CHAPTER 1 FUTURES MARKETS: INTRODUCTION

OVERVIEW

This chapter lays the foundations that are essential to understanding how futures markets function. First, we introduce forward contracts, which have existed for many centuries and are closely related to modern futures contracts. We show that the very first futures contract emerged as a special kind of forward contract, one containing highly standardized contract terms and traded on an organized exchange. Understanding the ways in which futures contracts differ from forward contracts is important for understanding why modern futures markets exist.

After exploring the development of modern futures contracts, the chapter describes some of the institutions that facilitate futures trading. These institutions include futures exchanges and futures clearinghouses. We examine the ways in which futures exchanges are structured and the ways they compete with each other for business. We describe how the clearinghouse serves to guarantee the performance of all futures transactions and to protect the financial integrity of the marketplace. The chapter also describes the various types of futures contracts that are traded and the role of various industry participants.

We focus on futures markets in the United States because U.S. futures markets have served as a model for newer futures markets found around the world. Although our focus is on U.S. markets, we also describe markets outside of the United States that have been growing rapidly in recent years.

This chapter discusses the two key social benefits that futures markets provide: price discovery and risk transference through hedging. Because regulation is important in determining whether futures markets can serve their social functions and the interests of the trading parties, the chapter next discusses the regulatory framework, closing with a description of the taxation of futures markets.

ORIGINS OF FORWARD CONTRACTING

A **forward contract** is an agreement negotiated between two parties for the delivery of a physical asset (e.g. oil or gold) at a certain time in the future, for a certain price fixed at the inception of the contract. The parties agreeing to the forward contract are known as counterparties. No actual transfer of ownership occurs in the underlying asset when the contract is initiated. Instead, there is simply an agreement to transfer ownership of the underlying asset at some future delivery date.

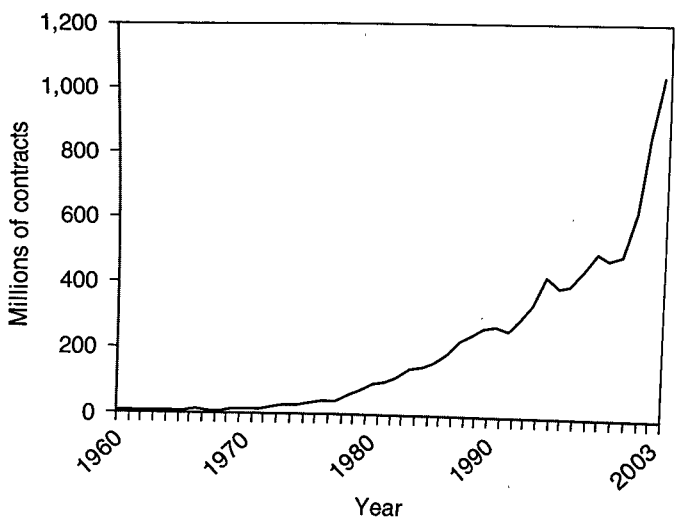
The following example illustrates a very simple, yet frequently occurring, type of forward contract. Having heard that a highly prized St. Bernard has just given birth to a litter of pups, a dog fancier rushes to the kennel to see the pups. After inspecting the pedigree of the parents, the dog fancier offers to buy a pup from the breeder. The exchange, however, cannot be completed at this time, since the pup is

too young to be weaned. The fancier and breeder thus agree that the dog will be delivered in 6 weeks and that the fancier will pay the $400 in 6 weeks upon delivery of the puppy. This contract is not a conditional contract; both parties are obligated to complete it as agreed.[1] The puppy example represents a very basic type of forward contract. The example could have been made more complicated by the breeder requiring a deposit, but that would not change the essential character of the transaction. In this example, there is a buyer and a seller. The buyer is said to have a **long position**, while the seller has a **short position**. The act of buying is also called **going long**, and the act of selling is called **going short**. In order for the contract to trade, there must be a long position and a short position. When one trader buys and another sells a futures contract, the transaction generates one contract of trading **volume**.

Figure 1.1 shows the growth of trading volume on U.S. futures exchanges. From the very nature of the trading, there will always be an equal number of long and short positions outstanding. When a contract is first listed for trading, there is no volume. Assume that the first trade is for one contract, leaving one trader long one contract and one trader short one contract. At this point, there is one open contract, or one contract is obligated for delivery. The **open interest** is the number of open contracts or the number of contracts obligated for delivery. (As we will see later in this chapter, most contracts do not actually lead to delivery.)

From the simplicity of the contract and its obvious usefulness in resolving uncertainty about the future, it is not surprising that such contracts have had a very long history that likely dates to the very beginning of the development of commercial markets. Some authors trace the origins of forward contracts to the commodity lending activities of ancient Babylonian temples. These examples date from the time of the First Babylonian Dynasty (1894 BC to 1595 BC). Other authors trace the practice to Roman and even classical Greek times. Strong evidence suggests that Roman emperors entered into

Figure 1.1 The Growth of Trading Volume on U.S. Exchanges



forward contracts with their suppliers of Egyptian grain. Still others have traced the origin of forward contracting to India.[2]

While there may not be much agreement about the origins of forward contracting, it is clear that trading originated with contracts similar in form to that of the puppy example. In fact, such contracts continue to be important today, not only among dog lovers, but in markets for credit and foreign exchange as well. For example, hundreds of billions of dollars of foreign currencies change hands daily through forward contracts between money center banks. These contracts are very similar in structure to the puppy contract.

Forward contracts on both foreign exchange and physical commodities involve physical settlement at maturity. A contract to purchase Japanese yen for British pounds 3 months hence, for example, involves a physical transfer of sterling from the buyer to the seller, in return for which the buyer receives yen from the seller at the negotiated exchange rate. Many forward contracts, however, are cash-settled forward contracts. At the maturity of such contracts, the long receives a cash payment if the spot price on the underlying prevailing at the contract's maturity date is above the purchase price specified in the contract. If the spot price on the underlying prevailing at the maturity date of the contract is below the purchase price specified in the contract, then the long makes a cash payment.

While forward markets are very large and important, and while they resemble futures markets, the aim of this book is primarily to develop an understanding of futures contracts and the organized exchanges where they trade. Comparing the structure of forward and futures contracts helps to illuminate the essential similarities and differences between these two kinds of markets.

FORWARD VERSUS FUTURES MARKETS

The precise origins of futures trading are unclear. The answer depends on which attributes are considered essential for a contract to be called a modern-day futures contract. Perhaps the first organized exchange to trade futures contracts was the Dōjima Rice Market in Osaka, Japan. As early as 1730, the Dōjima Rice Market was trading what were essentially rice futures, with standardized contractual definitions for product quality, delivery time, and delivery location. The contracts traded on a central trading floor, used a standardized clearing system, and the exchange provided a mechanism for determining official settlement prices.

In the Western world, the antecedents to modern futures contracts can be found in a type of forward contract known as a "to-arrive" contract. In a "to-arrive" contract, traders agree to terms for a transaction before the arrival of the goods. To-arrive contracts became popular, particularly in the Chicago grain trade, beginning in the 1840s. In 1848, the Chicago Board of Trade (CBOT) was founded to facilitate the exchange of "to-arrive" contracts. In 1865, the CBOT listed a new type of standardized contract they called "futures." By all accounts, this is the first time the term had been used.[3] Since then, the basic structure of futures contracts has been adopted by a number of other exchanges, both in the United States and abroad.

To see why futures contracts evolved from forward contracts, it is important to understand the main distinctions between the two types of contracts.[4] First, futures contracts are traded on an organized futures exchange, such as the CBOT. In contrast, forward contracts are privately negotiated in the over-the-counter (OTC) market. Second, the terms of futures contracts are standardized across all contracts of the same type, whereas the terms of forward contracts are individually negotiated to suit the needs of each party to the contract. Third, futures contracts are cleared through a central clearinghouse,

whereas forward contracts are not. Fourth, futures contracts rely on a system of margins and daily settlement to protect the financial integrity of the contract. Forward contracts generally do not rely on such a system. Fifth, users of futures contracts can easily and cheaply offset and close a position prior to contract expiration. Users of a forward contract can close their position only if they separately negotiate a termination agreement – something that may be costly to do. Finally, the regulatory structure governing the two types of contracts differs. Futures contracts are regulated by the Commodity Futures Trading Commission (CFTC), an agency of the federal government. Forward contracts are self-regulating in accordance with ordinary commercial contract law and, if things go badly, bankruptcy law.

Main Distinctions Between Futures And Forward Contracts

1. Futures trade on organized exchanges whereas forwards are traded OTC.
2. Futures contracts have standardized contract terms whereas the terms of forward contracts are individually negotiated.
3. Futures exchanges have clearinghouse arrangements to guarantee the fulfillment of contract obligations; the fulfillment of contract terms in the forward market depends on the creditworthiness of the contract's counterparties.
4. Futures contracts generally require margin payments and daily settlement whereas forward contracts do not.
5. Futures positions can be closed easily, forward contracts cannot.
6. Futures markets are regulated by identifiable government agencies, while forward markets are self-regulating in accordance with contract law.

The Organized Exchange

Legally, futures contracts must be traded on an organized exchange like the CBOT (some specialized instruments may have payoff structures that closely resemble futures contracts, such as some privately negotiated swaps, but these instruments are limited to sophisticated market participants such as large financial firms, and are excluded from the reach of futures regulation). The organization of the CBOT, the oldest and, until recently, largest futures exchange in the world, is typical. The exchange has been a nonprofit association of its members since its inception in the mid-nineteenth century. In recent years, however, there has been a movement away from the nonprofit form of the organization. For example, the Chicago Mercantile Exchange (CME) recently converted itself into a for-profit corporation. Eurex US is also a for-profit exchange under the Eurex holding company. The CBOT and the New York Mercantile Exchange (NYMEX) are in the process of converting to for-profit status.

In the not-for-profit organizational structure, individuals hold **exchange memberships**, also called **seats**.[5] These memberships are equity shares held by individuals, and trade in an active market among qualified individuals in much the same way that equity shares are traded in other markets. Table 1.1 shows recent membership prices for major futures exchanges in the United States. As the prices indicate, these seats are valuable capital assets. Also, the value of these seats fluctuates dramatically. The prices of these seats depend mainly on recent and anticipated trading volume.[6] The value of intellectual property held by exchanges has also become an important contributor to the value of seat prices.

Membership Prices of Major U.S. Futures Exchanges — Table 1.1

Exchange	Membership Price
Chicago Mercantile Exchange	$400,000
Chicago Board of Trade	935,000
New York Mercantile Exchange	1, 650,000
New York Board of Trade	205,000

Source: Exchange web sites. Prices represent last sale in July 2004.

Equity ownership is an important reason to hold an exchange membership, but not the only one. Exchange members hold the right to trade on the exchange and to have a voice in the exchange's operation. Members also serve on committees to administer the exchange's operations, rules, audit functions, public relations, and the legal and ethical conduct of members. Often administrative officers of the exchange manage the ordinary operation of the exchange and report to the membership.

When an exchange converts to for-profit status (that is, it "demutualizes"), the members receive shares of stock in the new corporation. In the conversion of the CME, for example, members holding seats in the not-for-profit association received two classes of stock in the new for-profit corporation. One class of stock represents ownership in the corporation, while the other carries the right to trade on the exchange. In December 2002, The CME held an initial public offering of its shares. These shares are now traded on the New York Stock Exchange under the ticker symbol CME. In 2004, the market capitalization of Chicago Mercantile Exchange Holdings, Inc. was approximately $4 billion. The CME still maintains transferable membership seats, where each seat controls a set number of publicly traded shares.[7]

Traditionally, futures contracts have traded by a system called **open outcry** in which the central marketplace is a trading room where traders literally "cry out" their bids to go long and offers to go short. In this system, trading occurs face to face in a designated trading area called a **pit** because of the bowl-like arrangement in which the traders stand. This is a physical location on the floor of the exchange, with each commodity trading in a designated pit. A trader makes an offer to buy or sell to all other traders present in the pit. Traders also use an unofficial, but highly developed, system of hand signals to express their wishes to buy or sell.

Traders in the pit fall into two groups that we can distinguish by their function. First, a trader can trade for his or her own account and bear the losses or enjoy the profits stemming from this trading. Second, a trader can be a broker acting on behalf of his or her own firm or on behalf of a client outside the exchange. For example, the brokers trading on the exchange often represent large brokerage houses such as Merrill Lynch or Prudential-Bache. Having distinguished between traders who execute trades for their own accounts and those who execute trades for others, we must realize that certain individuals exercise both functions simultaneously.[8]

As recently as 1990, futures trading was conducted exclusively through open outcry. Today, however, open outcry trading accounts for less than half of all futures trading volume. Most futures trading volume now occurs on electronic trading platforms. These trading platforms are owned and operated by the futures exchanges. Some exchanges, like the CME, NYMEX, and CBOT use both open outcry trading and electronic trading. Other exchanges, like Eurex US, offer electronic trading exclusively. Electronic trading is discussed in some detail in Chapter 2.

Members of the exchange who trade in the pits are typically speculators. A **speculator** is a trader who enters the futures market in pursuit of profit, accepting risk in the endeavor. Some of the traders in the pit who trade for their own account may not be full exchange members themselves. It is possible to lease a seat on the exchange from a full member. Also, some exchanges have created special licenses allowing nonmembers to trade in certain contracts in which the exchanges are eager to build volume. For the most part, a trader in the pit trading for his or her own account is a speculator.

In addition to speculators, many traders are **hedgers**, traders who trade futures to reduce some preexisting risk exposure. Hedgers are often producers or commercial users of a given commodity. For example, hedgers in wheat might include wheat farmers and large baking firms. Notice that these hedgers do not necessarily need to own the wheat when they hedge. A farmer might hedge by selling his anticipated harvest through the futures market. This could occur even before the farmer plants. Similarly, the baker who will eventually bake the farmer's wheat harvest into bread may hedge an expected need for wheat, months before the wheat is actually required. Therefore, hedging is the purchase or sale of futures as a temporary substitute for a transaction in the cash market.[9] For the most part, hedgers are not themselves located on the floor of the exchange. Instead, they trade through a brokerage firm. The brokerage firm communicates the order to the pit and has it executed by a broker in the pit.

Thus, there are two different kinds of brokers. An account executive for a brokerage firm is often called a broker. He or she could be located in any town or city and deals with his or her customers, conveying their orders to the exchange. A second type of broker is a floor broker, a broker on the floor of the exchange who executes orders for other customers. For a typical transaction entered by a trader off-the-floor of the exchange, the order will be given to the customer's broker (account executive), who will transmit the order to the brokerage firm's representatives at the exchange. There a floor broker, often employed by the brokerage firm, will execute the order on the floor of the exchange.

This organized structure for trading futures contracts differs from the organization of forward markets. Forward markets are loosely organized and have no physical location devoted to trading.[10] From the puppy example, this difference is clear. Perhaps the best-developed forward market is the market for foreign exchange. It is a worldwide network of participants, largely banks and brokers, who communicate with each other electronically. In the forward market for foreign exchange, there is no organized exchange and no central trading point.[11]

Standardized Contract Terms

A second major difference between forward and futures contracts is that futures contracts always have standardized contract terms. The puppy example is typical of a forward contract in its lack of standardization. The puppy is not a standardized item; the parties agreed on a particular delivery date, but they could have chosen any other date that was mutually agreeable; and there was no mechanism external to the traders to guarantee that the contract would be fulfilled. By contrast, futures contracts are highly uniform with well-specified commitments for a carefully described good to be delivered at a certain time and in a certain manner. Generally, the futures contract specifies the quantity and quality of the good that can be delivered to fulfill the futures contract. The contract also specifies the delivery date and method for closing the contract, and the permissible minimum and maximum price fluctuations permitted in trading.

As an example, consider the CBOT wheat contract. A single wheat contract consists of 5,000 bushels of wheat that must be of one of the following types: No. 2 Soft Red, No. 2 Hard Red Winter, No. 2 Dark Northern Spring, or No. 1 Northern Spring. The wheat contract trades for expiration in the

following months of each year: July, September, December, March, and May. The Board of Trade also stipulates the delivery terms for completing the contract. To deliver wheat in completion of the contract, the wheat must be in a warehouse approved by the CBOT.[12] These warehouses must be in the Chicago Switching District or the Toledo, Ohio, Switching District. The buyer transmits payment to the seller, and the seller delivers a warehouse receipt to the buyer. The holder of a warehouse receipt has title to the wheat in the warehouse. Delivery can occur on any business day in the delivery month.

The contract also stipulates the minimum price fluctuation, or **tick** size. For wheat, one tick is one-quarter cent/bushel. With 5,000 bushels contract, this gives a tick size of $12.50/contract. The contract also specifies a **daily price limit**, which restricts the price movement in a single day. For wheat, the trading price on a given day cannot differ from the preceding day's closing price by more than 30 cents/bushel, or $1,500/contract. When the contract is trading in its delivery month (called the spot month), this price limit is not in effect. Also, when a commodity enters a particularly volatile period, price limits are generally expanded over successive days. For example, when Iraq invaded Kuwait in 1991, oil prices skyrocketed for several days. On the first day, the futures price was allowed to rise only by the limit. Because the price rose the limit on one day, the price limit was expanded for the next day. For most commodities, price limits expand over several days until there is no limit on how much the price can change in a day. Also, some commodities do not have price limits.[13] Finally, the exchange controls the trading times for each futures contract. Wheat trades from 9:30 AM to 1:15 PM Chicago time on each trading day, except for the last day of trading when trading in the expiring contract ceases at noon. The last trading day for the wheat contract is 7 business days before the last business day of the delivery month.

Lock Limit Down: Mad Cows at the CME

The term "lock limit" refers to the price limits that exchanges place on their contracts. If the market is down the limit, trades cannot take place below the limit price, although trading is free to occur above that price. Most of the time, trading is effectively halted after a price limit is hit. Trading resumes the next day with a new limit price in place.

But what happens when the market is locked at a limit price as a contract moves into the delivery period? On December 23, 2003 the CME faced such a problem with its live cattle futures contract after "Mad Cow" disease (bovine spongiform encephalopathy, or BSE) was discovered in the United States for the first time. This discovery was announced with only four trading sessions remaining before the December contract expired. Prior to the news, the December contract was trading at 92.35 cents/lb with a daily price limit of 1.5 cents. After the jolting news, cash market indicators implied that the true market price for the December futures was likely to be much lower. On the first day of trading, sell orders poured in and potential buyers, who knew that the true price was lower than the limit price, refused to trade. The market hit the limit and trading halted shortly after the opening bell at 90.85 cents/lb. After the Christmas holiday, trading resumed with an expanded limit of 3 cents/lb. This limit was also hit immediately after the opening bell with only a few trades. After the weekend, the CME made an emergency rule change that applied only to the December contract that moved the price limit

Continued

to 5 cents/lb. The market again hit the limit price shortly after the opening bell at 82.85. Almost a week had passed since the news hit the market and still no market clearing price for the December contract had been established. The CME then expanded the limit to 7.5 cents/lb for the final full day of trading before delivery. The market resumed trading within this limit and closed at 77.95 cents/lb going into delivery the following day.

What would have been the consequences of going into delivery lock-limit down? For starters, the cash price and the futures price would not converge as it normally does. As a result, hedges would have been less effective. Those with short futures positions would not see their futures gains entirely offset their cash market losses. Those hedging anticipated purchases with long futures positions would have benefited. Going into delivery lock limit down would also raise concerns about whether such a large number of deliveries could actually take place. In normal times, traders choose not to stand for delivery. With lock limit prices, more people would have been locked into their positions and forced into the delivery process. The market may not have been able to handle such a large amount of deliveries in such a short period of time.

Fortunately, instances like this are extremely rare.

Although these rules may appear highly restrictive, they actually stimulate trading. Because the good being traded is so highly standardized, all the participants in the market know exactly what is being offered for sale, and they know the terms of the transactions. This uniformity helps to promote liquidity. All futures contracts have such a highly developed framework, which specifies all phases of the transaction. As we saw for wheat, these rules regulate all phases of the market, from the amounts the prices can move to the appropriate ways of making delivery. The prospective trader should consult a given contract for these exact details before initiating any trading. Each exchange publishes contract terms through their web sites.

Features Typically Standardized in a Futures Contract

1. Quantity
2. Quality
3. Expiration months
4. Delivery terms
5. Delivery differentials
6. Delivery dates
7. Minimum price fluctuation
8. Daily price limits
9. Trading days and hours

The Clearinghouse

To ensure that futures contracts trade in a smoothly functioning market, each futures exchange has an arrangement with a futures clearinghouse. The clearinghouse may be organized as a separate corporation that offers futures clearing services, possibly in addition to other services, to multiple exchanges.

Or the clearinghouse may be organized as a division of the futures exchange. In either case, each exchange will be closely associated with a particular clearinghouse. Clearing arrangements vary across the industry, largely the result of the Commodity Futures Modernization Act (CFMA) of 2000, which regulates clearinghouses as a line of business separate from the trade execution services offered by exchanges. The variety of clearing arrangements can best be observed in Chicago, where under a clearing service agreement between the CBOT and the CME that was implemented in 2004, most clearing functions for CBOT contracts are performed by the CME clearinghouse. Also in Chicago, the Clearing Corporation (CCorp) (formerly known as the Board of Trade Clearing Corporation) clears trades for Eurex US and the Merchants Exchange of St. Louis.

The clearinghouse guarantees that all of the traders in the futures market will honor their obligations.[14] The clearinghouse serves this role by adopting the position of buyer to every seller and seller to every buyer. This means that every trader in the futures market has obligations only to the clearinghouse and has expectations that the clearinghouse will maintain its side of the bargain as well. Thus, the clearinghouse substitutes its own credibility for the promise of each trader in the market. The clearinghouse can make its promises credible because of its financial safeguard system. Two types of clearinghouse financial safeguard systems are observed across the market. The first type is called **good to the last drop**, meaning that the clearinghouse commits its capital to satisfy any default obligations not covered by (1) the margin posted by clearing members on behalf of customers and the member's proprietary accounts; or (2) a separately capitalized guarantee fund. In the good-to-the-last-drop model, the clearinghouse commits to satisfying all obligations to the point where the clearinghouse itself is insolvent. The NYMEX clearinghouse and the London Clearing House (LCH) are examples of clearinghouses using the good-to-the-last-drop model.

The second type of financial safeguard model is the **live another day** model. In this model, clearing members are protected primarily with guarantee funds. The core capital of the clearinghouse is not committed to satisfying all obligations. In this model, a primary objective is to sustain the clearinghouse so that it can continue to perform its risk-mitigating role during times of crisis when it is needed the most. In this model, default obligations are ultimately borne by clearing members who must absorb unpaid invoices. There are many ways this model can be implemented. For example, the CCorp makes no commitments beyond the guarantee fund. Other clearinghouses using this safeguard model employ several lines of defense to protect the clearinghouse and ensure that all obligations are met.

A clearinghouse's first line of defense against clearinghouse default is the margin money deposited by clearing member firms on behalf of their customers and their own proprietary accounts. For example, in January 2004, the CME clearinghouse held $39.5 billion in margin money. A second line of defense is the capital of the clearing member in the event the clearing member defaults on its obligations to the clearinghouse. A third line of defense is the capital of the clearinghouse in excess of the working capital required for continuing clearinghouse operations. In the beginning of 2004, the value of capital amounted to approximately $85 million at the CME clearinghouse. Another line of defense comes from the guarantee fund maintained by clearing members at the clearinghouse. The money in the fund comes from a volume-based assessment on members so that the fund accrues value over time. At the beginning of 2004, the value of this guarantee fund totaled $876 million at the CME clearinghouse. If all of these funds are exhausted, the clearinghouse has the right to assess clearing members for unsatisfied obligations. The value of this assessment power totaled $2.4 billion at the beginning of 2004, at the CME clearinghouse. The clearinghouse also holds credit lines to ensure that funds are immediately available in the case of an emergency. Finally, the clearinghouse performs periodic risk evaluations of clearing members in an attempt to detect potential weaknesses in financial condition or risk controls.

Volume Investors

The March 1985 failure of Volume Investors, a futures broker and clearing member of the Commodities Exchange, Inc. (now a division of the NYMEX) illustrates the contractual relationships among the customer, the broker, and the clearinghouse. Some customers of Volume defaulted on a margin call, causing Volume to default on the clearinghouse's margin call. This clearinghouse's margin call exceeded Volume's assets. The clearinghouse seized all of the accumulated margin previously posted by Volume on behalf of its customers in order to pay the other clearing members. This left the non-defaulting customers of Volume with no margin at the clearinghouse and no timely means of obtaining from the failed broker their margin receipts or other funds held in their accounts. Thus, arm's-length customers of Volume, whose only connection with the individuals who defaulted was simply the use of a common broker, found that they had substantial sums at risk.[15]

In May 2000, a similar failure occurred when a customer of Klein and Co. Futures Inc. incurred substantial losses at the New York Board of Trade's New York Futures Exchange (NYFE) subsidiary. The losses caused the New York Clearing Corporation to liquidate Klein's customer margin account, which consisted of the commingled margins for all customers. Once again, arm's-length customers of the broker, whose only connection with the individual who defaulted was simply the use of a common broker, found that they had substantial sums at risk.

The clearinghouse takes no active position in the market, but interposes itself between all parties to every transaction. (As we will see, the clearinghouse works directly with brokerage houses that are clearing members and indirectly with the ultimate traders who must go through a brokerage house that is a clearing member). In the futures market, the number of contracts bought must always equal the number of contracts sold. So, for every party expecting to receive delivery of a commodity, the opposite trading partner must be prepared to make delivery. If we sum all outstanding long and short futures market positions, the total always equals zero.[16]

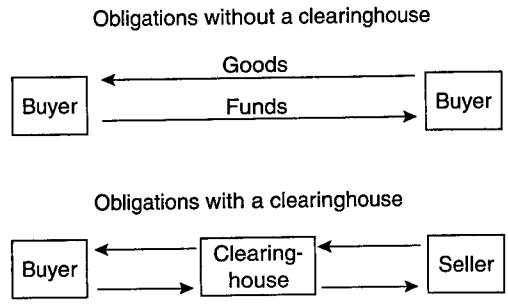
Table 1.2 shows the typical trading situation. In the table, we assume that all transactions occur on a single day, say May 1. Party 1 trades on the futures exchange to buy one oats contract of 5,000 bushels for delivery in September. In order for Party 1 to buy the contract, some other participant must sell. In panel (a) of the table, it is apparent that Party 1 and Party 2 have exactly complementary positions in the futures market. One party has bought exactly what the other has sold. Notice that the time of delivery, the amount of oats to be delivered, and the price all match. Without a perfect match in all these respects, there could not have been a transaction. In all probability, the two trading parties will not even know each other. It is perfectly possible that each will have traded through a broker from different parts of the country. In such a situation, problems of trust may arise. How can either party be sure that the other will fulfill the agreement? The clearinghouse exists to solve that problem. As panels (b) and (c) indicate, the clearinghouse guarantees fulfillment of the contract to each of the trading parties. After the initial sale is made, the clearinghouse steps in and acts as the seller to the buyer and acts as the buyer to the seller. In panel (b), the clearinghouse guarantees the buyer of the futures contract, Party 1, that it will deliver at the initially agreed time and price. To the seller, Party 2, the clearinghouse

Futures Market Obligations **Table 1.2**

The oat contract is traded by the CBOT. Each contract is for 5,000 bushels, and prices are quoted in cents per bushel.

(a)	*Party 1* Buys 1 SEP contract for oats at 171 cents/bushel	*Party 2* Sells 1 SEP contract for oats at 171 cents/bushel
(b)	*Party 1* Buys 1 SEP contract for oats at 171 cents/bushel	*Clearinghouse* Agrees to delivery to Party 1 a SEP contract for oats at a price of 171 cents/bushel
(c)	*Party 2* Sells 1 SEP contract for oats at 171 cents/bushel	*Clearinghouse* Agrees to receive from Party 2 a SEP contract for oats and to pay 171 cents/bushel

The Function of the Clearinghouse in Futures Markets **Figure 1.2**



guarantees that it will accept delivery at the agreed time and price, as panel (c) shows. Figure 1.2 illustrates the same idea graphically. Without a clearinghouse, both parties must deal with each other, and they have direct obligations to one another. With a clearinghouse, each party has obligations to the clearinghouse and the clearinghouse will ensure that they perform.

Because of the clearinghouse, the two trading parties do not need to trust each other or even know each other's identity. Instead, the two traders only have to be concerned about the reliability of the clearinghouse. However, the clearinghouse is a large, well-capitalized financial institution. Its failure to perform on its guarantee to the two trading parties would bring the futures market to ruin. In the history of U.S. futures trading, the clearinghouse has always performed as promised, so the risk of a future default by the clearinghouse is very small.[17]

A more careful examination of panels (b) and (c) from Table 1.2 gives further confidence that the clearinghouse will perform as promised. In total, the clearinghouse has no independent position in

oats. It is obligated to receive oats and pay 171 cents/bushel, but it is also obligated to deliver oats and receive 171 cents/bushel. These two obligations net out to zero. Since it maintains no futures market position of its own, the riskiness of the clearinghouse is less than it may appear.[18]

Margin and Daily Settlement

In addition to the clearinghouse, there are other safeguards for the futures market. Chief among these are the requirements for margin and daily settlement. Before trading a futures contract, the prospective trader must deposit funds with a broker. These funds serve as a good-faith deposit, or performance bond, by the trader and are referred to as **margin**. The main purpose of margin is to provide a financial safeguard to ensure that traders will perform on their contract obligations. The margin requirement restricts the activity of traders, so the exchanges and brokers are anxious that the margin requirements not be unreasonably high.[19] The amount of this margin varies from contract to contract and may vary by broker as well.[20] The margin may be posted in cash, a bank letter of credit, or in short-term U.S. Treasury instruments. The trader who posts this margin retains title to it in a **segregated account** held at the brokerage. In a segregated account, customer margin money cannot be commingled with the brokerage house's own money. This is to prevent the brokerage from trading for its own account using customer money. Although customer money is segregated from the brokerage house's money, customer money is not individually segregated from the money of other customers. This means that customers can potentially be at risk to defaults by other customers as we saw in the case of Volume Investors.

Types of Margin. In this section, we consider the different types of margins and show how margin requirements would affect a trader holding a single futures position. In the next section, we consider margin rules for more complicated positions.

There are three types of margin. The initial deposit just described is the **initial margin** – the amount a trader must deposit before trading any futures. The initial margin approximately equals the maximum daily price fluctuation permitted for the contract being traded. Upon proper completion of all obligations associated with a trader's futures position, the initial margin is returned to the trader. If one has deposited a security as the margin, then the trader earns the interest that accrues while the security has served as the margin.

For most futures contracts, the initial margin may be 5 percent or less of the underlying commodity's value. It may seem strange that the initial margin is so small relative to the value of the commodity underlying the futures contract. The smallness of this amount is reasonable, however, because there is another safeguard built into the system in the form of **daily settlement** or **marking-to-market**. In the futures market, traders are required to realize any losses in cash on the day they occur. In the parlance of the futures market, the contract is marked-to-the-market.

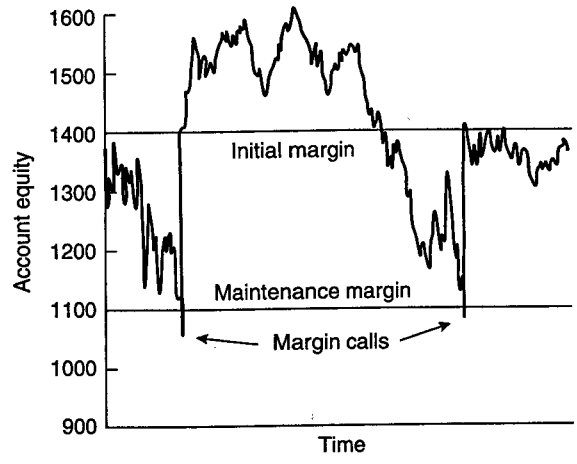
Three Types of Margin

1. Initial margin
2. Maintenance margin
3. Variation margin

To understand the process of daily settlement, consult Table 1.2 again and consider Party 1, who bought one contract for 171 cents/bushel. Assume that the contract closes on May 2 at 168 cents/bushel. This means that Party 1 has sustained a loss of 3 cents/bushel. Since there are 5,000 bushels in the contract, this represents a loss of $150, which is deducted from the margin deposited with the broker. When the value of the funds on deposit with the broker reaches a certain level, called the **maintenance margin**, the trader is required to replenish the margin, bringing it back to its initial level. This demand for additional margin is known as a **margin call**. The additional amount the trader must deposit is called the **variation margin**. The maintenance margin is generally about 75 percent of the amount of the initial margin. For example, assume that the initial margin was $1,400, that Party 1 had deposited only this minimum initial margin, and that the maintenance margin is $1,100. Party 1 has already sustained a loss of $150, so the equity in the margin account is $1,250. The next day, assume that the price of oats drops 4 cents/bushel, generating an additional loss for Party 1 of $200. This brings the value of the margin account to $1,050, which is below the level of the required maintenance margin. This means that the broker will require Party 1 to replenish the margin account to $1,400, the level of the initial margin. To restore the margin account, the trader must pay $350 variation margin. Variation margin must always be paid in cash.

Figure 1.3 uses the initial margin level of $1,400 and the maintenance margin level of $1,100 to illustrate this process. At the outset, the value of the margin deposited with the broker is $1,400. First, the trader has mixed results with some small gains and small losses, with losses predominating. Before long, losses drop the value of the account below $1,100. As the figure shows, the trader must then restore the value, or equity, in the account to $1,400. This is shown in Figure 1.3 by the large dot. After this first margin call, the trader has mixed results for a while, followed by large losses. These losses generate a second margin call. Figure 1.3 shows only the required cash flows. The trader could have withdrawn cash whenever the value of the equity exceeded $1,400. However, a trader cannot withdraw funds that would leave the account's equity value below the level of the initial margin.

Account Equity and Margin Requirements **Figure 1.3**



Because futures prices change almost every day, each account will have frequent gains and losses. The losses can require a variation margin payment, and the gains may entitle the trader to withdraw cash. For convenience, traders do not want to face a daily margin call in many cases. There are two basic ways to avoid a margin call. First, a trader can deposit securities with a value well in excess of the initial margin. Second, a trader can deposit funds in excess of the initial margin into an interest-bearing account. In either case, such a deposit provides a liquidity pool that will protect the trader from untimely demands for variation margin payments. Similarly, the trader can instruct the broker to sweep profits from his account into an interest-bearing investment. Those funds can be held ready to meet margin calls as required.

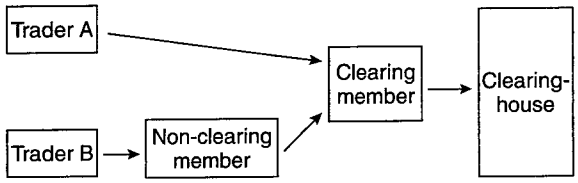
This practice of posting maintenance or variation margin and daily settlement helps make the futures market safer. Assume that Party 1 in Table 1.2 posted only the initial margin, the bare minimum to have the trade executed. Also assume that the trader suffered a loss requiring more margin and that the trader was unable or refused to post the required additional margin. The broker in such a situation is empowered to close the futures position by deducting the loss from the trader's initial margin and returning the balance, less commission costs, to the trader. The broker would also close the trader's entire brokerage account as well. Failure to post the required maintenance margin is a violation of a trader's agreement with the broker. Now, it becomes apparent why the initial margin is so small. The initial margin needs to cover only one day's price fluctuation, because any losses will be covered by the posting of additional variation margin. Failure to pay variation margin will lead to the futures position being closed out.[21] If the futures position cannot be immediately closed out (e.g. if trading is halted due to a limit price move), the broker takes over the position and manages it as a proprietary (broker-owned) position. Eventually, the broker will close out the position when it is possible to do so.

Margin Cash Flows. This section traces the flow of margin funds from the trader to the clearinghouse. The margin system functions through a hierarchy of market participants that links the clearinghouse with the individual trader. The members of an exchange may be classified as clearing members or non-clearing members. A clearing member is a member of the exchange that is also a member of the clearinghouse associated with the exchange. The clearinghouse deals only with clearing members. As a consequence, any non-clearing member must clear his or her trades through a clearing member.

Give Up Agreements

A **give up agreement** is a contract between the customer and broker that specifies the fees and responsibilities of the transacting broker and the clearing broker. Give up agreements are used for at least two reasons. First, not all brokers are members of the clearinghouse associated with the exchange where a transaction is executed. To clear the executed transaction, the broker will "give up" the transaction to a separate broker who is a clearing member of the relevant clearinghouse. Second, a large customer may use a give up agreement as part of a strategy to disguise its trading activity so that other market participants cannot discern what it is doing. Under such a strategy, a large customer might split a large order across five different brokers and then require the brokers to give up the trade for clearing to a single clearing broker. The give up agreement helps the large customer disguise its actions in the marketplace, but preserves the back-office trade processing efficiency that results from the use of a single clearing firm.

Margin Cash Flows **Figure 1.4**



The clearinghouse demands margin deposits from clearing members to cover all futures positions that are carried by that clearing member. For example, a clearing member might be a large broker who executes orders for individual traders and who provides clearing services for some non-clearing members of the exchange. Therefore, the clearing member will impose margin requirements on all of the accounts that it represents to the clearinghouse.

Figure 1.4 shows the margin flows for an individual trader who might trade through a clearing member or a non-clearing member. In the figure, Trader A trades through a broker who is a clearing member. In this case, Trader A deposits margin funds with the clearing member, who makes margin deposits with the clearinghouse. As a second alternative in Figure 1.4, Trader B trades through a broker who is a non-clearing member of the exchange. This broker must arrange to clear all trades with a clearing member. In this situation, Trader B deposits margin funds with his or her broker. This broker deposits margin funds with a clearing member, and the clearing member deposits margin funds with the clearinghouse.

It is not very important whether traders A and B trade directly through a clearing member or a non-clearing member. Most large brokerage firms are clearing members, so most individual traders who trade through their local broker will be trading through a clearing member. However, many members of each exchange trade for their own account as speculators. Few of them are clearing members, so they need to clear their trades through a clearing member.

Closing a Futures Position

Initially, we discussed the completion of a futures contract through delivery. However, in the discussion of variation margin we noted that the broker might close the position after trading on May 2. The careful reader might remember that the initial trade shown in Table 1.2 called for a September delivery. In view of that fact, it may not seem that the futures position could be closed in May. There are, however, three ways to close a futures position: delivery, offset, and an exchange-for-physicals (EFP).

Three Ways to Close a Futures Contract

1. Delivery or cash settlement
2. Offset or reversing trade
3. Exchange-for-physicals (EFP) or ex-pit transaction

Delivery. Most commodity futures contracts are written to call for completion of the futures contract through the physical delivery of a particular good. As we have seen in our discussion of the wheat contract, delivery takes place at certain locations and at certain times under rules specified by a futures exchange. Most financial futures contracts allow completion through **cash settlement**. In cash settlement, traders make payments at the expiration of the contract to settle any gains or losses, instead of making physical delivery. Both physical delivery and cash settlement close the contract in the expiration period. However, few futures contracts are actually closed through either physical delivery or cash settlement. For example, in the fiscal year ending September 30, 2003, only about three-fourths of 1 percent of all contracts traded were settled by either physical delivery or cash settlement. Table 1.3 shows the commodity groups and the percentage of contracts completed by delivery or cash settlement within each group. Only currencies have more than 2 percent of contracts completed by delivery or cash settlement. In the livestock, and energy/wood products groups, delivery or cash settlement is extremely rare. Therefore, the vast majority of all contracts initiated must be completed by some means other than delivery or cash settlement.

A well-designed futures contract must ensure that adequate supplies of the contract's underlying cash commodity are available at delivery in order to prevent manipulation of the delivery process. One method futures exchanges use to ensure the availability of adequate deliverable supplies is to allow shorts the option of delivering non-standard commodities at nonstandard delivery points. When shorts choose this option, they often must pay a surcharge, or **delivery differential**, relative to what they would have paid if they had delivered standard stocks at standard delivery points. These differentials are fixed as standard terms within the futures contract.

There are two types of delivery differentials: **quality differentials** and **location differentials**. Quality differentials are also referred to as **grade differentials**, and location differentials are sometime referred to as **territorial differentials**. Some contracts also specify delivery **timing differentials**.

Table 1.3 Completion of Futures Contracts (via Delivery or Cash Settlement October 1, 2002–September 30, 2003)

		Delivered or settled in cash	
Commodity group	**Volume**	**Contracts**	**Percentage**
Grains	28,917,090	98,235	0.33
Oilseeds	30,917,636	51,143	0.17
Livestock	7,190,906	36,107	0.50
Other agricultural	15,560,473	95,344	0.61
Energy/Wood	94,635,656	839,221	0.89
Metals	18,602,108	209,186	1.12
Financial instruments	760,292,234	7,115,757	0.94
Currencies	30,032,897	682,095	2.27
All commodities	986,149,000	9,125,088	0.93

Source: Commodity Futures Trading Commission, *Annual Report*, 2003.

Quality differentials are based on the standard, or "par" delivery grade. The **par grade** is specified as part of the futures contract. For example, the CBOT's corn contract specifies No. 2 yellow corn as the par grade. However, No. 3 yellow corn is eligible for delivery at a 1½ cent/bushel differential. In other words, if the cash price for the par grade at delivery were $3.00/bushel, a short delivering a shipping certificate for No. 3 yellow corn would receive $2.985/bushel. The CBOT's corn contract also allows delivery of No. 1 yellow corn, a premium grade to the par grade, for a 1½ cent/bushel premium differential. Continuing with our example, a short delivering a shipping certificate for No. 1 yellow corn would receive $3.015/bushel.

Location differentials are defined relative to the standard delivery point or points specified in the futures contracts. For example, the CBOT's corn contract specifies delivery at approved terminals along the Illinois River between Chicago and mile marker number 151 in Pekin, Illinois. Corn delivered at approved terminals between Chicago and Burns Harbor, Indiana will also receive the par price. Corn delivered at terminals between Lockport, Illinois and Seneca, Illinois receive a 2 cent/bushel premium to par. This premium accounts for the fact that it is cheaper to transport corn to the Gulf of Mexico from locations near the Mississippi River than from locations closer to Chicago. Corn delivered to terminals between Ottawa, Illinois and Chilicothe, Illinois receives a 2.5 cent/bushel premium to par. Corn delivered to terminals between Peoria and Pekin receives a 3 cent/bushel premium to par.

For any given futures contract, delivery differentials are fixed as part of the contract's specifications. These fixed differentials are periodically reviewed by the exchanges to determine whether they adequately reflect current market conditions. At any point in time, however, the fixed differentials in the futures contract may not reflect the current market. Both longs and shorts will carefully calculate the current "true" delivery differential and compare it with the delivery differential fixed in the contract. The longs expect that shorts will choose to deliver the cheapest-to-deliver grade at the cheapest-to-deliver location.

A delivery process that couples delivery differentials with non-par grades and locations greatly expands the potential deliverable supply for the futures contract. This is desirable for reducing the contract's susceptibility to manipulation. But expanding the deliverable supply can diminish the contract's usefulness as a hedging instrument by reducing the correlation between the futures contract and the par grade. Evaluating this tradeoff between reduced susceptibility to manipulation and reduced hedging effectiveness is a business decision of the exchange.[22]

Offset. By far, most futures contracts are completed through **offset** or via a **reversing trade**. To complete a futures contract obligation through offset, the trader transacts in the futures market to bring his or her net position in a particular futures contract back to zero. Consider again the situation depicted in Table 1.2. The first party has an obligation to the clearinghouse to accept 5,000 bushels of oats in September and to pay 171 cents/bushel for them at that time. Perhaps the trader does not wish to actually receive the oats and wants to exit the futures market earlier, say May 10. The trader can fulfill the commitment by entering the futures market again and making the reversing trade depicted in Table 1.4.

The first line of Table 1.4 merely repeats the initial trade that was made on May 1. On May 10, Party 1 takes exactly the opposite position by selling 1 SEP contract for oats at the current futures price of 180 cents/bushel. This time the trader transacts with a new entrant to the market, Party 3. After this reversing trade, Party 1's net position is zero. The clearinghouse recognizes this, and Party 1 is absolved from any further obligation. In this example, the price of September oats rose 9 cents/bushel during this period, happily yielding Party 1 a profit of $450. Party 2, the original seller, is not affected

Table 1.4 The Reversing Trade

	Party 1's Initial Position	*Party 2*
May 1	Bought 1 SEP contract for oats at 171 cents/bushel	Sold 1 SEP contract for oats at 171 cents/bushel
	Party 1's Reversing Trade	***Party 3***
May 10	Sells 1 SEP contract for oats at 180 cents/bushel	Buys 1 SEP oats contract at 180 cents/bushel

by Party 1's reversing trade. Party 2 still has the same commitment, because the clearinghouse continues to stand ready to complete this transaction described in Table 1.2. Now the clearinghouse also assumes a complementary obligation to the new market entrant, Party 3. Note that the position of the clearinghouse has not really changed due to the transactions on May 10. Also, Party 2 and Party 3 have complementary obligations after the new trades, just as Party 1 and Party 2 had complementary obligations after the initial transactions on May 1.

In entering the reversing trade, it is crucial that Party 1 sell exactly the same contract (at the same exchange) that was bought originally. Table 1.4 shows that the reversing trade matches the original transaction in the good traded, the number of contracts, and the maturity. If it does not, then the trader undertakes a new obligation instead of canceling the old. If Party 1 had sold one DEC contract on May 10 instead of selling the SEP contract, for example, he or she would be obligated to receive oats in September and to deliver oats in December. Such a transaction would result in holding two positions instead of a reversing trade.

Exchange-for-Physicals (EFP). A trader can complete a futures contract by engaging in an EFP. In an EFP, two traders agree to a simultaneous exchange of a cash commodity and futures contracts based on that cash commodity. The price and other terms of the transaction are privately negotiated by the parties involved. For example, assume that Trader A is long one wheat contract and genuinely wishes to acquire wheat. Also, assume that Trader B is short one wheat contract and owns wheat. The two traders agree on a price for the physical wheat and agree to cancel their complementary futures positions against each other. Table 1.5 shows this initial position in the first panel. Trader A buys the wheat from Trader B and they report their desire to cancel their futures position to the futures exchange. The exchange notes that their positions match (one short and one long) and cancels their futures obligations. The bottom panel of Table 1.5 illustrates the positions of Traders A and B in completing the EFP.

In this example, the result is much like an offsetting trade, because both futures traders have completed their obligations and are now out of the market. Traders like to use EFPs when price certainty is important. However, the EFP differs in certain respects from an offsetting trade. First, the traders actually exchange the physical good. Second, the futures contract was not closed by a transaction on the floor of the exchange. Third, the two traders privately negotiated the price and other terms of the transaction. Because an EFP transaction takes place away from the trading floor of the exchange, it is sometimes known as an **ex-pit** transaction. Federal law and exchange rules generally require all futures trading to take place in the pit or on an electronic trading platform. However, the EFP is the one recognized exception to this general rule. EFPs are also known as **against actuals** or **versus cash** transactions.

An Exchange-for-Physicals Transaction **Table 1.5**

Before the EFP

Trader A	*Trader B*
Long 1 wheat futures	Short 1 wheat futures
Wants to acquire actual wheat	Owns wheat and wishes to sell

EFP Transaction

Trader A	*Trader B*
Agrees with Trader B to purchase wheat and cancel futures	Agrees with Trader A to sell wheat and cancel futures
Receives wheat; pays Trader B	Delivers wheat; receives payment from Trader A
Reports EFP to exchange; exchange adjusts books to show that Trader A is out of the market	Reports EFP to exchange; exchange adjusts books to show that Trader B is out of the market

EFPs are commonly used by traders as a means of ensuring a desired price on component parts of complex trades. In estimating the profitability and risks from a complex package of trades, the trader must have certainty that the component parts of the package can be executed at predetermined and certain prices. Such predetermined certainty simply does not exist in the open market.

As the volume of EFPs has grown in recent years, some market observers have raised concerns about the effect EFPs have on liquidity within the market. These observers fear that EFPs may "fragment" the market, that is, divide a central market into smaller sub-markets. However, the evidence to date shows that EFPs have had a mostly benign effect.[23]

EXCHANGES AND TYPES OF FUTURES

Since the founding of the CBOT in 1848, futures markets have flourished. The past three decades have been a period of extraordinary growth for futures markets, due largely to the development of entirely new types of contracts in foreign exchange, interest rates, and stock indexes. Within the last 25 years, several new types of contracts have been developed, including futures on stock indexes, single stocks, weather, and macroeconomic indicators. The future promises to be a period of continued explosive growth for the industry.

Worldwide Exchanges

Table 1.6 lists the major futures exchanges in the world and their trading volume for 2003. Differences in size among these exchanges are striking, ranging from the Minneapolis Grain Exchange (MGE), which averages 4,000 trades per day, to the very large exchanges, such as the CME, which averages

Table 1.6 Major Futures Exchanges in the World for 2003

Exchange	2003 Volume (Futures Only)	Percentage of Top 20 Volume
Eurex (Germany)	668,650,028	24.55
Chicago Mercantile Exchange (U.S.A)	530,989,007	19.49
Chicago Board of Trade (U.S.A)	373,669,290	13.72
Euronext-Liffe (Netherlands)	273,121,004	10.03
Mexican Derivatives Exchange (Mexico)	173,820,944	6.38
Bolsa de Mercadorias e Futuros (Brazil)	113,895,061	4.18
New York Mercantile Exchange (U.S.A)	111,789,658	4.10
Tokyo Commodity Exchange (Japan)	87,252,219	3.20
London Metals Exchange (U.K)	68,570,154	2.52
Korea Stock Exchange (South Korea)	62,204,783	2.28
Sydney Futures Exchange (Australia)	41,831,862	1.54
National Stock Exchange of India (India)	36,141,561	1.33
SIMEX (Singapore)	35,356,776	1.30
International Petroleum Exchange (U.K)	33,258,385	1.22
OM Stockholm (Sweden)	22,667,198	0.83
Tokyo Grain Exchange (Japan)	21,084,727	0.77
New York Board of Trade (U.S.A)	18,822,048	0.69
Bourse de Montreal (Canada)	17,682,999	0.65
MEFF Renta Variable (Spain)	17,109,363	0.63
Tokyo Stock Exchange (Japan)	15,965,175	0.59
Total (Top 20, 2003) Futures Volume	2,723,882,242	100%

Source: Futures Industry Association.

2.9 million trades/day. Table 1.7 lists some of the major futures clearinghouse organizations. Recent years have seen considerable restructuring in the industry. One of the largest mergers occurred in 2003, when Eurex US, through its holding company, US Futures Exchange, offered a 20 percent stake to the owners of BrokerTec, an all-electronic futures exchange that had suspended its operations shortly before the merger. Another noteworthy exchange merger occurred in 1998 when the Coffee, Sugar, and Cocoa Exchange merged with the New York Cotton Exchange to form the New York Board of Trade. Four years earlier two other New York exchanges, the Commodity Exchange of New York (COMEX) and the NYMEX, merged under the NYMEX name, with separate NYMEX and COMEX divisions. In 1986, prior to the recent merger activity in New York, a merger occurred in Chicago when the CBOT acquired the MidAmerica Commodity Exchange (MidAm) and converted all MidAm contracts to CBOT "mini" contracts. The CBOT decommissioned the MidAm in 2001 and closed it entirely in 2003. U.S. exchanges have also been active in joint ventures and other affiliations. For example, in 2001 the CME, the CBOT, and the Chicago Board Options Exchange (CBOE) formed OneChicago to trade single stock futures.

Major Futures Clearing Organizations **Table 1.7**

Clearinghouse	Affiliated Exchanges
The CCorp	Eurex US and the Merchants Exchange of St. Louis
CME Clearinghouse	CME With clearing link to CBOT
Kansas City Board of Trade Clearing Corporation	Kansas City Board of Trade
Energy Clear Corporation	Exempt Commercial Markets
MGE Clearinghouse	MGE
NYMEX Clearinghouse	NYMEX
New York Clearing Corporation	New York Board of Trade
The Options Clearing Corporation	OneChicago, and option exchanges
The London Clearinghouse	Exempt commercial Markets and OTC markets

Source: The CFTC web site, www.cftc.gov.

Types of Futures Contracts

The types of futures contracts that are traded fall into five fundamentally different categories. The underlying good traded may be a physical commodity, a foreign currency, an interest-earning asset, an index, usually a stock index, and individual stocks. Contracts for nearly 400 different goods are currently available worldwide. While Chapters 5 to 11 deal specifically with each of the different groups of underlying goods, it is useful to have some appreciation for the range of goods that are traded on the futures market.

Physical Commodity Contracts. Contracts on physical commodities include agricultural contracts, metallurgical contracts, and energy contracts. In the agricultural area, contracts are traded in grains (corn, oats, rice, and wheat), oil and meal (soybeans, soymeal, and soyoil, and sunflower seed and sunflower oil), livestock (lean hogs, cattle, and pork bellies), forest products (lumber and plywood), textiles (cotton), and foodstuffs (cocoa, coffee, orange juice, and sugar). For many of these commodities, several different contracts are available for different grades or types of the commodity. For most of the goods, there are also a number of months for delivery. The months chosen for delivery of the seasonal crops generally fit their harvest patterns. The number of contract months available for each commodity also depends on the level of trading activity. For some relatively inactive futures contracts, there may be trading in only one or two delivery months in the year.[24] By contrast, an active commodity, such as soybean meal, may have trading in eight delivery months.

The metallurgical category includes contracts traded on gold, silver, aluminum, platinum, palladium, lead, nickel, tin, zinc, and copper. Metals futures contracts are traded primarily at the COMEX Division of the NYMEX and the London Metals Exchange.[25]

The energy category includes contracts written on heating oil, crude oil, natural gas, unleaded gasoline, coal, propane, and electricity. Energy futures are traded primarily at the NYMEX and the International Petroleum Exchange (a subsidiary of the Intercontinental Exchange, or ICE).

We consider futures contracts on agricultural, energy, and metallurgical commodities in Chapter 5. With few exceptions (such as electricity), these commodities share two important common characteristics: they are physically settled and are highly storable.

Foreign Currencies. Active futures trading of foreign currencies dates back to the inception of freely floating exchange rates in the early 1970s. U.S. dollar based contracts trade on an ever-expanding list of currencies including the Australian dollar, Brazilian Real, Russian Ruble, New Zealand dollar, Swedish Krona, South African Rand, Norwegian Krone, British pound, the Canadian dollar, the Japanese yen, the Swiss franc, Mexican peso, Czech koruna, Hungarian forint, Polish zloty, and the European Monetary Union Euro. In addition, contracts based on several different currency cross rates are traded. For example, contracts trade on the euro–pound exchange rates and the euro–zloty exchange rates. The foreign exchange futures market represents the one case of a futures market existing in the face of a truly active forward market. The forward market for foreign exchange is many times larger than the futures market. Many people believe that the presence of the forward market deterred the introduction and slowed the growth of futures trading in foreign exchange. Contracts on different currencies are also traded on a number of foreign futures exchanges, as Table 1.7 shows.

Interest-Earning Assets. Futures trading on interest-bearing assets started only in 1975, but the growth of this market has been tremendous. Contracts are traded now on Treasury bills, notes, and bonds, on Eurodollar deposits, interest rate swaps, Fed funds, and on municipal bonds. The existing contracts span almost the entire U.S. yield curve, so it is possible to trade instruments with virtually every maturity. Many of these contracts are physically settled, but some, such as the Eurodollar futures contract traded at the CME, are cash settled to a reference rate. In addition to U.S. products, contracts on foreign debt instruments are traded on foreign futures exchanges. For example, futures contracts on 3-month Euribor are traded in London at Euronext.liffe and futures contracts on the 10-year German Government Bond (called the Bund) are traded in Frankfurt on the Eurex exchange.

Indexes. Most, but not all, index-based futures contracts are stock index futures. Prior to 1982, these contracts could not trade in the United States because stock market regulators feared that stock index futures trading would harm the market for underlying stocks. In addition, a regulatory prohibition on the cash settlement of futures contracts constrained the launch of index-based futures contracts, which must be cash settled. After much controversy, index-based futures contracts began trading in 1982 and have been extremely successful. U.S. exchanges trade contracts on many different broad-based stock indexes: the Standard and Poor's 500, the Dow Jones Industrial Average, the Russell 2000, and the NASDAQ 100. These exchanges also trade futures contracts on style-based indexes such as the Standard and Poor's Barra Growth Index, and the Standard and Poor's Barra Value Index. Futures on narrow-based indexes, such as industry sector indexes, have been tried but have failed to generate significant volume. Outside of the United States, foreign exchanges trade futures on foreign stock indexes, such as the British FTSE 100, the French CAC 40, the Dow Jones Euro Stoxx 50, the German DAX, the Brazilian Bovespa stock index, the Japanese Nikkei 225 index, and the Korean KOSPI 200. We discuss stock index futures in detail in Chapters 9 and 10.

Index-based contracts do not permit physical delivery. A trader's obligation must be fulfilled by a reversing trade or a cash settlement at the end of trading. In addition to stock indexes, futures contracts have been written on other types on indexes as well, including a foreign exchange index, an

index of municipal bonds, the consumer price index, a price variance index, and weather indexes based on heating degree days or cooling degree days.

One of the more unusual index-based contracts can be found at the CME. The CME has constructed a futures contract based on the Goldman Sachs Commodity Index (GSCI). The GSCI is an index composed of the prices of 26 commodity futures contracts. The index provider selects the components and their weighting within the index. The index uses only the prices from nearby futures contracts. Essentially this product is a futures contract on a basket of futures contracts.

Individual Stocks. The last major group of futures contracts is for individual stocks, like shares of IBM. These contracts are called "single stock futures" in the United States and "universal futures" in Great Britain. Although futures contracts written on broad-based stock market indexes have been traded since 1982, it was not until the passage of the CFMA of 2000 that trading of futures contracts on individual stocks was permitted in the United States. Outside of the United States, single stock futures have been traded for nearly a decade on various European and Asian exchanges. In Sweden and Finland, the products have been traded since the early 1990s. We discuss single stock futures in Chapters 9 and 10.

Relative Importance of Commodity Types

Figure 1.5 presents another division of futures contracts into eight categories and shows the relative importance of trading in these different categories in the United States in 2003. As Figure 1.5 shows, over half of the trading volume stems from financial instruments. These include futures contracts based on underlying instruments such as Treasury securities and stock indexes. As we have noted, trading in these contracts began in 1975, so growth in this area has been dramatic. Figure 1.6 shows how the portions of futures trading volume have shifted among these commodity groups over recent years.

Market Share by Commodity Type **Figure 1.5**

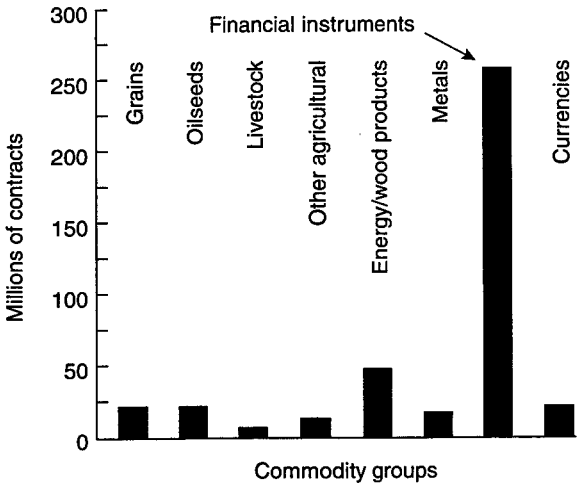
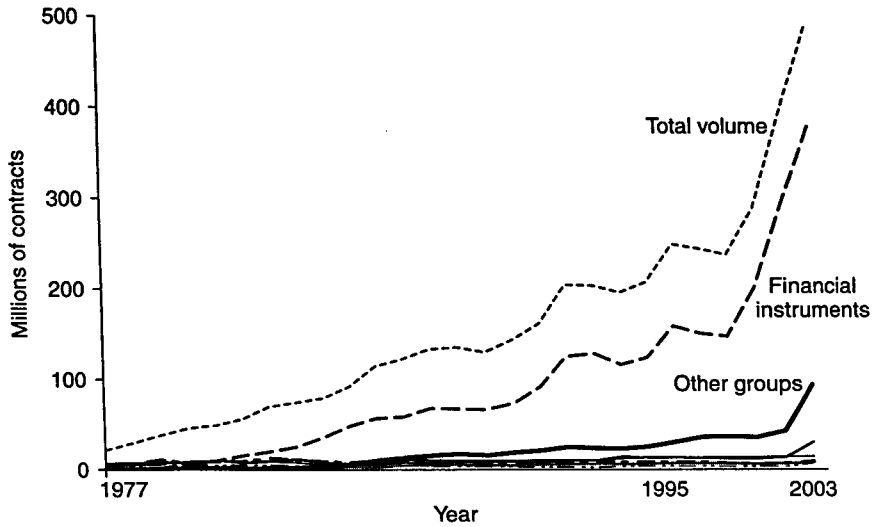


Figure 1.6 Changing Commodity Trading Volume



PURPOSES OF FUTURES MARKETS

Any industry as old and as large as the futures market must serve some social purpose. If it did not, it would most likely have passed from existence some time ago. Traditionally, futures markets have been recognized as meeting the needs of three groups of futures market users: those who wish to discover information about future prices of commodities, those who wish to speculate, and those who wish to hedge. While Chapter 4 discusses the uses that these three groups make of futures markets in detail, it is important to have some understanding of the social function of futures markets before proceeding. Traditionally, speculation is not regarded as socially useful by itself, although it may have socially useful by-products. Thus, there are two main social functions of futures markets – price discovery and hedging.

Social Functions of Futures Markets

1. Price discovery
2. Hedging

Price Discovery

Price discovery is the revealing of information about future cash market prices through the futures market. As discussed earlier, in buying or selling a futures contract, a trader agrees to receive or deliver a given commodity at a certain time in the future for a price that is determined now. In such a

circumstance, it is not surprising that there is a relationship between the futures price and the price that people expect to prevail for the commodity at the delivery date specified in the futures contract. While the exact nature of that relationship will be considered in detail in Chapter 3, the relationship is predictable to a high degree. By using the information contained in futures prices today, market observers can form estimates of what the price of a given commodity will be at a certain time in the future. The forecasts of future prices that can be drawn from the futures market compare in accuracy quite favorably with other types of forecasts. Futures markets serve a social purpose by helping people make better estimates of future prices, so that they can make their consumption and investment decisions more wisely. Futures prices also assist in price discovery for some commodities where cash markets are not well developed.

As an example of price discovery and its benefits, consider a mine operator who is trying to decide whether to reopen a marginally profitable silver mine. The silver ore in the mine is not of the best quality, so the yield from the mine will be relatively low. The financial wisdom of operating the mine will depend on the price the miner can obtain for the silver once it is mined and refined. However, the miner must make the decision about the mine today, and the silver will not be ready for market for 15 months. The crucial element in the miner's decision is the future price of silver.

While the price of silver 15 months from now cannot be known with certainty, it is possible to use the futures market to estimate that future price. The price quoted in the futures market today for a silver futures contract that expires in 15 months can be a very useful estimate of the future price. As we will see in Chapter 3, for some commodities an estimate of the future price of a good drawn from the futures market is one of the best estimates possible. In our example, let us assume that the futures price for silver is high enough to justify starting to operate the mine again. The miner figures that the new mine will be profitable if he can obtain the futures price for the silver when it becomes available in 15 months. In this situation, the miner has used the futures market as a vehicle of price discovery. Farmers, lumber producers, cattle ranchers, and other economic agents can use futures markets the same way. They all use futures market estimates of future cash prices to guide their production or consumption decisions.

Hell and High Water

The Great Chicago Fire started on October 6, 1871 and destroyed a large portion of the financial district of Chicago. Six of the 17 grain elevators used as delivery points for CBOT contracts were destroyed. In addition, the CBOT's headquarters building was destroyed and all records were lost. Charles Taylor's history of the CBOT provides a first-hand account of the devastation the fire caused:

> In considering the state of the Board of Trade it must be remembered that the loss of the exchange building with its records and its sacred mementoes was not the chief loss sustained by its members. Practically all of them had offices in the neighborhood of the Chamber of Commerce Building, and all their private records and books were destroyed. Their bank deposits were locked in red-hot vaults from which no one could tell in what condition they would be taken. Many of the members lived within the fire zone and they were homeless, without food, and with little more than the clothes on their backs.[26]

Continued

Chicago was the setting for another disaster in 1992. This time, however, the disaster involved water rather than fire. The Great Chicago Underground Flood began on April 13, 1992 when construction workers on the Chicago River drove a support pillar into the bottom of the river and through the ceiling of an abandoned railway tunnel built in 1899 to haul coal and to remove ashes from buildings in downtown Chicago. Workers attempted to plug the hole with rocks and mattresses, but massive amounts of river water poured into the maze of underground tunnels. The CBOT and the CME ceased operations as 250 million gallons of river water rushed into the basements and sub-basements of the exchange halls, causing a power outage and forcing the evacuation of the entire downtown area. Because the flood affected the heart of Chicago's financial district, it proved to be an exceptionally costly business disaster. Other markets were impacted by the closure of Chicago's futures exchanges. Country elevators throughout the Midwest, which relied on the price discovery role of futures market as the basis for their cash market pricing, pulled bids and refused to post new bids for local farmers.[27]

Hedging

Many futures market participants trade futures as a substitute for a cash market transaction. For example, we considered a farmer who sold wheat futures in anticipation of a harvest, and we noted that the farmer used futures as an alternative to the sale of wheat through the cash market. We now consider this classic kind of hedge in more detail. At planting time, the farmer bears a risk associated with the uncertain harvest price his wheat will command. The farmer might use the futures market to hedge by selling a futures contract. If the farmer expects to harvest 100,000 bushels of wheat in 9 months, the farmer could establish a price for that harvest by selling 20 wheat futures contracts. (Each wheat contract is for 5,000 bushels.) By selling these futures contracts, the farmer seeks to establish a price today for the wheat that will be harvested in the future. With certain qualifications, this futures transaction protects the farmer from wheat price fluctuations that might occur between the present and the future harvest. The futures transaction served as a substitute for a cash market sale of wheat. A cash market sale was impossible, because the wheat did not actually exist. In this example, the farmer sells wheat in the futures market as a temporary substitute for a future anticipated cash market transaction. Therefore, **anticipatory hedging** is a futures market transaction used as a substitute for an anticipated future cash market transaction.

Hedging transactions can take other forms. For example, consider an oil wholesaler who holds a substantial inventory of gasoline. The wholesaler needs the inventory as a stock from which to service retail customers. If the wholesaler simply holds the stock of gasoline, she must bear the price risk of fluctuating gasoline prices. As an alternative, she can sell crude oil futures as a substitute for selling the gasoline itself. By holding gasoline in her business inventory and selling crude oil futures to offset the risk associated with the gasoline, the wholesaler can reduce her business risk. The wholesaler could have used the cash market directly to reduce risk by simply selling her entire inventory in the cash

market. Unfortunately, this method of reducing business risk eliminates the business, because the wholesaler would no longer have the gasoline inventory that is essential to her entire business. Selling futures substitutes for the risk-reducing transaction of selling her entire inventory.

For both of our examples, the hedger uses the futures market as a substitute for a cash market transaction. Both hedgers had a preexisting risk associated with the commodity being sold. The farmer anticipated harvesting and selling wheat, and he used the futures market as a substitute for a cash market sale of wheat. Even though the farmer did not have wheat on hand when he sold futures, he did have a preexisting risk in wheat. The risk arose from the anticipated holding of the cash wheat at harvest. For the oil wholesaler, the risk was immediate. As prices of oil fluctuate, the value of her gasoline inventory would fluctuate as well. Thus, the wholesaler had a preexisting risk associated with the price of oil, and she used the futures market transaction to reduce that risk.

Because hedgers are traders who use futures transactions as substitutes for cash transactions, hedgers are almost always business concerns that deal with a specific commodity. Almost without exception, individual traders are speculators because they enter the futures market in pursuit of profit and increase their risk in the process. By contrast, hedgers have a preexisting risk exposure of some form that leads them to use futures transactions as a substitute for a cash market transaction. Hedging is the prime social rationale for futures trading, and therefore we will give hedging a great deal of attention throughout the book. Chapter 4 explains the use that the hedger makes of the futures markets, while the techniques and applications of hedging are elaborated for specific markets in Chapters 5 through 11.

Traders in the futures markets are either speculators or hedgers, or the agents of one of these two groups. Yet the benefits provided by the futures market extend to many other sectors of society. The individual interested in forecasts provided by future prices need not enter the market to benefit. For example, our silver miner did not need to trade any futures to capture the benefits of price discovery. The forecasts are available for the price of the daily newspaper. The chance for hedgers to avoid unacceptable risks by entering the futures market also has wide implications for social welfare. Some individuals would not engage in certain clearly beneficial forms of economic activity if they were forced to bear all of the risk of the activity themselves. Being able to transfer risk to other parties via the futures market enhances economic activity in general. Of course, a general stimulation of economic activity benefits society as a whole.[28]

REGULATION OF FUTURES MARKETS

Federal regulation of futures markets dates to the enactment of the Grain Futures Act of 1922. This statute was superseded by the Commodity Exchange Act (CEA) of 1936. The CEA has been amended several times, most recently with the passage of the CFMA of 2000. The aim of Federal regulation is to provide a marketplace in which the social functions of futures markets can be fulfilled. Futures market regulations are designed to deter manipulation, abusive trading practices, and fraud because these activities interfere with the process of price discovery or the efficient transfer of unwanted risk. For example, practices that make futures prices behave as poor indicators of future spot prices reduce the usefulness of the futures market for price discovery. Also, practices that distort prices can increase the cost of transferring risk. Congress created the CFTC in 1974 to administer the Federal laws governing futures markets.

Onions

One curiosity embedded in the Federal laws governing futures markets in the United States, is that futures trading in onions is illegal. Onion futures traded at the CME and the NYMEX between 1942 and 1959.[29] Due to concerns by onion growers of futures-related speculation and volatile prices, Congress passed public Law 85–839 (7 USC 13-1) in August 1958, which prohibited dealings in onion futures. As a result, onions were excluded from the definition of the term "commodity" in the Commodity Exchange Act. The definition of "commodity" in the CEA now reads as follows:

> The term "commodity" means wheat, cotton, rice, corn, oats, barley, rye, flaxseed, grain sorghums, mill feeds, butter, eggs, Solanum tuberosum (Irish potatoes), wool, wool tops, fats and oils (including lard, tallow, cottonseed oil, peanut oil, soybean oil, and all other fats and oils), cottonseed meal, cottonseed, peanuts, soybeans, soybean meal, livestock, livestock products, frozen concentrated orange juice, and all other goods and articles, except onions as provided in Public Law 85–839 (7 USC 13–1), and all services, rights, and interests, in which contracts for future delivery are presently or in the future dealt in.[30]

Careful reading of the definition (especially the part about all services, rights, and interests) reveals that nearly anything one can think of in the universe qualifies as a commodity – except onions. If a futures exchange were to offer a futures contract on a non-commodity like onions, traders on the losing end of transactions could simply walk away from their obligations by claiming that the contract is illegal and therefore unenforceable. In addition, the statute specifies monetary penalties for anyone who trades onion futures. To date, no futures exchange has attempted to evade the onion prohibition by offering shallot, scallion, or leek futures.

In addition to direct regulation by the federal government, the laws and regulations governing futures trading at organized exchanges impose self-regulatory duties on industry members who interact with public customers. In other words, industry members themselves must perform a regulatory role. The CFTC oversees the entire regulatory structure to make sure that industry members perform their self-regulatory duties. There are four identifiable levels of regulation in the futures market: the broker; the exchange and clearinghouse; an industry self-regulatory body, the National Futures Association (NFA); and a federal government agency, the CFTC. To a large extent, these levels overlap, but each regulatory body has its specific duties.

Futures Market Regulators

1. The broker
2. Exchange and clearinghouse
3. Industry self-regulatory body – National Futures Association (NFA)
4. Federal governmental agency – Commodity Futures Trading Commission (CFTC)

The Broker

As we have seen in our discussion of the margin system, the broker essentially represents his or her customers to the exchange and clearinghouse. In the margin system, the clearinghouse holds the clearing member responsible for all of the accounts that the clearing member carries. Because of the representations to the industry that the broker makes on behalf of its client, the broker has a duty to keep informed about the activities of its customer and to ensure that those activities are proper. Among futures market participants, the often repeated rule for brokers is "know your customer." The broker is the industry representative in the best position to know a given customer, because the customer gains access to trading directly through the broker.

As we will see in more detail, some kinds of futures trading are not permitted to any traders. Other traders have restrictions on the kind of trading that they should engage in. As an example, let us consider a **position limit**. For a commodity with a position limit, no single trader is allowed to hold more than a certain number of contracts. This rule limits the influence of a single trader on the market and aims to prevent the trader from controlling the futures price.[31] On occasion, some traders have tried to circumvent this rule by trading through different accounts. Often, the broker can detect such a maneuver and has a duty to report such activity. As this example shows, the broker is often in the best position to detect some abuses, because he or she is closest to the customer. The trading of some customers is restricted due to the nature of the customer's business. For example, some financial institutions are allowed to trade only certain types of futures for hedging purposes. The broker for such an institution should not allow prohibited trading.

In general terms, the broker is responsible for knowing the customer's position and intentions, for ensuring that the customer does not disrupt the market or place the system in jeopardy, and for keeping the customer's trading activity in line with industry regulations and legal restrictions.

Futures Exchanges and Clearinghouses as Regulators

The futures exchanges and clearinghouses have specific self-regulatory duties. Many of these duties require the exchange and clearinghouse to control the conduct of the exchange and clearing members. To do so, the exchanges and clearinghouses formulate and enforce rules for their members. Generally, these rules are designed to create a smoothly functioning market in which traders can feel confident that their orders will be executed and cleared properly and at a fair price. Thus, all exchanges prohibit fraud, dishonorable conduct, and defaulting on contract obligations. Clearinghouse rules set minimum financial requirements for clearinghouse members in order to ensure the financial integrity of the clearing system.

More specifically, exchange rules prohibit **fictitious trading**, that is, trading that merely gives the appearance of transacting without any actual change in ownership or any actual exposure to market risk.[32] Table 1.8 identifies abusive trading practices, known in the industry as "trade practice violations." Exchange rules also prohibit exchange members from circulating rumors to affect price, disclosing a customer's order, trading with oneself, taking the opposite side of a customer's order, making false statements to the exchange, and failing to comply with a legitimate order by the exchange.

The rules also prohibit many types of **prearranged trading**. A prearranged trade occurs when two futures market participants consult in advance and agree to make a certain trade at a given price. Instead, the rules require that all orders (with limited exceptions) be offered to the entire market

Table 1.8 Abusive Trading Practices

Prearranged trading	Agreeing to some aspect of a transaction before it is, openly executed on the exchange floor.
Accommodation trading	Entering transactions to assist another floor participant in accomplishing improper trading objectives.
Trading before customers' orders, front running	Trading for one's personal account or an account in which one has an interest, while having in hand any executable customer order in that contract.
Bucketing	Failing to introduce an order to the marketplace, traditionally occurring when a broker noncompetitively takes the other side of a customer order to the detriment of the customer or other members.
Wash trading	Entering transactions to provide the appearance of trading activity without resulting in a change in market position.
Curb trading	Trading after the official close of trading.

Source: Government Accounting Office, "Automation Can Enhance Detection of Trade Abuses but Introduces New Risks," September 1989.

through open outcry. The rules prohibit prearranged trading because it can be abusive. For example, assume that a floor broker receives an order to buy wheat and that the fair market price for the wheat contract is $4.20/bushel. In a prearranged trade, the floor broker might agree with a friendly floor trader to buy the contract from him or her at $4.21. With the true market value at $4.20, this practice cheats the customer by $0.01/bushel or $50 per 5,000-bushel contract. Had the order been offered to the market as the rules require, the order would have been filled at the prevailing price of $4.20. Thus, the prohibition of prearranged trading aims at ensuring that each order is executed at a fair market price.

The rules also prohibit a broker from trading for his or her own account at the customer's requested price before filling a customer's order. The broker who trades for himself or herself before filling a customer's order engages in the prohibited practice called **front running** (also called "trading ahead"). To see why this practice is prohibited, assume that market prices are rising rapidly due to some new information. Assume also that the broker holds a customer order to buy. If the broker executes his or her own order first, the broker's own order will be executed at a more favorable price, because of the quickly rising prices. Thus, front running gives the broker an unfair advantage. As a second example, assume that a broker receives a very large customer order to sell. The broker knows that placing this order will depress the futures price temporarily. The front running broker would enter his or her own order to sell first. The broker's order would be executed at the high price, and the broker would then execute the customer's order. Upon execution of the customer's order, the price falls as the broker anticipated. Now the broker can buy and close his or her position. This gives the broker a profit

from front running. In front running, the broker uses his or her special knowledge of order flow or market movement to obtain an unethical and prohibited personal advantage.

Futures exchanges also set daily price limits, margin requirements, and position limits. They may also set position accountability limits. A position accountability limit refers to the right of the exchange to have access to all information regarding the nature of a trader's position, trading strategy and hedging information.[33] Position limits and position accountability limits can be defined for any single contract month, or for all contract months combined. Exchanges are required by federal regulations to have position limits or position accountability limits for contracts as they enter the delivery month in order to deter would-be manipulators. Some exchanges also have rules to set trading volume limits, although these rules have rarely been used in recent years. In addition, each exchange has rules that govern membership on the exchange. For example, exchange rules establish membership requirements and specify how customer complaints are to be resolved. For each of these categories, the rules of the exchange are subject to oversight by the CFTC. The federal law administered by the CFTC provides a set of core principles, or standards, that are meant to allow futures exchanges to use methods of their choice to achieve the federal requirements.

National Futures Association (NFA)

In 1974, Congress passed a new law for the regulation of futures markets. Part of that law authorized the futures industry to create one or more self-regulatory bodies. The purpose of these bodies according to the act is "... to prevent fraudulent and manipulative acts and practices, to promote just and equitable principles of trade, in general, to protect the public interest, and to remove impediments to and perfect the mechanism of free and open futures trading." While the law has contemplated more than a single self-regulatory body, the NFA is the only such body in existence. For many classes of market participants who wish to do commodity-related business with the public, membership in the NFA is mandatory.

The NFA has the responsibility for screening and testing applicants for registration, and it can review personal background information before allowing individuals to register in the various categories of futures professionals. The NFA also requires members who handle customer funds to maintain adequate capital and to keep accurate trading records. Finally, the NFA can audit member firms' records and capital adequacy. For serious violations, the NFA can suspend or expel violators from the futures industry. Finally, the NFA operates an arbitration process for resolving trading disputes.

As the NFA states, it seeks to prevent infractions before they occur. By doing so, it helps the futures industry to remain viable by keeping the public trust. However, in assessing the NFA, it is wise to remember that it is an industry self-regulatory body, designed to protect the integrity of the industry and to promote the interests of the industry.

The NFA also assists exchanges in carrying out their self-regulatory responsibilities with respect to market surveillance, compliance, and rule enforcement. It has entered into regulatory service agreement with the Eurex US, the Merchants' Exchange, OnExchange, Island Futures Exchange and (the now defunct) BrokerTec. The NFA performed the market surveillance function for BrokerTec between 2001 and 2003 and entered into a similar agreement with the Eurex US in 2004.

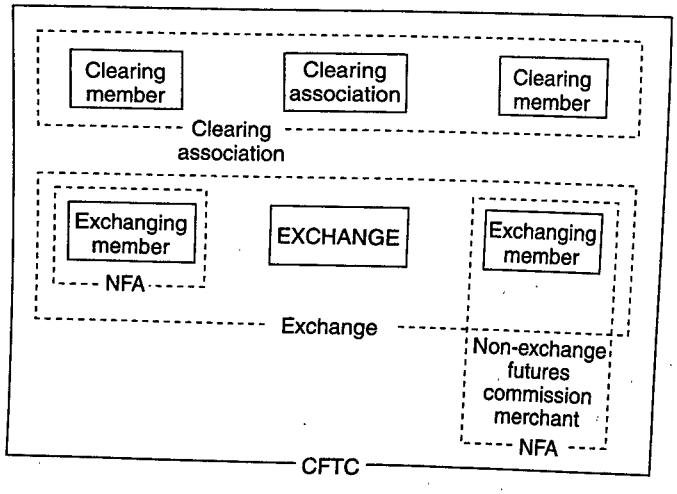
The NFA plays a key role in the regulation of security futures products. The CFMA Act of 2000 requires the NFA to monitor futures market participants for compliance with the applicable securities laws. The statute recognizes the NFA as a "limited purpose national securities association."

COMMODITY FUTURES TRADING COMMISSION (CFTC)

The CFTC was created by Congress in 1974 as an independent agency of the federal government to administer the CEA. Prior to the creation of the CFTC, the CEA was administered by the U.S. Department of Agriculture. In its role as administrator of the CEA, the CFTC has exclusive federal jurisdiction over commodity futures and futures option markets in the United States. One of the CFTC's main missions is to protect market participants from manipulation, abusive trade practices, and fraud. The CFTC also has regulatory oversight of futures exchanges, futures clearinghouses, and other self-regulatory organizations such as the NFA. Congress also gave the agency authority to address market emergencies that could prevent markets from performing their price discovery and risk shifting roles. Figure 1.7 shows the place of the CFTC in the regulatory structure of the futures industry in the United States. The overlapping regulatory structure displayed in the figure represents the oversight role that the CFTC has over self-regulatory bodies.

The regulatory role of the CFTC changed greatly as a result of the passage of the CFMA of 2000.[34] While retaining prohibitions against fraud and market manipulation, the CFMA replaced many of the prescriptive rules and regulations for exchanges and clearinghouses with broad set of core principles. These core principles give the CFTC flexibility to tailor regulation to the type of market, product, and participant, and to keep better pace with change. These core principles for exchanges and clearinghouses are shown in Appendix A. One result of the CFMA can be seen in the way the CFTC regulates exchanges wishing to list new contracts for trading. Prior to the CFMA, the CFTC required that futures exchanges submit new contracts to the CFTC for approval. The approval process took on average 90 days to complete and U.S. futures exchanges complained bitterly that the process hampered

Figure 1.7 Overlapping Futures Market Regulation



Source: G. D. Koppenhaver, "Futures Market Regulation," *Economic Perspectives*, 11:1, January/February 1987. Reproduced by permission of the Federal Reserve Bank of Chicago.

their ability to respond quickly to rapid market developments – constraints not faced by the exchanges' competitors overseas and in the OTC market. The burden of proof fell on the exchanges to demonstrate that a new contract met all regulatory requirements. Now, as a result of the CFMA, an exchange wishing to list a new contract can do so almost instantly if they can certify that the contract complies with the core principles and the CFTC's regulations, including the requirement that the contract not be readily susceptible to manipulation. In other words, the CFMA shifted the burden of proof to the CFTC to demonstrate that a contract does not comply with regulatory requirements. The CFTC's authority to level severe sanctions deters exchanges from falsely certifying their products. Exchanges have taken advantage of their new authority by certifying 438 new products in the 3 years following the enactment of the CFMA, a sizeable jump from the 175 new contracts approved by the CFTC in the 3 years leading up to the passage of the CFMA.[35]

The CFMA also changed the way the CFTC monitors exchange compliance with federal regulations. Rather than conduct detailed compliance reviews of exchange members, the CFTC now relies on rule-enforcement reviews of the exchange. The purpose of these reviews is to ensure that the exchanges are adhering to their own rules and procedures. In this way, the CFTC has more of an oversight role as opposed to a direct role in monitoring compliance. The exchange, through its self-regulatory obligations, has the primary responsibility for enforcing member compliance with rules. The CFTC's rule enforcement reviews ensure that the exchange is adequately performing its obligations.

The CFTC is based in Washington, DC with branch offices in New York City, Chicago, Kansas City, and Minneapolis. The Commission itself consists of five commissioners, one of whom serves as the CFTC's Chairman. The commissioners are appointed by the president and confirmed by the Senate for staggered 5 year terms. No more than three members of the CFTC can be from a single political party. Major policy decisions, the adoption of agency rules and regulations, and the authorization of enforcement proceedings, must be approved by a majority vote of the Commissioners.

The CFTC employs a staff of approximately 500 people nationwide. The CFTC has three main operating divisions: the Division of Clearing and Intermediary Oversight, which oversees clearing organizations and activities related to market intermediaries; the Division of Market Oversight, which conducts daily market surveillance and oversees futures exchanges; and the Division of Enforcement, which investigates and prosecutes alleged violations of the CEA and CFTC regulations. The CFTC also has three supporting offices: the Office of the Chief Economist, which provides economic advice to the commission; the Office of the General Counsel, which serves as the commission's legal advisor; and the Office of the Executive Director, which handles the commission's administrative functions. Regulatory initiatives and commission decisions are announced on the CFTC's web site, www.CFTC.gov.

The CFTC's Large-Trader Reporting System

The heart of the CFTC's market surveillance program is its large-trader reporting system, which collects position-level data from large traders who own or control a position in a U.S. futures market above specific reporting thresholds. The purpose of this surveillance program is to help the CFTC identify potential concentrations of market power within a market and to enforce speculative position limits. Under the large-trader reporting system, clearing members, FCMs, and foreign brokers file daily electronic confidential reports with the CFTC showing the entire futures and option positions of large traders.

Continued

Reporting thresholds are set so that the CFTC has information representing 70 to 90 percent of the total open interest in any given market. The reporting level varies from market to market depending on the size of the market and the size of deliverable supplies. Reporting thresholds are specified in the CFTC's regulations and are posted on its web site (www.cftc.gov).

The CFTC uses various means to ensure the accuracy of its large-trader data. If a trader holds positions at more than one brokerage firm, his positions are aggregated across the various firms to determine the trader's aggregate position. Aggregating positions is necessary for the CFTC's surveillance staff to make a thorough assessment of a trader's potential market impact and a trader's compliance with speculative position limits.

The CFTC transforms the raw large-trader data into analytical reports. Using these reports, the CFTC's surveillance staff monitors the largest traders in each market. CFTC staff members also monitor traders' position across markets. For contracts that settled at expiration through physical delivery, the CFTC's surveillance staff uses the large trader information to determine the adequacy of the potential deliverable supply.

The CFTC publishes a weekly report based on the confidential large trader report. The published report, called the Commitments of Traders Report, shows the aggregate positions held by the largest reportable traders.

RECENT REGULATORY INITIATIVES

In the late 1990s and early 2000s, significant changes in the regulation of futures markets occurred, both in an amendment to the Commodity Exchange Act and in accounting rules.

The CFMA of 2000

As mentioned earlier in this chapter, the CFMA of 2000 made sweeping changes to the way futures markets had previously been regulated. Although the law was passed by Congress in 2000, much of it required detailed rulemakings and interpretations before it could be fully implemented. As a result, many of the key features of the law have only recently become apparent. These key features, some of which have been discussed above, are more fully described below and these include:

- Permitting futures trading on individual stocks and narrow-based stock indexes.
- Clarifying the legal status of privately-negotiated swap transactions.
- Promoting competition and innovation in futures markets.
- Providing a predictable and calibrated regulatory structure tailored to the product, the participant, and the trading platform.
- Allowing exchanges to bring new contracts to market without prior regulatory approval.

- Establishing a set of core principles, or standards, that permit futures exchanges and clearinghouses to use different methods to achieve federal requirements.
- Giving the CFTC clear authority to stop certain illegal, foreign exchange transactions aimed at defrauding small investors.
- Giving the CFTC separate oversight authority with respect to clearinghouse organizations.

One purpose of the CFMA was to promote competition and innovation in futures markets and to provide a predictable and calibrated regulatory structure tailored to the product, the participant, and the trading platform (i.e. the method of trading). These "three P's," that is, product, participant, and platform, dictate the level of regulatory oversight the market receives. A soybean producer in Iowa will receive more regulatory protection than a bond trader representing a Wall Street financial institution. Transactions on an organized futures exchange will be subject to greater regulatory oversight than privately-negotiated transactions between sophisticated traders. Products that are susceptible to manipulation will receive greater regulatory scrutiny than those products that are less susceptible to manipulation.

The CFMA laid out three tiers of regulation for futures exchanges depending on the types of products being traded, the level of sophistication of the participants using them, and the type of trading platform. The first tier is the most heavily regulated and includes futures on commodities that Congress judged to be potentially susceptible to manipulation and that are also offered to members of the public. This tier includes futures contracts on agricultural commodities. Futures contracts in the first tier must be traded on an organized futures exchange like the CBOT where trading can be continually monitored by exchange officials and CFTC staff.

In the second tier are exempt futures contracts, that is, futures contracts on instruments that are judged to be less susceptible to manipulation and are offered only to sophisticated investors, financial institutions, commercial users, and professional traders. These contracts, which include metals and energy products, are exempt from most federal regulations except for those regulations concerning fraud and manipulation. These contracts need not be traded on an organized futures exchange. These exempt products can be traded on a set of separately regulated exchanges called "exempt commercial markets." They are also referred to by industry insiders as "2(h)(3)" markets from the section of the CEA that governs their regulation. These exchanges are not required to conduct market surveillance to prevent market disruptions. Instead, fraud and manipulation are deterred by the certain knowledge that stiff monetary penalties, or possibly criminal penalties, await those market participants who commit fraudulent or manipulative acts. Congress granted regulatory exemptions to these exchanges as a way of promoting exchange competition by encouraging the development of new exchanges. As the exempt exchange gains trading volume, it becomes subject to additional regulatory requirements that approach those of nonexempt exchanges like the CBOT. Individual investors (so-called "retail customers") are, for their own protection, excluded from trading in exempt commercial markets.

In practice, products in this second tier are traded on both highly regulated exchanges like the NYMEX and through exempt commercial markets like the ICE. If exchanges choose to offer these products in a fully regulated environment, then these products can be offered to retail customers.

The third tier includes contracts on financial products that are traded on a principal-to-principal ("P2P") basis. These contracts are privately-negotiated between large, sophisticated contract counterparties. These contracts, better known as "swaps," are transacted in the OTC market or on an electronic trading facility that facilitates principal-to-principal trades that are excluded from futures trading laws. Congress believed that products in the third tier were not susceptible to manipulation and that

participants had the sophistication and resources to fend for themselves and did not require protection through government regulation. In practice, some products in this category, such as interest rate products, are traded on both highly-regulated organized exchanges and on a principal-to-principal basis.

The CFMA also greatly affected the way futures clearinghouses are regulated. Prior to the CFMA, regulations embodied the assumption that trade execution and clearing were necessarily a single, integrated activity. The result of these regulations was that an "exchange clearinghouse" was assumed to exist as part of the exchange. The CFMA recognizes clearing as a separate line of business from trade execution, and therefore regulates clearing separately from the way trade execution is regulated. The CFMA directs the CFTC to recognize "derivatives clearing organizations." Like exchanges, clearing organizations must abide by a set of core principles that are tailored to the specific risks associated with clearing. These core principles are shown in Appendix A. The CFMA also enables clearing organizations to clear OTC derivatives in an effort to reduce counterparty risk and systemic risks associated with these transactions. It is important to note that, despite authorization to clear OTC products through a clearing organization, the underlying OTC transactions are outside the jurisdiction of the CFTC.

Who is a Sophisticated Trader?

In futures market regulation, a sophisticated trader is referred to as an eligible contract participant, or "ECP." The significance of this term is that it legally defines who can engage in transactions that are exempt or excluded from Federal laws and regulations protecting futures market customers. For example, counterparties to a privately-negotiated swap transaction must meet the legal standard of an ECP. The term applies to financial institutions, investment companies, corporations, pension plans, government entities, broker dealers, FCMs, insurance companies, floor brokers, traders, commodity pools, or individuals with total assets exceeding $10 million. Each entity has its own set of very detailed requirements to be considered eligible. ECPs who enter into privately-negotiated-derivatives transactions with other ECPs are presumed to be sophisticated traders who can fend for themselves without the protections of the Federal government. If there is a dispute between ECPs, they are on their own to resolve it through the courts. The qualification standards for asset size and wealth are used as proxies for the sophistication of the entity.

Accounting Rules

In 1998, the Financial Accounting Standards Board (FASB) adopted a new set of rules governing the accounting practices for futures and other derivative instruments. These rules are contained in the FASB's Statement of Financial Accounting Standards No. 133, "Accounting for Derivative Instruments and Hedging Activities," also know as FAS 133.

Before the issuance of FAS 133, accounting rules for derivatives transactions were unclear and not uniform. The issuance of FAS 133 supercedes many previous FAS statements pertaining to derivatives (FAS 80, FAS 105, and FAS 119). FAS 133 also amends FAS 80 ("Foreign Currency Translation") and

FAS 107 ("Disclosures about Fair Value of Financial Instruments"). As such, FAS 133 provides a new and uniform treatment of accounting for derivatives. Originally scheduled to go into effect in 1999, implementation of FAS 133 was delayed due to protests by affected firms. The FASB also issued FAS 138 to modify the terms of implementation in response to complaints, but FAS 138 does not significantly modify the principles of FAS 133. In 2000, FAS 133/FAS138 became fully operational and now forms the basic framework for derivatives accounting in the United States. The entire document is 245 pages long. Appendix B provides an overview of these accounting rules. Application of the principles of FAS 133 will require familiarity with the statement itself.

TAXATION OF FUTURES TRADING

In 1981, Congress passed a law regarding the taxation of gains and losses in futures trading that had dramatic effects on the ways in which futures contracts could be used. The new law stipulated that all paper gains and losses on futures positions must be treated as though they were realized at the end of the tax year. For tax purposes, this new law meant that the futures positions must be marked-to-market at the end of the year. Forty percent of any gains or losses are to be treated as short-term gains and 60 percent as long-term capital gains or losses.[36]

Trading Jackets

First-time visitors to futures exchanges in Chicago or New York often comment on the blur of color they see in the trading pits. This kaleidoscope of color results from the brightly colored trading jackets worn by the thousands of traders, runners, and exchange officials who circulate around the crowded exchange floor. The trading jacket has become one of the most familiar images associated with modern futures markets.

Archive photographs from the biggest U.S. exchanges show no evidence of trading jackets prior to the 1930s. Beginning in the 1930s, archive photos show telegraph boys and exchange workers wearing uniforms that closely resemble the modern trading jacket, but traders themselves wore business suits. In short, in the old days it was the *non-traders* who wore trading jackets.

A convergence of events in the 1970s led traders to begin wearing trading jackets. First, a new generation of young traders began their careers around this time. These young traders conformed to the era's style of dress that appeared sloppy and unprofessional to older members, who wrote membership rules requiring professional attire that included collared shirts, ties, and jackets. Second, identification of traders became an issue as the number of traders on the trading floor increased with the launch of

Continued

financial futures. The launch of financial futures also led to the creation of "permit trading" where nonmembers could trade in specific pits for which they had permits requiring some means of easily distinguishing permit holders from full members. Third, security on the exchange floor became an issue after a series of incidents in which unauthorized individuals found their way into the trading pits.

The trading jacket helped solve all three problems. Trading jackets conformed to exchange rules on professional attire, but provided a functional alternative to the non-functional suit coat. Traders needed cool, lightweight, loose-fitting jackets for the over-heated exchange floor and they needed jackets with lots of pockets for trading cards, research notes, and other items. Trading jackets provided a convenient way to identify traders on the crowded exchange floor through a color-coding system. Finally, trading jackets and badges helped secure the trading floor by making it harder for unauthorized walk-ins to go unnoticed.

At the CBOT, traders and staff of brokerage firms and trading firms all wear the same color jackets so that they can quickly find each other on the exchange floor. Independent traders often wear the jacket color associated with the clearing firm with which the trader is affiliated. Just as important as helping traders identify their own firm members and affiliates, the colors also help identify traders and staff from other brokerage firms. The distinctive colors worn by traders, along with identification badges containing a three-digit clearing member ID, contribute to efficient trading operations by making it easy for a trader to precisely identify the firm represented by the opposing trader when executing a transaction. Precise identification of trading firms is necessary for ensuring that trade execution and clearing goes smoothly.

At the CME, different colored jackets help to identify individuals on the exchange floor by their function. Members or brokers wear red jackets. Runners and phone clerks wear gold jackets, out-trade clerks wear pale green jackets, market reporters wear light blue jackets. CME members who trade only specific contracts, such as emerging market futures, wear orange jackets. CME employees wear dark blue jackets, while CME Information Technology employees wear black jackets.

Trading jackets are unique to open-outcry trading. When the London International Financial Futures and Options Exchange (LIFFE) went from open outcry trading to electronic trading in 1999, trading jackets no longer served a useful purpose and were abandoned. One London trader said, "We still keep our old trading jackets hanging up on the wall to remind us how it used to be."

One company that has a stake in the continued success of open outcry trading is PECO, a manufacturer of trading jackets. PECO's web site, www.tradingjackets.com, offers a full selection of colors, patterns, fabrics, and varieties of styling.

Futures traders tend to be a superstitious lot. When on a streak of good luck, traders are reluctant to do anything that might disturb the momentum. This includes washing their trading jackets. Traders will wear their lucky jackets until they fall apart or the luck runs out. Some traders have even been buried in their lucky jackets, reflecting a hope that the good luck their jackets provided in the trading pits on the Earth could be retained for eternity in the great trading pit in the Sky.

CONCLUSION

This chapter has explored the basic institutional features of futures markets, focusing on the United States. We have seen that futures markets have emerged as a special kind of forward contract traded on organized exchanges and featuring highly standardized contract terms. This institutional environment includes a clearinghouse to guarantee performance to all trades and a margin system designed to protect the financial integrity of the marketplace. This system allows the futures market to provide two key social benefits: price discovery and risk transference through hedging.

Futures exchanges trade contracts on a variety of goods, ranging from the traditional agricultural commodities, to metals, interest rate contracts, contracts on stock indexes, foreign currency futures, and single stock futures. The market has a complex regulatory environment, with brokers, exchanges, clearinghouses, an industry organization, and a federal agency all playing a role. These regulatory bodies govern the activities of a variety of futures market participants.

QUESTIONS AND PROBLEMS

1. In purchasing a house, contracting to buy the house occurs at one time. Typically, closing occurs weeks later. At the closing, the buyer pays the seller for the house and the buyer takes possession. Explain how this transaction is like a futures or forward transaction.
2. In the futures market, a widget contract has a standard contract size of 5,000 widgets. What advantage does this have over the well-known forward market practice of negotiating the size of the transaction on a case-by-case basis? What disadvantages does the standardized contract size have?
3. What factors need to be considered in purchasing a commodity futures exchange seat? What are all the possible advantages that could come from owning a seat?
4. Explain the difference between initial and maintenance margin.
5. Explain the difference between maintenance and variation margin.
6. On February 1, a trader is long the JUN wheat contract. On February 10, she sells a SEP wheat futures, and sells a JUN wheat contract on February 20. On February 15, what is her position in wheat futures? On February 25, what is her position? How would you characterize her transaction on February 20?
7. Explain the difference between volume and open interest.
8. Define "tick" and "daily price limit."
9. A trader is long one SEP crude oil contract. On May 15, he contracts with a business associate to receive 1,000 barrels of oil in the spot market. The business associate is short one SEP crude oil contract. How can the two traders close their futures positions without actually transacting in the futures market?
10. Explain how a trader closes a futures market position via cash settlement.
11. Explain "price discovery."
12. Contrast anticipatory hedging with hedging in general.
13. What is "front running"?
14. Explain the difference in the roles of the National Futures Association and the Commodity Futures Trading Commission.
15. What are the two types of financial safeguard models used by futures clearinghouses?
16. What does it mean for an exchange to "demutualize?"
17. How did the CFMA of 2000 alter the regulation of the futures industry?

NOTES

[1] The mutual obligation of both buyer and seller of a futures contract is an important feature of the futures market that helps to distinguish futures contracts from options. If you buy a call option, then you buy the right to obtain a good at a certain price, but the buyer of a call has no obligation. Instead, as the term implies, he has an option to buy something but no obligation to do anything. The buyer of a futures contract, by contrast, undertakes an obligation to make a payment at a subsequent time and to take delivery of the good that is contracted. The initiation of any futures contract implies a set of future obligations.

[2] For a discussion of the historical origins of forward contracting and futures markets, see C. Culp, *Risk Transfer: Derivatives in Theory and Practice*, Hoboken: John Wiley and Sons, 2004; Loosigian, *Interest Rate Futures*, Princeton, NJ: Dow Jones Books, Inc., 1980; L. Venkataramanan, *The Theory of Futures Trading*, New York: Asia Publishing House, 1965; J. C. Williams, "The Origin of Futures Markets," *Agricultural History*, 56: 1, 1982, pp. 306–325; and U. Schaede, "Forwards and Futures in Tokugawa-Period Japan: A New Perspective on the Dōjima Rice Market," *Journal of Banking and Finance*, 13, 1989, pp. 487–513.

[3] For an account of the early days of the Chicago Board of Trade, see *The Commodity Trading Manual*, Chicago: Chicago Board of Trade, 1989. It was not until 1925 that the CBOT adopted a central counterparty clearinghouse structure to make their contracts truly a futures in the modern sense.

[4] More precise legal distinctions are offered in a later section.

[5] Scott Chambers and Colin Carter, "U.S. Futures Exchanges as Nonprofit Entities," *Journal of Futures Markets*, 10:1, 1990, pp. 79–88, analyze the difference that their nonprofit status has on the operation of futures exchanges. They argue that this freedom from profit maximizing goals stimulates cross-subsidization of the exchanges' products. In a practical sense, this analysis implies that exchanges use profits from successful contracts to subsidize less profitable contracts.

[6] See R. Chiang, G. D. Gay, and R. W. Kolb, "Commodity Exchange Seat Prices," *Review of Futures Markets*, 6:1, 1987, pp. 1–12.

[7] For more information on demutualization at U.S. futures exchanges, see K. Pendley, "Going Corporate: The Outlook for U.S. Futures Exchanges," *Futures Industry Magazine*, January/February 2002.

[8] The practice of trading for one's own account and simultaneously acting as a broker for other parties is known as **dual trading**. This practice has come under close scrutiny and some restrictions have been placed on it. We discuss dual trading more fully in Chapter 2.

[9] This is the classic definition of hedging given by H. Working, "Hedging Reconsidered," *Journal of Farm Economics*, 35, 1953, pp. 544–561.

[10] There are some exceptions to this general rule. For example, the London Metals Exchange trades metal forwards, but has a physical trading floor.

[11] Chapter 11 discusses the foreign exchange forward market in some detail as a preliminary to the discussion of the foreign exchange futures market.

[12] Approved warehouses are called "regular" warehouses.

[13] In general, futures on financial products tend to have few if any price limits. This means that price limits are restricted mainly to physical commodities. Michael J. Brennan, "A Theory of Price Limits in Futures Markets," *Journal of Financial Economics*, 16:2, 1986, pp. 213–233, provides an argument to explain why price limits are observed in some markets but not in others. Brennan argues that price limits serve to restrict

the flow of information available to traders in the event of dramatic changes in the true economic value of the commodity. If the futures price has moved the limit, the traders' information about the true value of the good is restricted because the trader cannot observe the market price for the good. Therefore, the trader has a stronger incentive to meet his margin call than he or she might have if they knew the true equilibrium price. Price limits do not restrict the trader's information if information is available from sources outside the futures market. For example, in financial markets there are good sources of information beyond the futures markets about the prices of goods. For agricultural markets, the sources of information beyond the futures market are not as valuable, Brennan notes. Thus, we would expect to find few price limits on financial futures, because price limits would not be effective in limiting the trader's information. Correlatively, price limits should be observed on agricultural commodities where the trader's information flow is poorer. Brennan notes that the pattern of price limits on futures is broadly consistent with this observation. Price limits are more popular on agricultural futures than on financial futures.

Price limits allegedly provide a "cooling-off period" when prices are very volatile. Others have argued that price limits prevent markets from "overshooting" the true market price. Evidence from the academic literature for either proposition is mixed at best. For example, Chul Woo Park, "Examining Futures Price Changes and Volatility on the Trading Day After a Limit-Lock Day," *Journal of Futures Markets*, 20, 2000, pp. 445–466, finds that prices continue to rise on average after an up-limit day and that volatility is influenced in some markets but not others. Ma, R. Rao, and R. Sears, "Volatility, Price Resolution, and the Effectiveness of Price Limits," *Journal of Financial Services Research*, 3:3, 1989, pp. 165–199, find that volatility the next day is lower and that the price tends to reverse direction after it hits the price limit. This issue remains highly controversial, as the comments on the Ma, Rao, and Sears articles by M. Miller and S. Lehmann indicate. For other studies of price limits see: Henk Berkman and Onno W. Steenbeek, "The Influence of Daily Price Limits on Trading in Nikkei Futures, "*Journal of Futures Markets*, 18:3, 1998, pp. 265–279; Joan Evans and James Mahoney, "The Effects of Daily Price Limits on Cotton Futures and Options Trading," *Federal Reserve Bank of New York*, 1996; Laura E. Kodres and Daniel P. O'Brien, "The Existence of Pareto-Superior Price Limits," *American Economic Review*, 84:4, 1994, pp. 919–932. Lucy F. Ackert and William C. Hunter, "Rational Price Limits in Futures Markets: Tests of a Simple Optimizing Model," *Review of Financial Economics*, 4:1, 1994, pp. 93–108.

[14] Edward J. Kane "Market Incompleteness and Divergences Between Forward and Futures Interest Rates," *Journal of Finance*, 35:2, 1980, pp. 221–234, in his article argues that the costliness of the performance guarantees provided by the clearinghouse is sufficient to cause a divergence between the prices of forward and futures contracts. Other justifications for such divergences have emerged, and Chapter 2 considers this topic in greater detail.

[15] For more information on the customer-broker relationship, see James V. Jordan and George Emir Morgan, "Default Risk in Futures Markets: The Customer Broker Relationship," *Journal of Finance*, 45, 1990, 909–933.

[16] Notice that this is different from the stock market. Stocks represent title to the real assets of the firms, and these are owned by someone at every point in time. The long and short positions in the stock market, when "netted out," always equal the number of outstanding shares actually in existence, not zero, as in the futures market.

[17] For more on the clearinghouse and its functions, see F. R. Edwards, "The Clearing Association in Futures Markets: Guarantor and Regulator," *The Journal of Futures Markets*, 3:4, 1983, pp. 369–392.

[18] We might say that the clearinghouse is "perfectly hedged." No matter whether futures prices rise or fall, the wealth of the clearinghouse will not be affected. This is the case since the clearinghouse holds both long and short positions that perfectly balance each other. Chapter 3 introduces the concept of hedging and it is pursued through all subsequent chapters.

[19] L. Kalavathi and L. Shanker, "Margin Requirements and the Demand for Futures Contracts," *Journal of Futures Markets*, 11:2, 1991, pp. 213–237, argue that increasing margins decreases demand for futures positions. Similarly, Stanley R. Pliska and Catherine T. Shalen, "The Effects of Regulations on Trading Activity and Return Volatility in Futures Markets," *Journal of Futures Markets*, 11:2, 1991, pp. 135–151, maintain that extremely high margins can reduce liquidity as measured by open interest, and trading volume.

[20] Probably the major determinant of the level of margin is the volatility of the futures contract. See C. K. Ma, G. Wenchi, and C. J. Frohlich, "Margin Requirements and the Behavior of Silver Prices," *Journal of Business Finance and Accounting*, 20:1, 1993, pp. 41–60; R. P. H. Fishe, L. G. Goldberg, T. F. Gosnell, and S. Sinha, "Margin Requirements in Futures Markets: Their Relationship to Price Volatility," *Journal of Futures Markets*, 10:5, 1990, pp. 541–554; and J. T. Moser, "Futures Margin and Excess Volatility," *Chicago Fed Letter*, 1991, pp. 1–4. However, it is not clear that raising margins can reduce volatility; see J. T. Moser, "Determining Margin for Futures Contracts: The Role of Private Interests and the Relevance of Excess Volatility," *Economic Perspectives*, 16:2, 1992, pp. 2–18. Further, open interest appears to mitigate volatility, so high margins that might diminish open interest might actually increase volatility; see H. Bessembinder and P. J. Seguin, "Price Volatility, Trading Volume, and Market Depth," *Journal of Financial and Quantitative Analysis*, 28:1, 1993, pp. 21–39.

[21] For a more extended discussion of margins, see K. Kahl, R. Rutz, and J. Sinquefield, "The Economics of Performance Margins in Futures Markets," *The Journal of Futures Markets*, 5:1, 1985, pp. 103–112. Some have argued that higher margins impede futures trading in some cases. See R. Fishe, and L. Goldberg, "The Effects of Margins on Trading in Futures Markets," *The Journal of Futures Markets*, 6:2, 1986, pp. 261–271. M. Hartzmark, "The Effects of Changing Margin Levels on Futures Market Activity, the Composition of Traders in the Market, and Price Performance," *Journal of Business*, 59:2, 1986, pp. S147–S180, argues that changing margin levels may have unpredictable effects on the composition of traders in the market, and he maintains that margin rules are unsuitable as a regulatory tool for controlling excessive speculation. W. C. Hunter, "Rational Margins on Futures Contracts: Initial Margins," *Review of Research in Futures Markets*, 5:2, 1986, pp. 160–173, argues that exchanges should set margins to reflect the risk-taking behavior of its members.

[22] See Avaham Kamara and Andrew F. Siegel, "Optimal Hedging in Futures Markets with Multiple Delivery Specifications," *The Journal of Finance*, 42: 4 1987, pp. 1007–1021. See also Stephen Craig Pirrong, Roger Kormendi, and Philip Meguire, "Multiple Delivery Points, Pricing Dynamics, and Hedging Effectiveness in Futures Markets for Spatial Commodities," *Journal of Futures Markets*, 14:5, 1994, pp. 545–573, find that this delivery option is priced and that the value of this option can be substantial. Pirrong, Kormendi, and Meguire find that additional delivery points increase the hedging effectiveness of the contract.

[23] Empirical evidence on the role of EFPs can be found in an article by Paul Laux and Sharon Brown-Hruska, "Fragmentation and Complementarity: The Case of EFPs" *The Journal of Futures Markets*, 22:8 2002, pp. 697–727.

[24] Often there may be a number of delivery months on which trading is permitted, but contracts with little trading volume will actually have an active market in only one or two delivery months at a time.

[25] In addition to physical metals contracts, the London Metals Exchange also trades a plastics contract and offers contracts on a metals index.

[26] Charles H. Taylor, *History of the Board of Trade of the City of Chicago*, Volume 1, Chicago: Robert O. Law Company, 1917, 427–428.

[27] See Gregory Kuserk and Peter Locke, "The Chicago Loop Tunnel Flood: Cash Pricing and Activity, *Review of Futures Markets*, 13:1, 1994, pp. 115–146.

[28] In his book, Jeffrey Williams, *The Economic Function of Futures Markets*, Cambridge: Cambridge University Press, 1986, argues that the main purpose of futures markets is to provide means for the borrowing and lending of commodities. In his analogy, the futures market makes the market for commodities behave like the money market, with easy access to borrowing and lending.

[29] See Roger W. Gray, "Onions Revisited," *Journal of Farm Economics*, 45: 2, 1963, 273–276. Onion futures commenced trading at the CME on September 8, 1942 and at the New York Mercantile Exchange on October 14, 1946. Although onion futures were banned in 1958, trading was permitted in already existing contracts with open interest. The last trade in onion futures occurred on November 5, 1959.

[30] The CFMA also added language that in effect included in the term commodity "an occurrence, extent of occurrence, or contingency ... that is ... beyond the control of the parties ... and ... associated with a financial, commercial, or economic consequence."

[31] Position limits do not apply in the same way to hedgers. For many contracts, position limits only apply during the delivery month.

[32] In some isolated instances, it is possible for a wash sale to have an economic purpose. For example, a trader who currently has a position established in the market may wish to avoid standing for delivery, where the position in the delivery queue depends on when the position was established. A trader may be tempted to engage in a wash transaction in order to move to the end of the delivery queue, that is, to "refresh" his position. Such a transaction, even though it arguably has an economic purpose, would be prohibited because all wash trades are *per se* prohibited.

[33] Part 150 of the CEA defines different kinds of position accountability limits. In the first type, called "Category 1" accountability limits, the exchange has the right to require traders to provide information about their positions to the exchange. In the second type, called "Category 2" accountability limits, the exchange has the authority to halt the increase of a trader's position in addition to requiring that traders provide information about their positions.

[34] For a thorough survey of the CFMA, see Walter L. Lukken and James A. Overdahl., "Derivative Contracts and Their Regulation," in Clifford E. Kirsch (ed), *Financial Product Fundamentals*, New York: Practicing Law Institute, February, 2004, 18-31–18-33.

[35] The pre-CFMA and post-CFMA numbers may be a bit misleading due to the fact that many of the new post-CFMA contracts were single-stock futures.

[36] Raymond Chiang and Dennis J. Lasser, "Tax Timing Options on Futures Contracts and the 1981 Economic Recovery Act," *The Financial Review,* 24:1, 1989, pp. 75–92, examine the impact of the law on the pricing of foreign exchange futures and forward contracts. Upon initial passage, this law applied to futures, but not to forward contracts. (The law was extended to apply to forward contracts effective in 1982.) Chiang and Lasser examine the differences between futures and forward prices for foreign exchange and conclude that the market responded to the law by widening the differences between forward and futures prices. This response would make sense, because the law temporarily destroyed the tax-timing option on futures contracts, while leaving the option intact on forward contracts. Chiang and Lasser found that the difference between forward and futures prices vanished when the two again became subject to the same tax treatment in 1982.