CHAPTER 2

Mechanics of Futures and Forward 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 corporate 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 also examine forward contracts and explain the difference between the pattern of payoffs realized from futures and forward contracts.

2.1 CLOSING OUT FUTURES POSITIONS

As discussed in Chapter 1, a futures contract is an agreement to buy or sell an asset for a certain price at a certain time in the future. The reader may be surprised to learn that the vast majority of the futures contracts that are initiated do not lead to delivery. The reason is that most investors choose to close out their positions prior to the delivery period specified in the contract. Making or taking delivery under the terms of a futures contract is often inconvenient and in some instances quite expensive. This is true even for a hedger who wants to buy or sell the asset underlying the futures contract. Such a hedger usually prefers to close out the futures position and then buy or sell the asset in the usual way.

Closing out a position involves entering into an opposite trade to the original one. For example, an investor who buys five July corn futures contracts on May 6 can close out the position on June 20 by selling (i.e., shorting) five July corn futures contracts. An investor who sells (i.e., shorts) five July contracts on May 6 can close out the position on June 20 by buying five July contracts. In each case, the investor's total gain or loss is determined by the change in the futures price between May 6 and June 20.

In spite of the fact that delivery is so unusual, 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] An understanding of delivery procedures is essential to a full understanding of the relationship between spot and futures prices.

2.2 THE SPECIFICATION OF THE FUTURES CONTRACT

The major exchanges that trade futures contracts are listed at the end of this book. 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 Cotton Exchange has specified the asset in its orange juice futures contract as

> U.S. Grade A, with Brix value of not less than 57 degrees, having a Brix value to acid ratio of not less than 13 to 1 nor more than 19 to 1, with factors of color and flavor each scoring 37 points or higher and 19 for defects, with a minimum score 94.

The Chicago Mercantile Exchange in its random-length lumber futures contract has specified that

> Each delivery unit shall consist of nominal 2×4s of random lengths from 8 feet to 20 feet, grade-stamped Construction and Standard, Standard and Better, or #1 and #2; however, in no case may the quantity of Standard grade or #2 exceed 50%. Each delivery unit shall be manufactured in California, Idaho, Montana, Nevada, Oregon, Washington, Wyoming, or Alberta or British Columbia, Canada, and contain lumber produced from grade-stamped Alpine fir, Englemann spruce, hem-fir, lodgepole pine, and/or spruce pine fir.

For some commodities a range of grades can be delivered, but the price received depends 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.

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

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

contract is any long-term U.S. 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 5.

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 Chicago Mercantile Exchange's random-length lumber contract, the delivery location is specified as

> On track and shall either be unitized in double-door boxcars or, at no additional cost to the buyer, each unit shall be individually paper-wrapped and loaded on flatcars. Par delivery of hem-fir in California, Idaho, Montana, Nevada, Oregon, and Washington, and in the province of British Columbia.

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. For example, in the case of the corn futures contract traded by the Chicago Board of Trade, delivery can be made at Chicago, Burns Harbor, Toledo, or St. Louis. However, deliveries at Toledo and St. Louis are made at a discount of 4 cents per bushel from the Chicago contract price.

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, currency futures on the Chicago Mercantile Exchange have delivery months of March, June, September, and December;

corn futures traded on the Chicago Board of Trade have delivery months of January, March, May, July, September, November, 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 futures price is quoted in a way that is convenient and easy to understand. For example, crude oil futures prices on the New York Mercantile Exchange are quoted in dollars per barrel to two decimal places (i.e., to the nearest cent). Treasury bond and Treasury note futures prices on the Chicago Board of Trade are quoted in dollars and thirty-seconds of a dollar. The minimum price movement that can occur in trading is consistent with the way in which the price is quoted. Thus, it is \$0.01 per barrel for the oil futures and one thirty-second of a dollar for the Treasury bond and Treasury note futures.

Daily Price Movement Limits

For most contracts, daily price movement limits are specified by the exchange. If the price moves down 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

Position limits are the maximum number of contracts that a speculator may hold. In the Chicago Mercantile Exchange's random-length lumber contract, for example, the position limit at the time of writing is 1,000 contracts with no more than 300 in any one delivery month. Bona fide hedgers are not affected by position limits. The purpose of the limits is to prevent speculators from exercising undue influence on the market.

2.3 CONVERGENCE OF FUTURES PRICE TO SPOT PRICE

As the delivery month of 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. Short a futures contract.
2. Buy the asset.
3. Make delivery.

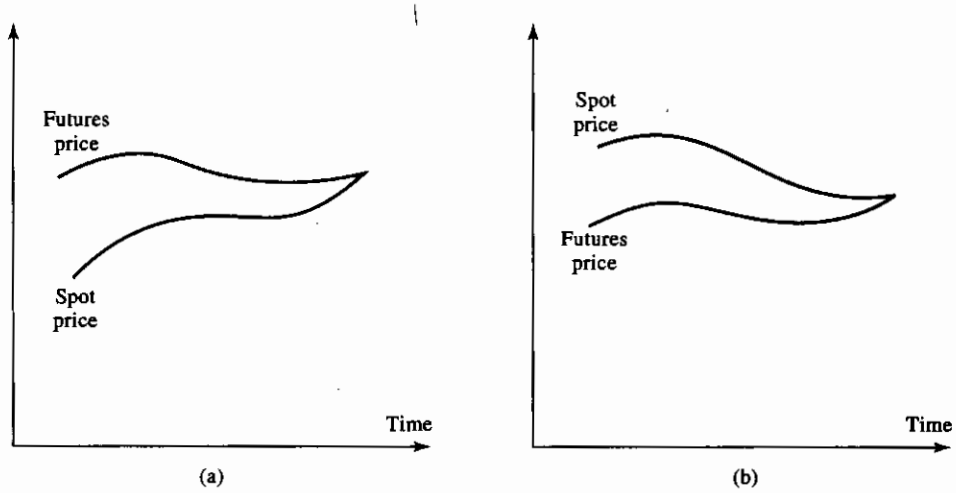

Figure 2.1 Relationship between futures price and spot price as the delivery month is approached: (a) futures price above spot price, (b) futures price below spot price

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 2.1a the futures price is above the spot price prior to the delivery month. In Figure 2.1b the futures price is below the spot price prior to the delivery month. The circumstances under which these two patterns are observed are discussed later in this chapter and in Chapter 3.

2.4 THE OPERATION OF 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.

Marking to Market

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 New York Commodity Exchange (COMEX). We suppose that the current futures price is $400 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 \$400 to \$397. The investor has a loss of \$600 (= 200 × \$3), because the 200 ounces of December gold, which the investor contracted to buy at \$400, can now be sold for only \$397. The balance in the margin account would therefore be reduced by \$600 to \$3,400. Similarly, if the price of December gold rose to \$403 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

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 \$400 and closed out on June 26 at \$392.30. The numbers in the second column, except the first and the last, represent the futures prices at the close of trading.

Day	Futures price (\$)	Daily gain (loss) (\$)	Cumulative gain (loss) (\$)	Margin account balance (\$)	Margin call (\$)
	400.00			4,000	
June 5	397.00	(600)	(600)	3,400	
June 6	396.10	(180)	(780)	3,220	
June 9	398.20	420	(360)	3,640	
June 10	397.10	(220)	(580)	3,420	
June 11	396.70	(80)	(660)	3,340	
June 12	395.40	(260)	(920)	3,080	
June 13	393.30	(420)	(1,340)	2,660	1,340
June 16	393.60	60	(1,280)	4,060	
June 17	391.80	(360)	(1,640)	3,700	
June 18	392.70	180	(1,460)	3,880	
June 19	387.00	(1,140)	(2,600)	2,740	1,260
June 20	387.00	0	(2,600)	4,000	
June 23	388.10	220	(2,380)	4,220	
June 24	388.70	120	(2,260)	4,340	
June 25	391.00	460	(1,800)	4,800	
June 26	392.30	260	(1,540)	5,060	

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 by selling the contract. 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 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 $392.30, 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, providing 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 face 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.

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 takes a long position in a contract on an

asset for one maturity month and 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 the next chapter.

The Clearinghouse and Clearing Margins

The *exchange clearinghouse* is an adjunct of the exchange and acts as an intermediary in futures transactions. It guarantees the performance of the parties to each transaction. The clearinghouse has a number of members. Brokers who are not clearinghouse 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, a clearinghouse member is required to maintain a margin account with the clearinghouse. This 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. The *gross basis* simply adds the total of all long positions entered into by clients to the total of all the short positions entered into by clients. The *net basis* allows these to be 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.

It should be stressed that the whole purpose of the margining system is to reduce the possibility of market participants sustaining losses because of defaults. Overall the system has been very successful. Losses arising from defaults in contracts at major exchanges have been almost nonexistent.

2.5 NEWSPAPER QUOTES

Many newspapers carry futures quotations. The *Wall Street Journal*'s futures quotations can currently be found in the Money and Investing section. Table 2.2 shows the quotations for commodities as they appeared in the *Wall Street Journal* of Friday,

Table 2.2 Commodity futures quotes from the *Wall Street Journal* on March 16, 2001

FUTURES PRICES

Thursday, March 15, 2001

Open Interest Reflects Previous Trading Day.

GRAINS AND OILSEEDS

	OPEN	HIGH	LOW	SETTLE	CHANGE	LIFETIME HIGH	LIFETIME LOW	OPEN INT.
Corn (CBT) 5,000 bu.; cents per bu.								
May	217½	217¾	210½	210¾	– 7	282½	206½	186,129
July	225¼	225½	218¼	218¾	– 6¾	287½	213¼	109,750
Sept	233½	233½	226½	226¾	– 7	276½	219¾	29,131
Dec	244½	244¾	237¼	237¾	– 7	275	229¼	86,793
Mr02	253¾	253¾	246¾	247	– 6¾	270	246¾	10,285
May	258	259	253½	254	– 6¼	266½	253½	2,165
July	263¼	263¾	257	257¼	– 7	279½	242	2,621
Dec	263½	264	257½	258½	– 6	272	245	3,686
Est vol 103,000; vol Wed 60,060; open int 431,377, +1,845.								
Oats (CBT) 5,000 bu.; cents per bu.								
May	108¾	109	105	106	– 3¼	140½	104¼	9,145
July	112½	113	109¼	110½	– 2½	131¾	109¼	3,936
Sept	113½	115	112½	113¼	– 2¼	136½	112½	693
Dec	121¼	122	118	119¼	– 2¾	140½	118	1,838
Est vol 1,607; vol Wed 1,000; open int 15,690, +99.								
Soybeans (CBT) 5,000 bu.; cents per bu.								
May	444	447¼	438	445½	+ 1½	604	438	71,060
July	451½	454	444	451¾	+ ½	609	444	42,238
Aug	451	454	444	450	– 1	549	444	5,244
Sept	449½	451	441½	447½	– 1¼	549	441½	4,018
Nov	453¾	455¾	446	451½	– 2¼	605	446	22,257
Ja02	463½	464½	455	460	– 2½	537½	455	1,264
Mar	472	473	464½	468½	– 3	546	464½	682
July	486½	487	479	464	– 1	521	479	184
Est vol 52,000; vol Wed 58,491; open int 147,411, –1,855.								
Soybean Meal (CBT) 100 tons; $ per ton.								
May	149.90	152.00	149.50	151.90	+ 2.00	189.50	149.50	42,273
July	149.50	151.00	148.90	150.90	+ 1.50	190.00	148.90	24,434
Aug	149.40	149.70	148.10	149.60	+ 1.00	190.40	148.10	8,937
Sept	148.00	148.50	147.10	148.30	+ .70	182.80	147.10	6,311
Oct	147.90	148.00	146.30	147.30	+ .40	181.00	146.30	4,829
Dec	148.20	148.50	146.50	147.40	....	180.00	146.50	13,704
Ja02	148.50	149.30	147.00	147.70	+ .20	166.50	147.00	1,305
Mar	149.50	150.00	149.00	149.60	+ .10	166.50	149.00	540
Est vol 16,500; vol Wed 29,151; open int 102,761, +492.								
Soybean Oil (CBT) 60,000 lbs.; cents per lb.								
May	16.20	16.33	15.81	16.08	– .11	20.68	14.72	55,792
July	16.55	16.69	16.15	16.43	– .12	20.95	15.11	34,729
Aug	16.74	16.85	16.34	16.56	– .13	20.98	15.30	8,309
Sept	16.99	16.99	16.50	16.72	– .13	21.15	15.46	4,603
Oct	17.06	17.15	16.70	16.91	– .17	20.35	15.68	5,260
Dec	17.33	17.47	16.95	17.27	– .11	21.25	16.00	11,627
Ja02	17.72	17.72	17.20	17.43	– .12	17.88	16.25	2,151
Mar	18.03	18.03	17.50	17.70	– .15	18.10	16.58	1,109
May	....	....	....	18.00	– .05	17.45	17.30	183
Est vol 21,000; vol Wed 29,106; open int 124,025, –384.								
Wheat (CBT) 5,000 bu.; cents per bu.								
May	284¾	285	271½	273¾	– 10	326	268	70,515
July	294¾	295¼	282½	284¾	– 9½	350	279¼	47,305
Sept	305	305	292½	295	– 9	325	285	5,420
Dec	318½	318½	307	309½	– 9	343	253	9,840
Mr02	329	329	318½	320	– 9	346	316	1,416
July	334	334	325	327	– 7	355	320	960
Dec	347	347	338	340	– 8	365	331	294
Est vol 37,000; vol Wed 27,019; open int 135,866, +2,686.								
Wheat (KC) 5,000 bu.; cents per bu.								
Mar	....	....	....	314	– 7	349	301	372
May	329¾	330¼	318½	320¼	– 9	352½	310	31,260
July	339½	340¼	328¾	330¼	– 9	359	317	31,275
Sept	349	349	338½	340	– 9	365½	328½	2,798
Dec	360	360	341	351½	– 8½	375	339½	3,154
Mr02	369	369	360	361	– 9	383	353	565
Est vol 8,418; vol Wed 7,384; open int 69,478, –669.								
Wheat (MPLS) 5,000 bu.; cents per bu.								
Mar	....	....	....	330	– 1	375½	299	7
May	335	335½	325	328	– 6½	379	319¾	14,278
July	342¾	343	332½	335¼	– 6½	381	327	10,508
Sept	350½	350¾	341	343	– 6¾	391	335½	1,720
Dec	361	361	352½	354½	– 6	389	346	560
Mr02	368	368	362½	363½	– 6	387	356	147
Est vol 5,181; vol Wed 5,117; open int 27,259, +278.								
Canola (WPG)-20 metric tons; Can. $ per ton								
Mar	....	....	....	285.00	+ 2.50	305.50	257.00	1,050
May	282.60	284.00	280.20	283.90	+ 2.30	305.50	259.20	38,896
July	284.00	284.80	281.30	284.70	+ 1.20	290.80	263.20	23,746
Aug	....	....	....	284.00	– 0.50	292.00	271.00	63
Sept	....	....	....	285.50	+ 0.00	288.00	268.00	1,207
Nov	287.00	287.60	284.30	287.30	+ 1.10	299.00	271.10	22,434
Ja02	....	....	....	289.50	+ 0.90	290.80	277.00	457
Est vol na; vol Wed 20,671; open int 87,853, –47.								
Wheat (WPG)-20 metric tons; Can. $ per ton								
Mar	....	....	....	145.00	+ 0.00	157.50	134.50	55
May	145.60	145.60	142.50	142.60	– 3.30	159.00	137.50	4,976
July	148.00	148.00	144.50	144.80	– 3.20	155.00	140.50	3,263
Oct	122.30	122.30	119.50	119.80	– 2.80	123.50	118.10	1,524
Dec	....	....	....	122.80	– 2.80	127.00	121.60	1,234
Est vol na; vol Wed 215; open int 11,052, –133.								
Barley-Western (WPG)-20 metric tons; Can. $ per ton								
Mar	....	....	....	130.00	+ 0.00	136.40	117.80	0
May	129.80	129.80	128.10	128.10	– 1.60	137.50	120.30	7,242
July	130.50	130.60	129.20	129.20	– 1.50	137.90	123.90	5,160
Oct	131.50	131.50	131.10	131.10	– 0.60	137.90	129.00	6,035
Dec	133.50	133.50	133.50	133.50	– 0.20	138.00	131.40	1,023
Est vol na; vol Wed 586; open int 19,460, +76.								

LIVESTOCK AND MEAT

Cattle-Feeder (CME) 50,000 lbs.; cents per lb.								
Mar	85.75	85.80	85.40	85.45	– .40	91.30	84.80	2,994
Apr	86.35	86.52	85.90	85.95	– .52	90.80	85.00	4,588
May	86.40	86.65	86.05	86.07	– .57	89.90	85.05	5,168
Aug	87.75	87.85	87.50	87.55	– .25	89.90	86.00	4,552
Sept	87.35	87.50	87.15	87.35	– .10	89.47	86.05	480
Oct	87.25	87.50	87.17	87.35	– .10	89.47	86.05	541
Nov	87.90	87.90	87.55	87.85	– .20	89.87	86.40	722
Est vol 1,958; vol Wed 3,932; open int 19,186, –405.								
Cattle-Live (CME) 40,000 lbs.; cents per lb.								
Apr	78.25	78.57	77.85	77.97	– .72	81.82	72.17	55,037
June	72.80	73.07	72.40	72.52	– .40	75.75	69.72	30,131
Aug	72.25	72.35	71.95	72.05	– .32	75.00	69.97	23,313
Oct	74.50	74.60	74.15	74.17	– .37	76.50	72.00	15,508
Dec	75.52	75.55	75.20	75.22	– .35	77.20	73.30	6,268
Est vol 21,158; vol Wed 26,579; open int 131,996, –4,182.								
Hogs-Lean (CME) 40,000 lbs.; cents per lb.								
Apr	65.05	66.15	64.70	65.67	+ .85	66.15	48.85	22,330
June	70.90	71.45	70.35	70.92	+ .27	71.45	55.20	14,856
July	67.00	67.50	66.45	67.22	+ .07	67.50	54.77	3,892
Aug	63.30	63.87	62.65	63.00	– .10	63.87	53.20	3,896
Oct	54.90	55.50	54.90	55.22	+ .17	55.50	46.40	3,407
Dec	52.00	53.05	52.00	52.55	+ .37	53.05	44.80	2,142
Est vol 13,808; vol Wed 9,757; open int 50,573, +436.								
Pork Bellies (CME) 40,000 lbs.; cents per lb.								
Mar	84.70	87.25	84.70	87.25	+ 3.00	87.25	58.00	281
May	86.00	88.52	85.55	86.50	+ 2.97	88.52	60.20	2,222
July	86.40	88.85	86.05	88.85	+ 3.00	88.85	60.10	304
Est vol 1,285; vol Wed 777; open int 2,915, –72.								

FOOD AND FIBER

Cocoa (NYBOT)-10 metric tons; $ per ton.								
Mar	1,038	1,040	1,000	998	– 38	1,362	707	22
May	1,021	1,033	1,004	1,015	– 25	1,222	727	30,318
July	1,030	1,036	1,018	1,028	– 24	1,245	753	21,574
Sept	1,043	1,047	1,032	1,040	– 24	1,246	776	12,574
Dec	1,053	1,059	1,048	1,056	– 23	1,237	805	14,910
Mr02	1,068	1,070	1,063	1,074	– 22	1,257	835	8,455
May	....	....	....	1,088	– 22	1,267	850	6,287
July	....	....	....	1,100	– 22	1,242	875	5,515
Sept	....	....	....	1,115	– 22	1,186	907	7,553
Dec	....	....	....	1,135	– 22	1,264	936	7,604
Est vol 9,125; vol Wed 5,515; open int 114,912, –896.								
Coffee (NYBOT)-37,500 lbs.; cents per lb.								
Mar	60.10	60.30	59.50	59.10	– 1.90	153.85	59.25	98
May	61.25	62.25	60.90	61.00	– 2.00	127.00	60.90	30,868
July	64.75	65.20	63.90	63.95	– 1.85	127.00	63.90	12,405
Sept	67.50	67.75	66.65	66.60	– 1.80	127.00	66.65	6,757
Dec	70.75	71.20	69.90	70.00	– 1.60	127.00	69.90	4,480
Mr02	74.25	74.90	74.05	73.50	– 1.50	107.00	74.05	2,576
May	77.00	77.00	77.00	76.35	– 1.35	87.00	77.00	188
July	79.75	79.75	79.75	79.20	– 1.20	84.00	79.75	332
Est vol 10,308; vol Wed 7,229; open int 57,704, +233.								
Sugar-World (NYBOT)-112,000 lbs.; cents per lb.								
May	8.79	8.97	8.74	8.92	+ .19	10.68	6.10	81,574
July	8.35	8.45	8.26	8.42	+ .14	10.12	6.21	33,188

(*continued on next page*)

Table 2.2 (*continued*)

Oct	8.10	8.17	8.01	8.15	+	.13	9.88	6.27	24,806
Mr02	7.90	7.97	7.82	7.94	+	.11	9.75	6.90	10,106
May	7.76	7.80	7.74	7.82	+	.12	9.64	7.60	2,856
July	7.70	7.70	7.70	7.74	+	.11	9.60	7.62	2,970
Oct	7.70	7.70	7.70	7.73	+	.11	8.50	7.63	2,471

Est vol 21,050; vol Wed 20,306; open int 157,969, +2,812.

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

May	21.28	21.31	21.28	21.29		....	21.65	18.00	1,265
July	21.45	21.45	21.45	21.45	–	.02	21.80	18.39	3,555
Sept	21.53	21.54	21.50	21.50	–	.04	21.99	18.69	1,529
Nov	20.86	20.86	20.86	20.86		....	21.15	18.65	1,130
Ja02	20.70	20.70	20.70	20.70		....	21.25	18.00	414
Mar	20.82	20.82	20.82	20.82	–	.03	21.23	19.01	424
May	20.92	20.92	20.92	20.92	–	.01	21.20	20.75	157
July	21.05	21.05	21.05	21.05	+	.03	21.25	20.90	237

Est vol 178; vol Wed 1,495; open int 9,711, –785.

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

May	53.01	53.05	49.93	50.09	–	2.56	70.50	49.93	35,505
July	53.90	54.05	51.05	51.30	–	2.28	71.10	51.05	14,542
Oct	54.20	54.20	52.79	52.77	–	.88	67.20	52.79	1,117
Dec	54.30	54.40	52.90	53.13	–	.92	67.70	52.90	15,372
Mr02	55.55	55.55	54.60	54.50	–	.85	67.10	54.60	1,628
May	55.50	55.50	54.90	54.95	–	.90	68.50	54.90	1,251
July	56.40	56.40	55.95	55.90	–	.85	68.50	55.95	1,072
Oct	....	....	....	55.15	–	1.10	65.50	59.00	120
Dec	55.75	55.75	55.75	55.15	–	1.05	64.75	55.75	294

Est vol 15,000; vol Wed 7,514; open int 70,901, –39.

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

May	74.75	75.10	74.50	74.70	–	.40	92.15	74.40	19,984
July	78.70	78.90	78.35	78.45	–	.45	94.00	78.00	4,383
Sept	81.70	81.90	81.70	81.70	–	.40	95.85	80.00	1,356
Nov	84.70	85.10	84.70	84.75	–	.35	98.35	80.00	2,350
Ja02	....	....	....	87.75	–	.35	97.00	80.20	116

Est vol 750; vol Wed 1,398; open int 28,196, –194.

METALS AND PETROLEUM

Copper-High (Cmx.Div.NYM)-25,000 lbs.; cents per lb.

Mar	80.50	80.70	80.25	80.25	–	0.15	93.90	70.20	2,989
Apr	80.80	80.85	80.50	80.60	–	0.20	93.40	70.65	3,780
May	81.40	81.50	80.75	81.05	–	0.25	93.50	76.35	35,371
June	81.40	81.50	81.40	81.30	–	0.25	93.00	80.40	1,697
July	81.60	82.05	81.40	81.55	–	0.25	93.20	78.60	10,277
Aug	81.95	82.05	81.95	81.70	–	0.25	92.50	80.90	1,173
Sept	82.20	82.40	82.10	81.90	–	0.25	93.00	79.75	3,612
Oct	....	....	....	81.95	–	0.25	92.40	81.00	1,157
Nov	....	....	....	82.05	–	0.25	91.75	81.00	958
Dec	82.10	82.10	82.10	82.15	–	0.25	92.00	79.20	5,425
Ja02	....	....	....	82.15	–	0.25	90.80	81.30	505
Feb	....	....	....	82.15	–	0.25	90.00	81.40	291
Mar	82.40	82.40	82.40	82.15	–	0.25	91.00	79.35	1,030
Apr	....	....	....	82.15	–	0.25	89.70	81.55	237
May	....	....	....	82.10	–	0.25	89.60	81.55	491
June	....	....	....	82.05	–	0.25	89.50	81.35	346
July	....	....	....	82.05	–	0.25	88.90	81.80	524

Est vol 8,000; vol Wed 11,151; open int 71,461, +1,582.

Gold (Cmx.Div.NYM)-100 troy oz.; $ per troy oz.

Mar	....	....	....	260.00	–	2.50	274.50	257.50	8
Apr	262.80	263.60	259.50	260.30	–	2.60	305.00	255.10	64,242
June	264.90	265.70	261.30	262.30	–	2.60	447.00	258.20	27,409
Aug	266.00	266.00	263.80	263.80	–	2.70	322.00	259.50	5,532
Oct	266.00	266.50	265.50	265.10	–	2.80	284.80	262.00	1,733
Dec	269.50	269.50	267.00	266.40	–	2.90	429.50	264.10	6,560
Ju02	272.00	272.00	272.00	270.20	–	3.10	385.00	269.30	4,357
Dec	276.10	276.10	276.10	274.20	–	3.40	358.00	276.10	2,097
Ju03	....	....	....	278.70	–	3.50	338.00	281.50	1,032
Dec	285.00	285.00	285.00	283.30	–	3.70	359.30	285.00	1,608
Ju04	....	....	....	288.10	–	3.90	355.00	290.30	1,470
Dec	....	....	....	292.90	–	4.10	388.00	309.00	1,424

Est vol 42,000; vol Wed 42,653; open int 123,480, –3,341.

Platinum (NYM)-50 troy oz.; $ per troy oz.

Apr	582.10	585.00	578.00	580.40	–	4.20	641.00	550.50	5,592
July	580.00	580.00	575.00	575.90	–	4.20	630.00	567.00	1,667

Est vol 779; vol Wed 498; open int 7,261, –114.

Silver (Cmx.Div.NYM)-5,000 troy oz.; cnts per troy oz.

Mar	439.5	442.5	432.0	432.5	–	10.3	552.0	432.0	124
May	447.0	447.0	434.0	435.3	–	10.5	537.0	434.0	49,630
July	448.5	448.5	438.0	439.2	–	10.5	574.0	438.0	9,286
Dec	456.0	456.0	447.0	447.0	–	10.5	680.0	447.0	5,592
Jl02	465.0	465.0	465.0	456.7	–	10.3	559.0	465.0	511
Dec	470.0	472.0	470.0	463.9	–	10.3	613.0	464.0	1,965
Dc03	485.0	485.0	485.0	474.3	–	10.3	565.0	485.0	549
Dc04	....	....	....	482.9	–	10.3	560.0	496.5	741

Est vol 11,000; vol Wed 5,249; open int 73,524, +486.

Crude Oil, Light Sweet (NYM) 1,000 bbls.; $ per bbl.

Apr	26.46	26.72	26.12	26.55	+	0.14	34.40	15.80	61,543
May	26.64	26.93	26.35	26.82	+	0.20	33.50	15.80	104,734
June	26.90	27.10	26.53	26.97	+	0.20	33.75	14.56	49,218
July	26.80	27.05	26.57	27.01	+	0.26	32.20	19.05	26,115
Aug	26.70	26.90	26.54	26.90	+	0.31	31.60	18.40	17,290
Sept	26.59	26.70	26.36	26.74	+	0.35	31.00	17.96	15,444
Oct	26.25	26.42	26.25	26.55	+	0.36	30.40	19.80	11,523
Nov	26.05	26.20	26.00	26.34	+	0.38	30.10	18.20	14,590
Dec	26.00	26.10	25.70	26.12	+	0.40	30.50	14.90	35,959
Ja02	25.55	25.80	25.50	25.90	+	0.42	29.00	18.90	12,365
Feb	25.31	25.60	25.31	25.68	+	0.44	28.15	19.94	6,208
Mar	25.10	25.40	25.10	25.46	+	0.46	27.90	18.45	4,247
Apr	24.98	25.15	24.98	25.22	+	0.47	27.50	20.95	2,950
May	24.93	24.93	24.93	24.98	+	0.46	27.35	20.84	3,021
June	24.40	24.60	24.40	24.74	+	0.49	27.25	17.35	21,331
July	....	....	....	24.54	+	0.51	25.96	19.85	1,997
Aug	24.20	24.20	24.20	24.34	+	0.53	26.77	20.53	1,118
Sept	....	....	....	24.14	+	0.55	24.59	20.43	5,662
Oct	....	....	....	23.94	+	0.57	26.36	22.88	1,254
Nov	....	....	....	23.74	+	0.59	25.50	22.77	1,011
Dec	23.25	23.35	23.15	23.53	+	0.59	26.95	15.50	19,402
Ja03	....	....	....	23.36	+	0.59	25.75	22.56	2,155
Feb	....	....	....	23.20	+	0.59	24.03	22.70	467
Mar	....	....	....	23.05	+	0.59	23.85	21.90	855
June	22.60	22.60	22.60	22.69	+	0.59	25.05	19.82	8,075
Sept	....	....	....	22.45	+	0.62	0.00	0.00	200
Dec	....	....	....	22.29	+	0.64	24.44	15.92	11,882
Dc04	....	....	....	21.94	+	0.64	24.00	16.35	5,814
Dc05	....	....	....	21.59	+	0.65	23.00	17.00	5,054
Dc06	....	....	....	21.30	+	0.66	22.55	19.10	1,052

Est vol 198,048; vol Wed 219,388; open int 452,586, +12,550.

Heating Oil No. 2 (NYM) 42,000 gal; $ per gal.

Apr	.7040	.7100	.6980	.7065	+	.0026	.9495	.5140	35,815
May	.6837	.6920	.6780	.6887	+	.0038	.8900	.5075	18,721
June	.6835	.6905	.6770	.6872	+	.0043	.8625	.5590	9,423
July	.6860	.6950	.6830	.6912	+	.0048	.8430	.5800	6,273
Aug	.6880	.7005	.6880	.6967	+	.0053	.8430	.5740	12,578
Sept	.7020	.7090	.6980	.7047	+	.0063	.8430	.5850	5,809
Oct	.7080	.7185	.7080	.7122	+	.0068	.8030	.5920	3,076
Nov	.7120	.7230	.7120	.7197	+	.0078	.8425	.6325	2,751
Dec	.7200	.7300	.7175	.7257	+	.0063	.8426	.6400	12,958
Ja02	.7210	.7320	.7200	.7267	+	.0068	.8170	.6800	2,709
Feb	.7150	.7270	.7135	.7197	+	.0093	.8075	.6865	2,023
Mar	.6950	.7075	.6940	.6997	+	.0088	.7875	.6660	5,946
Apr	.6794	.6880	.6760	.6802	+	.0093	.7525	.6525	897
May	.6594	.6680	.6580	.6612	+	.0103	.7070	.6500	751
June	.6479	.6480	.6479	.6507	+	.0113	.7000	.6385	1,186
July	.6459	.6575	.6459	.6487	+	.0113	.8700	.6459	107
Aug	.6494	.6494	.6494	.6522	+	.0113	.6535	.6494	116

Est vol 42,834; vol Wed 41,457; open int 121,120, +1,283.

Gasoline-NY Unleaded (NYM) 42,000; $per gal.

Apr	.8681	.8700	.8530	.8679	+	.0009	.9959	.6825	33,600
May	.8626	.8640	.8500	.8614	+	.0001	.9884	.7840	33,773
June	.8455	.8540	.8430	.8509	–	.0001	.9745	.7520	16,362
July	.8325	.8375	.8280	.8353	–	.0005	.9300	.7600	10,175
Aug	.8140	.8150	.8060	.8126	–	.0014	.9150	.7460	13,610
Sept	.7780	.7870	.7780	.7839	–	.0021	.8490	.7300	17,026
Oct	.7490	.7490	.7490	.7469	–	.0021	.7950	.6800	1,290
Nov	.7275	.7275	.7275	.7259	–	.0016	.7810	.6880	1,382
Dec	....	....	....	.7149	–	.0001	.7470	.6650	701

Est vol 30,025; vol Wed 32,906; open int 128,002, +2,123.

Natural Gas, (NYM) 10,000 MMBtu.; $ per MMBtu's

Apr	4.900	4.980	4.870	4.927	+	.016	6.940	2.120	38,089
May	4.985	5.010	4.920	4.960	+	.001	6.220	2.119	29,702
June	5.023	5.070	4.975	5.000	–	.009	6.140	2.095	19,122
July	5.100	5.110	5.020	5.043	–	.016	6.140	2.095	15,476
Aug	5.099	5.130	5.040	5.068	–	.021	6.095	2.102	23,168
Sept	5.079	5.100	5.030	5.048	–	.021	6.040	2.137	14,964
Oct	5.089	5.110	5.030	5.058	–	.021	6.050	2.133	27,152
Nov	5.260	5.260	5.180	5.185	–	.019	6.140	2.275	12,521
Dec	5.360	5.360	5.250	5.305	–	.019	6.270	2.415	14,547
Ja02	5.420	5.420	5.320	5.340	–	.019	8.290	2.450	10,928
Feb	5.190	5.190	5.140	5.145	–	.019	6.050	2.440	8,387
Mar	4.880	4.890	4.830	4.852	–	.013	5.730	2.360	19,059
Apr	4.440	4.520	4.440	4.509	–	.009	4.920	2.290	7,175
May	4.320	4.450	4.320	4.422	–	.009	4.775	2.350	11,249
June	4.420	4.460	4.400	4.439	–	.009	4.770	2.345	8,192
July	4.486	4.510	4.440	4.485	–	.011	4.750	2.365	5,707
Aug	4.510	4.520	4.480	4.499	–	.011	4.770	2.412	12,324
Sept	4.482	4.530	4.450	4.461	–	.011	4.770	2.423	6,387
Oct	4.477	4.490	4.457	4.476	–	.011	4.785	2.465	8,080
Nov	4.587	4.587	4.550	4.586	–	.011	4.890	2.610	3,750
Dec	4.693	4.693	4.650	4.692	–	.011	5.010	2.720	6,567

(*continued on next page*)

Table 2.2 (*continued*)

Ja03	4.740	4.740	4.690	4.732	–	.011	5.049	2.730	11,155
Feb	4.610	4.610	4.570	4.601	–	.011	4.874	2.695	6,288
Mar	....	....	....	4.438	–	.011	4.710	2.705	8,237
Apr	....	....	....	4.247	–	.011	4.520	2.610	5,498
May	4.240	4.240	4.240	4.217	–	.011	4.490	2.630	4,043
June	....	....	....	4.246	–	.011	4.400	2.610	2,173
July	....	....	....	4.266	–	.011	4.530	2.550	4,022
Aug	....	....	....	4.304	–	.011	4.535	2.970	4,047
Sept	4.293	4.293	4.293	4.302	–	.011	4.445	3.070	1,440
Oct	4.301	4.301	4.301	4.310	–	.011	4.455	3.480	4,198
Nov	4.423	4.423	4.423	4.432	–	.011	4.673	3.835	1,316
Dec	4.551	4.551	4.550	4.560	–	.011	4.820	3.960	1,413
Ja04	4.590	4.590	4.590	4.600	–	.011	4.880	3.950	2,508
Feb	....	....	....	4.480	–	.011	4.760	4.410	2,060
Mar	4.351	4.351	4.351	4.340	–	.011	4.510	4.351	130

Est vol 50,132; vol Wed 42,996; open int 361,052, +1,212.

Brent Crude (IPE) 1,000 net bbls.; $ per bbl.

Apr	24.15	24.54	23.90	24.19	+	0.26	32.88	21.60	19,187
May	25.08	25.22	24.62	25.01	+	0.17	31.96	23.18	61,673
June	25.35	25.47	24.88	25.22	+	0.09	31.50	13.55	50,655
July	25.46	25.52	24.80	25.29	+	0.05	29.95	23.05	22,556
Aug	25.35	25.48	24.79	25.28	+	0.07	30.25	23.10	16,124
Sep	25.28	25.53	24.95	25.19	+	0.10	28.74	18.35	10,891
Oct	25.17	25.17	24.99	25.05	+	0.13	29.15	22.75	3,868
Nov	24.95	25.00	24.60	24.87	+	0.17	27.04	23.15	4,057
Dec	24.80	24.80	24.42	24.67	+	0.19	29.50	13.70	26,483
Ja02	24.28	24.28	24.26	24.44	+	0.21	25.55	22.50	2,617
Feb	24.01	24.01	24.01	24.19	+	0.21	25.21	22.73	1,214
Mar	....	....	....	23.99	+	0.22	25.67	18.00	1,982
Jun	....	....	....	23.37	+	0.40	25.69	17.35	2,120
Dec	22.20	22.20	22.20	22.32	+	0.45	25.58	17.35	8,954

Est vol 105,000; vol Wed 105,000; open int 232,383, +703.

Gas Oil (IPE) 100 metric tons; $ per ton

Apr	208.00	212.00	206.50	209.25	–	4.50	284.50	161.00	29,838
May	208.00	211.50	206.25	209.00	–	5.00	270.50	187.50	12,848
June	210.00	212.25	208.00	210.25	–	4.50	269.00	165.00	11,724
July	211.50	213.00	210.50	211.50	–	4.75	254.50	206.00	5,432
Aug	213.75	213.75	211.75	212.75	–	4.25	248.25	206.75	3,079
Sep	214.50	214.75	213.00	214.00	–	3.75	244.75	164.00	3,097
Oct	215.00	216.25	213.50	215.25	–	3.25	261.50	168.00	2,238
Nov	....	....	....	216.00	–	3.00	244.00	214.00	2,180
Dec	215.00	217.50	214.50	216.50	–	2.75	240.00	213.25	8,956
Ja02	217.25	217.25	216.75	216.50	–	2.75	240.00	214.00	2,864
Feb	....	....	....	214.50	–	2.50	221.00	214.00	1,916
Mar	....	....	....	211.25	–	2.25	245.75	195.00	351
Jun	202.50	202.50	202.00	202.00	–	2.00	225.00	182.00	2,558
Dec	202.50	203.00	202.50	202.50	–	2.50	210.25	181.00	530

Est vol 35,000; vol Wed 22,619; open int 87,611, +500.

EXCHANGE ABBREVIATIONS

(for commodity futures and futures options)

CANTOR-Cantor Exchange; **CBT-Chicago Board of Trade; CME**-Chicago Mercantile Exchange; **CSCE**-Coffee, Sugar & Cocoa Exchange, New York; **CMX**-COMEX (Div. of New York Mercantile Exchange); **CTN**-New York Cotton Exchange; **DTB**-Deutsche Terminboerse; **FINEX**-Financial Exchange (Div. of New York Cotton Exchange; **IPE**-International Petroleum Exchenge; **KC**-Kansas City Board of Trade; **LIFFE**-London International Financial Futures Exchange; **MATIF**-Marche a Terme International de France; **ME**-Montreal Exchange; **MCE**-MidAmerica Commodity Exchange; **MPLS**-Minneapolis Grain Exchange; **NYFE**-New York Futures Exchange (Sub. of New York Cotton Exchange); **NYM**-New York Mercantile Exchange; **SFE**-Sydney Futures Exchange; **SGX**-Singapore Exchange Ltd.; **WPG**-Winnipeg Commodity Exchange.

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March 16, 2001. The quotes refer to the trading that took place on the previous day (i.e., Thursday, March 15, 2001). The quotations for index futures and currency futures are given in Chapter 3. The quotations for interest-rate futures are given in Chapter 5.

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 corn, traded on the Chicago Board of Trade. The contract size is 5,000 bushels, and the price is quoted in cents per bushel. The months in which particular contracts are traded are shown in the first column. Corn contracts with maturities in May 2001, July 2001, September 2001, December 2001, March 2002, May 2002, July 2002, and December 2002 were traded on March 15, 2001.

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 May 2001 corn on March 15, 2001, the opening price was $217\frac{1}{2}$ cents per bushel and, during the day, the price traded between $210\frac{1}{2}$ and $217\frac{3}{4}$ cents.

Settlement Price

The fourth number is the *settlement price*. This is the average of the prices 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. In the case of the May 2001 corn futures contract, the settlement price was $210\frac{3}{4}$ cents on March 15, 2001, down 7 cents from March 14, 2001.

The settlement price is important, because it is used for calculating daily gains and losses and margin requirements. In the case of the May 2001 corn futures, an investor with a long position in one contract would find his or her margin account balance reduced by \$350 (= 5,000 × 7 cents) between March 14, 2001, and March 15, 2001. Similarly, an investor with a short position in one contract would find that the margin balance increased by \$350 between these two dates.

Lifetime Highs and Lows

The sixth and seventh numbers show the highest futures price and the lowest futures price achieved in the trading of the particular contract over its lifetime. The May 2001 corn contract had traded for well over a year on March 15, 2001. During this period the highest and lowest prices achieved were $282\frac{1}{2}$ cents and $206\frac{1}{2}$ cents.

Open Interest and Volume of Trading

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. Because of the problems in compiling the data, the open-interest information is one trading day older than the price information. Thus, in the *Wall Street Journal* of March 16, 2001, the open interest is for the close of trading on March 14, 2001. In the case of the May 2001 corn futures contract, the open interest was 186,129 contracts.

At the end of each section, Table 2.2 shows the estimated volume of trading in contracts of all maturities on May 15, 2001, and the actual volume of trading in these contracts on May 14, 2001. It also shows the total open interest for all contracts on May 14, 2001, and the change in this open interest from the previous trading day. For all corn futures contracts, the estimated trading volume was 103,000 contracts on May 15, 2001, and the actual trading volume was 60,060 contracts on May 14, 2001. The open interest for all corn futures contracts was 431,377 on May 14, 2001, up 1,845 from the previous trading day.

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

Patterns of Futures Prices

A number of different patterns of futures prices can be picked out from Table 2.2. The futures price of gold on the New York Mercantile Exchange and the futures price of wheat on the Chicago Board of Trade increase as the time to maturity increases. This is known as a *normal market*. By contrast, the futures price of Sugar-World is a decreasing function of maturity. This is known as an *inverted market*. Other commodities show mixed patterns. For example, the futures price of Crude Oil first increases and then decreases with maturity.

2.6 KEYNES AND HICKS

We refer to the market's average opinion about what the future price of an asset will be at a certain future time as the *expected future price* of the asset at that time. Suppose that it is now June and the September futures price of corn is 200 cents. It is interesting

to ask what the expected future price of corn is in September. Is it less that 200 cents, greater than 200 cents, or exactly equal to 200 cents? As illustrated in Figure 2.1, the futures price converges to the spot price at maturity. If the expected future spot price is less than 200 cents, the market must be expecting the September futures price to decline so that traders with short positions gain and traders with long positions lose. If the expected future price is greater than 200 cents the reverse must be true. The market must be expecting the September futures price to increase so that traders with long positions gain while those with short positions lose.

Economists John Maynard Keynes and John Hicks argued that if hedgers tend to hold short positions and speculators tend to hold long positions, the futures price of an asset will be below its expected future spot price. This is because speculators require compensation for the risks they are bearing. They will trade only if they can expect to make money on average. Hedgers will lose money on average, but they are likely to be prepared to accept this because the futures contract reduces their risks. If hedgers tend to hold long positions while speculators hold short positions, Keynes and Hicks argued that the futures price will be above the expected future spot price for a similar reason.

When the futures price is below the expected future spot price, the situation is known as *normal backwardation*; when the futures price is above the expected future spot price, the situation is known as *contango*. In the next chapter we will examine in more detail the relationship between futures and spot prices.

2.7 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 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. In the case of financial futures, delivery is

usually made by wire transfer. For all contracts the price paid is usually based on the settlement price immediately preceding the date of the notice of intention to deliver. Where appropriate, 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 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, it is simply marked to market on the last trading day, and all positions are declared closed. To ensure that the futures price converges to the spot price, the settlement price on the last trading day 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 final settlement is based on the opening price of the index on the third Friday of the delivery month.

2.8 TYPES OF TRADERS

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 take a long position, 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 order* (MIT) 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.

2.9 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. The NFA requires its members to pass an exam. 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 U.S. 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, imposing stricter position limits, prohibiting trades that increase a speculator's open position, and forcing market participants to close out their positions.

Other types of trading irregularities 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.

2.10 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.

[2] Possibly the best known example of this involves tbe activities of the Hunt brothers in the silver market in 1979–1980. 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.

Accounting

Financial Accounting Standards Board (FASB) Statement No. 52, Foreign Currency Translation, established accounting standards in the United States for foreign currency futures. FASB Statement No. 80, Accounting for Futures Contracts, established accounting standards in the United States for all other contracts. The two statements require changes in market value 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.

Consider a trader who in September 2000 takes a long position in a March 2001 corn futures contract and closes out the position at the end of February 2001. Suppose that the futures prices are 150 cents per bushel when the contract is entered into, 170 cents per bushel at the end of 2000, and 180 cents per bushel when the contract is closed out. One contract is for the delivery of 5,000 bushels. If the trader is a speculator, the gains for accounting purposes are

$$5{,}000 \times \$0.20 = \$1{,}000$$

in 2000 and

$$5{,}000 \times \$0.10 = \$500$$

in 2001. If the trader is hedging the purchase of 5,000 bushels of corn in 2001, the entire gain of $1,500 is realized in 2001 for accounting purposes. We will refer to this treatment as *hedge accounting*.

This example is shown in Table 2.3. The treatment of hedging gains and losses is sensible. If the trader in our example is a company that is hedging the purchase of 5,000 bushels of corn at the end of February 2001, the effect of the futures contract is to ensure that the price paid is close to 150 cents per bushel. The accounting treatment reflects that this price is paid in 2001. The 2000 accounts for the trader are unaffected by the futures transaction.

In June 1998, the Financial Accounting Standards Board issued FASB Statement No. 133, Accounting for Derivative Instruments and Hedging Activities (FAS 133). 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 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. FAS 133 is effective for all fiscal years beginning after June 15, 2000.

Tax

Under the U.S. 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/losses or 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

[3] Previously the attraction of derivatives in some situations was that they were "off-balance-sheet" items.

Table 2.3 Accounting treatment of a futures transaction

From the Trader's Desk—February 2001
September 2000: Investor takes a long position in one March 2001 futures contract to buy 5,000 bushels of corn. Futures price is 150 cents per bushel.
End of 2000: Futures price is 170 cents per bushel.
February 2001: The contract is closed out. Futures price is 180 cents per bushel.

If Investor Is a Speculator
Accounting gain in 2000 is 5,000 × 20 cents = $1,000.
Accounting gain in 2001 is 5,000 × 10 cents = $500.

If Investor Is Hedging a Purchase of Corn in 2001
The transaction has no impact on the reported results in 2000.
Accounting gain in 2001 is 5,000 × 30 cents = $1,500.

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 taxed at a lower rate than ordinary income. (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 less than one year.) The Taxpayer Relief Act of 1997 widened the rate differential between ordinary income and long-term capital gains. 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. Gains and losses are capital. For the noncorporate taxpayer they are considered 60% long term and 40% short term.

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

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 deduction from the hedged items.

Special rules apply to foreign currency futures transactions. A taxpayer can make a binding election to treat gains and losses from all futures contracts in all foreign currencies as ordinary income, regardless of whether the contracts is entered into for hedging or speculative purposes. If a taxpayer does not make this election foreign currencies futures transactions are treated in the same way as other futures transactions.

2.11 FORWARD CONTRACTS

As explained in Chapter 1, forward contracts are similar to futures contracts in that they are agreements to buy or sell an asset at a certain time in the future for a certain price. Whereas futures contracts are traded on an exchange, forward contracts are traded in the over-the-counter market. They are typically entered into by two financial institutions or by a financial institution and one of its corporate clients.

One of the parties to a forward contract assumes a *long position* and agrees to buy the asset on a certain specified date for a certain price. The other party assumes a *short position* and agrees to sell the asset on the same date for the same price. Forward contracts do not have to conform to the standards of a particular exchange. The contract delivery date can be any date mutually convenient to the two parties. Usually, in forward contracts a single delivery date is specified, whereas in futures contracts there is a range of possible delivery dates.

Unlike futures contracts, forward contracts are not marked to market daily. The two parties contract to settle up on the specified delivery date. Whereas most futures contracts are closed out prior to delivery, most forward contracts do lead to delivery of the physical asset or to final settlement in cash. Table 2.4 summarizes the main differences between forward and futures contracts.

Forward Price and Delivery Price

The *forward price* for a forward contract is similar in general concept to the futures price for a futures contract. A contract's current forward price is the market price that would be agreed to today for delivery of the asset at the maturity of the forward contract. The forward price is usually different from the spot price and varies with the maturity of the forward contract. (See Table 1.1 for forward prices of the British pound on June 19, 2000.)

Suppose it is March 5, 2001, and the forward price for gold for delivery on September 5, 2001, is $350 per ounce. Ignoring the bid–offer that would apply, we suppose that a company enters into a forward contract to buy gold at this price. The $350 per ounce price then becomes what is termed the *delivery price* in the particular forward contract that the company has entered into. As time passes, the delivery price in this contract remains at $350 per ounce. However, the forward price for the delivery of gold on September 5, 2001, is liable to change. For example, if the price of gold goes up sharply, the forward price could be $375 on June 5, 2001.

Table 2.4 Comparison of forward and futures contracts

Forward	Futures
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

Payoffs

Forward contracts are settled at maturity. We suppose the maturity date is time T and define:

S_T: Spot price of asset at time T

K: Delivery price in the forward contract

A long forward contract to buy one unit of an asset is worth $S_T - K$ at maturity because it enables an asset worth S_T to be purchased for K. We refer to $S_T - K$ as the *payoff* from the contract or the *terminal value* of the contract. A short forward contract to sell one unit of an asset is worth $K - S_T$ at time T because it enables an asset worth S_T to be sold for K. The payoff or terminal value for the contract is $K - S_T$.

Payoffs from forward contracts can be positive or negative. Because it costs nothing to enter into a forward contract, the profit from the contract is the same as the payoff. The profits from long and short positions are shown in Figure 2.2.

Profits from Forward and Futures Contracts

Suppose that the sterling exchange rate for a 90-day forward contract is 1.8381 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 1.8600. Investor A makes a gain of $21,900 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 $21,900 over the 90-day period.

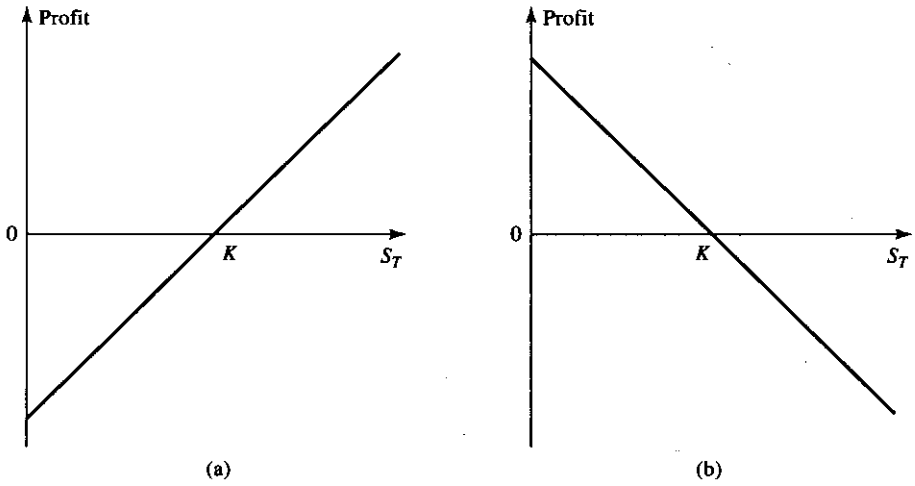

Figure 2.2 Profit from forward contract: (a) long position, (b) short position; delivery price = K; price of asset at maturity = S_T

Table 2.5 The payoffs from futures and forward contracts

From the Trader's Desk

Investor A takes a long position in a 90-day forward contract on £1 million. Forward price is 1.8381. Investor B takes a long position in 90-day futures contracts on £1 million. Futures price is 1.8381. At the end of the 90 days, the sterling exchange rate proves to be 1.8600.

Outcome

Investors A and B each make a total gain equal to

$$(1.8600 - 1.8381) \times 1{,}000{,}000 = \$21{,}900$$

Investor A's gain is made entirely on the 90th day, whereas investor B's gain is realized day by day over the 90-day period. On some days investor B may realize a loss, whereas on other days he or she will realize a gain.

This example is summarized in Table 2.5. Using the notation introduced earlier, $S_T = 1.8600$, $K = 1.8381$, and the gain from a long forward contract to buy £1 is

$$S_T - K = 1.8600 - 1.8381 = 0.0219$$

dollars. The total gain from a contract on £1 million is therefore $21,900.

2.12 FOREIGN EXCHANGE QUOTES

Both forward and futures contracts trade actively on foreign currencies. However, there is a difference in the way exchange rates are quoted in the two markets. Futures prices are always quoted as the number of U.S. dollars per unit of the foreign currency or as the number of U.S. 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 U.S. 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 U.S. dollar (USD). Consider the Canadian dollar (CAD). A futures price quote of 0.7050 USD per CAD corresponds to a forward price quote of 1.4184 CAD per USD (1.4184 = 1/0.7050).

2.13 SUMMARY

In this chapter we have looked at how futures and forward markets operate. In futures markets, contracts are traded on an exchange, and it is necessary for the exchange to define carefully the precise nature of what is traded, the procedures that will be followed, and the regulations that will govern the market. Forward contracts are negotiated directly over the telephone by two relatively sophisticated individuals. As a result, there is no need to standardize the product, and an extensive set of rules and procedures is not required.

A very high proportion of the futures contracts that are traded do not lead to the

delivery of the underlying asset. They are closed out 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.

Forward contracts differ from futures contracts in a number of ways. Forward contracts are private arrangements between two parties, whereas futures contracts are traded on exchanges. There is generally a single delivery date in a forward contract, whereas futures contracts frequently involve a range of such dates. Because they are not traded on exchanges, forward contracts need not be standardized. A forward contract is not usually settled until the end of its life, and most contracts do in fact lead to delivery of the underlying asset or a cash settlement at this time.

In the next few chapters we will look at how forward and futures prices are determined. We will also examine in more detail the ways in which forward and futures contracts can be used for hedging.

Suggestions for Further Reading

Chance, D. *An Introduction to Derivatives*, 4th edn. Orlando, FL: Dryden Press, 1997.

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Hicks, J. R. *Value and Capital*. Oxford: Clarendon Press, 1939.

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Keynes, J. M. *A Treatise on Money*. London: Macmillan, 1930.

Kolb, R. *Futures, Options, and Swaps*, 3rd edn. Oxford: Blackwell, 2000.

Schwager, J. D. *A Complete Guide to the Futures Markets*, New York: John Wiley & Sons, 1984.

Teweles, R. J., and F. J. Jones. *The Futures Game*. New York: McGraw-Hill, 1987.

Quiz (Answers at End of Book)

2.1. Distinguish between the terms *open interest* and *trading volume.*

2.2. What is the difference between a *local* and a *commission broker.*

2.3. Suppose that you enter into a short futures contract to sell July silver for $5.20 per ounce on the New York Commodity Exchange. The size of the contract is 5,000 ounces. The initial margin is $4,000, and the maintenance margin is $3,000. What change in the futures price will lead to a margin call? What happens if you do not meet the margin call?

2.4. Suppose that in September 2000 you take a long position in a contract on May 2001 crude oil futures. You close out your position in March 2001. The futures price (per barrel) is $18.30 when you enter into your contract, $20.50 when you close out your position, and $19.10 at the end of December 2000. One contract is for the delivery of 1,000 barrels. What is your total profit? When is it realized? How is it taxed if you are (a) a hedger and (b) a speculator? Assume that you have a December 31 year-end.

2.5. What does a stop order to sell at $2 mean? When might it be used? What does a limit order to sell at $2 mean? When might it be used?

2.6. What is the difference between the operation of the margin accounts administered by a clearinghouse and those administered by a broker?

2.7. What differences exist in the way prices are quoted in the foreign exchange futures market, the foreign exchange spot market, and the foreign exchange forward market?

Questions and Problems (Answers in Solutions Manual)

2.8. The party with a short position in a futures contract sometimes has options as to the precise asset that will be delivered, where delivery will take place, when delivery will take place, and so on. Do these options increase or decrease the futures price? Explain your reasoning.

2.9. What are the most important aspects of the design of a new futures contract?

2.10. Explain how margins protect investors against the possibility of default.

2.11. An investor enters into two long futures contracts on frozen orange juice. Each contract is for the delivery of 15,000 pounds. The current futures price is 160 cents per pound, the initial margin is $6,000 per contract, and the maintenance margin is $4,500 per contract. What price change would lead to a margin call? Under what circumstances could $2,000 be withdrawn from the margin account?

2.12. Show that if the futures price of a commodity is greater than the spot price during the delivery period there is an arbitrage opportunity. Does an arbitrage opportunity exist if the futures price is less than the spot price? Explain your answer.

2.13. Explain the difference between a market-if-touched order and a stop order.

2.14. Explain what a stop–limit order to sell at 20.30 with a limit of 20.10 means.

2.15. At the end of one day a clearinghouse member is long 100 contracts, and the settlement price is $50,000 per contract. The original margin is $2,000 per contract. On the following day the member becomes responsible for clearing an additional 20 long contracts, entered into at a price of $51,000 per contract. The settlement price at the end of this day is

$50,200. How much does the member have to add to its margin account with the exchange clearinghouse?

2.16. On July 1, 2001, a company enters into a forward contract to buy 10 million Japanese yen on January 1, 2002. On September 1, 2001, it enters into a forward contract to sell 10 million Japanese yen on January 1, 2002. Describe the payoff from this strategy.

2.17. The forward price on the Swiss franc for delivery in 45 days is quoted as 1.8204. The futures price for a contract that will be delivered in 45 days is 0.5479. Explain these two quotes. Which is more favorable for an investor wanting to sell Swiss francs?

2.18. Suppose you call your broker and issue instructions to sell one July hogs contract. Describe what happens.

2.19. "Speculation in futures markets is pure gambling. It is not in the public interest to allow speculators to trade on a futures exchange." Discuss this viewpoint.

2.20. Identify the contracts with the highest open interest in Table 2.2. Consider each of the following sections separately: grains and oilseeds, livestock and meat, food and fiber, and metals and petroleum.

2.21. What do you think would happen if an exchange started trading a contract in which the quality of the underlying asset was incompletely specified?

2.22. "When a futures contract is traded on the floor of the exchange, it may be the case that the open interest increases by one, stays the same, or decreases by one." Explain this statement.

2.23. Suppose that on October 24, 2001, you take a short position in an April 2002 live-cattle futures contract. You close out your position on January 21, 2002. The futures price (per pound) is 61.20 cents when you enter into the contract, 58.30 cents when you close out your position, and 58.80 cents at the end of December 2001. One contract is for the delivery of 40,000 pounds of cattle. What is your total profit? How is it taxed if you are (a) a hedger and (b) a speculator?

Assignment Questions

2.24. A company enters into a short futures contract to sell 5,000 bushels of wheat for 250 cents per bushel. The initial margin is $3,000 and the maintenance margin is $2,000. What price change would lead to a margin call? Under what circumstances could $1,500 be withdrawn from the margin account?

2.25. Suppose that on March 15, 2001, speculators tended to be short Sugar-World futures and hedgers tended to be long Sugar-World futures. What does the Keynes and Hicks argument imply about the expected future price of sugar? Use Table 2.2. Explain carefully what is meant by the expected price of a commodity on a particular future date.

2.26. Suppose that corn can be stored for 20 cents per bushel per year and the risk-free interest rate is 5% per year. How could you make money in the corn market on March 15, 2001, by trading the May 2001 and May 2002 contracts? Use Table 2.2.

2.27. "A long forward contract is equivalent to a long position in a call option and a short position in a put option." Explain this statement.