

AAE 575

Advanced Futures Markets

Lecture 1 January 23

Introduction

The purpose of this course is to investigate various methods used in forming price expectations. Since the futures market is in itself a reflection of current expectations of futures value, we are going to apply or price-forecasting techniques to agricultural commodities traded in futures markets. If we can improve on the forecasts of future prices relative to current values traded in commodity futures markets, we should be able to profit by taking positions in the futures market today in anticipation the market will move towards our price forecasts as the time to maturity approaches.

What are Futures Markets?

Futures markets are simply facilities where provisions are made for future cash transactions. While parallels are often drawn between futures and stock markets, they are actually quite dissimilar. The outside appearance of loud, chaotic environments in which individuals are attempting to engage in economic transactions is really the only substantive similarity.

Stock markets (exchanges) are centers of exchange where actual assets and property rights are traded. The stock exchanges bring together people with an excess supply of capital with those who need to raise capital in order to develop or grow a business. They facilitate the transfer of corporate ownership and actual property rights change hands as a result of each transaction.

Futures markets, on the other hand, bring people together to transfer the price risk associated with the ownership of some commodity, but not the actual trading of the property rights associated with the commodity. While holding a futures obligation through to contract expiration often results in a transfer of ownership, it does not constitute the primary function nor represent the majority of activity conducted at futures exchanges.

Futures markets essentially match up risk averse cash market participants (called hedgers or commercials) with less risk averse (potentially risk seeking) traders who often (usually) have no cash position in the traded commodity (called speculators or non-commercials).

The commercial firms primary business focus is on providing value added services in the overall production and distribution of the cash commodity, and the futures market is used to facilitate price insurance while they are engaged in providing their value added service.

The non-commercials generally do not participate in the cash market for the traded commodity. They are willing to assume the price risk associated with its change in value during the production, processing, storage, and transportation stages of delivering to the final consumer in return for the possibility of profiting from price change.

Trading in Futures Markets

The instruments traded in futures markets are standardized packages of generally generic commodities, called contracts. Everything about the commodity bundle is standardized across all contracts of the same commodity except price. For example, the corn contract traded at the Chicago Board of Trade is for 5000 bushels of No.2 yellow corn, deliverable in Chicago¹ on a specific date (or, more precisely, within about a three week period during the month the futures contract expires). While corn futures contracts are traded for delivery different months, they are different contracts. The buyer of a futures contract for March delivery cannot go back to the seller and try and negotiate a different delivery date. To alter the delivery date, the trader would have to liquidate his/her position in the March contract and enter into a different contract for the alternate delivery period.

Many commodities do not have contracts calling for delivery every month. In the case of corn, for example, there are contracts traded for March, May, July, September, and December delivery only. The delivery months are generally selected to coincide with production and/or consumption patterns in the underlying commodity. The March contract for corn coincides with the first major movement of the previous fall's crop out of storage, and the beginning of the planting season for next year's crop. The May contract is toward the end of the traditional storage period, and the end of planting for next year's crop. The July contract represents the middle of the growing season for the new crop. September is the early harvest contract, and December the end of harvest and the beginning of the storage season for the next year.

Commodities that do not have as well defined seasonal components sometimes do have contracts for delivery every month. Examples include both oil and milk futures contracts.

A futures contract does represent a legal commitment to make or take delivery of the underlying commodity at contract expiration at the traded price, but in reality very few deliveries against futures contracts actually take place. Since the futures contract is an obligation to enter into a cash transaction at a later date, any trader can negate that obligation by simply passing it to another trader before contract expiration. For example, if I buy a futures contract for July corn, I am taking on legal commitment to take delivery of corn in Chicago in July from someone who has sold corn for July delivery. However, if between now and July I agree to sell a corn futures contract for July delivery, I have offset my purchase commitment. In effect, the original seller now will be delivering corn not to me, but to the party I sold corn to. This same commitment to take delivery may be traded several dozen times before the futures contract actually matures.

¹ There are actually several acceptable delivery points, each with a specific price adjustment from the Chicago futures price to account for transportation from Chicago. However, the delivery points are fixed and non-negotiable between futures traders.

Futures Market Characteristics

One unique feature of futures markets is that futures contracts are traded on margin. Margin requirements in futures markets are generally very low. Many margin requirements are 8 to 10 percent of the value of the futures contract, but sometimes margins are as low as 1 percent of a futures contract's value. It is the ability of traders in futures markets to leverage a relatively small amount of capital into a sizeable position that accounts for both the attractiveness of futures speculation and also its image as a high risk-trading environment.

It is important to remember that trading in futures markets is often at the high-risk end of most investment opportunities. However, this comes from the tendency of traders to be highly leveraged rather than from the overall price volatility in the commodity being traded. Consider two traders, one in the futures market and one in the stock market. If both traders have \$5000 to invest, the stock trader normally would buy \$5000 worth of stock, or ownership in some publicly traded corporation. The most that trader could lose is \$5000, and this would only happen if the company went out of business. Some stock traders can trade on margin, or leverage their investment capital to secure a larger stake in the market. However, in most cases the margin requirement is 50 percent. Therefore, even trading on margin the stock trader can only purchase \$10,000 worth of stock, and can at most lose twice the original investment.

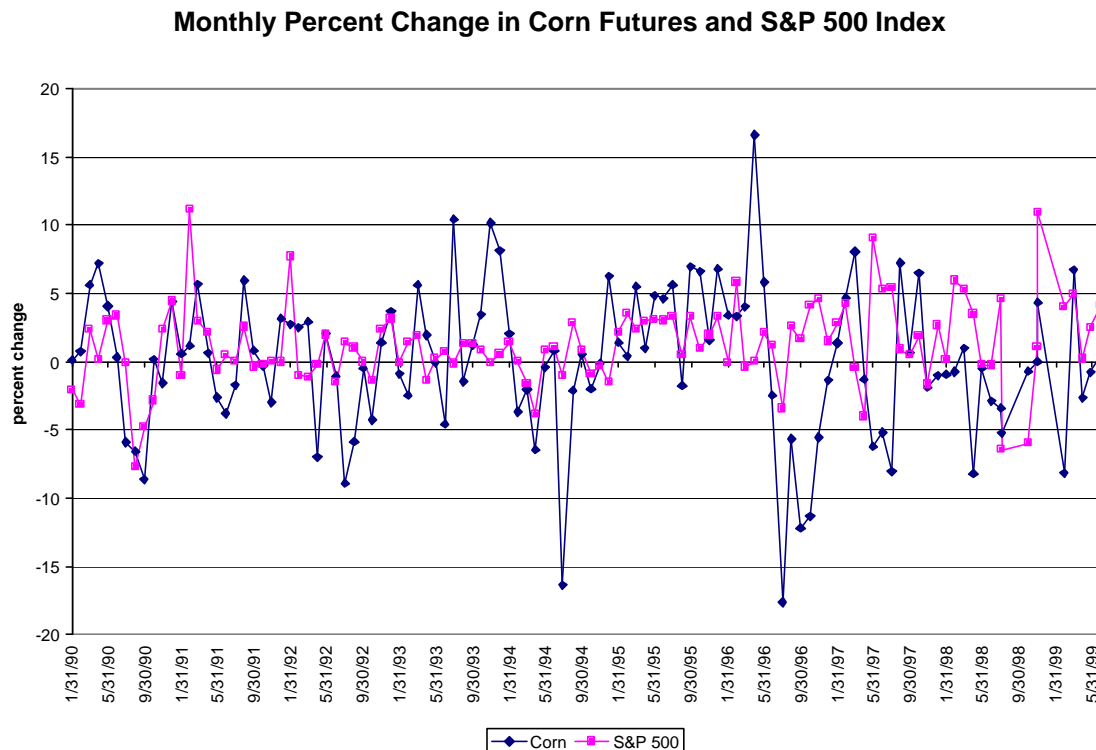
The futures trader can leverage his/her original \$5000 to control a position within an underlying value several times the initial margin. Let's assume the futures trader decides to buy corn futures for December delivery. Assume corn for December delivery is trading at \$2.50 per bushel. Each contract is for 5000 bushels, so the underlying value of a corn futures contract for December delivery is \$12,500. However, the initial margin required to buy 1 corn futures contract is about \$500. If the trader chooses to commit the entire \$5000 to the futures market, he/she could buy 50,000 bushels of corn, with an underlying market value of \$125,000.

If both traders experience a 10 percent reduction in the value of their investments over time, the stock trader will lose \$500 if he/she did not buy stock on margin, or \$1000 if they bought the stock on margin. The futures trader, however, will lose 10 percent on an initial market value of \$125,000 (if all \$5000 were used to acquire market positions), or \$12,500 – two and a half times the initial investment capital. It is important to note, however, that the significantly larger losses to the futures trader did not come from increased price risk in the commodity versus stock market, but from his/her decisions to maximize their leverage in the market. If they had chosen to buy only 1 futures contract with an underlying market value of \$12,500 (\$2.50 per bushel x 5000 bushels), a ten percent change in market value would have resulted in a loss of only \$1250.

Figure 1 shows the monthly percentage change in corn futures contracts from January 1990 through June 1999 compared to the monthly percentage change in then S&P 500 stock index over the same period. Note that in general price volatility is quite similar.

Further, it should be noted that the S&P 500 represents a diversified look at the stock market. Many individual stocks were significantly more volatile than the overall index.

Figure 1.



Another unique feature of futures markets relative to other types of markets is the imposition of daily price limits. Unlike stock markets, most futures contracts have daily price limits that prevent the price from moving out of a pre-specified range within a given trading day. The size of the price limits varies by commodity, but all serve the same basic function.

The most important characteristic of daily price limits is that they allow futures market participants to objectively measure the maximum amount of price risk that can be faced in a trading session.

Without price limits, the price risk faced by each trader would be essentially unlimited, and margin requirements would have to be increased significantly to account for this increased risk. This, in turn, would negate one of the attractive features of futures markets -- the ability to leverage a relatively small amount of capital into a substantial market position.

Another function of price limits is to prevent overly emotional reactions to market surprises. By forcing traders to remain within a given price range until the next trading day, market participants are given the opportunity too evaluate the importance and price implications of surprise events outside of the chaos often experienced on the trading

floors. The intent is to insure that any dramatic price reaction to an event is a rational evaluation of changed value, and not a hysterical response to an unexpected surprise.

A third unique feature of futures markets is the ability to sell something you do not have possession of. Since a futures contract is a commitment to enter into a cash transaction at some later date, the futures commitment can be made regardless of the current cash position of the trader. I can sell corn for July delivery even though I do not have corn because I can acquire corn between now and July to fulfil my delivery commitment. This can be done one of two ways: I can buy corn out of a Chicago warehouse that has been certified as deliverable against futures contracts and then deliver the warehouse receipt showing ownership to a futures buyer, or I can simply buy a July futures contract prior to expiration and offset my sales commitment. If I sell today and buy an identical contract tomorrow, the delivery commitments transfer from me to the person I sold to and the person I bought from. I am now out of the market, and earned the difference in price between when I sold and when I bought. If prices went down between the sell and buy transactions, I sold for more than I bought for and earned a profit. If prices went up, I sold for less than I bought for and earned a loss.

Compare this to going short (or being a net seller) in the stock market. It is possible to sell stock I do not own, but this is done by actually borrowing the stock and delivering it immediately to the buyer. In the stock market you immediately deliver the borrowed stocks to the buyer, and then must acquire and return stocks to the party from whom they were borrowed. In the futures market you are only promising to deliver a commodity at some future date, so you do not need to borrow it and deliver it immediately upon selling the futures contract. Further, you can pass the delivery commitment to another trader by buying an identical contract (but likely at a different price) from them prior to contract expiration.

A last unique feature of futures markets is their daily settlement of financial commitments. Futures markets are marked to market daily, meaning that all profits and losses must be settled before the start of trading the next day. Like price limits, this is necessary to keep margin requirements to a minimum.

There are really two separate margins involved in futures transactions. The first is called the initial margin. This is the amount of money a trader must have in a futures trading account in order to initiate a position in the futures market. In the corn example above, the initial margin was \$500. If I choose to buy or sell corn for July delivery today, I must post at least \$500 in my margin account (the margin account will be held by my broker). If I buy corn, and the price by the end of the trading day is 2 cents per bushel less than where I bought, then I have lost 2 cents times 5000 bushels, or \$100. My account will be debited \$100 at the end of the day, and anyone earning a profit from the price of corn going down (those who had earlier sold corn for July delivery) would be credited with profits. Those earning profits could withdraw all monies in excess of the \$500 initial margin at the end of the day if they so chose.

The second type margin involved in futures trading is the maintenance margin. The maintenance margin is generally less than the initial margin (there are rare circumstances where the maintenance margin may equal the initial margin), and it represents that minimum value a trader's account must have before the trader is required to deposit additional funds to his/her trading account in order to maintain a futures position. Assume in the corn trading example that the maintenance margin is \$350. When I bought corn and incurred a 2 cent per bushel loss after the first day, the value of my account fell from \$500 (the initial margin) to \$400. While \$100 was deducted from my account and placed in the account of a trader who profited from the 2 cent price decline, I was not forced to put additional money in my trading account because its value was still above the maintenance margin of \$350. However, if I incurred another 2 cent per bushel loss on the next trading day, my account value would fall to \$300. At this point I would be required to make a deposit to my trading account, and restore its value to the full initial margin amount. If I failed to do so, my position would be liquidated and I would no longer have a futures position.

When an additional deposit is required to return the account value to its initial margin amount, the trader faces what is called a margin call. Technically, all margin calls are due by the opening of trade the following day. However, many brokerage firms give their customers two or three days to make a margin call. However, the exchange clearing house does not extend the same courtesy to the brokerage firms, so in essence the brokerage firm makes the margin call on the customer's behalf and then waits for reimbursement.

Table 1 illustrates a trading account and its changing value as price changes. In the example, a trader bought 1 July corn contract at \$2.50 per bushel. The initial margin is \$500, and the maintenance margin is \$350. Remember that any amount above the initial margin can be taken out of the account at any time, but anytime the account value falls below the maintenance margin, a deposit sufficient to return value all the way to the initial margin is required.

How Futures are Traded

Futures contract transactions can only be entered into on the floor of a licensed futures exchange. Trading takes place in an open auction style market. All traders must announce their willingness to buy or sell at a given price through open outcry, making the information accessible to all other traders. As soon as a transaction takes place the price is posted and every trader can see the most recently determined price.

Since trading can only take place on the floor of the exchange, most traders must hire brokers to facilitate their trade activity. A typical arrangement would be for a trader to engage a broker in their local community who then has access to a broker/trader on the floor of the exchange. The trader pays a commission to the local broker who then pays a (smaller) commission to the broker/trader on the exchange floor. In addition, the trader pays a small fee to the exchange itself. This is how the exchange generates revenue and supports the various services it provides.

Table 1. Margin Account Maintenance.

Date	Price per Bushel	Action	Margin Action	Account Balance
Initial margin = \$500				
Maintenance margin = \$350				
17-Jan	\$2.50	Buy July corn	Deposit \$500	\$500
18-Jan	\$2.48			\$400
19-Jan	\$2.46			\$300
			Margin Call \$200	\$500
20-Jan	\$2.47			\$550
21-Jan	\$2.40			\$200
			Margin Call \$300	\$500
24-Jan	\$2.43			\$650
25-Jan	\$2.45			\$750
26-Jan	\$2.49			\$950
			Withdraw \$450	\$500
27-Jan	\$2.51			\$600
28-Jan	\$2.55	Sell July corn		\$800

This method of trade has been relatively unchanged since the developments of the Chicago Board of Trade in the 1860's. However, versions of electronic trade are being tested, and we may see a change in the way trade is conducted in the future.

Despite the term "contract", there is no signed contract, receipt, or delivery certificate associated with a futures transaction. Even if a buyer accepts delivery, meaning he/she bought a futures contract and held it to expiration, the physical commodity is often never seen. Generally, a trader taking delivery of a commodity through a futures transaction receives a warehouse receipt (in the case of grain) identifying ownership at a futures exchange approved warehouse. The physical commodity is often resold in the cash market without ever moving from the warehouse.

An increasingly common feature in futures contracts is cash settlement. In the case of hogs or Class III milk, no physical commodity changes hands even at contract expiration. Instead, a trader allowing a contract to expire simply receives or pays the difference between the last futures price at which he/she cash settles and the cash value of the physical commodity at futures contract expiration. In other words, buyers and sellers simply settle the difference between the value of their futures positions and the value of the physical commodity in cash rather than actually exchanging ownership of the commodity.

Why Futures Contracts are Traded

The social implications of futures trading have been debated since their introduction in U.S. business. Futures markets have always been controversial, and research into futures market performance has not always arrived at similar conclusions.

In general, the social benefits of futures trading have been defined as:

- 1) providing a format for competitive and transparent price discovery,
- 2) providing a mechanism for hedging commercial price risk,
- 3) facilitating financing (through the margin activity), and
- 4) allocating resources.

If a futures market functions properly it should lead to less market segmentation and foster competition by unifying diverse and geographically separated markets through the transmission of easily accessible market price information. If I know with certainty how much a commodity is worth in Chicago for a specific delivery period, and I know something about the costs associated with moving between Chicago and my local market, I am in a much better position to offer or bid a competitive price in the market place.