

Introduction to Hedging Agricultural Commodities With Futures

Producers of agricultural commodities regularly face price and production risks. Furthermore, increased global free trade and changes in domestic agricultural policy have increased these risks. As the variability of price increases the variability of revenue, 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 using 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. As when gains from a car 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 to minimize price volatility. This guide provides an overview to agricultural hedging to aid producers 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 North Carolina has a shortage of corn 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.

Market participants consist of hedgers and speculators. In speculation, neither party has actual ownership of a commodity, but each believes he can outguess the market direction. Hedging, described in more detail below, is the process whereby a person owns the commodity and uses the commodity futures markets to transfer risk.

Where futures arbitrage occurs

The two main futures exchanges where arbitrage for agricultural commodity futures markets occurs are located in Chicago. 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, and feeder cattle are traded. Both exchanges are now part of the CME group. In addition, cotton futures are traded at ICE Futures U.S. in New York.

Buyers equal sellers

In a marketplace like the CBOT or the CME, the number and price of contracts bought 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 pass, 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 contract 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, increased 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. A person who prefers less income variability would pay for the decreased variability and accept the pay cut of, on average, \$1,000 per month. Alternatively, the employer would require the \$1,000 per month to offset the risk now assumed from the person not being motivated to sell more.

Similarly, 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 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 \$4 per bushel. Knowing that his cost of production is \$3.50 per bushel, Joe is willing to price one-third of his anticipated production at \$4 per 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, and speculators or agribusinesses (grain elevator operators and others looking to lock in a price ceiling for the grain they are forward contracting) simultaneously are buying the contracts. The following scenarios describe three possible outcomes for Joe. (The following analysis holds basis — the difference between the cash market and the futures market — constant and

does not include commissions, which would lower the net price Joe receives by a small amount.)

If the futures price goes higher

The fall futures and cash price of corn goes up to \$4.20 per bushel when Joe is ready to harvest the crop. Joe loses \$0.20 per bushel in the futures market but he gains this back in the cash market through the simultaneous increase of the cash price and the futures price. The difference between the cash market and the futures market (basis) will determine how much Joe makes in the cash market. At worst, Joe receives \$4 per bushel, less commissions, for his hedged grain.

If the futures price goes lower

The fall futures and cash price of corn goes down to \$3.70 per bushel when Joe is ready to harvest the crop. Joe gains \$0.30 per bushel in the futures market but loses in the cash market through the simultaneous decrease of the cash price and the futures price. Again, what happens to basis during this time will determine how much Joe makes in the cash market. At worst, Joe receives \$4 per bushel, less commissions, for his hedged grain.

If the futures price doesn't change

The fall futures and cash price of corn stays at \$4 per 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 \$4 per bushel, less commissions, for his hedged grain.

What these scenarios have in common

In these scenarios, Joe generally knows what price he will receive for the hedged portion of his corn crop. He does not need to worry about a price decline that would affect revenue; therefore, he knows about how much of a revenue stream he will have for cash-flow analysis. Some types of production risks, however, cannot be covered through futures. Producers concerned about production risks due to natural catastrophes, for example, may want to inquire about crop insurance to cover production shortfalls.

These scenarios did not discuss the basis component of hedging. A change in basis can increase or decrease a net price decrease or increase from hedging.

When to hedge

By knowing his cost of production, Joe can determine prices at which he might consider forward pricing portions of his production. Thus, producers must know their cost of production when hedging a commodity. For instance, if Sue knows her cost of production on 400-pound feeder calves is \$140 per hundredweight, then she might consider forward pricing a portion of her calf crop through the futures market when the futures market price allows for her to cover her cost of production plus a profit margin.

The costs of hedging

Although the costs of hedging are straightforward, 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 a few dollars to \$35 or more per contract for either a buy or a sell order. Therefore, the total costs to enter and exit the market can reach \$70 or more per contract.

Margin money is paid only on futures positions and not when purchasing options positions. Margin refers to earnest money placed in a brokerage account to cover potential losses. An initial margin is needed to start trading. Typically, a futures position requires the initial cost of 3% to 10% of the actual cost of the contract being traded (for example, a 5,000-bushel corn contract may require an initial margin of \$990 per contract as of June 2020). The exact percentage is determined by the futures exchange. The maintenance margin is used to step-up the margin account to keep it at a minimum amount of equity. For instance, suppose the maintenance margin on the corn contract is \$900 per contract. Whenever the margin account balance drops to \$900 because of paper losses in the futures market, a margin call occurs, requiring that additional money be added to the account to bring the balance up to the initial margin level of \$970. A margin call can occur an unlimited number of times.

Original authors: Joe Parcell and Vern Pierce