

CHAPTER 2

Mechanics of Futures Markets

In Chapter 1 we explained that both futures and forward contracts are agreements to buy or sell an asset at a future time for a certain price. Futures contracts are traded on an organized exchange, and the contract terms are standardized by that exchange. By contrast, forward contracts are private agreements between two financial institutions or between a financial institution and one of its clients.

This chapter covers the details of how futures markets work. We examine issues such as the specification of contracts, the operation of margin accounts, the organization of exchanges, the regulation of markets, the way in which quotes are made, and the treatment of futures transactions for accounting and tax purposes. We compare futures contracts with forward contracts and explain the difference between the payoffs realized from them.

2.1 BACKGROUND

As we saw in Chapter 1, futures contracts are now traded actively all over the world. The Chicago Board of Trade (CBOT, www.cbot.com) and the Chicago Mercantile Exchange (CME, www.cme.com) are the two largest futures exchanges in the United States. (They finalized an agreement to merge in July 2007.) The two largest exchanges in Europe are Euronext (www.euronext.com), which reached an agreement to merge with the New York Stock Exchange (www.nyse.com) in 2006, and Eurex (www.eurexchange.com), which is co-owned by Deutsche Börse and the Swiss Exchange. Other large exchanges include Bolsa de Mercadorias & Futuros (www.bmf.com.br) in São Paulo, the Tokyo International Financial Futures Exchange (www.tiffe.or.jp), the Singapore International Monetary Exchange (www.sgx.com), and the Sydney Futures Exchange (www.sfe.com.au). A table at the end of this book provides a more complete list.

We examine how a futures contract comes into existence by considering the corn futures contract traded on the Chicago Board of Trade (CBOT). On March 5 a trader in New York might call a broker with instructions to buy 5,000 bushels of corn for delivery in July of the same year. The broker would immediately issue instructions to a trader to buy (i.e., take a long position in) one July corn contract. (Each corn contract on CBOT is for the delivery of exactly 5,000 bushels.) At about the same time, another

Business Snapshot 2.1 The Unanticipated Delivery of a Futures Contract

This story (which may well be apocryphal) was told to the author of this book by a senior executive of a financial institution. It concerns a new employee of the financial institution who had not previously worked in the financial sector. One of the clients of the financial institution regularly entered into a long futures contract on live cattle for hedging purposes and issued instructions to close out the position on the last day of trading. (Live cattle futures contracts trade on the Chicago Mercantile Exchange and each contract is on 40,000 pounds of cattle.) The new employee was given responsibility for handling the account.

When the time came to close out a contract the employee noted that the client was long one contract and instructed a trader at the exchange to buy (not sell) one contract. The result of this mistake was that the financial institution ended up with a long position in two live cattle futures contracts. By the time the mistake was spotted trading in the contract had ceased.

The financial institution (not the client) was responsible for the mistake. As a result, it started to look into the details of the delivery arrangements for live cattle futures contracts—something it had never done before. Under the terms of the contract, cattle could be delivered by the party with the short position to a number of different locations in the United States during the delivery month. Because it was long, the financial institution could do nothing but wait for a party with a short position to issue a *notice of intention to deliver* to the exchange and for the exchange to assign that notice to the financial institution.

It eventually received a notice from the exchange and found that it would receive live cattle at a location 2,000 miles away the following Tuesday. The new employee was sent to the location to handle things. It turned out that the location had a cattle auction every Tuesday. The party with the short position that was making delivery bought cattle at the auction and then immediately delivered them. Unfortunately the cattle could not be resold until the next cattle auction the following Tuesday. The employee was therefore faced with the problem of making arrangements for the cattle to be housed and fed for a week. This was a great start to a first job in the financial sector!

trader in Kansas might instruct a broker to sell 5,000 bushels of corn for July delivery. This broker would then issue instructions to sell (i.e., take a short position in) one corn contract. A price would be determined and the deal would be done. Under the traditional open outcry system, floor traders representing each party would physically meet to determine the price. With electronic trading, a computer would match trades and monitor prices.

The trader in New York who agreed to buy has a *long futures position* in one contract; the trader in Kansas who agreed to sell has a *short futures position* in one contract. The price agreed to is the current *futures price* for July corn, say 300 cents per bushel. This price, like any other price, is determined by the laws of supply and demand. If, at a particular time, more traders wish to sell rather than buy July corn, the price will go down. New buyers then enter the market so that a balance between buyers and sellers is maintained. If more traders wish to buy rather than sell July corn, the price goes up. New sellers then enter the market and a balance between buyers and sellers is maintained.

Closing Out Positions

The vast majority of futures contracts do not lead to delivery. The reason is that most traders choose to close out their positions prior to the delivery period specified in the contract. Closing out a position means entering into the opposite trade to the original one. For example, the New York investor who bought a July corn futures contract on March 5 can close out the position by selling (i.e., shorting) one July corn futures contract on, say, April 20. The Kansas investor who sold (i.e., shorted) a July contract on March 5 can close out the position by buying one July contract on, say, May 25. In each case, the investor's total gain or loss is determined by the change in the futures price between March 5 and the day when the contract is closed out.

Delivery is so unusual that traders sometimes forget how the delivery process works (see Business Snapshot 2.1). Nevertheless we will spend part of this chapter reviewing the delivery arrangements in futures contracts. This is because it is the possibility of final delivery that ties the futures price to the spot price.¹

2.2 SPECIFICATION OF A FUTURES CONTRACT

When developing a new contract, the exchange must specify in some detail the exact nature of the agreement between the two parties. In particular, it must specify the asset, the contract size (exactly how much of the asset will be delivered under one contract), where delivery will be made, and when delivery will be made.

Sometimes alternatives are specified for the grade of the asset that will be delivered or for the delivery locations. As a general rule, it is the party with the short position (the party that has agreed to sell the asset) that chooses what will happen when alternatives are specified by the exchange. When the party with the short position is ready to deliver, it files a *notice of intention to deliver* with the exchange. This notice indicates selections it has made with respect to the grade of asset that will be delivered and the delivery location.

The Asset

When the asset is a commodity, there may be quite a variation in the quality of what is available in the marketplace. When the asset is specified, it is therefore important that the exchange stipulate the grade or grades of the commodity that are acceptable. The New York Board of Trade (NYBOT) has specified the asset in its frozen concentrated orange juice futures contract as orange solids from Florida and/or Brazil that are US Grade A with Brix value of not less than 62.5 degrees.

For some commodities a range of grades can be delivered, but the price received depends on the grade chosen. For example, in the Chicago Board of Trade corn futures contract, the standard grade is "No. 2 Yellow", but substitutions are allowed with the price being adjusted in a way established by the exchange. No. 1 Yellow is deliverable for 1.5 cents per bushel more than No. 2 Yellow. No. 3 Yellow is deliverable for 1.5 cents per bushel less than No. 2 Yellow.

The financial assets in futures contracts are generally well defined and unambiguous.

¹ As mentioned in Chapter 1, the spot price is the price for almost immediate delivery.

For example, there is no need to specify the grade of a Japanese yen. However, there are some interesting features of the Treasury bond and Treasury note futures contracts traded on the Chicago Board of Trade. The underlying asset in the Treasury bond contract is any long-term US Treasury bond that has a maturity of greater than 15 years and is not callable within 15 years. In the Treasury note futures contract, the underlying asset is any long-term Treasury note with a maturity of no less than 6.5 years and no more than 10 years from the date of delivery. In both cases, the exchange has a formula for adjusting the price received according to the coupon and maturity date of the bond delivered. This is discussed in Chapter 6.

The Contract Size

The contract size specifies the amount of the asset that has to be delivered under one contract. This is an important decision for the exchange. If the contract size is too large, many investors who wish to hedge relatively small exposures or who wish to take relatively small speculative positions will be unable to use the exchange. On the other hand, if the contract size is too small, trading may be expensive as there is a cost associated with each contract traded.

The correct size for a contract clearly depends on the likely user. Whereas the value of what is delivered under a futures contract on an agricultural product might be \$10,000 to \$20,000, it is much higher for some financial futures. For example, under the Treasury bond futures contract traded on the Chicago Board of Trade, instruments with a face value of \$100,000 are delivered.

In some cases exchanges have introduced “mini” contracts to attract smaller investors. For example, the CME’s Mini Nasdaq 100 contract is on 20 times the Nasdaq 100 index, whereas the regular contract is on 100 times the index.

Delivery Arrangements

The place where delivery will be made must be specified by the exchange. This is particularly important for commodities that involve significant transportation costs. In the case of the NYBOT frozen concentrate orange juice contract, delivery is to exchange-licensed warehouses in Florida, New Jersey, or Delaware.

When alternative delivery locations are specified, the price received by the party with the short position is sometimes adjusted according to the location chosen by that party. The price tends to be higher for delivery locations that are relatively far from the main sources of the commodity.

Delivery Months

A futures contract is referred to by its delivery month. The exchange must specify the precise period during the month when delivery can be made. For many futures contracts, the delivery period is the whole month.

The delivery months vary from contract to contract and are chosen by the exchange to meet the needs of market participants. For example, corn futures traded on the Chicago Board of Trade have delivery months of March, May, July, September, and December. At any given time, contracts trade for the closest delivery month and a number of subsequent delivery months. The exchange specifies when trading in a particular month’s contract will begin. The exchange also specifies the last day on

which trading can take place for a given contract. Trading generally ceases a few days before the last day on which delivery can be made.

Price Quotes

The exchange defines how prices will be quoted. For example, crude oil prices on the New York Mercantile Exchange are quoted in dollars and cents. Treasury bond and Treasury note futures on the Chicago Board of Trade are quoted in dollars and thirty-seconds of a dollar.

Price Limits and Position Limits

For most contracts, daily price movement limits are specified by the exchange. If in a day the price moves down from the previous day's close by an amount equal to the daily price limit, the contract is said to be *limit down*. If it moves up by the limit, it is said to be *limit up*. A *limit move* is a move in either direction equal to the daily price limit. Normally, trading ceases for the day once the contract is limit up or limit down. However, in some instances the exchange has the authority to step in and change the limits.

The purpose of daily price limits is to prevent large price movements from occurring because of speculative excesses. However, limits can become an artificial barrier to trading when the price of the underlying commodity is advancing or declining rapidly. Whether price limits are, on balance, good for futures markets is controversial.

Position limits are the maximum number of contracts that a speculator may hold. The purpose of these limits is to prevent speculators from exercising undue influence on the market.

2.3 CONVERGENCE OF FUTURES PRICE TO SPOT PRICE

As the delivery period for a futures contract is approached, the futures price converges to the spot price of the underlying asset. When the delivery period is reached, the futures price equals—or is very close to—the spot price.

To see why this is so, we first suppose that the futures price is above the spot price during the delivery period. Traders then have a clear arbitrage opportunity:

1. Sell (i.e., short) a futures contract
2. Buy the asset
3. Make delivery

These steps are certain to lead to a profit equal to the amount by which the futures price exceeds the spot price. As traders exploit this arbitrage opportunity, the futures price will fall. Suppose next that the futures price is below the spot price during the delivery period. Companies interested in acquiring the asset will find it attractive to enter into a long futures contract and then wait for delivery to be made. As they do so, the futures price will tend to rise.

The result is that the futures price is very close to the spot price during the delivery period. Figure 2.1 illustrates the convergence of the futures price to the spot price. In

Figure 2.1 Relationship between futures price and spot price as the delivery period is approached: (a) Futures price above spot price; (b) futures price below spot price.

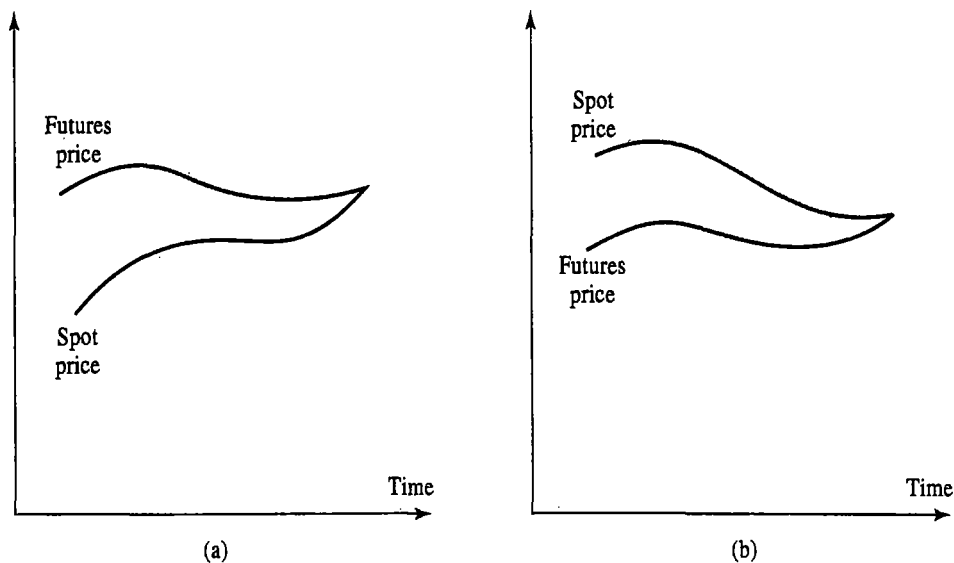


Figure 2.1(a) the futures price is above the spot price prior to the delivery period. In Figure 2.1(b) the futures price is below the spot price prior to the delivery period. The circumstances under which these two patterns are observed are discussed in Chapter 5.

2.4 DAILY SETTLEMENT AND MARGINS

If two investors get in touch with each other directly and agree to trade an asset in the future for a certain price, there are obvious risks. One of the investors may regret the deal and try to back out. Alternatively, the investor simply may not have the financial resources to honor the agreement. One of the key roles of the exchange is to organize trading so that contract defaults are avoided. This is where margins come in.

The Operation of Margins

To illustrate how margins work, we consider an investor who contacts his or her broker on Thursday, June 5, to buy two December gold futures contracts on the COMEX division of the New York Mercantile Exchange (NYMEX). We suppose that the current futures price is \$600 per ounce. Because the contract size is 100 ounces, the investor has contracted to buy a total of 200 ounces at this price. The broker will require the investor to deposit funds in a *margin account*. The amount that must be deposited at the time the contract is entered into is known as the *initial margin*. We suppose this is \$2,000 per contract, or \$4,000 in total. At the end of each trading day, the margin account is adjusted to reflect the investor's gain or loss. This practice is referred to as *marking to market* the account.

Suppose, for example, that by the end of June 5 the futures price has dropped from \$600 to \$597. The investor has a loss of \$600 ($= 200 \times \3), because the 200 ounces of December gold, which the investor contracted to buy at \$600, can now be sold for only

\$597. The balance in the margin account would therefore be reduced by \$600 to \$3,400. Similarly, if the price of December gold rose to \$603 by the end of the first day, the balance in the margin account would be increased by \$600 to \$4,600. A trade is first marked to market at the close of the day on which it takes place. It is then marked to market at the close of trading on each subsequent day.

Note that marking to market is not merely an arrangement between broker and client. When there is a decrease in the futures price so that the margin account of an investor with a long position is reduced by \$600, the investor's broker has to pay the exchange \$600 and the exchange passes the money on to the broker of an investor with a short position. Similarly, when there is an increase in the futures price, brokers for parties with short positions pay money to the exchange and brokers for parties with long positions receive money from the exchange. Later we will examine in more detail the mechanism by which this happens.

The investor is entitled to withdraw any balance in the margin account in excess of the initial margin. To ensure that the balance in the margin account never becomes negative a *maintenance margin*, which is somewhat lower than the initial margin, is set. If the balance in the margin account falls below the maintenance margin, the investor receives a margin call and is expected to top up the margin account to the initial margin level the next day. The extra funds deposited are known as a *variation margin*. If the investor does not provide the variation margin, the broker closes out the position. In the case of the investor considered earlier, closing out the position would involve neutralizing the existing contract by selling 200 ounces of gold for delivery in December.

Table 2.1 illustrates the operation of the margin account for one possible sequence of futures prices in the case of the investor considered earlier. The maintenance margin is assumed for the purpose of the illustration to be \$1,500 per contract, or \$3,000 in total. On June 13 the balance in the margin account falls \$340 below the maintenance margin level. This drop triggers a margin call from the broker for an additional \$1,340. Table 2.1 assumes that the investor does in fact provide this margin by the close of trading on June 16. On June 19 the balance in the margin account again falls below the maintenance margin level, and a margin call for \$1,260 is sent out. The investor provides this margin by the close of trading on June 20. On June 26 the investor decides to close out the position by selling two contracts. The futures price on that day is \$592.30, and the investor has a cumulative loss of \$1,540. Note that the investor has excess margin on June 16, 23, 24, and 25. Table 2.1 assumes that the excess is not withdrawn.

Further Details

Many brokers allow an investor to earn interest on the balance in a margin account. The balance in the account does not, therefore, represent a true cost, provided that the interest rate is competitive with what could be earned elsewhere. To satisfy the initial margin requirements (but not subsequent margin calls), an investor can sometimes deposit securities with the broker. Treasury bills are usually accepted in lieu of cash at about 90% of their face value. Shares are also sometimes accepted in lieu of cash—but at about 50% of their market value.

The effect of the marking to market is that a futures contract is settled daily rather than all at the end of its life. At the end of each day, the investor's gain (loss) is added to (subtracted from) the margin account, bringing the value of the contract back to zero. A futures contract is in effect closed out and rewritten at a new price each day.

Table 2.1 Operation of margins for a long position in two gold futures contracts. The initial margin is \$2,000 per contract, or \$4,000 in total, and the maintenance margin is \$1,500 per contract, or \$3,000 in total. The contract is entered into on June 5 at \$600 and closed out on June 26 at \$592.30. The numbers in the second column, except the first and the last, represent the futures prices at the close of trading.

<i>Day</i>	<i>Futures price</i> (<i>\$</i>)	<i>Daily gain (loss)</i> (<i>\$</i>)	<i>Cumulative gain (loss)</i> (<i>\$</i>)	<i>Margin account balance</i> (<i>\$</i>)	<i>Margin call</i> (<i>\$</i>)
	600.00			4,000	
June 5	597.00	(600)	(600)	3,400	
June 6	596.10	(180)	(780)	3,220	
June 9	598.20	420	(360)	3,640	
June 10	597.10	(220)	(580)	3,420	
June 11	596.70	(80)	(660)	3,340	
June 12	595.40	(260)	(920)	3,080	
June 13	593.30	(420)	(1,340)	2,660	1,340
June 16	593.60	60	(1,280)	4,060	
June 17	591.80	(360)	(1,640)	3,700	
June 18	592.70	180	(1,460)	3,880	
June 19	587.00	(1,140)	(2,600)	2,740	1,260
June 20	587.00	0	(2,600)	4,000	
June 23	588.10	220	(2,380)	4,220	
June 24	588.70	120	(2,260)	4,340	
June 25	591.00	460	(1,800)	4,800	
June 26	592.30	260	(1,540)	5,060	

Minimum levels for initial and maintenance margins are set by the exchange. Individual brokers may require greater margins from their clients than those specified by the exchange. However, they cannot require lower margins than those specified by the exchange. Margin levels are determined by the variability of the price of the underlying asset. The higher this variability, the higher the margin levels. The maintenance margin is usually about 75% of the initial margin.

Margin requirements may depend on the objectives of the trader. A bona fide hedger, such as a company that produces the commodity on which the futures contract is written, is often subject to lower margin requirements than a speculator. The reason is that there is deemed to be less risk of default. Day trades and spread transactions often give rise to lower margin requirements than do hedge transactions. In a *day trade* the trader announces to the broker an intent to close out the position in the same day. In a *spread transaction* the trader simultaneously buys (i.e., takes a long position in) a contract on an asset for one maturity month and sells (i.e., takes a short position in) a contract on the same asset for another maturity month.

Note that margin requirements are the same on short futures positions as they are on

long futures positions. It is just as easy to take a short futures position as it is to take a long one. The spot market does not have this symmetry. Taking a long position in the spot market involves buying the asset for immediate delivery and presents no problems. Taking a short position involves selling an asset that you do not own. This is a more complex transaction that may or may not be possible in a particular market. It is discussed further in Chapter 5.

The Clearinghouse and Clearing Margins

A *clearinghouse* acts as an intermediary in futures transactions. It guarantees the performance of the parties to each transaction. The clearinghouse has a number of members, who must post funds with the exchange. Brokers who are not members themselves must channel their business through a member. The main task of the clearinghouse is to keep track of all the transactions that take place during a day, so that it can calculate the net position of each of its members.

Just as an investor is required to maintain a margin account with a broker, the broker is required to maintain a margin account with a clearinghouse member and the clearinghouse member is required to maintain a margin account with the clearinghouse. The latter is known as a *clearing margin*. The margin accounts for clearinghouse members are adjusted for gains and losses at the end of each trading day in the same way as are the margin accounts of investors. However, in the case of the clearinghouse member, there is an original margin, but no maintenance margin. Every day the account balance for each contract must be maintained at an amount equal to the original margin times the number of contracts outstanding. Thus, depending on transactions during the day and price movements, the clearinghouse member may have to add funds to its margin account at the end of the day. Alternatively, it may find it can remove funds from the account at this time. Brokers who are not clearinghouse members must maintain a margin account with a clearinghouse member.

In determining clearing margins, the exchange clearinghouse calculates the number of contracts outstanding on either a gross or a net basis. When the gross basis is used, the number of contracts equals the sum of the long and short positions. When the net basis is used, these are offset against each other. Suppose a clearinghouse member has two clients: one with a long position in 20 contracts, the other with a short position in 15 contracts. Gross margining would calculate the clearing margin on the basis of 35 contracts; net margining would calculate the clearing margin on the basis of 5 contracts. Most exchanges currently use net margining.

Credit Risk

The whole purpose of the margining system is to eliminate the risk that a trader who makes a profit will not be paid. Overall the system has been very successful. Traders entering into contracts at major exchanges have always had their contracts honored. Futures markets were tested on October 19, 1987, when the S&P 500 index declined by over 20% and traders with long positions in S&P 500 futures found they had negative margin balances. Traders who did not meet margin calls were closed out but still owed their brokers money. Some did not pay and as a result some brokers went bankrupt because, without their clients' money, they were unable to meet margin calls on contracts they entered into on behalf of their clients. However, the exchanges had

Business Snapshot 2.2 Long-Term Capital Management's Big Loss

Long-Term Capital Management (LTCM), a hedge fund formed in the mid-1990s, always collateralized its transactions. The hedge fund's investment strategy was known as convergence arbitrage. A very simple example of what it might do is the following. It would find two bonds, X and Y, issued by the same company that promised the same payoffs, with X being less liquid (i.e., less actively traded) than Y. The market always places a value on liquidity. As a result the price of X would be less than the price of Y. LTCM would buy X, short Y, and wait, expecting the prices of the two bonds to converge at some future time.

When interest rates increased, the company expected both bonds to move down in price by about the same amount, so that the collateral it paid on bond X would be about the same as the collateral it received on bond Y. Similarly, when interest rates decreased, LTCM expected both bonds to move up in price by about the same amount, so that the collateral it received on bond X would be about the same as the collateral it paid on bond Y. It therefore expected that there would be no significant outflow of funds as a result of its collateralization agreements.

In August 1998, Russia defaulted on its debt and this led to what is termed a "flight to quality" in capital markets. One result was that investors valued liquid instruments more highly than usual and the spreads between the prices of the liquid and illiquid instruments in LTCM's portfolio increased dramatically. The prices of the bonds LTCM had bought went down and the prices of those it had shorted increased. It was required to post collateral on both. The company was highly leveraged and unable to make the payments required under the collateralization agreements. The result was that positions had to be closed out and LTCM lost about \$4 billion. If the company had been less highly leveraged it would probably have been able to survive the flight to quality and could have waited for the prices of the liquid and illiquid bonds to move closer to each other.

sufficient funds to ensure that everyone who had a short futures position on the S&P 500 got paid off.

Collateralization in OTC Markets

Credit risk has traditionally been a feature of the over-the-counter markets. There is always a chance that the party on the other side of an over-the-counter trade will default. It is interesting that, in an attempt to reduce credit risk, the over-the-counter market is now imitating the margining system adopted by exchanges with a procedure known as *collateralization*.

Consider two participants in the over-the-counter market, company A and company B, with an outstanding over-the-counter contract. They could enter into a collateralization agreement where they value the contract each day. If from one day to the next the value of the contract to company A increases, company B is required to pay company A cash equal to this increase. Similarly, if the value of the contract to company A decreases, company A is required to pay company B cash equal to the decrease. Interest is paid on outstanding cash balances.

Collateralization significantly reduces the credit risk in over-the-counter contracts and is discussed further in Section 22.8. Collateralization agreements were used by a hedge fund, Long-Term Capital Management (LTCM), in the 1990s. They allowed LTCM to be highly leveraged. The contracts did provide credit risk protection, but as described in Business Snapshot 2.2 the high leverage left the hedge fund vulnerable to other risks.

2.5 NEWSPAPER QUOTES

Many newspapers carry futures prices. Table 2.2 shows the prices for commodities as they appeared in the *Wall Street Journal* of Tuesday, January 9, 2007. The prices refer to the trading that took place on the previous day (i.e., Monday, January 8, 2007). The prices for index futures, currency futures, and interest rate futures are given in Chapters 3, 5, and 6, respectively.

The *Wall Street Journal* only shows quotes for contracts with relatively short maturities. For most commodities, contracts trade with much longer maturities than those shown. However, trading volume tends to decrease as contract maturity increases.

The asset underlying the futures contract, the exchange that the contract is traded on, the contract size, and how the price is quoted are all shown at the top of each section in Table 2.2. The first asset is copper, traded on COMEX (a division of the New York Mercantile Exchange). The contract size is 25,000 lbs, and the price is quoted in cents per lb. The maturity month of the contract is shown in the first column.

Prices

The first three numbers in each row show the opening price, the highest price achieved in trading during the day, and the lowest price achieved in trading during the day. The opening price is representative of the prices at which contracts were trading immediately after the opening bell. For March 2007 copper on January 8, 2007, the opening price was 253.50 cents per pound and, during the day, the price traded between 247.00 and 258.95 cents.

Settlement Price

The fourth number is the *settlement price*. This is the price used for calculating daily gains and losses and margin requirements. It is usually calculated as the price at which the contract traded immediately before the bell signaling the end of trading for the day. The fifth number is the change in the settlement price from the previous day. For the March 2007 copper futures contract, the settlement price was 252.80 cents on January 8, 2007, down 0.70 cents from the previous trading day.

In the case of the March 2007 futures, an investor with a long position in one contract would find his or her margin account balance reduced by \$175.00 ($= 25,000 \times 0.70$ cents) on January 8, 2007. Similarly, an investor with a short position in one contract would find that the margin balance increased by \$175.00 on this date.

Table 2.2 Commodity futures quotes from the *Wall Street Journal*, January 9, 2007. (Columns show month, open, high, low, settle, change, and open interest, respectively.)

From platinum to orange juice: futures contracts

Commodity futures prices, including open interest, or the number of contracts outstanding. Nearby-month contracts are listed first. Most-active contracts are also listed, plus other notable months.

KEY TO EXCHANGES: CBT: Chicago Board of Trade; CME: Chicago Mercantile Exchange; COM: Comex; KC: Kansas City Board of Trade; MPLS: Minneapolis Grain Exchange; NYBOT: New York Board of Trade; NYM: New York Mercantile Exchange, or Nymex

Metal & Petroleum Futures

	Open	High	Contract Hi Lo	Low	Settle	Chg	Open Interest
Copper-High(CMO)-25,000 lbs.; cents per lb.							
Jan	255.65	256.50		252.00	251.45	-0.80	2,527
March	253.50	258.95		247.00	252.80	-0.70	48,809
Gold(CMO)-100 troy oz.; \$ per troy oz.							
Jan	607.50	2.60	514
Feb	609.30	612.40		605.00	609.40	2.50	179,246
April	616.10	617.30		611.90	615.40	2.50	36,615
June	622.10	623.50		615.80	621.20	2.50	31,616
Oct	634.80	635.00		633.50	632.70	2.50	19,436
Dec	638.90	640.50		638.00	638.30	2.50	42,082

Platinum(NYM)-50 troy oz.; \$ per troy oz.							
Jan	1119.40	10.40	14
April	1114.00	1132.90		1111.50	1126.90	14.90	8,043

Silver(CMO)-5,000 troy oz.; cts per troy oz.							
Jan	1225.0	1225.0		1225.0	1226.0	13.0	115
March	1222.0	1242.5		1209.5	1236.0	13.0	60,566

Crude Oil, Light Sweet(NYM)-1,000 bbls.; \$ per bbl.							
Feb	56.24	57.72		55.10	56.09	-0.22	297,617
March	57.56	58.85		56.38	57.34	-0.03	189,021
April	58.30	59.81		57.40	58.08	0.02	63,918
June	60.20	61.33		59.08	60.01	0.10	78,744
Dec	62.78	64.08		62.10	62.94	0.28	143,083
Dec'08	65.25	65.25		63.53	64.18	0.33	70,370

Heating Oil No. 2(NYM)-42,000 gal.; \$ per gal.							
Feb	1.5800	1.6020		1.5475	1.5571	-0.0087	84,979
March	1.6135	1.6385		1.5855	1.5950	-0.0083	51,391

Gasoline-NY RBOB(NYM)-42,000 gal.; \$ per gal.							
Feb	1.5072	1.5185		1.4530	1.4685	-0.0246	58,858
March	1.5345	1.5634		1.5020	1.5160	-0.0201	35,902

Natural Gas(NYM)-10,000 MMBtu.; \$ per MMBtu.							
Feb	6.370	6.560		6.325	6.378	.194	78,114
March	6.547	6.690		6.496	6.548	.201	140,874
April	6.600	6.768		6.580	6.637	.190	103,520
May	6.750	6.857		6.680	6.732	.175	44,710
Oct	7.300	7.350		7.190	7.237	.150	39,416
March'08	8.735	8.780		8.680	8.682	.110	39,031

Agriculture Futures

Corn(CBT)-5,000 bu.; cents per bu.							
March	369.00	369.75		361.25	363.50	-4.75	570,439
Dec	365.00	367.00		359.50	364.75	-5.00	318,645

Ethanol(CBT)-29,000 gal.; \$ per gal.							
Feb	2.249	2.249		2.249	2.249	-0.011	56

Oats(CBT)-5,000 bu.; cents per bu.							
March	263.00	263.00		260.00	260.75	-1.00	8,412
Dec	232.50	233.00		232.50	233.00	...	4,039

Soybeans(CBT)-5,000 bu.; cents per bu.

Jan	664.50	668.25		662.00	665.00	-3.00	5,812
March	682.75	684.00		674.50	677.25	-4.25	218,149

Soybean Meal(CBT)-100 tons; \$ per ton.

Jan	190.00	191.80		189.60	190.60	-0.40	2,614
March	195.70	196.70		194.10	195.10	-0.80	74,207

Soybean Oil(CBT)-60,000 lbs.; cents per lb.

Jan	28.18	28.18		27.97	28.12	-0.28	1,696
March	28.80	28.88		28.34	28.49	-0.31	144,012

Rough Rice(CBT)-2,000 cwt.; cents per cwt.

Jan	1024.50	1038.00		1017.00	1035.00	14.00	248
March	1048.00	1063.00		1042.00	1059.50	13.00	10,406

Wheat(CBT)-5,000 bu.; cents per bu.

March	470.00	471.25		455.50	464.00	-6.25	238,277
July	477.25	478.75		465.00	473.50	-3.50	83,574

Wheat(KC)-5,000 bu.; cents per bu.

March	481.25	481.50		475.00	479.00	-2.25	60,413
July	485.00	486.00		479.50	483.50	-2.75	32,604

Wheat(MPLS)-5,000 bu.; cents per bu.

March	487.25	487.25		478.00	482.25	-4.75	22,412
Dec	502.00	506.00		501.00	504.00	-2.50	8,571

Cattle-Feeder(CME)-50,000 lbs.; cents per lb.

Jan	98.800	99.500		98.625	98.875	.225	4,530
March	97.750	98.500		97.500	97.850	.200	14,509

Cattle-Live(CME)-40,000 lbs.; cents per lb.

Feb	92.600	93.650		92.600	93.250	.675	124,905
April	94.300	94.975		94.100	94.450	.325	71,613

Hogs-Lean(CME)-40,000 lbs.; cents per lb.

Feb	60.400	60.900		60.000	60.300	-1.00	82,727
April	64.250	64.725		63.750	63.950	-3.00	45,227

Coffee(NYBOT)-37,500 lbs.; cents per lb.

March	120.25	120.90		119.20	120.10	-0.35	82,758
May	123.25	123.80		122.00	123.10	-0.40	20,611

Sugar-World(NYBOT)-112,000 lbs.; cents per lb.

March	11.20	11.32		11.09	11.16	.07	263,326
May	11.23	11.32		11.14	11.21	.10	90,874

Sugar-Domestic(NYBOT)-112,000 lbs.; cents per lb.

March	19.95	19.95		19.95	19.95	-0.04	3,468
May	19.90	19.90		19.90	19.89	-0.01	2,592

Cotton(NYBOT)-50,000 lbs.; cents per lb.

March	54.15	54.80		54.15	54.53	.11	108,341
May	55.10	55.55		55.10	55.38	.27	24,645

Orange Juice(NYBOT)-15,000 lbs.; cents per lb.

Jan	201.95	203.40		200.00	201.90	-0.05	430
March	196.90	197.25		195.50	195.80	-0.15	21,427

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Open Interest

The final column in Table 2.2 shows the *open interest* for each contract. This is the total number of contracts outstanding. The open interest is the number of long positions or, equivalently, the number of short positions. The open interest for March 2007 copper is shown as 48,809 contracts. Note that the open interest for the January 2007 contract is much lower because most traders who held long or short positions in that contract have already closed out.

Sometimes the volume of trading in a day is greater than the open interest at the end of the day for a contract. This is indicative of a large number of day trades.

Patterns of Futures Prices

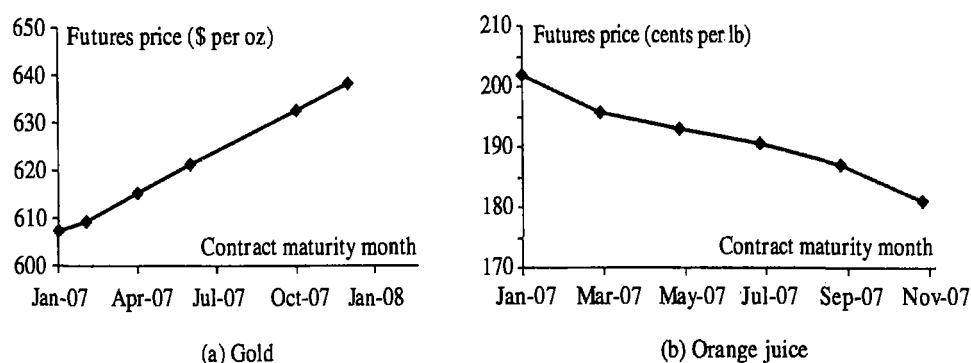
Futures prices can show a number of different patterns. In Table 2.2, gold, crude oil, and natural gas all have settlement prices that increase with the maturity of the contract. This is known as a *normal market*. Table 2.2 shows that the settlement prices for January and March orange juice futures were 201.90 and 195.80 cents, respectively. Other data show that the May 2007, July 2007, September 2007, and November 2007 contracts had settlement prices of 193.00, 190.50, 187.00, and 181.00 cents, respectively, on January 8, 2007. The orange juice futures price was therefore a decreasing function of maturity on January 8, 2007. This is known as an *inverted market*. Figure 2.2 displays the settlement price as a function of maturity for gold and orange juice on January 8, 2007.

Futures prices can show a mixture of normal and inverted markets. An example is provided by live cattle on January 8, 2007. As shown in Table 2.2, the April futures price was higher than the February futures price. However, the June futures price (not shown) was lower than the April futures price. For later maturities, the futures price continued decreasing, then increased, then decreased again as a function of maturity.

2.6 DELIVERY

As mentioned earlier in this chapter, very few of the futures contracts that are entered into lead to delivery of the underlying asset. Most are closed out early. Nevertheless, it

Figure 2.2 Settlement futures price as a function of contract maturity on January 8, 2007, for (a) gold and (b) orange juice



is the possibility of eventual delivery that determines the futures price. An understanding of delivery procedures is therefore important.

The period during which delivery can be made is defined by the exchange and varies from contract to contract. The decision on when to deliver is made by the party with the short position, whom we shall refer to as investor A. When investor A decides to deliver, investor A's broker issues a notice of intention to deliver to the exchange clearinghouse. This notice states how many contracts will be delivered and, in the case of commodities, also specifies where delivery will be made and what grade will be delivered. The exchange then chooses a party with a long position to accept delivery.

Suppose that the party on the other side of investor A's futures contract when it was entered into was investor B. It is important to realize that there is no reason to expect that it will be investor B who takes delivery. Investor B may well have closed out his or her position by trading with investor C, investor C may have closed out his or her position by trading with investor D, and so on. The usual rule chosen by the exchange is to pass the notice of intention to deliver on to the party with the oldest outstanding long position. Parties with long positions must accept delivery notices. However, if the notices are transferable, long investors have a short period of time, usually half an hour, to find another party with a long position that is prepared to accept the notice from them.

In the case of a commodity, taking delivery usually means accepting a warehouse receipt in return for immediate payment. The party taking delivery is then responsible for all warehousing costs. In the case of livestock futures, there may be costs associated with feeding and looking after the animals (see Business Snapshot 2.1). In the case of financial futures, delivery is usually made by wire transfer. For all contracts, the price paid is usually the most recent settlement price. If specified by the exchange, this price is adjusted for grade, location of delivery, and so on. The whole delivery procedure from the issuance of the notice of intention to deliver to the delivery itself generally takes about two to three days.

There are three critical days for a contract. These are the first notice day, the last notice day, and the last trading day. The *first notice day* is the first day on which a notice of intention to make delivery can be submitted to the exchange. The *last notice day* is the last such day. The *last trading day* is generally a few days before the last notice day. To avoid the risk of having to take delivery, an investor with a long position should close out his or her contracts prior to the first notice day.

Cash Settlement

Some financial futures, such as those on stock indices, are settled in cash because it is inconvenient or impossible to deliver the underlying asset. In the case of the futures contract on the S&P 500, for example, delivering the underlying asset would involve delivering a portfolio of 500 stocks. When a contract is settled in cash, all outstanding contracts are declared closed on a predetermined day. The final settlement price is set equal to the spot price of the underlying asset at either the opening or close of trading on that day. For example, in the S&P 500 futures contract trading on the Chicago Mercantile Exchange, the predetermined day is the third Friday of the delivery month and final settlement is at the opening price.

2.7 TYPES OF TRADERS AND TYPES OF ORDERS

There are two main types of traders executing trades: commission brokers and locals. *Commission brokers* are following the instructions of their clients and charge a commission for doing so; *locals* are trading on their own account.

Individuals taking positions, whether locals or the clients of commission brokers, can be categorized as hedgers, speculators, or arbitrageurs, as discussed in Chapter 1. Speculators can be classified as scalpers, day traders, or position traders. *Scalpers* are watching for very short-term trends and attempt to profit from small changes in the contract price. They usually hold their positions for only a few minutes. *Day traders* hold their positions for less than one trading day. They are unwilling to take the risk that adverse news will occur overnight. *Position traders* hold their positions for much longer periods of time. They hope to make significant profits from major movements in the markets.

Orders

The simplest type of order placed with a broker is a *market order*. It is a request that a trade be carried out immediately at the best price available in the market. However, there are many other types of orders. We will consider those that are more commonly used.

A *limit order* specifies a particular price. The order can be executed only at this price or at one more favorable to the investor. Thus, if the limit price is \$30 for an investor wanting to buy, the order will be executed only at a price of \$30 or less. There is, of course, no guarantee that the order will be executed at all, because the limit price may never be reached.

A *stop order* or *stop-loss order* also specifies a particular price. The order is executed at the best available price once a bid or offer is made at that particular price or a less-favorable price. Suppose a stop order to sell at \$30 is issued when the market price is \$35. It becomes an order to sell when and if the price falls to \$30. In effect, a stop order becomes a market order as soon as the specified price has been hit. The purpose of a stop order is usually to close out a position if unfavorable price movements take place. It limits the loss that can be incurred.

A *stop-limit order* is a combination of a stop order and a limit order. The order becomes a limit order as soon as a bid or offer is made at a price equal to or less favorable than the stop price. Two prices must be specified in a stop-limit order: the stop price and the limit price. Suppose that at the time the market price is \$35, a stop-limit order to buy is issued with a stop price of \$40 and a limit price of \$41. As soon as there is a bid or offer at \$40, the stop-limit becomes a limit order at \$41. If the stop price and the limit price are the same, the order is sometimes called a *stop-and-limit order*.

A *market-if-touched (MIT) order* is executed at the best available price after a trade occurs at a specified price or at a price more favorable than the specified price. In effect, an MIT becomes a market order once the specified price has been hit. An MIT is also known as a *board order*. Consider an investor who has a long position in a futures contract and is issuing instructions that would lead to closing out the contract. A stop order is designed to place a limit on the loss that can occur in the event of unfavorable

price movements. By contrast, a market-if-touched order is designed to ensure that profits are taken if sufficiently favorable price movements occur.

A *discretionary order* or *market-not-held order* is traded as a market order except that execution may be delayed at the broker's discretion in an attempt to get a better price.

Some orders specify time conditions. Unless otherwise stated, an order is a day order and expires at the end of the trading day. A *time-of-day order* specifies a particular period of time during the day when the order can be executed. An *open order* or a *good-till-canceled order* is in effect until executed or until the end of trading in the particular contract. A *fill-or-kill order*, as its name implies, must be executed immediately on receipt or not at all.

2.8 REGULATION

Futures markets in the United States are currently regulated federally by the Commodity Futures Trading Commission (CFTC; www.cftc.gov), which was established in 1974. This body is responsible for licensing futures exchanges and approving contracts. All new contracts and changes to existing contracts must be approved by the CFTC. To be approved, the contract must have some useful economic purpose. Usually this means that it must serve the needs of hedgers as well as speculators.

The CFTC looks after the public interest. It is responsible for ensuring that prices are communicated to the public and that futures traders report their outstanding positions if they are above certain levels. The CFTC also licenses all individuals who offer their services to the public in futures trading. The backgrounds of these individuals are investigated, and there are minimum capital requirements. The CFTC deals with complaints brought by the public and ensures that disciplinary action is taken against individuals when appropriate. It has the authority to force exchanges to take disciplinary action against members who are in violation of exchange rules.

With the formation of the National Futures Association (NFA; www.nfa.futures.org) in 1982, some of responsibilities of the CFTC were shifted to the futures industry itself. The NFA is an organization of individuals who participate in the futures industry. Its objective is to prevent fraud and to ensure that the market operates in the best interests of the general public. It is authorized to monitor trading and take disciplinary action when appropriate. The agency has set up an efficient system for arbitrating disputes between individuals and its members.

From time to time, other bodies, such as the Securities and Exchange Commission (SEC; www.sec.gov), the Federal Reserve Board (www.federalreserve.gov), and the US Treasury Department (www.treas.gov), have claimed jurisdictional rights over some aspects of futures trading. These bodies are concerned with the effects of futures trading on the spot markets for securities such as stocks, Treasury bills, and Treasury bonds. The SEC currently has an effective veto over the approval of new stock or bond index futures contracts. However, the basic responsibility for all futures and options on futures rests with the CFTC.

Trading Irregularities

Most of the time futures markets operate efficiently and in the public interest. However, from time to time, trading irregularities do come to light. One type of trading

irregularity occurs when an investor group tries to “corner the market”.² The investor group takes a huge long futures position and also tries to exercise some control over the supply of the underlying commodity. As the maturity of the futures contracts is approached, the investor group does not close out its position, so that the number of outstanding futures contracts may exceed the amount of the commodity available for delivery. The holders of short positions realize that they will find it difficult to deliver and become desperate to close out their positions. The result is a large rise in both futures and spot prices. Regulators usually deal with this type of abuse of the market by increasing margin requirements or imposing stricter position limits or prohibiting trades that increase a speculator’s open position or requiring market participants to close out their positions.

Other types of trading irregularity can involve the traders on the floor of the exchange. These received some publicity early in 1989, when it was announced that the FBI had carried out a two-year investigation, using undercover agents, of trading on the Chicago Board of Trade and the Chicago Mercantile Exchange. The investigation was initiated because of complaints filed by a large agricultural concern. The alleged offenses included overcharging customers, not paying customers the full proceeds of sales, and traders using their knowledge of customer orders to trade first for themselves (an offence known as *front running*).

2.9 ACCOUNTING AND TAX

The full details of the accounting and tax treatment of futures contracts are beyond the scope of this book. A trader who wants detailed information on this should consult experts. In this section we provide some general background information.

Accounting

Accounting standards require changes in the market value of a futures contract to be recognized when they occur unless the contract qualifies as a hedge. If the contract does qualify as a hedge, gains or losses are generally recognized for accounting purposes in the same period in which the gains or losses from the item being hedged are recognized. The latter treatment is referred to as *hedge accounting*.

Consider a company with a December year end. In September 2007 it buys a March 2008 corn futures contract and closes out the position at the end of February 2008. Suppose that the futures prices are 250 cents per bushel when the contract is entered into, 270 cents per bushel at the end of 2007, and 280 cents per bushel when the contract is closed out. The contract is for the delivery of 5,000 bushels. If the contract does not qualify as a hedge, the gains for accounting purposes are

$$5,000 \times (2.70 - 2.50) = \$1,000$$

in 2007 and

$$5,000 \times (2.80 - 2.70) = \$500$$

² Possibly the best known example of this was the attempt by the Hunt brothers to corner the silver market in 1979–80. Between the middle of 1979 and the beginning of 1980, their activities led to a price rise from \$9 per ounce to \$50 per ounce.

in 2008. If the company is hedging the purchase of 5,000 bushels of corn in February 2008 so that the contract qualifies for hedge accounting, the entire gain of \$1,500 is realized in 2008 for accounting purposes.

The treatment of hedging gains and losses is sensible. If the company is hedging the purchase of 5,000 bushels of corn in February 2008, the effect of the futures contract is to ensure that the price paid is close to 250 cents per bushel. The accounting treatment reflects that this price is paid in 2008.

In June 1998, the Financial Accounting Standards Board issued FASB Statement No. 133 (FAS 133), Accounting for Derivative Instruments and Hedging Activities. FAS 133 applies to all types of derivatives (including futures, forwards, swaps, and options). It requires all derivatives to be included on the balance sheet at fair market value.³ It increases disclosure requirements. It also gives companies far less latitude than previously in using hedge accounting. For hedge accounting to be used, the hedging instrument must be highly effective in offsetting exposures and an assessment of this effectiveness is required every three months. A similar standard IAS 39 has been issued by the International Accounting Standards Board.

Tax

Under the US tax rules, two key issues are the nature of a taxable gain or loss and the timing of the recognition of the gain or loss. Gains or losses are either classified as capital gains or losses or alternatively as part of ordinary income.

For a corporate taxpayer, capital gains are taxed at the same rate as ordinary income, and the ability to deduct losses is restricted. Capital losses are deductible only to the extent of capital gains. A corporation may carry back a capital loss for three years and carry it forward for up to five years. For a noncorporate taxpayer, short-term capital gains are taxed at the same rate as ordinary income, but long-term capital gains are subject to a maximum capital gains tax rate of 15%. (Long-term capital gains are gains from the sale of a capital asset held for longer than one year; short-term capital gains are the gains from the sale of a capital asset held one year or less.) For a noncorporate taxpayer, capital losses are deductible to the extent of capital gains plus ordinary income up to \$3,000 and can be carried forward indefinitely.

Generally, positions in futures contracts are treated as if they are closed out on the last day of the tax year. For the noncorporate taxpayer, this gives rise to capital gains and losses that are treated as if they were 60% long term and 40% short term without regard to the holding period. This is referred to as the “60/40” rule. A noncorporate taxpayer may elect to carry back for three years any net losses from the 60/40 rule to offset any gains recognized under the rule in the previous three years.

Hedging transactions are exempt from this rule. The definition of a hedge transaction for tax purposes is different from that for accounting purposes. The tax regulations define a hedging transaction as a transaction entered into in the normal course of business primarily for one of the following reasons:

1. To reduce the risk of price changes or currency fluctuations with respect to property that is held or to be held by the taxpayer for the purposes of producing ordinary income

³ Previously the attraction of derivatives in some situations was that they were “off-balance-sheet” items.

2. To reduce the risk of price or interest rate changes or currency fluctuations with respect to borrowings made by the taxpayer

The hedging transaction must be identified before the end of the day on which the taxpayer enters into the transaction. The asset being hedged must be identified within 35 days. Gains or losses from hedging transactions are treated as ordinary income. The timing of the recognition of gains or losses from hedging transactions generally matches the timing of the recognition of income or expense associated with the transaction being hedged.

2.10 FORWARD vs. FUTURES CONTRACTS

The main differences between forward and futures contracts are summarized in Table 2.3. Both contracts are agreements to buy or sell an asset for a certain price at a certain future time. A forward contract is traded in the over-the-counter market and there is no standard contract size or standard delivery arrangements. A single delivery date is usually specified and the contract is usually held to the end of its life and then settled. A futures contract is a standardized contract traded on an exchange. A range of delivery dates is usually specified. It is settled daily and usually closed out prior to maturity.

Profits from Forward and Futures Contracts

Suppose that the sterling exchange rate for a 90-day forward contract is 1.9000 and that this rate is also the futures price for a contract that will be delivered in exactly 90 days. What is the difference between the gains and losses under the two contracts?

Under the forward contract, the whole gain or loss is realized at the end of the life of the contract. Under the futures contract, the gain or loss is realized day by day because of the daily settlement procedures. Suppose that investor A is long £1 million in a 90-day forward contract and investor B is long £1 million in 90-day futures contracts. (Because each futures contract is for the purchase or sale of £62,500, investor B must purchase a total of 16 contracts.) Assume that the spot exchange rate in 90 days proves to be 2.1000 dollars per pound. Investor A makes a gain of

Table 2.3 Comparison of forward and futures contracts.

<i>Forward</i>	<i>Futures</i>
Private contract between two parties	Traded on an exchange
Not standardized	Standardized contract
Usually one specified delivery date	Range of delivery dates
Settled at end of contract	Settled daily
Delivery or final cash settlement usually takes place	Contract is usually closed out prior to maturity
Some credit risk	Virtually no credit risk

\$200,000 on the 90th day. Investor B makes the same gain—but spread out over the 90-day period. On some days investor B may realize a loss, whereas on other days he or she makes a gain. However, in total, when losses are netted against gains, there is a gain of \$200,000 over the 90-day period.

Foreign Exchange Quotes

Both forward and futures contracts trade actively on foreign currencies. However, there is sometimes a difference in the way exchange rates are quoted in the two markets. For example, futures prices where one currency is the US dollar are always quoted as the number of US dollars per unit of the foreign currency or as the number of US cents per unit of the foreign currency. Forward prices are always quoted in the same way as spot prices. This means that, for the British pound, the euro, the Australian dollar, and the New Zealand dollar, the forward quotes show the number of US dollars per unit of the foreign currency and are directly comparable with futures quotes. For other major currencies, forward quotes show the number of units of the foreign currency per US dollar (USD). Consider the Canadian dollar (CAD). A futures price quote of 0.9500 USD per CAD corresponds to a forward price quote of 1.0526 CAD per USD ($1.0526 = 1/0.9500$).

SUMMARY

A very high proportion of the futures contracts that are traded do not lead to the delivery of the underlying asset. Traders usually enter into offsetting contracts to close out their positions before the delivery period is reached. However, it is the possibility of final delivery that drives the determination of the futures price. For each futures contract, there is a range of days during which delivery can be made and a well-defined delivery procedure. Some contracts, such as those on stock indices, are settled in cash rather than by delivery of the underlying asset.

The specification of contracts is an important activity for a futures exchange. The two sides to any contract must know what can be delivered, where delivery can take place, and when delivery can take place. They also need to know details on the trading hours, how prices will be quoted, maximum daily price movements, and so on. New contracts must be approved by the Commodity Futures Trading Commission before trading starts.

Margins are an important aspect of futures markets. An investor keeps a margin account with his or her broker. The account is adjusted daily to reflect gains or losses, and from time to time the broker may require the account to be topped up if adverse price movements have taken place. The broker either must be a clearinghouse member or must maintain a margin account with a clearinghouse member. Each clearinghouse member maintains a margin account with the exchange clearinghouse. The balance in the account is adjusted daily to reflect gains and losses on the business for which the clearinghouse member is responsible.

Information on futures prices is collected in a systematic way at exchanges and relayed within a matter of seconds to investors throughout the world. Many daily newspapers such as the *Wall Street Journal* carry a summary of the previous day's trading.