

MU Guide

Introduction to Hedging Agricultural Commodities with Futures

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Producers of agricultural commodities regularly face price and production risk. Furthermore, increased global free trade and changes in domestic agricultural policy have increased these risks. As the variability of price and production increases, producers are realizing the importance of risk management as a component of their management strategies.

One means of reducing these risks is through the use of the commodity futures exchange markets. Like the use of car insurance to hedge the potential costs of a car accident, agricultural producers can use the commodity futures markets to hedge the potential costs of commodity price volatility. However, as with car insurance, where the gains from an insurance claim might not exceed the cost of the cumulative sum of premiums, the gains from hedging might not cover the costs of hedging. The primary objective of hedging is not to make money but rather to minimize price risk, and this includes using hedging to minimize losses. This guide provides an overview to agricultural hedging to aid in evaluating hedging opportunities.

Commodity arbitrage: Operations of a commodity exchange

Arbitrage is the process whereby a commodity is simultaneously bought and sold in two separate markets to take advantage of a price discrepancy between the two markets. A commodity futures exchange acts as a marketplace for persons interested in arbitrage. The factors driving arbitrage are the real or perceived differences in the equilibrium price as determined by supply and demand at various locations. For instance, suppose there is a shortage of corn in North Carolina to feed livestock. If I believe that I can profit from buying corn in Missouri, paying shipping costs, and selling corn in North Carolina, I will continue to do so until the supply and demand for corn are equal in North Carolina. At that point, the Missouri corn price plus the shipping costs will equal the North Carolina corn price.

For the futures market, the arbitrage activities are carried out through the exchange of paper promissory notes to sell or buy a commodity at an agreed upon price at a future date. Through the interaction of people who have different perceptions of where supply and demand are at present and how supply and demand will change in the future, commodity prices are driven to equilibrium. As new information enters the market, perceptions change and the process of arbitraging begins again.

For example, let's say Bill believes the domestic fall production of corn has been underestimated in midsummer, and Tom believes the domestic fall production of corn has been overestimated in midsummer. Bill believes corn prices will drop; Tom believes prices will go higher. Using the commodity exchange as a market place, Bill sells a futures contract and Tom buys a futures contract. Assume that Bill and Tom sell and buy their contracts for the same price and hold them for three months, at which time Bill must buy back his contract and Tom must sell his contract. Furthermore, the contract price is allowed to change in value freely during the three months with changes in supply and demand for the underlying commodity.

Depending on what happens to prices during the three months, the contract will either hold its value or it will appreciate or depreciate. If the value does not change, neither person benefits. If the value appreciates, Tom would earn a profit by selling back his contract at the new higher price, and Bill would lose money by buying back his contract back at the new higher price. Conversely, if the value depreciates, Tom would lose money by selling back his contract at the new lower price, just as Bill would profit by buying back his contract at that price.

Is arbitrage through a commodity exchange really this simple? In some ways yes, and the rules of trading allow for the buying and selling of the contract at any time. There is no minimum time you must hold a contract. However, as you might suspect from the above scenario, arbitrage through the futures is in some ways a gamble like buying insurance. Sometimes it pays for

itself and sometimes it doesn't. Furthermore, the scenario described above between Bill and Tom is called speculating. That is, neither party has actual ownership of a commodity, but they believe they can "out-guess" the market. Hedging is the process whereby a person owns the commodity and uses the commodity futures markets to transfer risk. This will be discussed in more detail later.

Where does futures arbitrage occur?

There are two main locations where arbitrage occurs for agricultural commodity futures markets. Chicago is the location of both of these main futures exchanges. The Chicago Board of Trade (CBOT) is where corn, soybean, soybean oil, soybean meal, wheat and rough rice futures are traded. The Chicago Mercantile Exchange (CME) is where futures in lean hogs, live cattle, stocker cattle, and feeder cattle are traded. In addition, cotton futures are traded at the New York Cotton Exchange (NYCE).

Buyers equal sellers

In a marketplace like the Chicago Board of Trade or Chicago Mercantile Exchange, the number and price of contract buyers equal the number and price of contracts sold. However, no obligation exists between specific buyers and sellers. Therefore, a person is allowed to buy or sell a contract at any time within the trading specifications for the exchange. As months change, the market enters a contract expiration month in which all persons end up with zero contracts for that trading period. That is, if you sell (buy) one contract, you must buy (sell) back one before contract expiration. However, the physical delivery of commodities allows for substituting the commodity for the contract.

Hedging: Transferring risk through arbitrage

Price risk for agricultural commodities can occur for a number of reasons, including drought, near record production, an increase in demand or decreased international production. The commodity futures markets provide a means to transfer risk between persons holding the physical commodity (hedgers) and other hedgers or persons speculating in the market. Futures exchanges exist and are successful based on the principle that hedgers may forgo some profit potential in exchange for less risk and that speculators will have access to increased profit potential from assuming this risk. For example, suppose a person works on commission and receives \$2,000, \$8,000, \$5,000, and \$13,000 in salary for four consecutive months for an average salary of \$7,000 per month over this period. Now suppose the person could accept a salaried position for a steady \$6,000 a month. If the person prefers less income variability, he or she would pay for the decreased variability and accept the pay cut, on average, of \$1,000 per month.

Alternatively, the employer would require the \$1,000/month to offset the risk he or she now assumes from the person not being motivated to sell more.

This concept applies to hedging in that hedgers might be willing to give up some revenue for a known price, and speculators would require the opportunity for more revenue by assuming the price risk. For example, suppose that in late April Joe Farmer plants 500 acres of corn. At this time, Joe Farmer notices that he can forward price a portion of his corn production through the futures market at \$2.80/bushel. Knowing that his cost of production is \$2.45/bushel, Joe is willing to price one-third of his anticipated production at \$2.80/bushel. That is, hedging by the agricultural producer generally involves selling the commodity at the commodity exchange market because producers want to lock in a price floor (a minimum price they will receive). Joe sells a futures contract for his corn, speculators or hedgers (grain elevator operators and others looking to lock in a price ceiling for the grain they are forward contracting) simultaneously are buying the contracts. Now, what can happen? The following analysis holds basis constant.

If the futures price goes higher

The fall futures and cash price of corn goes up to \$3.00/bushel when Joe is ready to harvest the crop. Joe loses \$0.20/bushel in the futures market but he gains this back in the cash market through the simultaneous cash price increase with the futures price. The difference between the cash market and the futures market will determine how much Joe makes in the cash market. At worst, Joe receives \$2.80/bushel for his hedged grain (this example does not include commissions, which would lower the price Joe receives by a small amount).

If the futures price goes lower

The fall futures and cash price of corn goes down to \$2.50/bushel when Joe is ready to harvest the crop. Joe gains \$0.30/bushel in the futures market but loses in the cash market through the simultaneous price decrease with the futures price. Again, what happens to basis, the difference between the cash and futures market, during this time will determine how much Joe makes in the cash market. At worst, Joe receives \$2.80/bushel, less commissions, for his hedged grain.

If the futures price doesn't change

The fall futures and cash price of corn stays at \$2.80/bushel when Joe is ready to harvest the crop. Joe does not gain in either the futures market or the cash market except for potential basis gain or loss. At worst, Joe receives \$2.80/bushel for his hedged grain, less commissions.

What do all of these scenarios have in common? Joe generally knew what price he would receive for the hedged portion of his corn crop. Why is this important? Joe does not need to worry about a price decline that

would affect revenue; therefore, Joe knows approximately how much of a revenue stream he will have for cash flow analysis. However, there may be some types of production risks that cannot be covered through futures. If producers are concerned about production risks due to natural catastrophes, they may want to inquire about crop insurance to cover production shortfalls.

Also, the basis component of hedging was not discussed. A change in basis can increase or decrease a net price decrease or increase from hedging.

When to hedge

By knowing the enterprise cost of production, Joe can determine prices at which he might consider forward pricing portions of his production. Thus, it is imperative that producers know their cost of production when hedging a commodity. For instance, if Calvin knows his cost of production on 400-pound feeder calves is \$60/cwt, then he might consider forward pricing a portion of his calf crop through the futures market when the futures market price allows for him to cover his cost of production. It is important that producers determine a target profit margin, because people tend to price at the market high. In short, it is nice to be able to say you received \$5/cwt more on your calf crop than your neighbor, but it is even better to be able to say you succeeded and retired as a farmer by making wise choices instead of risky ones.

What are the costs of hedging?

The costs of hedging are straightforward; however, these expenses can become substantial over time. Commissions are paid to a broker for administrative costs and for operation and regulation of the futures exchange. These costs can range from \$9 to \$35 or more per order — either a buy or a sell order. Therefore, to enter and exit the market the total costs can range from \$18 to \$70 or more.

Margin money is paid only on futures positions and not options positions. Margin refers to earnest money placed in a brokerage account to cover potential losses. The initial margin is needed to start trading. Typically, a futures position will require the initial cost of 3% to 10% of the actual cost of the contract being traded (e.g., a 5,000-bushel corn contract may require an initial margin of \$750 per contract). The exact percentage is determined by the futures exchange. The maintenance margin is used to step up the initial margin account. For instance, suppose the maintenance margin on the corn contract is \$500 per contract. Whenever the initial margin account drops to \$500 because of “paper” losses in the futures market, the account must be added to so that the balance in the account returns to the initial margin. There is no maximum number of times a margin call can occur.

Other Publications on Risk Management

- G 601, *Agricultural Commodity Futures Contract Specifications*
- G 603, *Introduction to Hedging Agricultural Commodities with Options*
- G 604, *Commodity Futures Terminology*
- G 605, *Interpreting Commodity Futures and Options Price Quotes*
- G 606, *An Introduction to Basis*
- G 607, *Long Hedge Example with Futures*
- G 608, *Short Hedge Example with Futures*
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