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## The Wild Side of Commodity Markets: Hedging in Times of High Volatility

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# Cornhusker Economics

## The Wild Side of Commodity Markets: Hedging in Times of High Volatility

Commodity markets go through periods with low volatility when we generally see small variations in prices, as well as periods with high volatility, when we tend to see large swings in prices. Regardless of the degree of price volatility in the market, producers can always use marketing contracts as a way to hedge the price risk of their operation. Even though the general mechanics of hedging are the same in periods of low volatility and high volatility, some aspects of hedging become more evident in times of high volatility. In this article, we will discuss some of these aspects focusing on hedging with futures contracts.

Futures contracts are one of many marketing contracts that we can use to hedge the price of our commodities. When we sell in the futures market, we are locking in the futures price for delivery in a given month in the future, which eliminates futures price risk. Regardless of what happens with the futures price between now and the delivery month, our futures price is already locked in and we know exactly what it will be at delivery time. On the other hand, the basis remains open when we hedge with futures contracts. Therefore, we are able to eliminate futures price risk (which is relatively large) but we still carry basis risk (which is relatively small).

For example, let us say that last fall a grain producer was planning to store some soybeans to sell in May 2021 and she decided to hedge it using futures contracts for May 2021 delivery. On October 7, 2020 this producer sold her grain using the soybean futures contract for May 2021 delivery at \$10.30/bu. Let us also assume that, based on her historical records, she was expecting a basis of  $-\$0.60/\text{bu}$  in May. In this case, she was looking at a realized price of  $\$9.70/\text{bu}$  upon delivery in May (=locked-in futures price plus expected basis). As long as the actual basis in May is really  $-\$0.60/\text{bu}$ , she will receive  $\$9.70/\text{bu}$  upon delivery. As for the futures price, it is already locked in and she does not need to worry about it anymore.

**Let us think of two scenarios with high volatility to discuss this hedge**

Scenario 1: The futures price goes down during the hedge (between October 2020 and May 2021). Hypothetically, let us imagine that we go through a period of high volatility and the spot price offered by the local elevator in the producer's cash market turned out to be  $\$6.00/\text{bu}$  in May 2021 and the futures price was  $\$6.60/\text{bu}$ , giving us a basis of  $-\$0.60/\text{bu}$ . The producer would then sell her grain in her cash market for  $\$6.00/\text{bu}$  and offset her futures contracts. She would buy back the futures contract at the current price of  $\$6.60/\text{bu}$  and leave the futures market with a profit of  $\$3.70/\text{bu}$  (sold at  $\$10.30/\text{bu}$  when the hedge was placed, bought at  $\$6.60/\text{bu}$  when the hedge was lifted). In total, the producer would receive  $\$9.70/\text{bu}$ , i.e.  $\$6.00/\text{bu}$  from the local elevator plus  $\$3.70/\text{bu}$  gained in the futures market. In this scenario, the producer made money in the futures market, which helped her offset the lower price in her cash market. Since the basis at delivery was as expected, the producer ended up receiving  $\$9.70/\text{bu}$  as anticipated at the beginning of the hedge.

Scenario 2: The futures price goes up during the hedge (between October 2020 and May 2021). Again let us imagine that we go through a period of high volatility and the spot price offered by the local elevator in the producer's cash market turned out to be  $\$15.85/\text{bu}$  in May 2021 and the futures price was  $\$16.45/\text{bu}$ , giving us a basis of  $-\$0.60/\text{bu}$ . The producer would then sell her grain in her cash market for  $\$15.85/\text{bu}$  and offset her futures contracts. She would buy back the futures contract at the current price of  $\$16.45/\text{bu}$  and leave the futures market with a loss of  $\$6.15/\text{bu}$  (sold at  $\$10.30/\text{bu}$  when the hedge was placed, bought at  $\$16.45/\text{bu}$  when the hedge was lifted). In total, the

producer would still receive \$9.70/bu, i.e. \$15.85/bu from the local elevator minus \$6.15/bu lost in the futures market. In this scenario, the producer lost money in the futures market, which did not allow her to benefit from the higher price in her cash market. Since the basis at delivery was as expected, the producer ended up receiving \$9.70/bu as anticipated in the beginning of the hedge.

**Take-away point #1: hedging is about risk management**

When prices went up during the hedge in Scenario 2, the producer could have received a higher price without the hedge. If she had not used futures contracts to hedge her grain, she would have just sold to the local elevator in May for \$15.85/bu and would have had no loss in the futures market. However, without the hedge, she would have been carrying price risk, which means that she could have made more money as prices went up just as likely she could have made less money if prices had gone down. Without the hedge, the producer would be wondering whether she would be able to receive \$15 per bushel for her grain (as in Scenario 2), or if she would end up receiving just \$6 per bushel (as in Scenario 1). When we do not hedge, we are fully exposed to the ups and downs of prices in the market.

When we hedge with futures contracts (or any other type of contract), we need to remember that we are doing that to reduce our risk. Hedging is about risk management, which means that we will not be able to take advantage of higher prices in case the market goes up but we will be protected against lower prices in case the market goes down. There is no way to get around this trade-off. If we do not hedge because we want to be able to hit a home run and sell at the highest price of the season, we will be exposed to the ups and downs of the market and we may as well end up selling at the lowest price of the season. If we want to reduce our price risk and get protection against lower prices, we will not be able to benefit from higher prices in case the market goes up. We need to be comfortable with this idea when we make a decision to hedge.

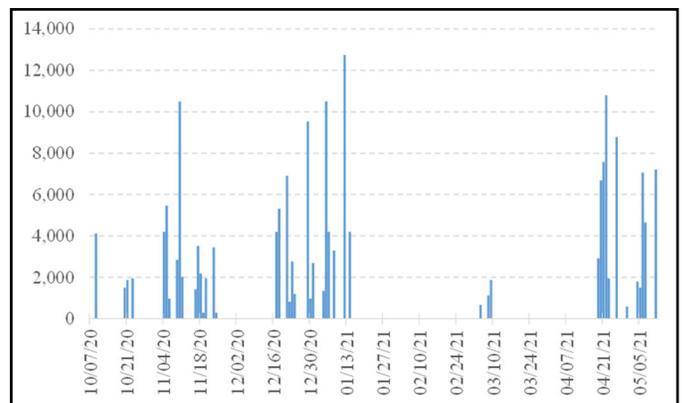
**Take-away point #2: there are cash flow implications of margin calls in the futures market**

When we hedge using futures contracts, we have to deal with the margin system in the futures market. There are good reasons for the existence of the margin system in the futures market, which is beyond the point of this article. What matters here is that we need to post an initial margin deposit when we start our futures hedge and then we are subject to margin calls during the hedge. Margin calls are additional deposits to our margin account in case we are losing money in the futures market. Essentially, the general idea behind margin calls is to make sure that all participants in the futures market will keep a minimum balance in their accounts and hence will still be able to honor their contracts regardless of how much money they may be losing.

In our example in Scenario 2, as the futures price was increasing between October 2020 and May 2021, our producer was losing money in the futures market with her short position. Let us assume that the producer was hedging 30,000 bushels with futures contracts for May 2021 delivery. As the futures price increased from \$10.30/bu when the hedge was placed on 10/6/2020 to \$16.45/bu when the hedge was lifted on 5/11/2021 (Figure 1), the producer received margin calls in 47 days out of the 149 days of the hedge for a total of \$184,500 in margin calls (Figure 2).



**Figure 1. Soybean futures price for May 2021 delivery from 10/07/2020 to 05/11/2021 (\$/bu)**



**Figure 2: Margin calls between 10/07/2020 and 05/11/2021 for a producer who sold 30,000 bushels using the soybean futures contract for May 2021 delivery (\$)**

As we can see in Figure 2, in the 47 days with margin calls during this hedge, the value of the additional deposits that the producer had to make ranged from \$300 to \$12,750. Just as an exercise, if we divide the total value of margin calls (\$184,500) by the number of margin calls (47), we would be looking at an average value of \$3,925 per margin call. This has important cash flow implications because the producer had to have the equivalent of \$184,500 in available funds during the hedge in order to meet the 47 margin calls.

The magnitude of margin calls depends on the amount of bushels hedged in the futures market. If the producer were hedging less (more) than 30,000 bushels in this example, there would have been less (more) than \$184,500 in margin calls. Regardless, the main point is that it becomes more likely to receive margin calls in periods of high volatility. In some cases, like in Scenario 2 in our example (which is based on actual futures price in the last few months), these margin calls can be substantial. Therefore, it is essential to account for the possibility of margin calls when we hedge with futures contracts, especially in times of high volatility.

**Take-away point #3: margin calls do not necessarily mean that you will receive less money at the end of the hedge**

Although it is certainly painful to receive margin calls (even more so 47 of them as in our example), they do not necessarily mean that we will receive a lower price at the end of the hedge. Back to Scenario 2 in our example, in May 2021 we have a spot price offered by the local elevator in the producer's cash market at \$15.85/bu and the futures price at \$16.45/bu. Since the producer initially sold in the futures market at \$10.30/bu and now is buying at \$16.45/bu to offset the futures contracts and lift the hedge, she is losing \$6.15/bu in the futures market. Given that she hedged 30,000 bushels, a loss of \$6.15/bu adds up to a total loss of \$184,500 ( $=\$6.15/\text{bu} \times 30,000 \text{ bu}$ ).

As we have discussed before, \$184,500 is exactly the total value of margin calls received during the hedge. Therefore, margin calls do not represent "additional" losses to the hedger. With or without margin calls, the producer is losing \$184,500 in our example (or \$6.15/bu on 30,000 bushels). The margin calls mean that this loss happens in "installments" during the hedge instead of being "charged" in full at the end of the hedge.

Furthermore, since the basis at delivery was  $-\$0.60/\text{bu}$  as expected, the producer ended up receiving \$9.70/bu as anticipated at the beginning of the hedge. Regardless the amount or value of margin calls, the final price received by the producer at the end of the hedge in this example is still \$9.70/bu because the basis at delivery turned out to be  $-\$0.60/\text{bu}$  as expected.

**Take-away point #4: the question that often comes up... what if I lift the hedge while I am still holding my grain?**

In a situation like Scenario 2 in our example, one could ask whether it would be "better" to offset the futures contracts and get out of the hedge before May 2021 in order to avoid more margin calls. After all, the market is going up and we do not need protection against lower prices. This is certainly a possibility, but there are at least two key points to consider before making this decision. First, if we lift the hedge, we will be carrying unhedged grain and we will no longer have any protection if the market happens to go down. In

times of high volatility, prices can go down just as fast as they go up, so this is when hedging becomes particularly important. Second, as we discussed before, margin calls are often painful and inconvenient, but they do not imply a lower price at the end of the hedge. As long as the basis does not change, the frequency or magnitude of margin calls will not affect the final price that we expect to receive at the end of the hedge.

No one can tell for sure whether it is "better" to lift the hedge with futures contracts in this situation. Sometimes it may be, sometimes it may not. Either way, one should at least consider carefully the points discussed above before making this decision.

**Final remarks**

In this article, we discussed hedging with futures contracts in times of high volatility. In particular, we focused the discussion on some points related to margin calls. The general ideas about hedging and risk management apply to any type of marketing contract, but the discussion related to margin calls is specific to futures contracts.

Given the high level of volatility that we have observed in commodity markets in the recent past, it is never too much to revisit the points discussed above and keep them in mind as we make marketing decisions involving futures contracts. There are a few other dimensions that could be explored within the points discussed above, as well as there are other points that could be discussed, but we will leave them for future articles.

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