily viewed as a hedging strategy for cattle feeders, it can also be utilized by producers determining whether to retain ownership through the feed yard (finishing phase). The cattle crush spread technique utilizes the futures market returns of finishing beef calves and allows the hedger (or potential hedger) to make an informed decision as to the likelihood of a profitable outcome when combined with analyzing basis risk. For instance, using the values in our example, a stocker possessing a load of feeder cattle at the end of April 2023, could reference the cattle crush spread for August 2023 live cattle and determine that selling the calves in the feeder market now is a better decision. The negative spread value indicates negative returns in the futures market by choosing to feed the calves out to slaughter weight. Although, changes in basis could result in improved profitability or further losses.

DISCUSSION

This publication highlights the usefulness of the cattle crush spread. The cattle crush spread, combined with an understanding of the local basis for corn, live cattle and feeder cattle, can serve as a reliable decision-making tool. In addition, its application can be an efficient hedging tool for Tennessee producers who might want to maintain ownership of cattle through the finishing phase in the feed yards.

REFERENCES

Steiner, L. 2014. "THE CATTLE CRUSH AND REVERSE CRUSH: An Industry Hedging Tool And A Financial Investment Opportunity." CME. <https://www.cmegroup.com/education/files/the-cattle-crush-and-reverse-crush.pdf>



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