

Introduction to Futures Markets

Futures markets are a valuable tool for agricultural producers looking to manage their price risk. They also serve as a vehicle for price discovery. In simple terms, futures markets are a place for people to trade products for delivery on a future date. This contrasts with “usual,” or “spot,” markets, which refer to the present (e.g., the price of soybeans today). Futures markets allow producers, buyers, and processors of a commodity to better plan expenses and revenues by reducing exposure to price volatility.

History of Futures Markets

Modern-day agricultural futures markets in the United States have their origins in Chicago. In the mid-1800s, Midwest grain producers did not have good storage options and sold their crops on the spot market at harvest. Most of this spot trading occurred in Chicago. The abundance of grain available at harvest sharply drove down the price a farmer would receive. As grain supplies dwindled throughout the year, consumers faced higher prices until the next harvest. This annual feast-or-famine cycle caused inefficient price discovery and difficulty planning how many acres to plant. A mechanism was needed to allow buyers and sellers to manage price risk throughout the year.

The need to manage price risk led to the creation of forward contracts. A forward contract is an agreement to sell a commodity in the future. The buyer and seller of the commodity agree on a price, quantity, quality, and other relevant terms. Forward contracts allowed buyers and sellers to reduce price volatility but came with some drawbacks. The contracts are unique to the negotiating parties, and performance is not necessarily guaranteed. For example, assume a forward contract was negotiated in March to sell corn at \$5 in September. If the spot price in September is \$3, some buyers may attempt to get out of the contract. This could particularly become an issue in the absence of strong, legally binding contracts.

As trading of grain expanded, the Chicago Board of Trade (CBOT) was formed in 1848 to serve as a centralized marketplace for buyers and sellers to meet and exchange commodities. In the early years of the exchange, forward contracts were used, but in 1865 the CBOT took the step of formalizing forward contracts and developed

futures contracts. Futures contracts alleviated many of the concerns with forward contracts. Futures contracts are standardized, and performance is guaranteed. Other futures exchanges quickly began operation in the late 1800s, including the Chicago Mercantile Exchange in 1874, Kansas City Board of Trade in 1876, New York Board of Trade (originally the New York Cotton Exchange) in 1870, and New York Mercantile Exchange in 1882.

Today, the largest futures exchanges in the United States are the CME Group and Intercontinental Exchange (ICE). The CME Group was created in 2007 from a merger of the Chicago Board of Trade and the Chicago Mercantile Exchange. The CME Group acquired the New York Mercantile Exchange in 2008 and the Kansas City Board of Trade in 2012. Through these acquisitions, CME Group has become the largest futures exchange. The Intercontinental Exchange (ICE) was established in 2000 focusing mainly on energy futures. ICE began offering futures contracts for soft commodities (cotton, coffee, sugar, etc.) in 2007 with the acquisition of the New York Board of Trade.

What Is a Futures Contract?

A futures contract is a legally binding agreement between a seller to deliver and a buyer to receive a commodity on a predetermined future date for an agreed-upon price. Each futures contract is standardized and specifies the time of delivery, exact quantity, quality, and expiration month. The contract states every detail except price. The result is a market where buyers and sellers are all trading contracts with the same details.

The seller of a futures contract is agreeing to deliver the specified quantity of the commodity at the specified delivery date. The buyer of a futures contract is agreeing to take delivery of the commodity at the specified delivery date. While physical delivery is possible for many commodities, most futures contracts do not result in physical delivery of the underlying commodity. A trader can easily settle (i.e., offset) their position by buying futures contracts (if they had originally sold) or selling futures contracts (if they had originally bought).

A common question is, “How can a trader sell a futures contract before they buy one?” or “How can I sell a futures

contract for a commodity I do not own?" When you sell a futures contract, you are simply promising to deliver the underlying commodity at a future date. You are not selling the physical commodity at the time you sell a futures contract, but only the promise to deliver the commodity for the agreed-upon terms. If the seller does not own the physical commodity, they know they can cancel this promise by buying back the futures contracts as long as the market has sufficient liquidity (i.e., many buyers and sellers participating).

An important component of a futures contract is standardization. Standardization allows all traders to know exactly what they are buying and selling. Everyone trading in the market will know the standards for the contract and, therefore, can focus solely on the price. This allows the futures market to be a reliable source for

market information, as any contract price change reflects a change in the expected price level of the underlying commodity and not changes in contract terms.

Table 1 contains an example of the CME Group's corn futures contract specifications. Futures exchanges set the standards for each contract and provide the platform on which they are traded. The exchange determines the trading hours, rules of conduct, dissemination of information to participants for market transparency, and mechanisms for settling disputes. Most importantly, the exchange clearinghouse guarantees settlement of each contract bought and sold. The futures market is often called a "zero sum" game—for every buyer there is a seller and vice versa. The clearinghouse serves as the middle agent between buyer and seller and matches traders together.

Table 1. CME Group corn futures contract specs.

Item	Specs
Contract unit	5,000 bushels
Price quotation	U.S. cents per bushel
Trading hours	CME Globex: Sunday–Friday, 7 p.m.–7:45 a.m. CT and Monday–Friday, 8:30 a.m.–1:20 p.m. CT
Minimum price fluctuation	¼ of one cent (0.0025) per bushel = \$12.50 TAS: Zero or +/- 4 ticks in the minimum tick increment of the outright
Product code	CME Globex: ZC CME ClearPort: C Clearing: C TAS: ZCT
Listed contracts	9 monthly contracts of March, May, September and 8 monthly contracts of July and December listed annually after termination of trading in the December contract of the current year.
Settlement method	Deliverable
Termination of trading	Trading terminates on the business day prior to the 15th of the contract month.
Last delivery day	Second business day following the last trading day of the delivery month.
Grade and quality	Through December 2018: #2 Yellow at contract price, #1 Yellow at a 1.5 cent/bushel premium, #3 Yellow at a 1.5 cent/bushel discount. As of March 2019: #2 Yellow at contract price, #1 Yellow at a 1.5 cent/bushel premium, #3 Yellow at a discount between 2 and 4 cents/bushel depending on broken corn and foreign material and damage grade factors.

Source: CME Group. https://www.cmegroup.com/trading/agricultural/grain-and-oilseed/corn_contract_specifications.html.

Contract Value and Margins

When trading futures contracts, it is important to understand the value of the contract and value of the total position. Each futures contract will have a designated size. CME Group corn and soybean futures contracts are both set at 5,000 bushels. The value of the contract is calculated as the contract size multiplied by the current price. If the current price for the December corn futures contract is \$4 per bushel, then the contract value is \$4 multiplied by 5,000, or \$20,000. If the price increased to \$4.10 per bushel the next day, then the contract value would be \$20,500, an increase of \$500.

A change in contract value will affect traders differently depending on whether they originally bought or sold the contract. The futures market is like other markets—the goal is to buy low and sell high (or sell high, then buy low). If a trader had previously bought a futures contract, then a price increase would benefit the trader as they would then be able to sell it at a higher price. If the trader had previously sold a futures contract, then a price increase would be a loss because the trader would have to buy it back at a higher price.

The clearinghouse accounts for all trades made on the exchange and keeps track of the value of each trader's position. The clearinghouse typically balances the books at the end of trading each day and adjusts each trader's account to reflect the daily price change. At the time of placing a futures trade, each trader must open a margin account and deposit an initial margin to ensure contract performance. The initial margin required is a small percentage of the overall contract value (typically 5–15 percent). The margin account is then debited or credited each day depending on the gains/losses of the contract value. This process is referred to as “marking-to-market.”

For example, if a trader opens a margin account with a \$3,000 initial margin and the contract loses \$200 in value the next day, then the margin account would be adjusted down to \$2,800. If a trader's margin account value drops below a set maintenance margin level, then the trader will receive a margin call. A margin call requires the trader to deposit additional funds into their account

to bring the level back up to the initial margin. If the requested margin call is not deposited, then the trader's position will be closed out. With margin accounts, futures markets are typically highly leveraged.

Market Quotes

Futures quotes are available from a wide variety of online sources. The exchange sets how prices will be quoted. Table 2 contains an example of futures quotes for CME Group's corn contract for various months. Futures contracts are unique to delivery month, and multiple futures contracts are available for a particular commodity throughout the year. A futures contract is generally referred to by its delivery month and year, which is indicated in the first column of Table 2.

The second column in Table 2 contains the *last traded* price for the contract. In our example, corn futures prices are quoted in cents per bushel, and the minimum price fluctuation is one quarter of a cent, or 2/8. Commodity quotes generally do not show the denominator of the fraction because it is assumed to be 8. In our example, the last traded price for the May 2021 corn was 581⁴/₈ cents per bushel, which can also be written as 581 4/8 cents or 581.50 cents. The ⁴/₈ portion of the price is equal to a half-cent. The last traded price for the July 2021 contract was 566⁶/₈ cents per bushel, which can also be written as 566 6/8 cents or 566.75 cents. It is important to read the contract specifications because this pricing rule does not hold for every commodity.

The third column in Table 2 displays the change of the last traded price from the *prior settlement* price. The prior settlement is the price at which the contract traded immediately before the end of the previous day's trading settlement. The *open* price represents the price at which the contract was trading immediately after the start of trading on April 13. *High* is the highest price that the contract has traded during the day, and *low* is the lowest price at which the contract has traded during the day. *Volume* is the number of contracts that have traded in a day.

Table 2. Futures quotes for CME Group corn futures contract on April 13, 2021 (U.S. cents per bushel).

Month	Last Trade	Change	Prior Settlement	Open	High	Low	Volume
May 2021	581 ⁴ / ₈	+12 ⁴ / ₈	569 ⁰ / ₈	569 ⁰ / ₈	584 ⁴ / ₈	565 ⁴ / ₈	85,648
Jul 2021	566 ⁶ / ₈	+11 ² / ₈	556 ⁰ / ₈	556 ⁰ / ₈	569 ⁶ / ₈	552 ⁶ / ₈	67,463
Sep 2021	515 ⁴ / ₈	+8 ⁰ / ₈	507 ⁶ / ₈	507 ⁴ / ₈	518 ⁰ / ₈	506 ⁰ / ₈	8,860
Dec 2021	503 ² / ₈	+6 ⁴ / ₈	496 ⁴ / ₈	495 ⁶ / ₈	505 ⁶ / ₈	494 ⁶ / ₈	30,279
March 2022	510 ⁴ / ₈	+7 ² / ₈	503 ² / ₈	502 ⁴ / ₈	513 ⁰ / ₈	502 ² / ₈	6,491

Source: CME Group.

Futures Markets and Risk Management

Futures markets are a valuable risk-management tool for agricultural producers, providing the ability to formulate price forecasts and the mechanism for managing price risk through hedging. A futures contract price represents the current market view of what the value of a commodity will be on the date the contract expires. For example, assume today is August 1 and the current price of the December corn futures contract is \$4/bushel. This price means that, on August 1, the prevailing market opinion is that a bushel of corn will be worth \$4 in December. A producer can use this information to formulate price forecasts for commodities. The difference between the local cash price in any particular area and the futures price is called "basis." A producer can use historical basis data to determine an expected basis for the upcoming year. Using the above example, if the historical average basis in relation to the December corn contract is -\$0.20 for a particular area, then a producer in that area can forecast a cash price in December of \$3.80/bushel.

The futures market additionally allows a producer to hedge their price risk. Hedging allows producers (or purchasers) to offset some of their price risk in the cash market by selling (or buying) a futures contract. For example, assume it is May and a farmer is growing soybeans with the plan to sell them at harvest in October to a local elevator. However, this farmer does not want to be subject to the price risk between May and October. The farmer does not have the physical soybeans to sell yet, but they can sell CME soybean futures contracts. When harvest arrives, the farmer would sell their soybeans on the cash market and buy back the futures contracts. If the price declines, the farmer is protected because their futures position will be more valuable (i.e., they sold high and will buy back low). Alternatively, if the price increases, the futures position will decline, but the value of the cash soybeans sold at harvest should increase. Ultimately, the farmer would receive a net price for the soybeans of the cash price received plus any gains or losses from the futures market transaction.

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