Wiley Trading Series

A COMPLETE GUIDE TO THE FUTURES MARKET

SECOND EDITION

Technical Analysis, Trading Systems, Fundamental Analysis, Options, Spreads, and Trading Principles

JACK D. SCHWAGER
AND MARK ETZKORN

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A Complete Guide to the Futures Market

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A Complete Guide to the Futures Market

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Second Edition

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In memory of Stephen Chronowitz, my mentor and friend.

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PART I

PRELIMINARIES

CHAPTER 1

For Beginners Only

If a little knowledge is dangerous, where is the man who has so much as to be out of danger?

—Thomas Henry Huxley

Purpose of This Chapter

The focus of this book is on analysis and trading. Although these subjects are explored in far greater depth than in most general commodity texts, the presentation in the following chapters does not assume any prior knowledge except for a familiarity with the basic concepts of futures markets. This chapter is intended to provide a sketch of the background information necessary to make this book accessible to the novice reader. The title of this chapter should be taken literally. Traders who are already familiar with futures markets should proceed directly to Chapter 2.

The introductory discussion provided by this chapter is deliberately brief and does not purport to cover all background subjects. Topics such as the history of exchanges, choosing a broker, and operation of the clearinghouse are not covered because a familiarity with these subjects is unnecessary for the analysis and trading of futures markets. Readers who desire a more detailed discussion of commodity market basics can refer to a wide range of introductory commodity texts.

The Nature of Futures Markets

A futures contract is a commitment to deliver or receive a standardized quantity and quality of a commodity or financial instrument at a specified future date. The price associated with this commitment is the trade entry level.

The essence of a futures market is in its name: Trading involves a commodity or financial instrument for a future delivery date, as opposed to the present time. Thus, if a cotton farmer wished to make a current sale, he would sell his crop in the local cash market. However, if the same farmer wanted to lock in a price for an anticipated future sale (e.g., the marketing of a still unharvested crop), he would have two options: He could locate an interested buyer and negotiate a contract specifying the price and other details (quantity, quality, delivery time, location, etc.). Alternatively, he could sell futures. Some of the major advantages of the latter approach are the following:

1. The futures contract is standardized; hence, the farmer does not have to find a specific buyer.
2. The transaction can be executed virtually instantaneously online.
3. The cost of the trade (commissions) is minimal compared with the cost of an individualized forward contract.
4. The farmer can offset his sale at any time between the original transaction date and the final trading day of the contract. The reasons this may be desirable are discussed later in this chapter.
5. The futures contract is guaranteed by the exchange.

Until the early 1970s, futures markets were restricted to commodities (e.g., wheat, sugar, copper, cattle). Since that time, the futures area has expanded to incorporate additional market sectors, most significantly stock indexes, interest rates, and currencies (foreign exchange). The same basic principles apply to these financial futures markets. Trading quotes represent prices for a future expiration date rather than current market prices. For example, the quote for December 10-year T-note futures implies a specific price for a $100,000, 10-year U.S. Treasury note to be delivered in December. Financial markets have experienced spectacular growth since their introduction, and today trading volume in these contracts dwarfs that in commodities. Nevertheless, futures markets are still commonly, albeit erroneously, referred to as commodity markets, and these terms are synonymous.

Delivery

Shorts who maintain their positions in deliverable futures contracts after the last trading day are obligated to deliver the given commodity or financial instrument against the contract. Similarly, longs who maintain their positions after the last trading day must accept delivery. In the commodity markets, the number of open long contracts is always equal to the number of open short contracts (see section Volume and Open Interest). Most traders have no intention of making or accepting delivery, and hence will offset their positions before the last trading day. (The long offsets his position by entering a sell order, the short by entering a buy order.) It has been estimated that fewer than 3 percent of open contracts actually result in delivery. Some futures contracts (e.g., stock indexes, eurodollar) use a *cash settlement* process whereby outstanding long and short positions are offset at the prevailing price level at expiration instead of being physically delivered.

Contract Specifications

Futures contracts are traded for a wide variety of markets on a number of exchanges both in the United States and abroad. The specifications for these contracts, especially details such as daily price limits, trading hours, and ticker symbols, can change over time; exchange web sites should be consulted for up-to-date information. Table 1.1 provides the following representative trading details for six futures markets (E-mini S&P 500, 10-year T-note, euro, Brent crude oil, corn, and gold):

1. **Exchange.** Note that some markets are traded on more than one exchange. In some cases, different contracts for the same commodity (or financial instrument) may even be traded on the same exchange.
2. **Ticker symbol.** The quote symbol is the letter code that identifies each market (e.g., ES for the E-mini S&P 500, C for corn, EC for the euro), combined with an alphanumeric suffix to represent the month and year.
3. **Contract size.** The specification of a uniform quantity per contract is one of the key ways in which a futures contract is standardized. By multiplying the contract size by the price, the trader can determine the dollar value of a contract. For example, if corn is trading at \$4.00/bushel (bu), the contract value equals \$20,000 (\$4 × 5,000 bu per contract). If Brent crude oil is trading at \$48.30, the contract value is \$48,300 (\$48.30 × 1,000 barrels). Although there are many important exceptions, very roughly speaking, higher per-contract dollar values will imply a greater potential/risk level. (The concept of contract value has no meaning for interest rate contracts.)
4. **Price quoted in.** This row indicates the relevant unit of measure for the given market.
5. **Minimum price fluctuation ("tick") size and value.** This row indicates the minimum increment in which prices can trade, and the dollar value of that move. For example, the minimum fluctuation for the E-mini S&P 500 contract is 0.25 index points. Thus, you can enter an order to buy December E-mini S&P futures at 1,870.25 or 1,870.50, but not 1,870.30. The minimum fluctuation for corn is $\frac{1}{4}$¢/bu, which means you can enter an order to buy December corn at \$4.01 $\frac{1}{2}$ or \$4.01 $\frac{3}{4}$, but not \$4.01 $\frac{5}{8}$ per bushel. The tick value is obtained by multiplying the minimum fluctuation by the contract size. For example, for Brent crude oil, one cent (\$0.01) per barrel × 1,000 barrels = \$10. For corn, $\frac{1}{4}$¢/bu × 5,000 = \$12.50.
6. **Contract months.** Each market is traded for specific months. For example, the E-mini S&P 500 futures contract is traded for March, June, September, and December. Corn is traded for March, May, July, September, and December. Table 1.2 shows the letter designations for each month of the year, which are added (along with the contract year) to a market's base ticker symbol to create a contract-specific ticker symbol. For example, December 2017 E-mini S&P 500 futures have a ticker symbol of ESZ17, while the symbol for the March 2018 contract is ESH18. The symbol for May 2017 corn is CK17. The last trading day for a contract typically occurs on a specified date in the contract month, although in some markets (such as crude oil), the last trading day falls in the month preceding the contract month. For most markets, futures are listed for contract months at least one year forward from the current date. However, trading activity is normally heavily concentrated in the nearest two contracts.

TABLE 1.1 Sample Futures Contract Specifications

	E-Mini S&P 500	10-Year T-Note	Euro FX	Brent Crude Oil	Corn	Gold
Exchange	CME Group	CME Group/CBOT	CME Group	Intercontinental Exchange (ICE Futures Europe)	CME Group/CBOT	CME Group/NYMEX
Ticker Symbol	ES	TY	EC	B	C	GC
Contract Size	$50 × S&P 500 Index	U.S. Treasury note with a face value at maturity of $100,000.	125,000 euros	1,000 barrels	5,000 bushels (~ 127 metric tons)	100 troy ounces
Price Quoted In	Index points	Points ($1,000) and halves of 1/32 of a point (e.g., 126-16 represents 126 16/32 and 126-165 represents 126 16.5/32).	U.S. dollars per euro	U.S. dollars and cents	Cents per bushel	U.S. dollars and cents per troy ounce
Minimum Price Fluctuation ("tick") Size and Value	0.25 index points = $12.50	One-half of 1/32 of one point ($15.625, rounded to the nearest cent per contract).	$0.00005 per euro increments ($6.25/contract)	One cent ($0.01) per barrel = $10	1/4 cent per bushel = $12.50	$0.10 per troy ounce = $10
Contract Months	Mar, Jun, Sep, Dec	Mar, Jun, Sep, Dec	Mar, Jun, Sep, Dec	All months of the year	Mar, May, Jul, Sep, Dec	The current month; the next two months; any Feb, Apr, Aug, and Oct within a 23-month period; and any June and Dec within a 72-month period beginning with the current month.
Trading Hours	Mon–Fri, 5:00 p.m. previous day to 4:15 p.m.; trading halt from 3:15 p.m. to 3:30 p.m.	5:00 p.m. to 4:00 p.m., Sun–Fri.	Sun–Fri. 5 p.m. to 4 p.m. CT with a 60-min. break each day beginning at 4:00 p.m.	1 a.m. to 11 p.m. London time	Sun–Fri, 7:00 p.m. to 7:45 a.m. CT and Mon–Fri, 8:30 a.m. to 1:20 p.m. CT.	Sun–Fri, 6:00 p.m. to 5:00 p.m. (5:00 p.m. to 4:00 p.m. Chicago time/CT) with a 60-minute break each day beginning at 5:00 p.m. (4:00 p.m. CT).

Daily Price Limit	7%, 13%, and 20% limits are applied to the futures fixing price, effective 8:30 a.m. to 3 p.m. CT, Mon–Fri.	7%, 13%, and 20% limits are applied to the futures fixing price, effective 8:30 a.m. to 3 p.m. CT, Mon–Fri. (See exchange for specifics.)	N/A	N/A	$0.25	N/A
Settlement Type	Cash settlement	Deliverable	Deliverable	Physical delivery based on EFP delivery, with an option to cash settle against the ICE Brent Index price for the last trading day of the futures contract.	Deliverable	Deliverable
First Notice Day	N/A	Final business day of the month preceding the contract month.	N/A	N/A	Last business day of month preceding contract month.	The last business day of the month preceding the delivery month.
Last Notice Day	N/A	Final business day of the contract month.	N/A	N/A	The business day after the last contract's last trading day.	The second-to-last business day of the delivery month.
Last Trading Day	Until 8:30 a.m. on the 3rd Friday of the contract month.	12:01 p.m. on the 7th business day preceding the last business day of the delivery month.	9:16 a.m. CT on the second business day immediately preceding the third Wed of the contract month.	The last business day of the second month preceding the relevant contract month.	Business day prior to the 15th calendar day of the contract month.	The third-to-last business day of the delivery month.
Deliverable Grade	N/A	U.S. T-notes with a remaining term to maturity of 6.5 to 10 years from the first day of the delivery month.	N/A	N/A	#2 Yellow at contract price, #1 Yellow at a 1.5 cent/bushel premium, #3 Yellow at a 1.5 cent/bushel discount.	Gold delivered under this contract shall assay to a minimum of 995 fineness.

TABLE 1.2 Contract Month Designations

Month	Ticker Designation
January	F
February	G
March	H
April	J
May	K
June	M
July	N
August	Q
September	U
October	V
November	X
December	Z

7. **Trading hours.** Trading hours are listed in terms of the local times for the given exchange. (All U.S. exchanges are currently located in either the Eastern or Central time zones.)
8. **Daily price limit.** Exchanges normally specify a maximum amount by which the contract price can change on a given day. For example, if the December corn contract closed at $4.10 on the previous day, and the daily price limit is 25¢/bu, corn cannot trade above $4.35 or below $3.85. Some markets employ formulas for increasing the daily limit after a specified number of consecutive limit days.

   In cases in which free market forces would normally seek an equilibrium price outside the range boundaries implied by the limit, the market will simply move to the limit and virtually cease to trade. For example, if after the market close the U.S. Department of Agriculture (USDA) releases a very bullish corn crop production estimate, which hypothetically would result in an immediate 30¢/bu price rise in an unrestricted market, prices will be *locked limit up* (25¢/bu) the next day. This means that the market will open and stay at the limit, with virtually no trading taking place. The reason for the absence of trading activity is that the limit rule restriction maintains an artificially low price, leading to a deluge of buy orders at that price but few if any sell orders.

   In the case of a very severe surprise event (e.g., sudden major crop damage), a market could move several limits in succession, although such moves are less common than in the days before near-24-hour electronic trading. In such situations, traders on the wrong side of the fence might not be able to liquidate their positions until the market trades freely. The new trader should be aware of, but not be overly frightened by, this possibility, since such events of extreme volatility rarely come as a complete surprise. In most cases, markets vulnerable to such volatile price action can be identified. Some examples of such markets would include commodities in which the USDA is scheduled to release a major report, coffee or frozen concentrated orange juice during their respective freeze seasons, and markets that have exhibited recent extreme trading volatility. For some markets, the limit on the nearby contract is removed at some point

approaching expiration (frequently *first notice day*—see item 10). Daily price limits can change frequently, so traders should consult the exchange on which their products trade to ensure they are aware of current thresholds.

9. **Settlement type.** Markets are designated either as physically deliverable or cash settled. In Table 1.1, the E-mini S&P 500 futures are cash settled, while all the other markets can be physically delivered.
10. **First notice day.** This is the first day on which a long can receive a delivery notice. First notice day presents no problem for shorts, since they are not obligated to issue a notice until after the last trading day. Furthermore, in some markets, first notice day occurs after last trading day, presenting no problem to the long either, since all remaining longs at that point presumably wish to take delivery. However, in markets in which first notice day precedes last trading day, longs who do not wish to take delivery should be sure to offset their positions in time to avoid receiving a delivery notice. (Brokerage firms routinely supply their clients with a list of these important dates.) Although longs can pass on an undesired delivery notice by liquidating their position, this transaction will incur extra transaction costs and should be avoided. ***Last notice day*** is the final day a long can receive a delivery notice.
11. **Last trading day.** This is the last day on which positions can be offset before delivery becomes obligatory for shorts and the acceptance of delivery obligatory for longs. As indicated previously, the vast majority of traders will liquidate their positions before this day.
12. **Deliverable grade.** This is the specific quality and type of the underlying commodity or financial instrument that is acceptable for delivery.

Volume and Open Interest

Volume is the total number of contracts traded on a given day. Volume figures are available for each traded month in a market, but most traders focus on the total volume of all traded months.

Open interest is the total number of outstanding long contracts, or equivalently, the total number of outstanding short contracts—in futures, the two are always the same. When a new contract begins trading (typically about 12 to 18 months before its expiration date), its open interest is equal to zero. If a buy order and sell order are matched, then the open interest increases to 1. Basically, open interest increases when a new buyer purchases from a new seller and decreases when an existing long sells to an existing short. The open interest will remain unchanged if a new buyer purchases from an existing long or a new seller sells to an existing short.

Volume and open interest are very useful as indicators of a market's liquidity. Not all listed futures markets are actively traded. Some are virtually dormant, while others are borderline cases in terms of trading activity. Illiquid markets should be avoided, because the lack of an adequate order flow will mean that the trader will often have to accept very poor trade execution prices if he wants to get in or out of a position.

Generally speaking, markets with open interest levels below 5,000 contracts, or average daily volume levels below 1,000 contracts, should be avoided, or at least approached very cautiously. New markets will usually exhibit volume and open interest figures below these levels during their

initial months (and sometimes even years) of trading. By monitoring the volume and open interest figures, a trader can determine when the market's level of liquidity is sufficient to warrant participation. Figure 1.1 shows February 2016 gold (top) and April 2016 gold (bottom) prices, along with their respective daily volume figures. February gold's volume is negligible until November 2015, at which point it increases rapidly into December and maintains a high level through January (the February contract expires in late February). Meanwhile, April gold's volume is minimal until January, at which point it increases steadily and becomes the more actively traded contract in the last two days of January—even though the February gold contract is still a month from expiration at that point.

The breakdown of volume and open interest figures by contract month can be very useful in determining whether a specific month is sufficiently liquid. For example, a trader who prefers to initiate a long position in a nine-month forward futures contract rather than in more nearby contracts because of an assessment that it is relatively underpriced may be concerned whether its level of trading activity is sufficient to avoid liquidity problems. In this case, the breakdown of volume and open interest figures by contract month can help the trader decide whether it is reasonable to enter the position in the more forward contract or whether it is better to restrict trading to the nearby contracts.

Traders with short-term time horizons (e.g., intraday to a few days) should limit trading to the most liquid contract, which is usually the nearby contract month.

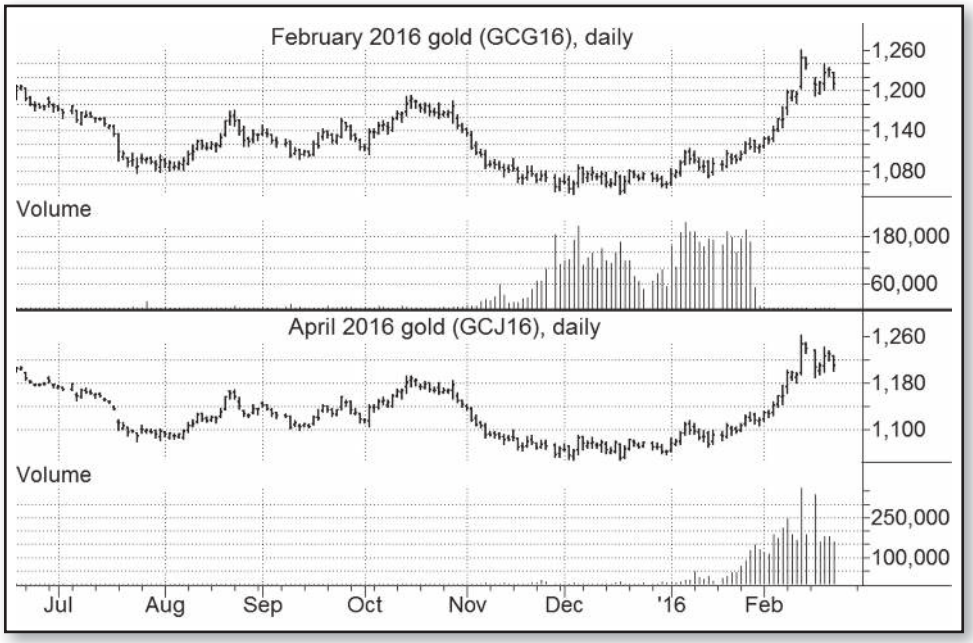

FIGURE 1.1 Volume Shift in Gold Futures

Hedging

A sell hedge is the sale of a futures contract as a temporary substitute for an anticipated future sale of the cash commodity.[1] Similarly, a buy hedge is a temporary substitute for an anticipated forward purchase of the cash commodity. In essence, the goal of the hedger is to lock in an approximate future price in order to eliminate exposure to interim price fluctuations. The concept of hedging is perhaps best explained through illustration. Let's look at several examples of hedging.

Hedging Examples for a Commodity

Cotton Producer Sell Hedge The date is April 1. A cotton farmer estimates his potential production at approximately 200,000 lbs, assuming average yields. The current cash price is 95¢/lb—an extremely attractive price, but one the producer cannot take advantage of, since his crop will not be harvested until November. December futures are trading at 85¢/lb, reflecting market expectations for an interim price decline. The producer believes the December price may actually be overly optimistic. He expects that a large increase in U.S. production, in response to high prices, will result in a major price collapse by the time the new crop is harvested. Given his bearish expectations, the producer is eager to lock in a price on his anticipated production.

Historical comparisons indicate the November–December cash prices in the producer's region tend to average approximately 2–4¢ below the December futures price. (The difference between cash and futures is called the *basis.* In this case, the November–December basis is said to be "2–4¢ under.") Thus, by selling December futures at the current price of 85¢/lb, the farmer can lock in an approximate cash price of 81–83¢. Because the producer believes prices will be significantly below 80¢/lb by harvest time, he decides to sell three December futures contracts against the expected post-harvest sale of his crop. This is called a *sell hedge*.

Note that three contracts represent 150,000 lbs of cotton, an amount equivalent to three-quarters of the producer's anticipated crop. The farmer does not hedge his entire crop, because his eventual output is still open to considerable uncertainty. If weather conditions are extremely poor, his yields could be reduced by more than 25 percent. Consequently, to avoid the possibility of overhedging his crop, an action that would leave him with a net short position, he prudently decides to sell only three contracts.

Table 1.3 illustrates two hypothetical outcomes of this hedge. In case 1, the producer is entirely correct in his expectations, and cash prices decline to 72¢/lb by December 1. In line with the normal historical basis relationship, December futures are simultaneously trading at 75¢/lb. The producer sells his cash crop at 72¢/lb, but also realizes a profit of 10¢/lb on his futures position. Thus, on the 150,000 lbs of crop that he has hedged, his effective price is 82¢/lb. (Commissions have not been included in this or the following illustrations in order to keep exposition as simple as possible. The adjustment for commissions would not meaningfully alter the results.) As a result of hedging, the

[1] The sell hedge may also be used as a proxy for temporary inventory reduction (see example of stock portfolio manager later in this section).

TABLE 1.3 Cotton Producer Sell Hedge

Case 1: Severely Weakening Cash Price		Case 2: Relatively Firm Cash Price	
Apr. 1	**Dec. 1**	**Apr. 1**	**Dec. 1**
Cash price 95¢	72¢	Cash price 95¢	92¢
Futures price 85¢	75¢	Futures price 85¢	95¢
Results:		Results:	
Cash sale price: 72¢		Cash sale price: 92¢	
Profit on futures: 10¢		Loss on futures: 10¢	
Effective sale price: 82¢		Effective sale price: 82¢	

farmer has locked in a much better price than he would have realized had he waited until his crop was harvested before taking any marketing action. In dollar terms, the producer's income is $15,000 higher than it would have been without the hedge:

$$3 \times 10¢/\text{lb} \times 50,000 \text{ lbs} = \$15,000$$

A hedge will not always be profitable. In the situation illustrated by case 2, Table 1.3, the producer's projections proved wrong as cash prices remained firm, declining a mere 3¢/lb from their lofty April 1 levels. In this case, the farmer is able to sell his crop at a much better than expected 92¢/lb, but he experiences a loss of 10¢/lb on his futures position. His effective sales price is once again 82¢/lb. Of course, in this instance, with the benefit of hindsight, the producer would have been much better off had he had not hedged. Nonetheless, note that even though he has sacrificed the opportunity for a windfall profit by hedging, he still realizes his target sales price of 82¢/lb.

The value of hedging is that it provides the producer with a much wider range of marketing strategies. Remember, if he prefers to take his chances and wait until after the harvest to market his crop, he can do so. Futures widen the range of possibilities by allowing the producer to lock in any futures-implied price during the interim. Thus, although he will not always make the right choice, presumably, over the long run, the increased marketing flexibility provided by futures should prove advantageous.

Cotton Mill Buy Hedge The date is June 1. A cotton mill has forward contracted to supply a fabric order for the following March. To meet this production order, the mill will need 1 million lbs of cotton on hand by December.

The current cash price is 77¢/lb, and December futures are trading at 80¢/lb. Assuming the same −3¢/lb basis established in the aforementioned cotton producer example, the December futures price quote implies cash prices will be unchanged in December relative to their current levels.

Although the mill has plenty of time to purchase the actual cotton, it is concerned that cash prices will rise significantly in the coming months. Since the end-product sales price has already been negotiated, the company must lock in its input price in order to guarantee a satisfactory profit margin. Given this scenario, the mill has two choices:

1. Increase its inventory sufficiently to cover its anticipated December–March requirements.
2. Hedge its forward requirements by buying December cotton futures.

Given the price structure in this example, the mill will be much better off buying futures. Why? Because the purchase of futures covers the forward commitment without incurring any storage costs. (This is true since the December futures price implies an unchanged cash price relative to current levels.) In contrast, the purchase of actual cotton would incur storage-related costs for the six-month period. The most important of these expenses would be borrowing costs, or lost interest, if the firm was using its own funds.

Table 1.4 illustrates two alternative outcomes for this hedge. In both cases, it is assumed the firm purchases the actual cotton on December 1, simultaneously offsetting its long hedge position in futures. In the first situation, cash prices increase between June and December, and the actual cash market purchase price on December 1 is 87¢/lb. However, as a result of a 10¢/lb profit on the futures hedge, the effective price to the firm is 77¢ (the cash price on June 1). In the second illustration, cash prices decline, and the firm's actual purchase price is 67¢/lb. However, as a result of a 10¢/lb loss in futures, the effective price is once again 77¢/lb. Although in this case the mill would have been better off not hedging, it is still purchasing the cotton at the previously desired locked-in price.

Since most companies will be more concerned about locking in adequate profit margins than about giving up windfall profits, hedging should provide a useful tool for business management. Furthermore, it should be emphasized that the firm always has the option not to hedge if, for any reason, the price implied by futures is not considered attractive. In short, users of commodities who incorporate hedging should have an advantage over their competitors, because they have a much wider range of purchasing strategies.

Hedging in Financial Futures

The previous examples illustrate the buy-and-sell hedge for a commodity. The same basic principles apply to the financial markets, as shown by the following examples.

A corporation expecting the need for a loan in six months and concerned about rising borrowing costs in the interim could lock in an approximate fixed rate by selling short-term interest rate futures (e.g., eurodollars). (An increase in interest rates will cause the *price* of interest rate instruments to decline.)

TABLE 1.4 Cotton Mill Buy Hedge

Case 1: Rising Cash Price		**Case 2: Declining Cash Price**	
June 1	**Dec. 1**	**June 1**	**Dec. 1**
Cash price 77¢	87¢	Cash price 77¢	67¢
Futures price 80¢	90¢	Futures price 80¢	70¢
Results:		Results:	
Cash purchase price: 87¢		Cash purchase price: 67¢	
Profit on futures: 10¢		Loss on futures: 10¢	
Effective purchase price: 77¢		Effective purchase price: 77¢	

A bond fund manager anticipating a cash influx in three months and an imminent decline in interest rates could lock in a rate of return by going long T-note futures.

A stock portfolio manager concerned about the possibility of a sharp, temporary break in stock prices could reduce market exposure by selling stock index futures (E-mini S&P 500, E-mini Nasdaq 100, Russell 2000 Index Mini). Such action would be far more cost effective (i.e., would incur much lower commission costs) than liquidating part or all of his portfolio and reinstating the position at a later date.

A U.S. company that knew it would require 10 million euros in three months to pay for an import transaction could lock in the exchange rate by purchasing euro futures.

General Observations Regarding Hedging

1. In all the preceding examples, the hedger offsets either an anticipated future transaction in the actual market or a current position with an equal but opposite transaction in futures. Thus, for the hedger, participation in futures can reduce risks associated with price changes. In effect, the true speculators among producers and users of commodities (or the financial markets) are those who do not hedge. For example, the farmer who does not hedge is speculating on the direction of prices during the interim before his crop is harvested.
2. Some written discussions of hedging almost seem to imply that producers and users of exchange-traded commodities should automatically hedge. This is ridiculous—hedging should be considered only if the futures-implied price is desirable. Otherwise, one is merely exchanging the futures-implied price for the subsequent actual cash price. Over the long run, this type of hedging should be a break-even process in terms of trades and a net loss generator because of commissions.
3. Hedging should be viewed as an important marketing tool, because it provides the producer and user with a wide range of purchase and sale strategies. Hedgers can always choose not to hedge, but nonhedgers eliminate the possibility of enhancing their profits through futures-related opportunities.
4. The hedger need not wait until the time of the actual transaction to lift the hedge. For example, reconsider the case of the cotton producer who sells December futures at 85¢/lb. If by October, futures have declined to 70¢/lb, the hedger might very well decide to cover his short hedge position. Although at a price of 85¢/lb the farmer was eager to protect against the possibility of declining prices, at a price of 70¢/lb he might well prefer to take his chances. If prices were subsequently to rally, the producer might decide to reinstate his hedge. In fact, sophisticated hedgers will often use such a trading approach in hedging. The key point is that, contrary to most textbook illustrations, a hedge should be maintained only as long as the implied price protection is deemed desirable.
5. It is important to keep the time differential and expectations in mind when comparing a current cash price with the cash price implied by futures. For example, in the hedge illustrated in case 1, Table 1.3, the futures-implied cash price is 13¢/lb below the current cash price. Yet, despite

this wide discount, the hedge is still very profitable because the price differential is ultimately far outweighed by the intervening price decline. Thus, the relevant question is not whether the futures-implied cash price is attractive relative to the *current* cash price, but rather whether it is attractive relative to the *expected future* cash price.

6. The hedger does not precisely lock in a transaction price. His effective price will depend on the basis. For example, if the cotton producer sells futures at 85¢/lb, assuming a −3¢ basis, his effective sales price will be 80¢/lb, rather than the anticipated 82¢/lb, if the actual basis at the time of offset is −5¢. However, it should be emphasized that this basis-price uncertainty is far smaller than the outright price uncertainty in an unhedged position. Furthermore, by using reasonably conservative basis assumptions the hedger can increase the likelihood of achieving, or bettering, the assumed locked-in price.
7. Although a hedger plans to buy or sell the actual commodity, it will usually be far more efficient to offset the futures position and use the local cash market for the actual transaction. Futures should be viewed as a pricing tool, not as a vehicle for making or taking delivery.
8. Most standard discussions of hedging make no mention whatsoever of price forecasting. This omission seems to imply that hedgers need not be concerned about the direction of prices. Although this conclusion may be valid for some hedgers (e.g., a middleman seeking to lock in a profit margin between the purchase and sales price), it is erroneous for most hedgers. There is little sense in following an automatic hedging program. Rather, the hedger should evaluate the relative attractiveness of the price protection offered by futures. Price forecasting would be a key element in making such an evaluation. In this respect, it can easily be argued that price forecasting is as important to many hedgers as it is to speculators.

Trading

The trader seeks to profit by anticipating price changes. For example, if the price of December gold is $1,150/oz, a trader who expects the price to rise above $1,250/oz will go long. The trader has no intention of actually taking delivery of the gold in December. Right or wrong, the trader will offset the position sometime before expiration. For example, if the price rises to $1,275 and the trader decides to take profits, the gain on the trade will be $12,500 per contract (100 oz × $125/oz). If, on the other hand, the trader's forecast is wrong and prices decline to $1,075/oz, with the expiration date drawing near, the trader has little choice but to liquidate. In this situation, the loss would be equal to $7,500 per contract. Note that the trader would not take delivery even given a desire to maintain the long gold position. In this case, the trader would liquidate the December contract and simultaneously go long in a more forward contract. (This type of transaction is called a *rollover* and would be implemented with a *spread* order—defined in the next section.) Traders should avoid taking delivery, since it can often result in substantial extra costs without any compensating benefits.

Novice traders should caution against the securities-based bias of trading only from the long side. In futures trading, there is no distinction between going short and going long.[2] Since prices can go down as well as up, the trader who takes only long positions will eliminate approximately half the potential trading opportunities. Also, it should be noted that futures frequently command a premium to current prices; consequently, the inflation argument for a long-side bias is frequently erroneous.

The successful trader must employ some method for forecasting prices. The two basic analytical approaches are:

1. **Technical analysis.** The technical analyst bases projections on non-economic data. Price data are by far the most important—and often only—input in technical analysis. The basic assumption of technical analysis is that prices exhibit repetitive patterns and that the recognition of these patterns can be used to identify trading opportunities. Technical analysis can also include other data, such as volume, open interest, and sentiment measures.
2. **Fundamental analysis.** The fundamental analyst uses economic data (e.g., production, consumption, exports) to forecast prices. In essence, the fundamentalist seeks to uncover trading opportunities by identifying potential transitions to significantly more ample or tighter supply-demand balances.

As discussed in Chapter 2, technical and fundamental analysis are not mutually exclusive approaches. Many traders use both in the decision-making process or as components of automated trading systems.

Types of Orders

Day versus Good Till Canceled (GTC)

Unless specified otherwise, orders are assumed to be good only for the day of entry. If the trader wants the order to remain open until canceled, he must specify that it is a good-till-canceled (GTC) order.

Market

This instruction directs the broker to execute the order upon receipt at the prevailing price level. Market orders are used when the trader is more concerned with initiating or liquidating a position immediately than with trying to achieve a specific execution price. Market orders ensure the trade will be executed unless prices are locked in at the daily limit or the order is entered too close to the end of the trading session.

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[2] Some beginners are confused about how it is possible for a trader to sell a commodity he does not own. The key to the answer lies in the fact that the trader is selling a *futures* contract, not the cash commodity. Even though the trader who stays short past the last trading day must acquire the actual commodity to fulfill his contractual obligation, there is no need for him to own the commodity before that time. The short sale is simply a bet that prices will go down before the last trading day. Right or wrong, the trader will offset his short position before the last trading day, eliminating any need for actual ownership of the commodity.

Limit

The limit order, also called an *or-better* order, is used when the trader wants to ensure that the execution price will be no worse than a certain level. For example, an order to buy December gold at a $1,150/ounce limit can only be executed at a price equal to or below $1,150.

If the market is trading higher than that level when the brokerage receives the order, it must wait for the price to decline to $1,150 before it can execute the trade. If the price fails to return to that level, the brokerage is unable to fill the order. Similarly, an order to sell December gold at a $1,190/ounce limit would indicate that the order can only be filled at a price equal to or above $1,190. Limit orders will normally provide better fills than will market orders, but the trade-off is that they may not be executed. A trader whose primary concern is to get the order filled, particularly if it is an order to liquidate a losing position, should not use a limit order.

Stop

A stop order is not executed until the market reaches the given price level. The indicated price on a buy stop must always be above the market, while the indicated price on a sell stop must always be below the market.

In effect, a stop order will always be filled at a price worse than the market price. Why then would a trader use a stop order? There are two very important reasons: First, stop orders are used to limit losses or protect open profits. For example, a trader who buys March sugar at 14.50¢/lb might place an order to sell March sugar at 13.50¢/lb stop, GTC. If the market subsequently declines to 13.50¢/lb or lower, the stop order becomes a market order. In this way, the trader limits his risk on the trade to approximately 100 points. The reason for the word *approximately* is that markets often move beyond the stop price before the order can be executed. In the case of a short position, the protective stop order would be placed at a higher price. For example, if the trader went short March sugar at 14.50¢/lb, an order might be placed to buy March sugar at 15.50¢/lb stop, GTC.

Second, a stop order may be used if a trader views the market's ability to reach a certain level as a price signal. For example, if March sugar has been trading between 12.00¢ and 15.00¢/lb for several months, a trader might believe that the ability of the market to significantly penetrate the high of this range would be a sign of strength, suggesting a potential bull move. In this case, the trader might enter an order to buy March sugar at 15.50¢/lb stop. Thus, even though March sugar can be purchased more cheaply at the current price, the trader prefers to use the stop order because he only wants to be long if the market is able to demonstrate a specified degree of strength.

Stop-Limit

A stop-limit order is a stop order in which the actual execution price is limited. For example, an order to "buy March 10-year T-notes at 124'16 stop, 124'24 limit, GTC" means that if March 10-year T-note futures advance to 124'16, the buy order is activated but cannot be executed at a price above 124'24. Similarly, an order to "sell March T-notes at 122 stop, 121'22 limit, GTC" is a sell stop that is activated if the market declines to 122, but which cannot be filled at a price below 121'22. The stop and limit portions of the order need not necessarily be at different prices.

Stop Close-Only

A stop close-only is a stop order that is activated only if any portion of the closing price range is beyond the indicated price. (This type of order is not accepted on all exchanges.)

Market If Touched

A market-if-touched (MIT) order is similar to a limit order except that it becomes a market order anytime the limit price is reached. For example, given the following sequence of prices—79.40, 79.35, 79.25, 79.20, 79.25, 79.30, 79.40, 79.50 . . .—a 79.20 MIT buy order would become a market order once 79.20 was reached, but a 79.20 limit order could be filled only at a price of 79.20 or better. In this illustration, the market decline to 79.20 is so fleeting that the limit order might very well not be filled, while the MIT order would be executed (probably at some price above 79.20). The MIT is a hairsplitting type of order that is largely superfluous. Over the long run, a trader will achieve equivalent results by using slightly higher buy limits (lower sell limits) instead of MIT orders.

Fill or Kill

As the name implies, a fill-or-kill (FOK) order is a limit order that must be filled immediately or canceled.

Scale

A scale order is used for multicontract positions in which the trader wants to enter different contracts at different prices. For example, if June British pound futures are trading at 153.00, a trader who wants to sell 10 contracts on a possible rally to the 155.00–157.00 zone might enter a scale order to sell 10 June British pound contracts, one at 155.20 limit and one contract every 0.20 points higher, with the last contract having a limit price of 157.00.

One Cancels Other

The one-cancels-other (OCO) order is a two-sided order in which the execution of one side cancels the other. For example, a trader who is long February live cattle at 117.00, with an objective of 125.00 and a stop point at 109.00, might enter the following order: sell 1 February cattle 125.00 limit/109.00 stop, OCO, GTC.

Contingent

In this type of order the execution instruction for one contract is contingent on another contract. An example would be: Sell October sugar at the market if March sugar trades at 13.00 or lower. (This type of order is not accepted on all exchanges.)

Spread

A spread involves the simultaneous purchase of one futures contract against the sale of another futures contract, either in the same market or in a related market. In essence, a spread trader is primarily concerned with the *difference* between prices rather than the *direction* of price. An example of a spread trade would be: Buy 1 July cotton/sell 1 December cotton, July 200 points premium December. This order would be executed if July could be bought at a price 200 points or less above the level at which December is sold. Such an order would be placed if the trader expected July cotton to widen its premium relative to December cotton.

Not all brokerages will accept all the order types in this section (and may offer others not listed here). Traders should consult with their brokerage to determine which types of orders are available to them.

Commissions and Margins

In futures trading, commissions are typically charged on a per-contract basis. In most cases, large traders will be able to negotiate a reduced commission rate. Although commodity commissions are relatively moderate, commission costs can prove substantial for the active trader—an important reason why position trading is preferable unless one has developed a very effective short-term trading method.

Futures margins are basically good-faith deposits and represent only a small percentage of the contract value (roughly 5 percent with some significant variability around this level). Futures exchanges will set minimum margin requirements for each of their contracts, but many brokerage houses will frequently require higher margin deposits. Since the initial margin represents only a small portion of the contract value, traders will be required to provide additional margin funds if the market moves against their positions. These additional margin payments are referred to as *maintenance*.

Many traders tend to be overly concerned with the minimum margin rate charged by a brokerage house. If a trader is adhering to prudent money management principles, the actual margin level should be all but irrelevant. As a general rule, the trader should allocate at least three to five times the minimum margin requirement to each trade. Trading an account anywhere near the full margin allowance greatly increases the chances of experiencing a severe loss. Traders who do not maintain at least several multiples of margin requirements in their accounts are clearly overtrading.

Tax Considerations

Tax laws change over time, but for the average speculator in the United States, the essential elements of the futures contract tax regulations can be summarized in three basic points:

1. There is no holding period for futures trades (i.e., all trades are treated equally, regardless of the length of time a position is held, or whether a position is long or short).

2. Sixty percent of futures trading gains are treated as long-term capital gains, and the remaining 40 percent are treated as short-term capital gains. Since current maximum tax rates on long- and short-term capital gains are 20 percent and 50 percent, respectively, this formula suggests a maximum tax rate of 32 percent on futures trades.
3. Gain (loss) in a given year is calculated as the total of realized gain (loss) plus unrealized gain (loss) as of December 31.

CHAPTER 2

The Great Fundamental versus Technical Analysis Debate

Curiously, however, the broken technician is never apologetic about his method. If anything, he is more enthusiastic than ever. If you commit the social error of asking him why he is broke, he will tell you quite ingeniously that he made the all-too-human error of not believing his own charts. To my great embarrassment, I once choked conspicuously at the dinner table of a chartist friend of mine when he made such a comment. I have since made it a rule never to eat with a chartist. It's bad for digestion.

—Burton G. Malkiel

One evening, while having dinner with a fundamentalist, I accidentally knocked a sharp knife off the edge of the table. He watched the knife twirl through the air, as it came to rest with the pointed end sticking into his shoe. "Why didn't you move your foot?" I exclaimed. "I was waiting for it to come back up," he replied.

—Ed Seykota (an avowed technician)

Fundamental analysis involves the use of economic data (e.g., production, consumption, disposable income) to forecast prices, whereas technical analysis is based primarily (and often solely) on the study of patterns in the price data itself. Which method is better? This question is the subject of great

debate. Interestingly, the experts are no less divided on this matter than are novices. In a series of books in which I interviewed some of the world's best traders,[1] I was struck by the sharply divergent views on this issue.

Jim Rogers was characteristic of one extreme of the spectrum. During the 1970s, Jim Rogers and George Soros were the two principals of the Quantum Fund, perhaps the most successful Wall Street fund of its day. In 1980, Rogers left the fund to escape managerial responsibilities and devote all his time to managing his own investments—an endeavor at which he again proved spectacularly successful. (The Quantum Fund maintained its excellent performance in the ensuing years under George Soros's directorship.) Over the years, Rogers has been on record with a high percentage of accurate market forecasts. As but one example, in my 1988 interview with him, Rogers correctly predicted both the massive collapse in the Japanese stock market and the continued multiyear downtrend in gold prices. Clearly, Jim Rogers is a man whose opinion merits serious attention.

When I queried Rogers about his opinion on chart reading (the classic method of technical analysis), he replied: "I haven't met a rich technician. Excluding, of course, the technicians who sell their services and make a lot of money." That cynical response succinctly summarized Rogers's views about technical analysis.

Marty Schwartz is a trader whose opinion lies at the other extreme. At the time of our interview, Schwartz, an independent stock index futures trader, was considering managing outside money. In conjunction with this undertaking, he had just had his personal track record audited, and he allowed me to view the results. During the prior 10-year period, he had achieved an average return of 25 percent—monthly! Equally impressive, during this 120-month period, he witnessed only two losing months—minuscule declines of 2 percent and 3 percent. Again, here was an individual whose opinion on the market warranted serious respect.

Although I did not mention Rogers's comments to Schwartz, when I asked Schwartz whether he had made a complete transition from fundamental to technical analysis (Schwartz had started his financial career as a stock analyst), his response almost sounded like a direct rebuttal to Jim Rogers: "Absolutely. I always laugh at people who say, 'I've never met a rich technician.' I love that! It is such an arrogant, nonsensical response. I used fundamentals for nine years and got rich as a technician."

There you have it. Two extraordinarily successful market participants holding polar-opposite views regarding the efficacy of fundamental versus technical analysis. Whom do you believe?

In my own assessment, both Rogers's and Schwartz's viewpoints contain elements of truth. It is possible to succeed as a trader by being a pure fundamentalist, a pure technician, or a hybrid of the two. The two methods are certainly not mutually exclusive. In fact, many of the world's most successful traders use fundamental analysis to determine the direction to trade a market and technical analysis to time the entry and exit of such trades.

One virtually universal trait I found among successful traders was that they had gravitated to an approach that best fit their personality. Some traders prefer very long-term approaches, while others

[1] *Market Wizards* (Hoboken, NJ: John Wiley & Sons, 2012 [orig. pub. 1989]); *The New Market Wizards* (Hoboken, NJ: John Wiley & Sons, 2008); *Stock Market Wizards* (New York, NY: HarperBusiness, 2003); and *Hedge Fund Market Wizards* (Hoboken, NJ: John Wiley & Sons, 2012).

are inclined toward day trading, some traders feel comfortable only when following signals generated by an automated system, while others find such a mechanical method anathema; some traders thrive in the near-bedlam atmosphere of a trading room, while others succeed only if their decisions are made in the calm of a quiet office; and some traders find fundamental analysis a natural approach, while others instinctively lean to technical methods, and still others a blend of the two.

Essentially, then, there is no universal answer to the question, which is better, fundamental analysis or technical analysis? Quite simply, it depends on the individual, who must determine his or her natural approach.

The relative popularity of fundamental analysis versus technical analysis tends to wax and wane in broad cyclical fashion. When I first became a market analyst in the 1970s, fundamental analysis was considered a solid approach, while technical analysis was regarded by most as some sort of hocus-pocus or black magic.

The situation changed, however, because the huge price trends that developed during the commodity inflation period of the 1970s were ideally suited to the trend-following techniques widely favored by technical analysts. Even the simplest trend-following strategies tended to perform extremely well during this period, while sophisticated fundamental methodologies often proved to be highly misleading. In this environment, the popularity of technical analysis grew enormously, while fundamental analysis declined in favor. This basic trend extended into the 1980s, as technical analysis became the primary method of choice and fundamental analysis a minority technique. By the end of the 1980s, a significant majority of money managers in the futures industry (known as commodity trading advisors, or CTAs) employed technical analysis exclusively or at least for the bulk of their trading decisions. Thus, whereas at the beginning of the 1970s few market participants would even consider technical analysis, by the late 1980s few would consider fundamental analysis.

By this time, however, general market behavior had become increasingly erratic, with fewer sustained trends and an increasing percentage of false price breakouts (i.e., price moves above or below trading ranges that are followed by price reversals rather than price extensions). Simultaneously, the spectacular performance of some technical trend followers deteriorated substantially, or at the very least their results exhibited periodic deep equity retracements. At the same time, it appeared that many of the traders and money managers with the best performance were those who were primarily fundamentally oriented, or at least relied on fundamentals as a significant input in their trading decisions.

To summarize, there is no "right" side to the great fundamental versus technical debate: the appropriate method depends on the individual. Moreover, even for individual traders, the perceived answer may change dramatically, or even completely reverse, over the years. Also, combining fundamental analysis with technical analysis can provide a particularly effective approach and is indeed descriptive of the general methodology used by some of the world's most successful traders. The bottom line is that each trader must explore both approaches and select the methodology or blend that feels the most comfortable and appropriate.

The relative pros and cons of using fundamental and technical analysis for trading, as well as practical considerations about combining the two methods, are examined in greater detail in Chapter 29.

PART II

CHART ANALYSIS AND TECHNICAL INDICATORS

CHAPTER 3

Charts: Forecasting Tool or Folklore?

Common sense is not so common.

—Voltaire

There is a story about a speculator whose desire to be a winner was intensified by each successive failure. Initially he tried basing his trading decisions on fundamental analysis. He constructed intricate models that provided price forecasts based on an array of supply/demand statistics. Unfortunately, his models' predictions were invariably upset by some unexpected event, such as a drought or a surprise export sale.

Ultimately, in exasperation, he gave up on the fundamental approach and turned to chart analysis. He scrutinized price charts, searching for patterns that would reveal the secrets of trading success. He was the first to discover such unusual formations as shark-tooth bottoms and Grand Teton tops. But alas, the patterns always seemed reliable until he started basing his trades on them. When he went short, top formations proved to be nothing more than pauses in towering bull markets. Equally distressing, steady uptrends had an uncanny tendency to reverse course abruptly soon after he went long.

"The problem," he reasoned, "is that chart analysis is too inexact. What I need is a computerized trading system." So he began testing various schemes to see if any would have been profitable as a trading system in the past. After exhaustive research, he found that buying cattle, cocoa, and eurodollars on the first Tuesday of months with an odd number of days and then liquidating these positions on the third Thursday of the month would have yielded extremely profitable results during the preceding five years. Inexplicably, this carefully researched pattern failed to hold once he began trading. Another stroke of bad luck.

The speculator tried many other approaches—Elliott waves, Fibonacci numbers, Gann squares, the phases of the moon—but all proved equally unsuccessful. It was at this point that he heard of a famous guru who lived on a remote mountain in the Himalayas and who answered the questions of all pilgrims who sought him out. The trader boarded a plane to Nepal, hired guides, and set out on a two-month trek. Finally, completely exhausted, he reached the famous guru.

"Oh, Wise One," he said, "I am a frustrated man. For many years I have sought the key to successful trading, but everything I have tried has failed. What is the secret?"

The guru paused for only a moment, and, staring at his visitor intently, answered, "BLASH." He said no more.

"Blash?" The trader did not understand the answer. It filled his mind every waking moment, but he could not fathom its meaning. He repeated the story to many, until finally one listener interpreted the guru's response.

"It's quite simple," he said. "Buy low and sell high."

The guru's message is apt to be disappointing to readers seeking the profound key to trading wisdom. BLASH does not satisfy our concept of an insight because it appears to be a matter of common sense. However, if, as Voltaire suggested, "Common sense is not so common," neither is it obvious. For example, consider the following question: What are the trading implications of a market reaching new highs? The "common-sense" BLASH theory would unambiguously indicate that subsequent trading activity should be confined to the short side.

Very likely, a large percentage of speculators would be comfortable with this interpretation. Perhaps the appeal of the BLASH approach is tied to the desire of most traders to demonstrate their brilliance. After all, any fool can buy the market after a long uptrend, but it takes genius to fade the trend and pick a top. In any case, few trading responses are as instinctive as the bias toward buying when prices are low and selling when prices are high.

As a result, many speculators have a strong predilection toward favoring the short side when a market trades in new high ground. There is only one thing wrong with this approach: it doesn't work. A plausible explanation is readily available. A market's ability to reach and sustain new highs is usually evidence of powerful underlying forces that often push prices much higher. Common sense? Certainly. But note that the trading implications are exactly opposite to those of the "common-sense" BLASH approach.

The key point of all of this is that many of our common-sense instincts about market behavior are wrong. Chart analysis provides a means of acquiring common sense in trading—a goal far more elusive than it sounds. For example, if prior to beginning trading an individual exhaustively researched historical price charts to determine the consequences of a market's reaching new highs, he would have a strong advantage in avoiding one of the common pitfalls that await the novice trader. Similarly, other market truths can be gleaned through a careful study of historical price patterns.

It must be acknowledged, however, that the usefulness of charts as an indicator of future price direction is a fiercely contested subject. Rather than list the pros and cons of this argument, we found an episode of a financial markets TV series that was very popular in the 1980s and 1990s, which succinctly highlighted some of the key issues in this debate. The transcript from this program is presented:

MODERATOR: Hello, I'm Louis Puneyser of *Wallet Street Week*. Tonight we will depart from our normal interview format to provide a forum for a debate on the usefulness of commodity price charts. Can all those wiggly lines and patterns really predict the future? Or is Shakespeare's description of life also appropriate to chart analysis: ". . . a tale told by an idiot, full of

sound and fury, signifying nothing"? Our guests tonight are Faith N. Trend, a renowned technical analyst with the Wall Street firm of Churnum & Burnum, and Phillip A. Coin, a professor at Ivory Tower University and the author of *The Only Way to Beat the Market—Become a Broker.* Mr. Coin, you belong to a group called the Random Walkers. Is that some sort of hiking club that decides its destinations by throwing darts at a trail map? (*He smiles smugly into the camera.*)

PROFESSOR COIN: Well, no, Mr. Puneyser. The Random Walkers are a group of economists who believe that market price movements are random. That is, one can no more devise a system to predict market prices than one can devise a system to predict the sequence of colors that will turn up on a roulette wheel. Both events are strictly a matter of chance. Prices have no memory, and what happened yesterday has nothing to do with what will happen tomorrow. In other words, charts can only tell you what has happened in the past; they are useless in predicting the future.

MS. TREND: Professor, you overlook a very important fact: daily prices are not drawn out of a bowl, but rather are the consequence of the collective activity of all market participants. Human behavior may not be as predictable as the motion of planets as governed by the laws of physics, but neither is it totally random. If this is not the case, your profession—economics—is doomed to the same fate as alchemy. (*Professor Coin squirms uncomfortably in his seat upon this reference.*) Charts reveal basic behavioral patterns. Insofar as similar interactions between buyers and sellers will result in similar price patterns, the past can indeed be used as a guideline for the future.

PROFESSOR COIN: If past prices can be used to predict future prices, why have a myriad of academic studies concluded that tested technical rules failed to outperform a simple buy-and-hold policy once commissions were taken into account?

MS. TREND: The rules used in those studies are generally oversimplified. The studies demonstrate that those particular rules don't work. They don't prove that a richer synthesis of price information, such as chart analysis, or a more complex technical system, cannot be successfully exploited for making trading decisions.

PROFESSOR COIN: Why then are there no studies that conclusively demonstrate the viability of chart analysis as a forecasting tool?

MS. TREND: Your argument merely reflects the difficulties of quantifying chart theories rather than the deficiencies of the chartist approach. One man's top formation is another man's congestion area. An attempt to define anything but the simplest chart pattern mathematically will be unavoidably arbitrary. The problems become even more tangled when one realizes that at any given time, the chart picture may exhibit conflicting patterns. Thus, in a sense, it is not really possible to test many chart theories objectively.

PROFESSOR COIN: That's rather convenient for you, isn't it? If these theories can't be rigorously tested, of what use are they? How do you know that trading on charts will lead to better than a 50/50 success rate—that is, before commissions?

MS. TREND: If you mean that blindly following every chart signal will only make your broker rich, I don't disagree. However, my point is that chart analysis is an art, not a science. A familiarity with basic chart theories is only the starting point. The true usefulness of charts depends on the individual trader's ability to synthesize successfully his own experience with standard concepts. In the right hands, charts can be extremely valuable in anticipating major market trends. There are many successful traders who base their decisions primarily on charts. What would you attribute their success to—a lucky streak?

PROFESSOR COIN: Yes. Exactly that, a lucky streak. If there are enough traders, some of them will be winners, whether they reach their decisions by reading charts or throwing darts at the commodity price page. It's not the method, just the laws of probability. Even in a casino, some percentage of the people are winners. You wouldn't say that their success is due to any insights or system.

MS. TREND: All that proves is that superior performance by some chartists *could* be due to chance. It doesn't disprove the contention that the skillful chartist is onto something that gives him an edge.

MODERATOR: I sense a lot of resistance here, and I think we could use some more support. Have either of you brought any evidence along that would tend to substantiate your positions?

PROFESSOR COIN: Yes! (*At this point, Professor Coin pulls a thick manuscript from his briefcase and thrusts it into Mr. Puneyser's hands. The moderator flips through the pages and shakes his head as he notices a profusion of funny little Greek letters.*)

MODERATOR: I had something a little less mathematical in mind. Even educational TV is not ready for this.

PROFESSOR COIN: Well, I also have this. (*He pulls out a sheet of paper and hands it to Ms. Trend.*) How would you interpret this chart, Ms. Trend? (*He unsuccessfully attempts to suppress a smirk.*)

MS. TREND: I'd say this looks like a chart based on a series of coin tosses. You know, heads one box up, tails one box down.

PROFESSOR COIN: (*Whose smirk has turned into a very visible frown.*) How did you know that?

MS. TREND: Lucky guess.

PROFESSOR COIN: Well, anyway, that doesn't affect my argument. Look at this chart. Here's a trend. And this here—isn't that what you people call a head-and-shoulders formation?

MODERATOR: Speaking of head and shoulders, do either of you have an opinion on Procter & Gamble?

PROFESSOR COIN: (*Continuing.*) The same chart patterns you are so quick to point to on your price charts also show up in obviously random series.

MS. TREND: Yes, but that line of reasoning can lead to some odd conclusions. For instance, would you agree that the fact that working economists tend to have advanced degrees is not a chance occurrence?

PROFESSOR COIN: Of course.

MS. TREND: Well then, a random sample of the population is also likely to turn up some people with advanced degrees. Do you then conclude that the fact that an economist has an advanced degree is a coincidence?

PROFESSOR COIN: I still don't see any difference between price charts and my randomly generated chart.

MS. TREND: You don't? Does this look like a randomly generated chart? *(Ms. Trend holds up a July 1980 silver chart—see Figure 3.1.)*

PROFESSOR COIN: Well, not exactly, but . . .

MS. TREND: (*On the attack.*) Or this. (*She holds up the December 1994 coffee chart—see Figure 3.2.*) I could go on.

MODERATOR: (*To Professor Coin.*) Ms. Trend really seems to be percolating. Are there any grounds for dismissing her examples?

PROFESSOR COIN: Well, I admit those examples are pretty extreme, but they still don't prove that past prices can predict future prices.

MODERATOR: Before our time reaches limit-up, so to speak, I would like to rechart our course. I wonder what your opinions are about fundamental analysts?

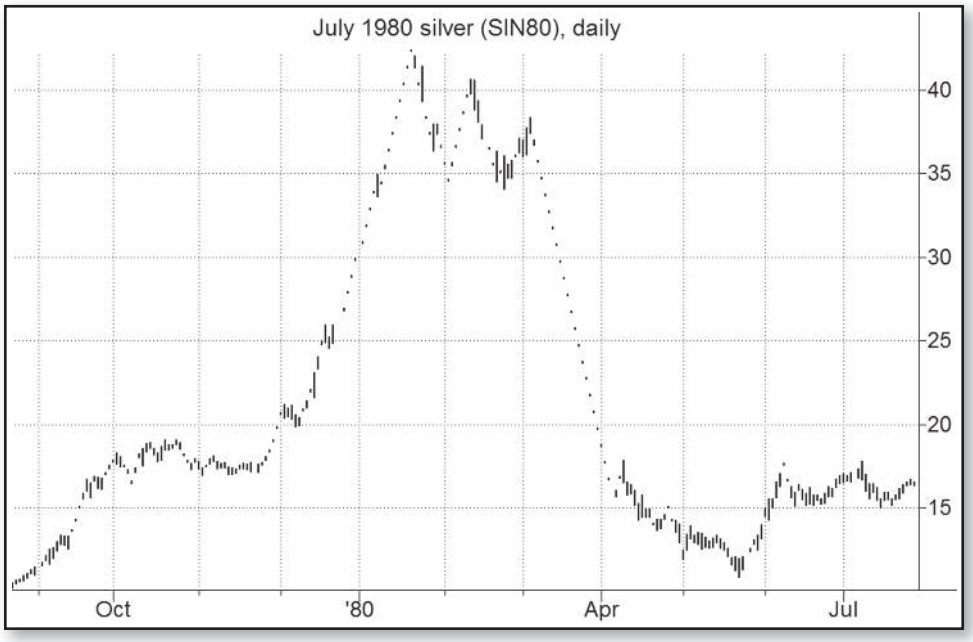

FIGURE 3.1 July 1980 Silver

FIGURE 3.2 December 1994 Coffee
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PROFESSOR COIN: Well, they're better than chartists since they can at least *explain* price moves. But I'm afraid their attempts to *forecast* prices are equally futile. You see, at any given moment, the market discounts all known information, so there is no way they can project prices unless they can anticipate unforeseen future developments such as droughts or export embargoes.

MS. TREND: Well, first I would like to address the implication that chart analysts ignore fundamentals. Actually we believe that the price chart provides an unambiguous and immediate summary of the net impact of all fundamental and psychological factors. In contrast, accurate fundamental models, if they could be constructed at all, would be extremely complex. Furthermore, the fundamental data for the forecast period would have to be estimated, thereby making the price projections extremely vulnerable to error.

MODERATOR: Then you might say you both agree with the statement that fundamentalists end up with holes in their shoes.

MS. TREND: Yes.

PROFESSOR COIN: Yes.

MODERATOR: Well, on that upbeat note of agreement, we end tonight's program.

In a sense, the argument between the "random walkers" and the chartists can never be clearly resolved. It must be understood that it is impossible to prove randomness; all that one can prove is

that a given pattern does not exist. Since there is no consensus as to the precise mathematical definition of many chart patterns, the viability of these patterns as price indicators can be neither proven nor disproven.

For example, if one wanted to test the contention that breakouts from trading ranges represent valid trade signals, the first requirement would be to formulate concise definitions of a trading range and a breakout. Assume that the following definitions are adopted: (1) that the trading range is a price band that completely encloses all daily price changes during the past six-week period and that is no wider than 5 percent of the median price during that period,[1] and (2) that a breakout is a closing price above or below the six-week trading range. Although the validity of breakouts as trading signals could be tested for these specific definitions, the definitions themselves will be challenged by many. Some of the objections might be the following:

1. The price band is too narrow.
2. The price band is too wide.
3. The six-week period is too long.
4. The six-week period is too short.
5. No allowance is made for isolated days beyond the confines of the range—an event that most chart analysts would agree does not disturb the basic pattern.
6. The direction of the trend prior to the trading range is not considered—a factor many chartists would view as a critical input in interpreting the reliability of a breakout.
7. The breakout should be required to exceed the boundary of the trading range by a minimum amount (e.g., 1 percent of the price level) in order to be viewed as valid.
8. Several closes above the trading range should be required to indicate a breakout.
9. A time lag should be used to test the validity of the breakout; for example, are prices still beyond the trading range one week after the initial penetration of the range?

The preceding list represents only a partial itemization of the possible objections to our hypothetical definitions of a trading range and breakout, and all of this for one of the most basic chart patterns. Imagine the ambiguities and complications in specifically defining a pattern such as a confirmed head and shoulders.

For their part, the chartists cannot win the argument, either. Although chart analysis is based on general principles, its application depends on individual interpretation. The successful chart-oriented trader might not have any doubts about the viability of chart analysis, but the "random walk" theoreticians would dismiss his success as a consequence of the laws of probability, since even a totally random trade selection process would yield a percentage of winners. In short, the debate is not about to be concluded.

It is also important to realize that even if conclusive tests were possible, the conflicting claims of the random walkers and the chartists need not necessarily be contradictory. One way of viewing the situation is that markets may witness extended periods of random fluctuation, interspersed with shorter periods of nonrandom behavior. Thus, even if the price series as a whole appears random, it

[1] The specification of maximum price width is deliberately intended to exclude periods of wide-swinging prices from being defined as trading ranges.

is entirely possible that there are periods within the data that exhibit definite patterns. The goal of the chart analyst is to identify those periods (i.e., major trends).

The time has come to admit my own biases. Personal experience has convinced me that charts are a valuable, if not essential, trading tool. However, such perceptions do not prove anything. The random walkers would argue that my conclusions could be based on selective memory—that is, a tendency to remember the successes of chart analysis and forget the failures—or just pure luck. And they are right. Such explanations *could* indeed be correct.

The bottom line is that each trader must evaluate chart analysis independently and draw his own conclusions. However, it should be strongly emphasized that charts are considered to be an extremely valuable trading tool by many successful traders, and therefore the new trader should be wary of rejecting this approach simply on the basis of intuitive skepticism. The following are some of the principal potential benefits of using charts. Note that a number of these uses remain valid even if one totally rejects the possibility that charts can be used to forecast prices.

1. Charts provide a concise price history—essential information for any trader.
2. Charts can provide the trader with a good sense of the market's volatility—an important consideration in assessing risk.
3. Charts are a very useful tool to the fundamental analyst. Long-term price charts enable the fundamentalist to isolate quickly the periods of major price moves. By determining the fundamental conditions or events that were peculiar to those periods, the fundamentalist can identify the key price-influencing factors. This information can then be used to construct a price behavior model.
4. Charts can be used as a timing tool, even by traders who formulate their trading decisions on the basis of other information (e.g., fundamentals).
5. Charts can be used as a money management tool by helping to define meaningful and realistic stop points.
6. Charts reflect market behavior that is subject to certain repetitive patterns. Given sufficient experience, some traders will uncover an innate ability to use charts successfully as a method of anticipating price moves.
7. An understanding of chart concepts is probably an essential prerequisite for developing profitable technical trading systems.
8. Cynics take notice: under specific circumstances, a contrarian approach to classical chart signals can lead to very profitable trading opportunities. The specifics of this approach are detailed in Chapter 15.

In short, charts have something to offer everyone, from cynics to believers. The remaining chapters of Part II review and evaluate the key concepts of classical chart theory, as well as addressing the all-important question of how charts can be used as an effective trading tool.

CHAPTER 4

Types of Charts

You don't need a weatherman to know which way the wind blows.

—Bob Dylan

Bar Charts

Bar charts are by far the most common type of price chart. In a daily bar chart, each day is represented by a vertical line that ranges from the daily low to the daily high. The day's closing value is indicated by a horizontal protrusion to the right of the bar, while the opening price is represented by a protrusion to the left of the bar. Figure 4.1 is a daily bar chart of the July 2015 soybean contract.

The daily (or intraday for short-term traders) bar chart is most useful for trading purposes, but bar charts for longer data periods provide extremely important perspective. These longer-period bar charts (e.g., weekly, monthly) are entirely analogous to the daily bar chart, with each vertical line representing the price range and final price level for the period. Figure 4.2 is a weekly bar chart for soybean futures. The segment within the rectangle corresponds to the period depicted in Figure 4.1. Figure 4.3 is a monthly bar chart for soybean futures, and the two rectangles enclose the periods depicted in Figures 4.2 and 4.1.

The change in time perspective can go in the other direction as well; intraday charts can provide greater detail of the price action than daily charts. Figure 4.4 is a 30-minute chart of the July soybean futures that covers the same time period as the last eight daily bars in Figure 4.1.

Used in combination, the monthly, weekly, daily, and intraday bar charts provide a telephoto-type effect. The monthly and weekly charts would be used to provide a broad market perspective and to formulate a technical opinion regarding the potential long-term trend. The daily chart—and, for

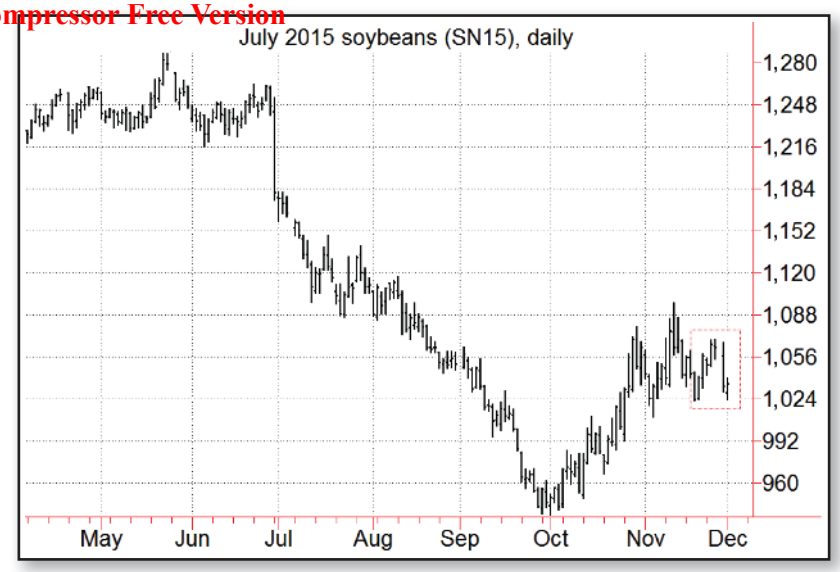

FIGURE 4.1 Daily Bar Chart: July 2015 Soybeans

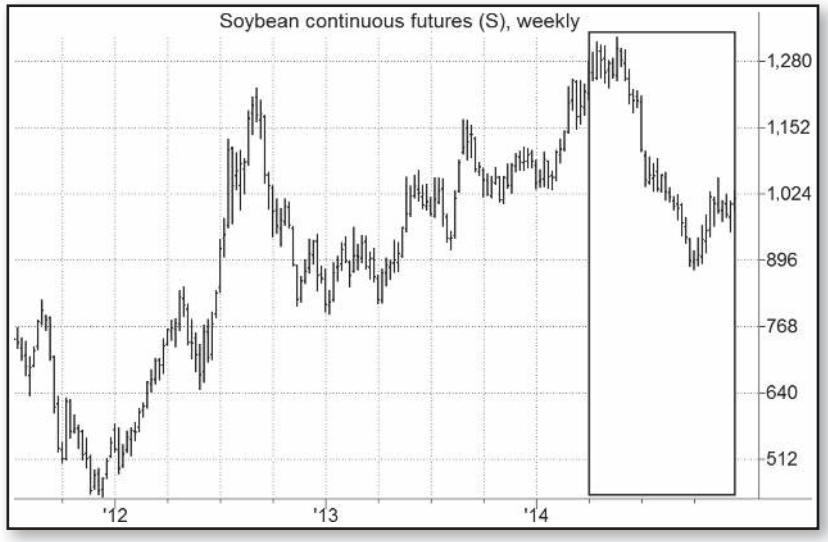

FIGURE 4.2 Weekly Bar Chart: Soybeans (Continuous Futures)
Note: Continuous futures will be defined in the next section.

FIGURE 4.3 Monthly Bar Chart: Soybeans (Continuous Futures)
Chart created using TradeStation. ©TradeStation Technologies, Inc. All rights reserved.

FIGURE 4.4 30-Minute Bar Chart: July 2015 Soybeans
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shorter-term traders, intraday charts—would then be employed to determine the timing of trades. If the long-term technical picture is sufficiently decisive, by the time the trader gets to the daily or intraday charts, he may already have a strong market bias. For example, if a trader interprets the monthly and weekly charts as suggesting the likelihood that the market has witnessed a major long-term top, he will only monitor the daily and intraday charts for sell signals.

The difference in perspective between short-term and long-term charts can be striking. For example, in the daily bar chart shown in Figure 4.5, the technical picture for coffee seemed quite bearish, with prices in late October 2013 having just pushed below a period of sideways price action while in the midst of a longer-term downtrend that showed no evidence of abating. The weekly futures chart (Figure 4.6), however, provided a strikingly different perspective. Although this multiyear chart also showed the market in an unbroken downtrend, it revealed that prices had fallen to the vicinity of the 2008 and 2009 lows—a significant price level that had supported the market in the past, and which, in late 2013, implied the potential for a major trend reversal in that vicinity. Indeed, as the inset chart for the December 2014 coffee contract shows, prices subsequently embarked on a huge rally from November 2013 into early October 2014. Although in late October 2013 it may not have been apparent which of these conflicting interpretations would prevail, the basic point is that longer-term charts may suggest very different interpretations of price patterns than those indicated by daily charts. Hence, both types of charts should be examined.

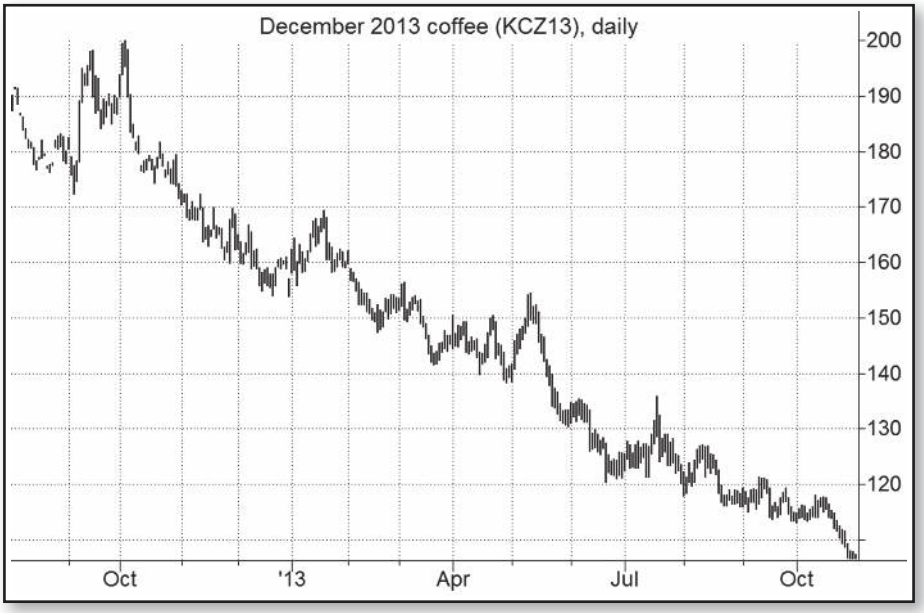

FIGURE 4.5 Daily Bar Chart Perspective: December 2013 Coffee
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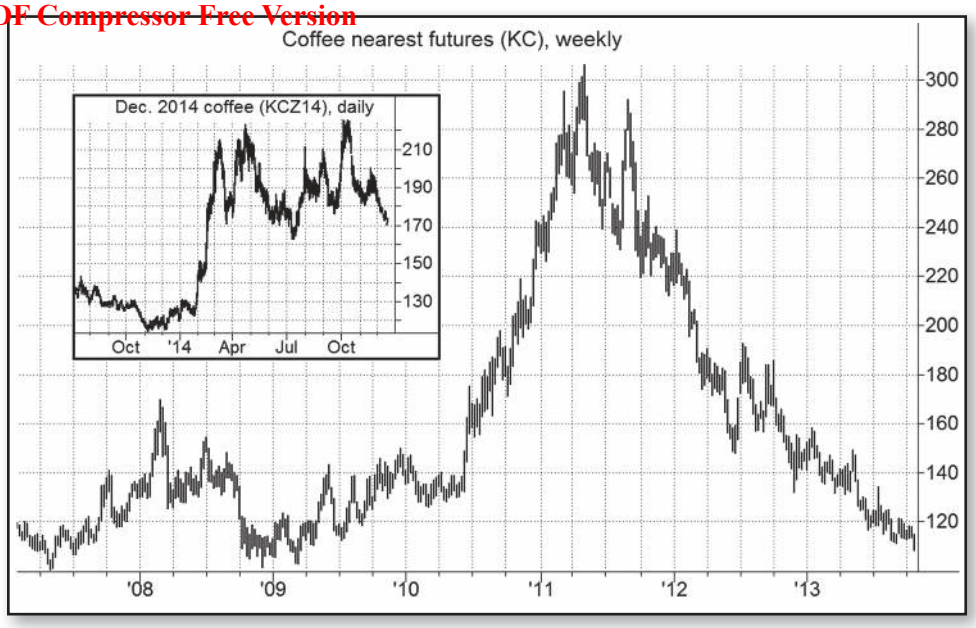

FIGURE 4.6 Weekly Bar Chart Perspective: Coffee Nearest Futures
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Linked Contract Series: Nearest Futures versus Continuous Futures

The time period covered by the typical weekly or monthly bar chart requires the use of a series of contracts. Normally, these contracts are combined using the *nearest futures* approach: a contract is plotted until its expiration and then the subsequent contract is plotted until its expiration, and so on. Traders should be aware that a nearest futures chart may reflect significant distortions due to the price gaps between the expiring month and the subsequent contract.

Figure 4.7 provides two clear examples of this type of distortion. The top chart is a live cattle weekly nearest futures chart; the bottom chart is a live cattle weekly *continuous* futures chart, which will be defined momentarily. The nearest futures chart implies a large 7.175-cent (6 percent) one-week gain in the price of cattle from the August 31 close to the September 7, 2012 close. However, this price jump never really took place because the price gap represented nothing more than the expiration of the lower-priced August 2012 cattle contract and the switch to the higher-priced October 2012 cattle contract. In contrast, the continuous futures chart, which, as will be explained shortly, reflects actual price movements, showed that price had rallied only 0.45 cents from August 31 to September 7, 2012. Almost exactly a year later the same relationship between the prices in different contract months produced an even more noteworthy discrepancy: While the nearest futures chart showed a 3.15-cent gain from August 30 to September 6, 2013, the continuous futures chart shows cattle prices actually *declined* 1.125 cents between these dates.

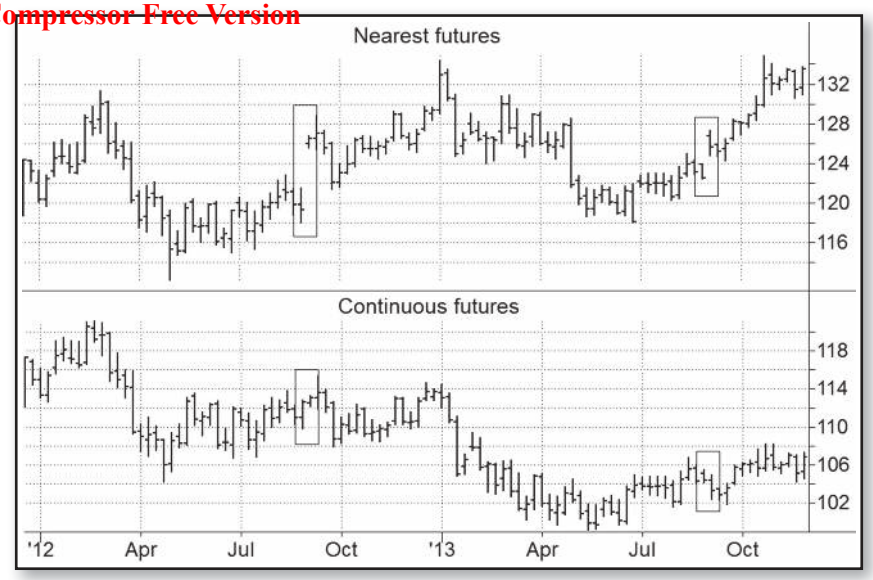

FIGURE 4.7 Distortion in Nearest Futures Chart: Cattle Weekly Nearest Futures (top) and Cattle Weekly Continuous Futures (bottom)
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The fact that a nearest futures chart is vulnerable to great distortion, in the sense that price moves depicted in the chart may contrast dramatically with the results realized by an actual trader (as was the case in the cattle example), makes it necessary to consider an alternate linked-contract representation that does not share this defect. The continuous futures chart provides such an alternative approach.

Continuous futures is a series that links together successive contracts in such a way that price gaps are eliminated at rollover points. Although continuous futures will precisely reflect price *swings,* past continuous levels will not match actual historical *levels.* (In contrast, nearest futures will accurately reflect actual historical levels, but not price swings.) The appropriate series depends on the intended purpose. Nearest futures should be used to indicate the actual price levels at which a market traded in the past. However, continuous futures should be used to illustrate the results that would have been realized by a trader. Continuous futures will be discussed in greater detail in Chapters 5 and 18.

Close-Only ("Line") Charts

As the name implies, close-only charts ignore high and low price information and reflect only closing values. Some price series can be depicted only in close-only chart formats because intraday data are not readily available. Two examples are cash price series (Figure 4.8) and spreads (Figure 4.9), which represent the price *difference* between two contracts, in this case the July 2015 and November 2015 soybean futures prices.

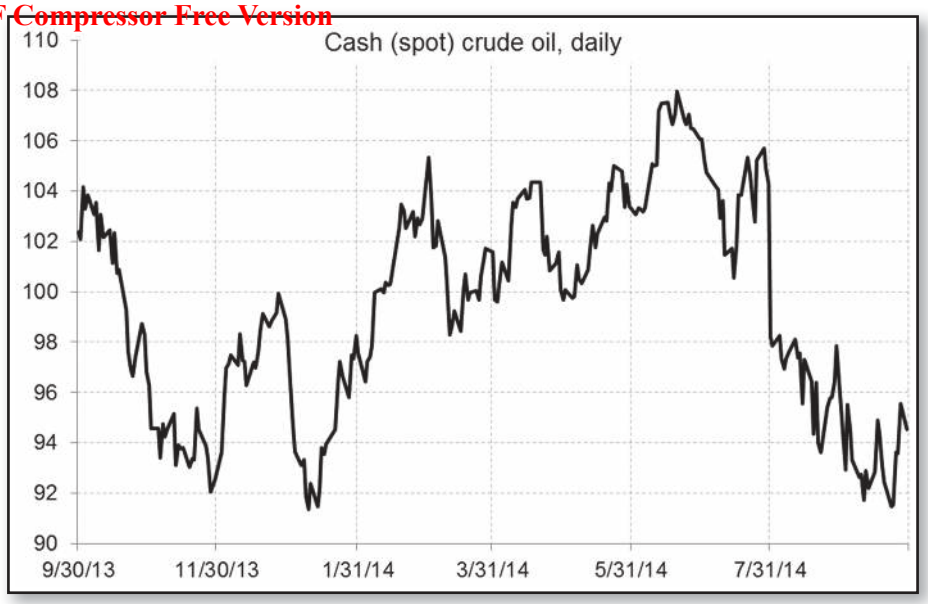

FIGURE 4.8 Cash Price Chart: Crude Oil

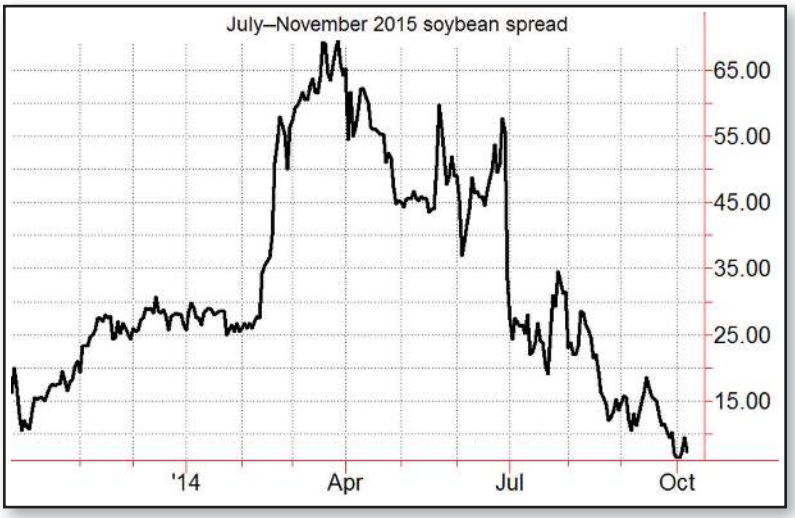

FIGURE 4.9 Spread Chart: July–November 2015 Soybeans
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Some chart traders may prefer close-only charts even when high/low/close data are available because they feel a clearer price picture can be obtained by using only the close. In their view, the inclusion of high/low data only serves to obfuscate the price chart. There is much to be said

for the emphasis on the closing value as the embodiment of the day's essential price information. Nevertheless, many important chart patterns depend on the availability of high/low data, and one should think twice before ignoring this information.

Point-and-Figure Charts

The essential characteristic of the point-and-figure chart is that it views all trading as a single continuous stream and hence ignores time. A point-and-figure chart is illustrated in Figure 4.10. As can be seen, a point-and-figure chart consists of a series of columns of *X*'s and *O*'s. Each *X* represents a price move of a given magnitude called the *box size*. As long as prices continue to rise, *X*'s are added to a column for each increment equal to the box size. However, if prices decline by an amount equal to or greater than the *reversal size* (usually quoted as a multiple of the box size), a new column of *O*'s is initiated and plotted in descending fashion. The number of *O*'s will depend on the magnitude of the reversal, but by definition must at least equal the reversal size. By convention, the first *O* in a column is always plotted one box below the last *X* in the preceding column. An analogous description would apply to price declines and upside reversals. The choice of box and reversal size is arbitrary.

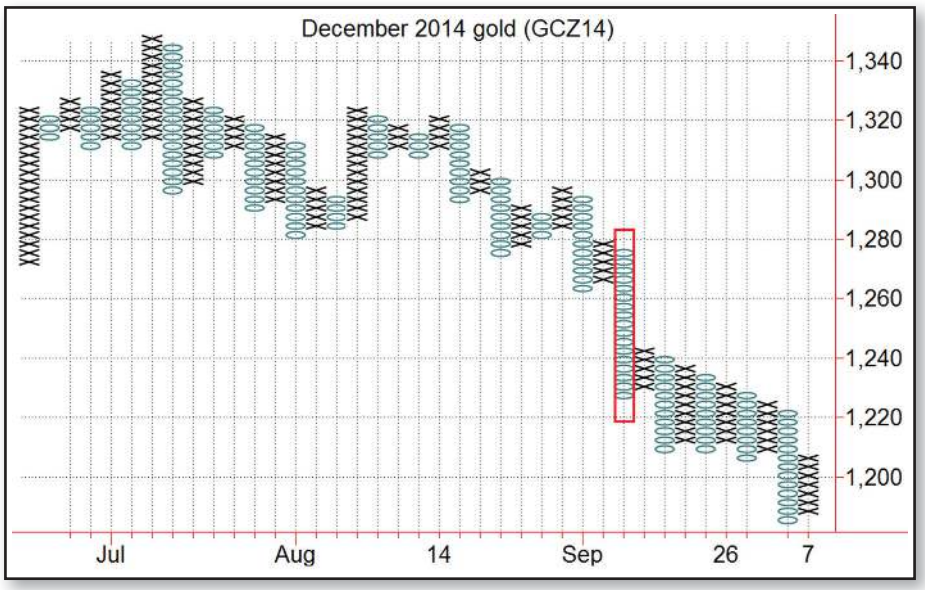

FIGURE 4.10 Point-and-Figure Chart: December 2014 Gold

FIGURE 4.11 Bar Chart Corresponding to Point-and-Figure Chart in Figure 4.10: December 2014 Gold

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Figure 4.10 is a point-and-figure chart of December 2014 gold futures with a box size of $3 and a reversal size of three boxes, or $9. In other words, as long as a price decline of $9 or more does not occur, *X*'s continue to be added in a single column. When a price decline of $9 or more occurs, a new column of *O*'s is begun, with the first *O* placed one box below the last *X*.

As stated previously, the point-and-figure chart does not reflect time. One column may represent one day or two months. For example, Figure 4.11 is a bar chart corresponding to the point-and-figure chart in Figure 4.10. The period captured in the rectangle corresponds to the similarly highlighted column in the point-and-figure chart. Note that this seven-day period occupies only one column on the point-and-figure chart.

Candlestick Charts

Candlestick charts add dimension and color to the simple bar chart. The segment of the bar that represents the range between the open and close is represented by a two-dimensional "real body," while the extensions beyond this range to the high and low are shown as lines (called "shadows"). A day on which the open and close are near opposite extremes of the daily range will have a large real body, whereas a day on which there is little net change between the open and close will have a small real body. The color of the real body indicates whether the close was higher than the open (white—Figure 4.12) or lower than the open (black—Figure 4.13). Figure 4.14 shows a daily candlestick chart corresponding to the price action displayed in Figures 4.10 and 4.11.

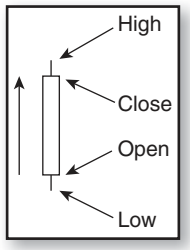

FIGURE 4.12 Candlestick Chart: White Real Body

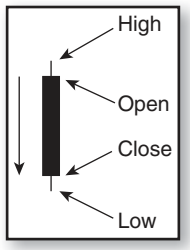

FIGURE 4.13 Candlestick Chart: Black Real Body

FIGURE 4.14 Candlestick Chart Corresponding to Figures 4.10 and 4.11: December 2014 Gold

CHAPTER 5

Linking Contracts for Long-Term Chart Analysis: Nearest versus Continuous Futures

The Necessity of Linked-Contract Charts

Many of the chart analysis patterns and techniques detailed in Chapters 6 through 9 require long-term charts—often charts of multiyear duration. This is particularly true for the identification of top and bottom formations, as well as the determination of support and resistance levels.

A major problem facing the chart analyst in the futures markets is that most futures contracts have relatively limited life spans and even shorter periods in which these contracts have significant trading activity. For many futures contracts (e.g., currencies, stock indexes) trading activity is almost totally concentrated in the nearest one or two contract months. For example, in Figure 5.1, there were only about two months of liquid data available for the March 2016 Russell 2000 Index Mini futures contract when it became the most liquid contract in this market as the December 2015 contract expiration approached. This market is not particularly unusual in this respect. In many futures markets, almost all trading is concentrated in the nearest contract, which will have only a few months (or weeks) of liquid trading history when the prior contract approaches expiration.

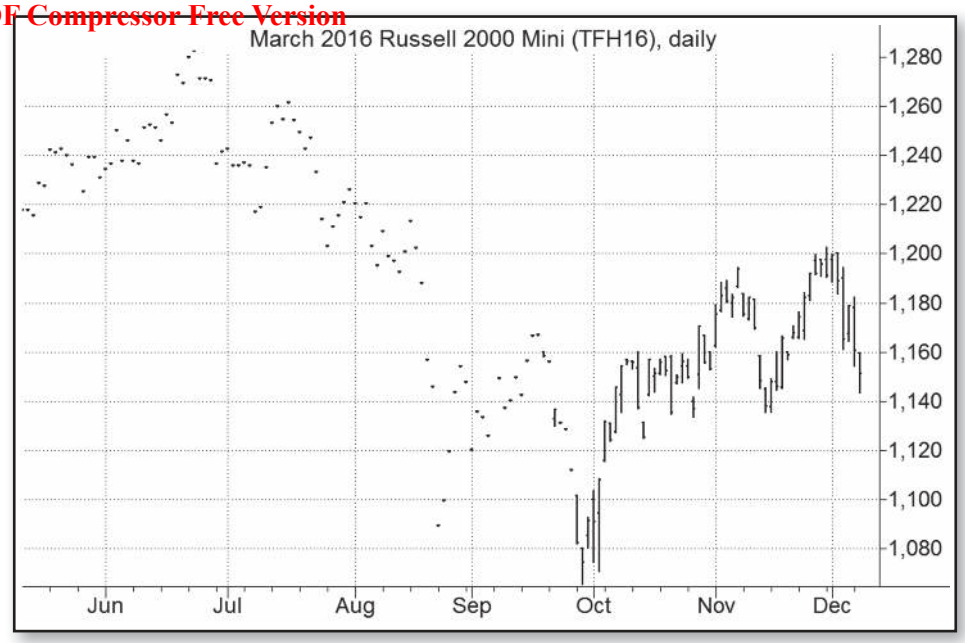

FIGURE 5.1 March 2016 Russell 2000 Mini Futures
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The limited price data available for many futures contracts—even those that are the most actively traded contracts in their respective markets—makes it virtually impossible to apply most chart analysis techniques to individual contract charts. Even in those markets in which the individual contracts have a year or more of liquid data, part of a thorough chart study would still encompass analyzing multiyear weekly and monthly charts. Thus, the application of chart analysis unavoidably requires linking successive futures contracts into a single chart. In markets with very limited individual contract data, such linked charts will be a necessity in order to perform *any* meaningful chart analysis. In other markets, linked charts will still be required for analyzing multiyear chart patterns.

Methods of Creating Linked-Contract Charts

Nearest Futures

The most common approach for creating linked-contract charts is typically termed *nearest futures.* This type of price series is constructed by taking each individual contract series until its expiration and then continuing with the next contract until its expiration, and so on.

Although, at surface glance, this approach appears to be a reasonable method for constructing linked-contract charts, the problem with a nearest futures chart is that there are price gaps between expiring and new contracts—and quite frequently, these gaps can be very substantial. For example, assume the September coffee contract expires at 132.50 cents/lb and the next nearest contract (December) closes at 138.50 cents/lb on the same day. Further assume that on the next day

December coffee falls 5 cents/lb to 133.50—a 3.6 percent drop. A nearest futures price series will show the following closing levels on these two successive days: 132.50 cents, 133.50 cents. In other words, the nearest futures contract would show a one-cent (0.75 percent) gain on a day on which longs would actually have experienced a huge loss. This example is by no means artificial. Such distortions—and indeed more extreme ones—are quite common at contract rollovers in nearest futures charts.

The vulnerability of nearest futures charts to distortions at contract rollover points makes it desirable to derive alternative methods of constructing linked-contract price charts. One such approach is detailed in the next section.

Continuous (Spread-Adjusted) Price Series

The spread-adjusted price series known as "continuous futures" is constructed by adding the cumulative difference between the old and new contracts at rollover points to the new contract series.[1] An example should help clarify this method. Assume we are constructing a spread-adjusted continuous price series for gold using the June and December contracts.[2] If the price series begins at the start of the calendar year, initially the values in the series will be identical to the prices of the June contract expiring in that year. Assume that on the rollover date (which need not necessarily be the last trading day) June gold closes at $1,200 and December gold closes at $1,205. In this case, all subsequent prices based on the December contract would be adjusted downward by $5—the difference between the December and June contracts on the rollover date.

Assume that at the next rollover date December gold is trading at $1,350 and the subsequent June contract is trading at $1,354. The December contract price of $1,350 implies that the spread-adjusted continuous price is $1,345. Thus, on this second rollover date, the June contract is trading $9 above the adjusted series. Consequently, all subsequent prices based on the second June contract would be adjusted downward by $9. This procedure would continue, with the adjustment for each contract dependent on the cumulative total of the present and prior transition point price differences. The resulting price series would be free of the distortions due to spread differences that exist at the rollover points between contracts.

The construction of a continuous futures series can be thought of as the mathematical equivalent of taking a nearest futures chart, cutting out each individual contract series contained in the chart, and pasting the ends together (assuming a continuous series employing all contracts and using the same rollover dates as the nearest futures chart). Typically, as a last step, it is convenient to shift the scale of the entire series by the cumulative adjustment factor, a step that will set the current price of the series equal to the price of the current contract without changing the shape of the series. The construction of a continuous futures chart is discussed in greater detail in Chapter 18.

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[1] To avoid confusion, readers should note that some data services use the term *continuous futures* to refer to linking together contracts of the same month (e.g., linking from March 2015 corn when it expires to March 2016 corn, and so on). Such charts are really only a variation of nearest futures charts—one in which only a single contract month is used—and will be as prone to wide price gaps at rollovers as nearest futures charts, if not more so. These types of charts have absolutely nothing in common with the spread-adjusted continuous futures series described in this section—that is, nothing but the name. It is unfortunate that some data services have decided to use this same term to describe an entirely different price series than the original meaning described here.

[2] The choice of a combination of contracts is arbitrary. One can use any combination of actively traded months in the given market.

Comparing the Series

It is important to understand that a linked futures price series can only accurately reflect either price *levels*, as does nearest futures, or price *moves*, as does continuous futures, but not both—much as a coin can land on either heads or tails, but not both. The adjustment process used to construct continuous series means that past prices in a continuous series will not match the actual historical prices that prevailed at the time. However, a continuous series will accurately reflect the actual price movements of the market and will exactly parallel the equity fluctuations experienced by a trader who is continually long (rolling over positions on the same rollover dates used to construct the continuous series), whereas a nearest futures price series can be extremely misleading in these respects.

Nearest versus Continuous Futures in Chart Analysis

Given the significant differences between nearest and continuous futures price series, the obvious question in the reader's mind is probably: Which series—nearest futures or continuous futures—would be more appropriate for chart analysis? To some extent, this is like asking which factor a consumer should consider before purchasing a new car: price or quality. The obvious answer is both—each factor provides important information about a characteristic that is not measured by the other. In terms of price series, considering nearest futures versus continuous futures, each series provides information that the other doesn't. Specifically, a nearest futures price series provides accurate information about past price *levels*, but not price *swings*, whereas the exact reverse statement applies to a continuous futures series.

Consider, for example, Figure 5.2. What catastrophic event caused the instantaneous 165-cent (24 percent) collapse in the nearest futures chart for corn from July 12 to July 15, 2013? Answer: absolutely nothing. This "phantom" price move reflected nothing more than a transition from the old crop July contract to the new crop December contract. Figure 5.3, which depicts the continuous futures price for the same market (and by definition eliminates price gaps at contract rollovers), shows that no such price move existed—corn was actually little changed from July 12 to July 15. Clearly, the susceptibility of nearest futures charts to distortions caused by wide gaps at rollovers can make it difficult to use nearest futures for chart analysis that focuses on price swings.

On the other hand, the continuous futures chart achieves accuracy in depicting price swings at the sacrifice of accuracy in reflecting price levels. In order to accurately show the magnitude of past price swings, historical continuous futures prices can end up being very far removed from the actual historical price levels. In fact, it is not even unusual for historical continuous futures prices to be negative (see Figure 5.4). Obviously, such "impossible" historical prices can have no relevance as guidelines to prospective support and resistance levels.

The fact that each type of price chart—nearest and continuous—has certain significant intrinsic weaknesses argues for combining both types of charts in a more complete analysis. Often these two types of charts will provide entirely different price pictures. For example, consider the nearest futures chart for lean hogs depicted in Figure 5.5. Looking at this chart, it would be tempting to

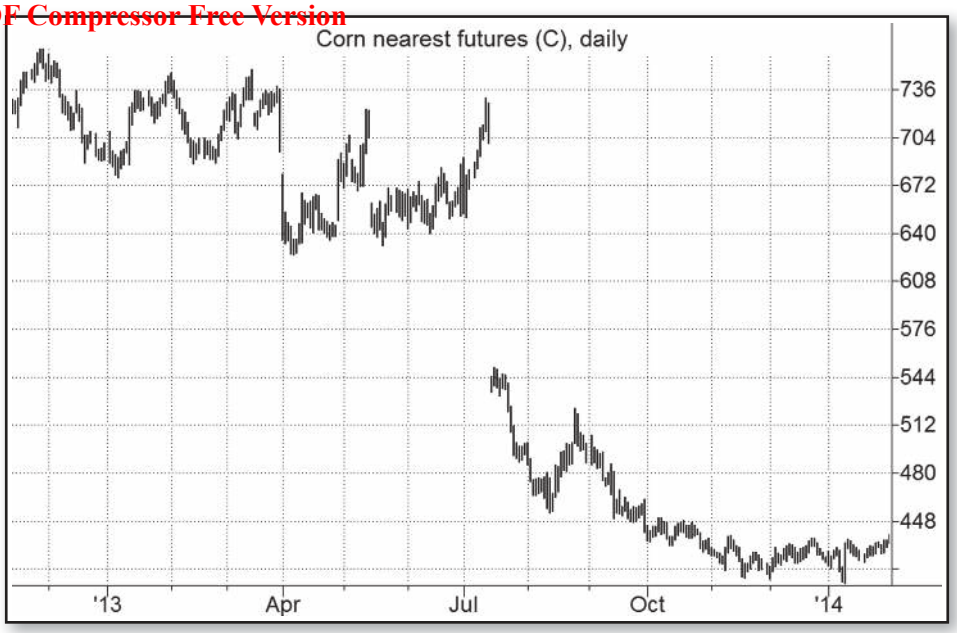

FIGURE 5.2 Corn Nearest Futures
Chart created using TradeStation. ©TradeStation Technologies, Inc. All rights reserved.

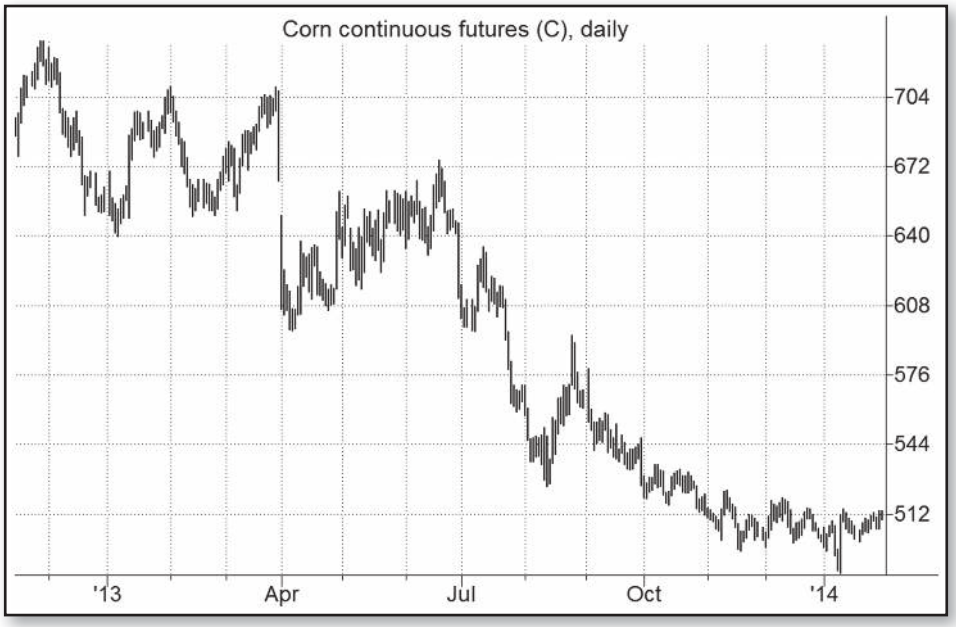

FIGURE 5.3 Corn Continuous Futures
Chart created using TradeStation. ©TradeStation Technologies, Inc. All rights reserved.

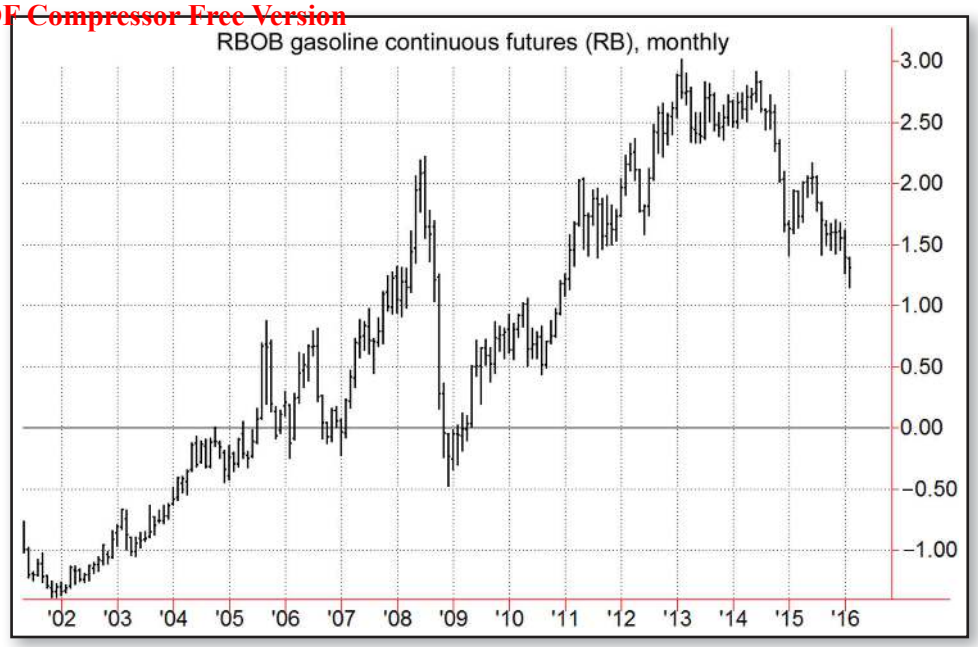

FIGURE 5.4 RBOB Gasoline Continuous Futures
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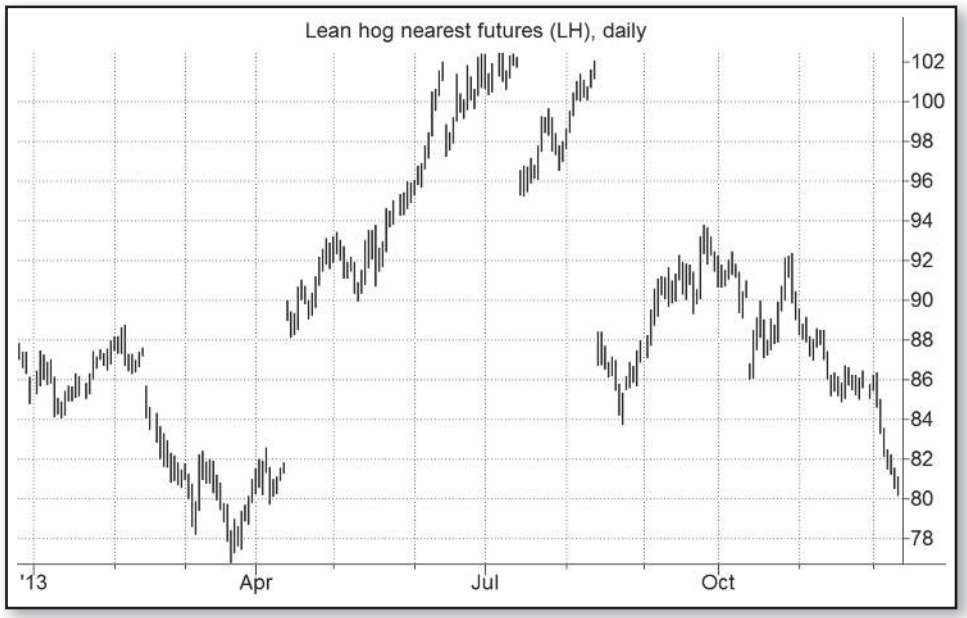

FIGURE 5.5 Lean Hog Nearest Futures
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FIGURE 5.6 Lean Hog Continuous Futures
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conclude that hogs were experiencing a period of severe price dislocation and volatility in 2013, peaking sometime in early July. Now look at Figure 5.6, which shows the continuous version of the same market. This chart shows that hog prices were in a consistent uptrend that began in April and peaked at the end of October. It is no exaggeration to say that, without the benefit of the chart labels, it would be virtually impossible to recognize that Figures 5.5 and 5.6 depict the same market.

Conclusion

In summary, the brevity of liquid trading periods for futures contracts in many markets makes the use of linked-contract charts essential. Continuous futures charts, which remove the distortions caused by price gaps at contract rollovers, are probably the most meaningful type of longer-term chart and, on balance, are far preferable to the more conventional nearest futures chart—although the latter can still be a useful supplement in identifying long-term support and resistance levels. Continuous futures are even more critical for testing trading systems—a topic that will be discussed in Chapter 18. Figures 5.7 through 5.16 provide comparisons between long-term nearest and continuous charts for various futures markets. Note how strikingly different nearest and continuous futures charts for the same market can be. Readers are reminded that continuous futures charts generated in the future will show different price scales than those shown in the following pages (although the price moves will remain the same), since it is assumed that the scales will be adjusted to match the prevailing current contract.

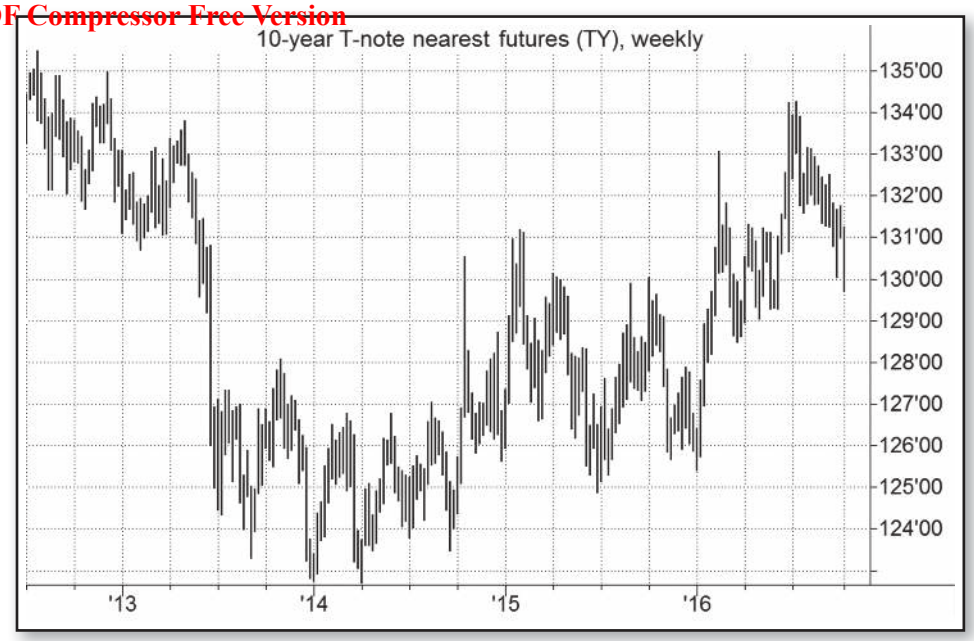

FIGURE 5.7 10-Year T-Note Nearest Futures
Chart created using TradeStation. ©TradeStation Technologies, Inc. All rights reserved.

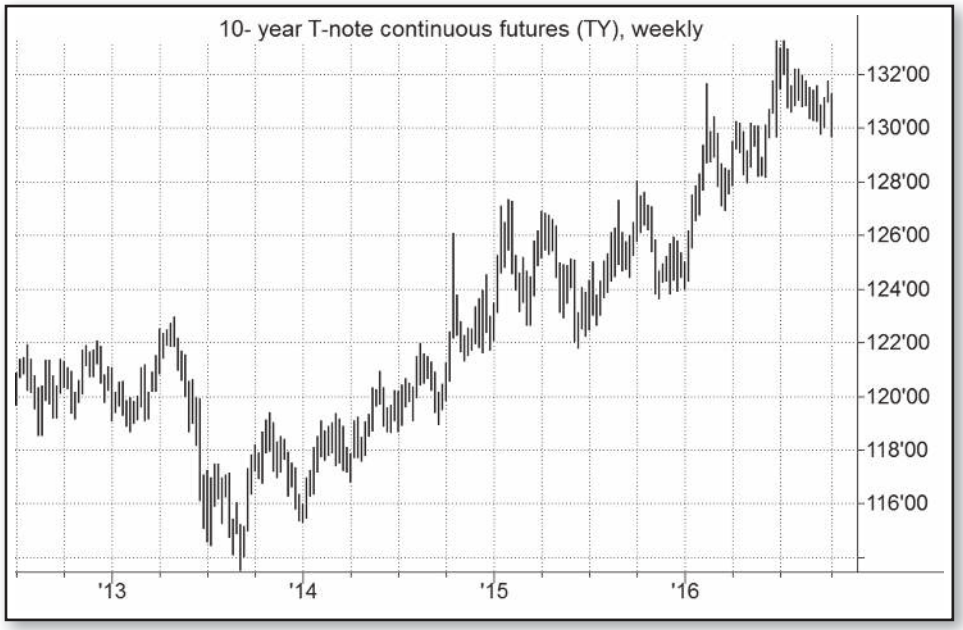

FIGURE 5.8 10-Year T-Note Continuous Futures
Chart created using TradeStation. ©TradeStation Technologies, Inc. All rights reserved.

FIGURE 5.9 Soybean Nearest Futures
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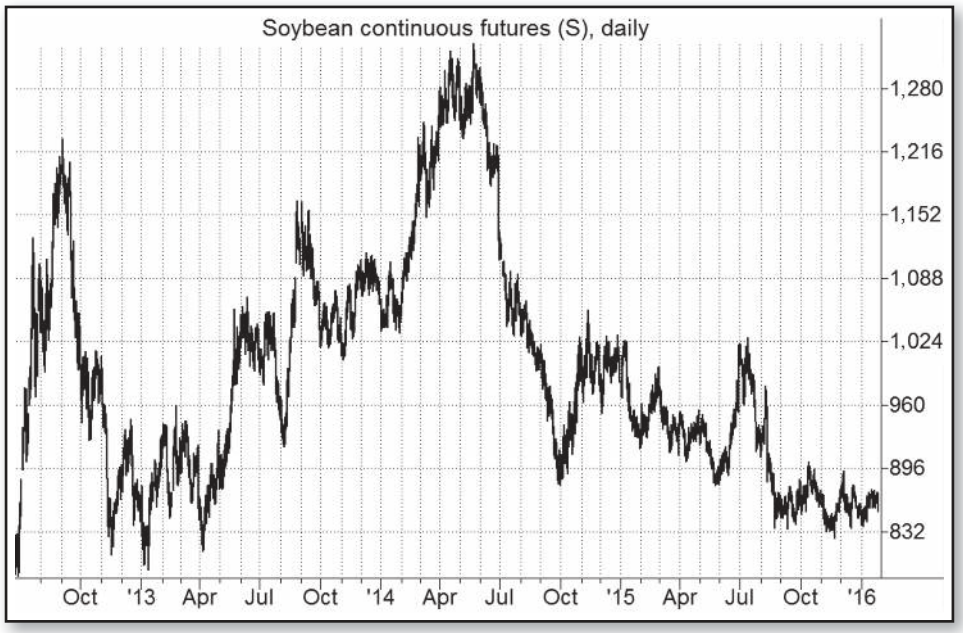

FIGURE 5.10 Soybean Continuous Futures
Chart created using TradeStation. ©TradeStation Technologies, Inc. All rights reserved.

FIGURE 5.11 Soybean Meal Nearest Futures
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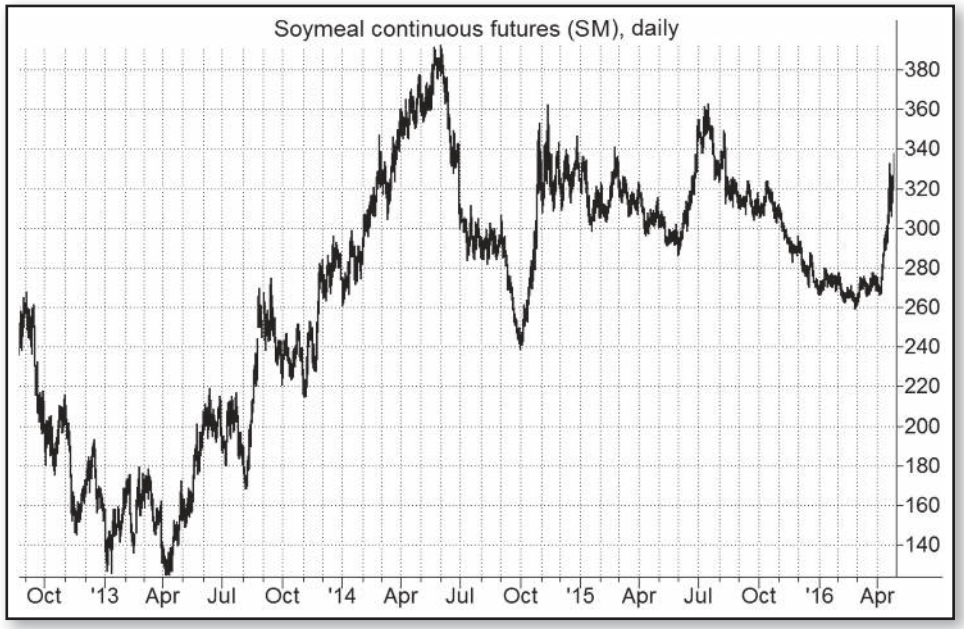

FIGURE 5.12 Soybean Meal Continuous Futures
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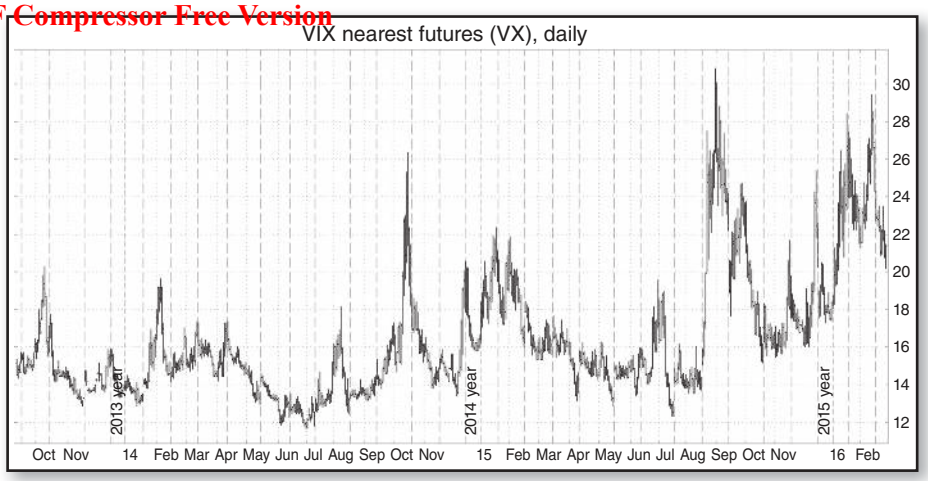

FIGURE 5.13 VIX Nearest Futures
Chart created using TD Ameritrade's thinkorswim.

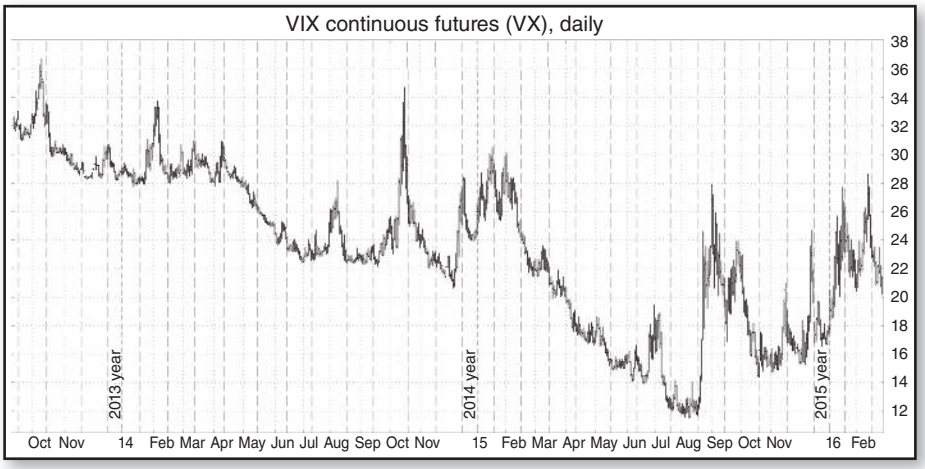

FIGURE 5.14 VIX Continuous Futures
Chart created using TD Ameritrade's thinkorswim.

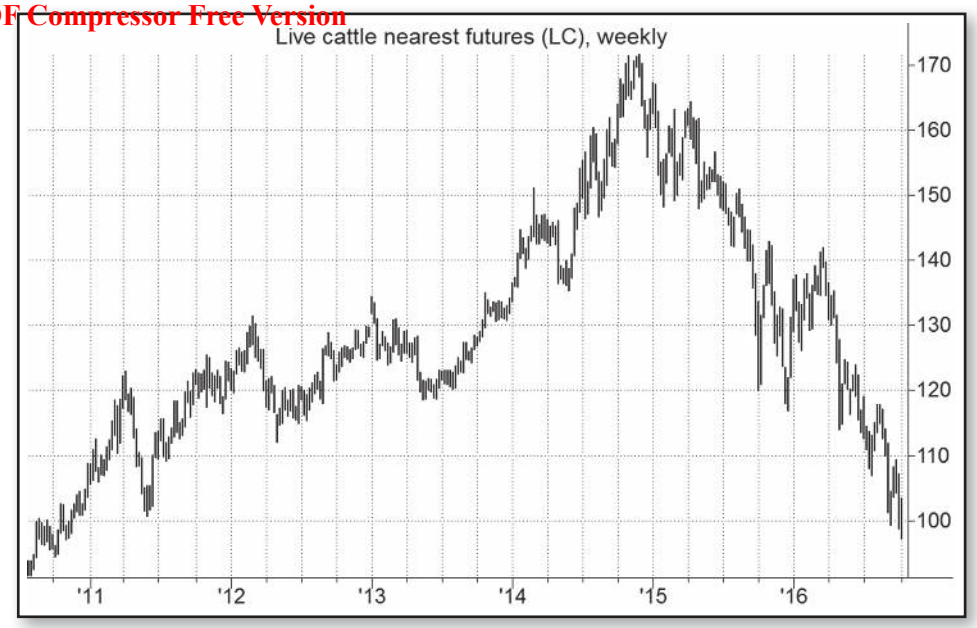

FIGURE 5.15 Live Cattle Nearest Futures
Chart created using TradeStation. ©TradeStation Technologies, Inc. All rights reserved.

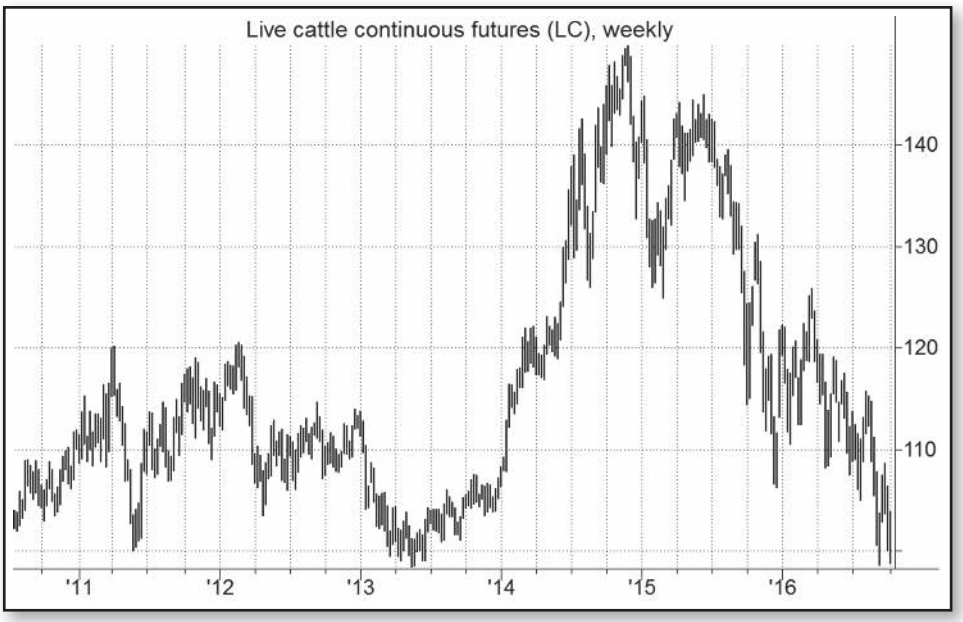

FIGURE 5.16 Live Cattle Continuous Futures
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CHAPTER 6

Trends

The trend is your friend except at the end when it bends.

—Ed Seykota

Defining Trends by Highs and Lows

One standard definition of an uptrend is a succession of higher highs and higher lows. For example, during the May 2014–March 2015 period in Figure 6.1, each relative high (RH) is higher than the preceding high, and each relative low (RL) is higher than the preceding low. In essence, an uptrend can be considered intact until a previous reaction low point is broken. A violation of this condition serves as a warning signal that the trend may be over. For example, in Figure 6.1, the late April penetration of the early April relative low confirmed the end of the nearly yearlong rally, after which the market entered an extended trading range (see weekly chart inset). Figure 6.2 provides an intraday example of an uptrend defined by successively higher highs and higher lows. It should be emphasized, however, that the disruption of the pattern of higher highs and higher lows (or lower highs and lower lows) should be viewed as a clue, not a conclusive indicator, of a possible long-term trend reversal.

In similar fashion, a downtrend can be defined as a succession of lower lows and lower highs (see Figure 6.3). A downtrend can be considered intact until a previous reaction high is exceeded.

Uptrends and downtrends are also often defined in terms of trend lines. An uptrend line is a line that connects a series of higher lows (see Figures 6.4 through 6.6); a downtrend line is a line that connects a series of lower highs (see Figure 6.7). Trend lines can sometimes extend for many years. For example, Figure 6.8 is a weekly chart with a trend line reflecting a multiyear uptrend in the E-mini Nasdaq 100 futures that included the daily timeframe uptrend from Figure 6.4. Figure 6.9 illustrates a trend line defining a 33-year uptrend in 10-year U.S. T-note futures.

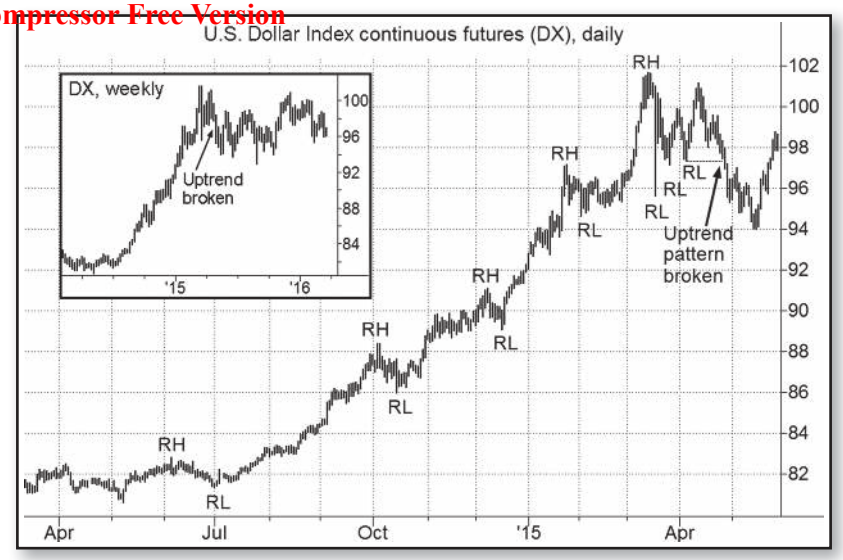

FIGURE 6.1 Uptrend as Succession of Higher Highs and Higher Lows: Dollar Index Continuous Futures

Note: RH = relative high; RL = relative low.

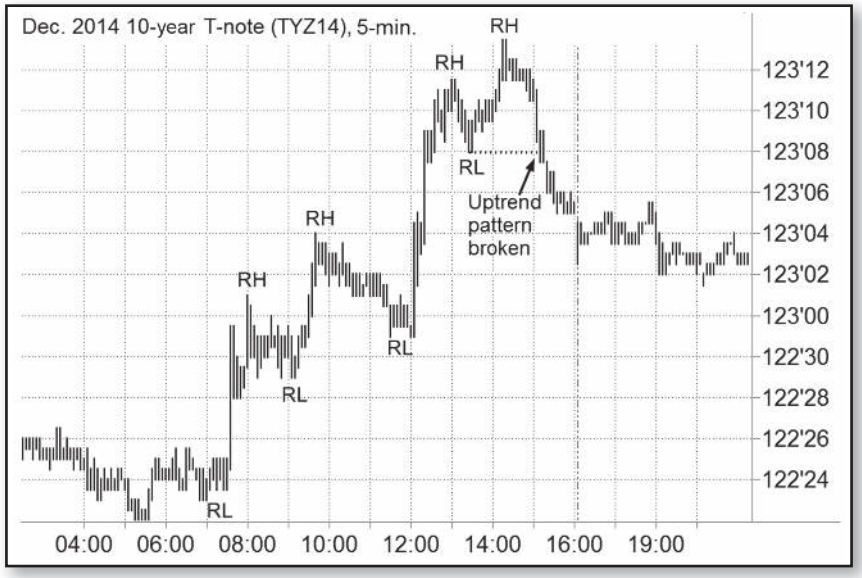

FIGURE 6.2 Uptrend as Succession of Higher Highs and Higher Lows: December 2014 10-Year T-Note

Note: RH = relative high; RL = relative low.

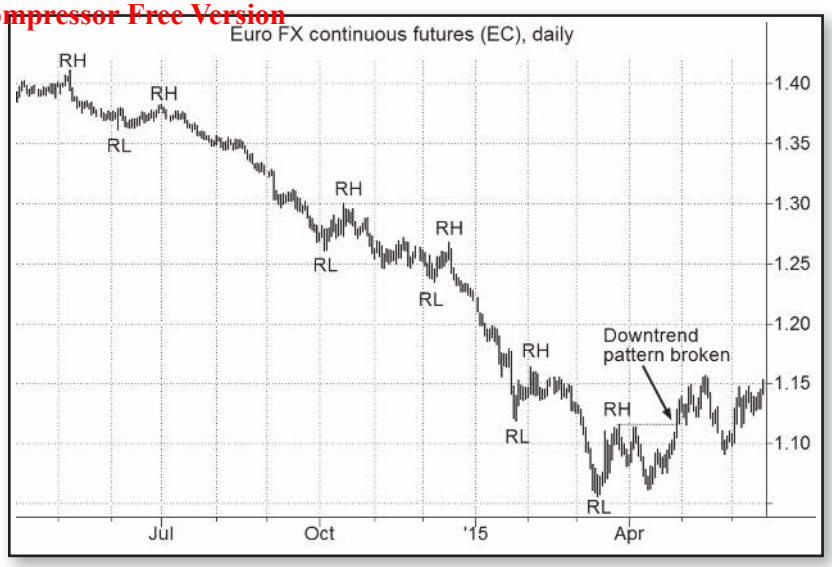

FIGURE 6.3 Downtrend as Succession of Lower Highs and Lower Lows: Euro Continuous Futures

Note: RH = relative high; RL = relative low.

FIGURE 6.4 Uptrend Line: E-Mini Nasdaq 100 Continuous Futures

FIGURE 6.5 Uptrend Line: Copper Continuous Futures
Chart created using TradeStation. ©TradeStation Technologies, Inc. All rights reserved.

FIGURE 6.6 Uptrend Line: June 2016 E-Mini Dow Futures
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FIGURE 6.7 Downtrend Line: WTI Crude Oil Continuous Futures
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FIGURE 6.8 Uptrend Line: E-Mini Nasdaq 100 Continuous Futures
Chart created using TradeStation. ©TradeStation Technologies, Inc. All rights reserved.

FIGURE 6.9 Uptrend Line: 10-Year U.S. T-Note Continuous Futures
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It is not uncommon for reactions against a major trend to begin near a line parallel to the trend line. Sets of parallel lines that enclose a trend are called *trend channels.* Figure 6.10 shows an uptrend channel on a daily chart, while Figure 6.11 shows a downtrend channel on a weekly chart.

FIGURE 6.10 Uptrend Channel: Soymeal Continuous Futures
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FIGURE 6.11 Downtrend Channel: Soybean Oil Continuous Futures
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The following rules are usually applied to trend lines and channels:

1. Declines approaching an uptrend line and rallies approaching a downtrend line are often good opportunities to initiate positions in the direction of the major trend.
2. The penetration of an uptrend line (particularly on a closing basis) is a sell signal; the penetration of a downtrend line is a buy signal. Normally, a minimum percentage price move or a minimum number of closes beyond the trend line is required to confirm a penetration.
3. The lower end of a downtrend channel and the upper end of an uptrend channel represent potential profit-taking zones for short-term traders.

Trend lines and channels are useful, but their importance is often overstated. It is easy to overestimate the reliability of trend lines when they are drawn with the benefit of hindsight. A consideration that is frequently overlooked is that trend lines often need to be redrawn as a bull or bear market is extended. Thus, although the penetration of a trend line will sometimes offer an early warning signal of a trend reversal, it is also common that such a development will merely require a redrawing of the trend line. For example, Figure 6.12 shows an uptrend line connecting the November and December 2012 lows in the Russell 2000 Mini futures. Prices remained above this line until February 2013, when prices closed below it, signaling an end to this move. Figure 6.13 extends Figure 6.12 by two months and shows that the February penetration of the original (dashed) trend line was a pullback that preceded a rally to a higher high. Prices remained above the revised (solid) trend line connecting the November and February lows until early April, at which point the market posted a more significant correction. Figure 6.14, however, shows the larger uptrend extended for almost another year, prompting three additional revisions to the uptrend line, each of which was necessitated by a closing penetration of the preceding trend line.

FIGURE 6.12 Uptrend Line: Russell 2000 Mini Continuous Futures
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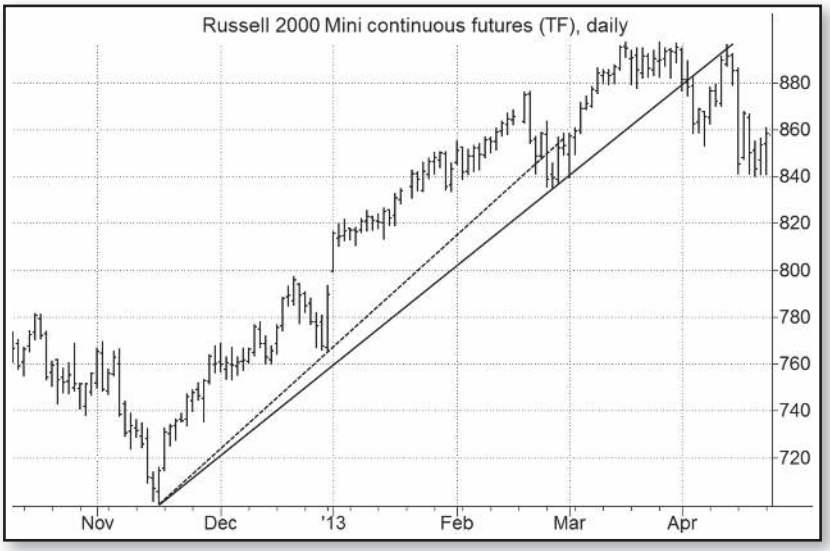

FIGURE 6.13 Uptrend Line Redefined: Russell 2000 Mini Continuous Futures
Chart created using TradeStation. ©TradeStation Technologies, Inc. All rights reserved.

FIGURE 6.14 Uptrend Line Redefined: Russell 2000 Mini Continuous Futures
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Figure 6.15 provides a similar example for a downtrend. The initial downtrend line connecting the December 2014 and March 2015 highs (gray dotted line) was penetrated to the upside in June, but after a few weeks of sideways price action, the market resumed its decline. The revised trend line (thicker dashed line) connecting the December 2014 and June 2015 highs extended until November 2015, when prices again pushed higher—enough to require a third revision to the downtrend line (solid line), but not enough to end the longer-term downtrend.

FIGURE 6.15 Downtrend Line Redefined: Oat Continuous Futures
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The preceding examples are meant to drive home the point that the penetration of trend lines is more the rule than the exception. The simple fact is that trend lines tend to be penetrated, sometimes repeatedly, during their evolution, which is equivalent to saying that trend lines are frequently redefined as they extend. The important implications of this observation are that trend lines work much better in hindsight than in real time and that penetrations of trend lines often prove to be false signals.

TD Lines

In his book *The New Science of Technical Analysis,*[1] Thomas DeMark accurately notes that the drawing of trend lines is a highly arbitrary process. Presented with the same chart, different people will draw different trend lines. In fact, presented with the same chart at different times, even the same person might well draw the trend line differently.

It is easy to see the reason for this lack of precision. A trend line is typically intended to connect several relative highs or relative lows. If there are only two such points, the trend line can be drawn precisely. If, however, the trend line is intended to connect three or more points—as is frequently the case—a precise line will exist in only the rare circumstance that the relationship between all the points is exactly linear. In most cases, the trend line that is drawn will exactly touch at most one or two of the relative highs (or lows), while bisecting or missing the other such points. The trend line that provides the best fit is truly in the eye of the beholder.

DeMark recognizes that in order for a trend line to be defined precisely and unambiguously, it must be based on exactly two points. DeMark also notes that, contrary to convention, trend lines should be drawn from right to left because "recent price activity is more significant than historical movement." These concepts underlie his approach of drawing trend lines. DeMark's TD methodology for defining trend lines is explained by the following definitions:[2]

Relative high. A daily high that is higher than the high on the N prior and N succeeding days, where N is a parameter value that must be defined. For example, if $N = 5$, the relative high is defined as a high that is higher than any high in the prior five days and succeeding five days. (An analogous definition could be applied for data expressed in any time interval. For example, in a 60-minute bar chart, the relative high would be a high that is higher than the high on the prior or succeeding N 60-minute bars.)

Relative low. A daily low that is lower than the low on the N prior and N succeeding days.

TD downtrend line. The prevailing downtrend line is defined as the line connecting the most recent relative high and the most recent preceding relative high that is *also* higher than the most recent relative high. The latter condition is essential to assure the trend line connecting the two relative highs slopes down. Figure 6.16 illustrates the prevailing TD downtrend line, assuming an $N = 5$ parameter value is used to define relative highs.

[1] Thomas DeMark, *The New Science of Technical Analysis* (New York, NY: John Wiley & Sons, 1994).

[2] The following definitions and terminology differ from those used by DeMark, but the implied method of identifying trend lines is equivalent. I simply find the following approach clearer and more succinct than DeMark's presentation of the same concept.

FIGURE 6.16 TD Downtrend Line ($N = 5$): E-Mini Nasdaq 100 Continuous Futures
Chart created using TradeStation. ©TradeStation Technologies, Inc. All rights reserved.

TD uptrend line. The prevailing uptrend line is defined as the line connecting the most recent relative low and the most recent preceding relative low that is *also* lower than the most recent relative low. Figure 6.17 illustrates the prevailing TD uptrend line, assuming an $N = 8$ parameter value is used to define relative lows.

By basing trend line definitions on the most recent relative highs and relative lows, trend lines will be continually redefined as new relative highs and relative lows are defined. For example, Figure 6.18

FIGURE 6.17 TD Uptrend Line ($N = 8$): Copper Continuous Futures
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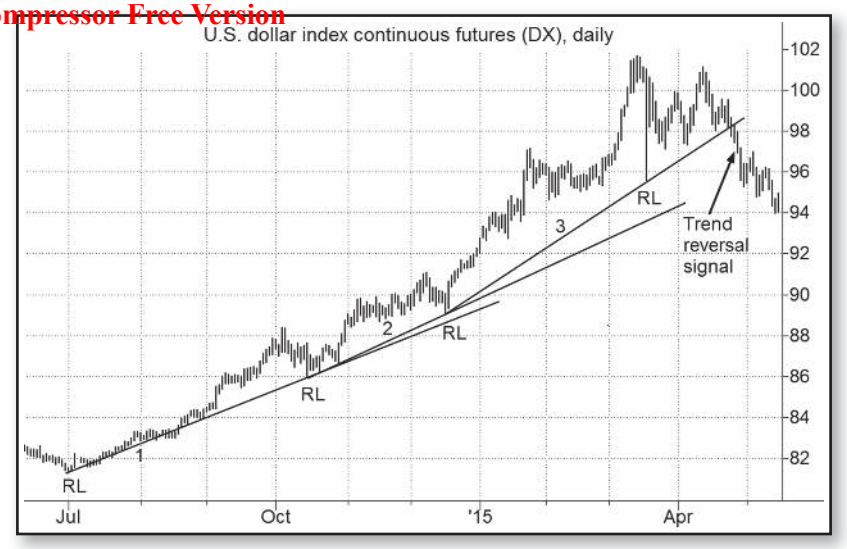

FIGURE 6.18 Succession of TD Uptrend Lines ($N = 10$): U.S. Dollar Index Continuous Futures
Note: Lines 1–3 are successive TD uptrend lines that use $N = 10$ to define relative lows (RL).

shows the succession of TD uptrend lines that would be implied as new relative lows are defined ($N = 10$) until a trend reversal signal is received. In this chart it is assumed that a trend reversal signal is defined as three consecutive closes below the prevailing uptrend line. In similar fashion, Figure 6.19

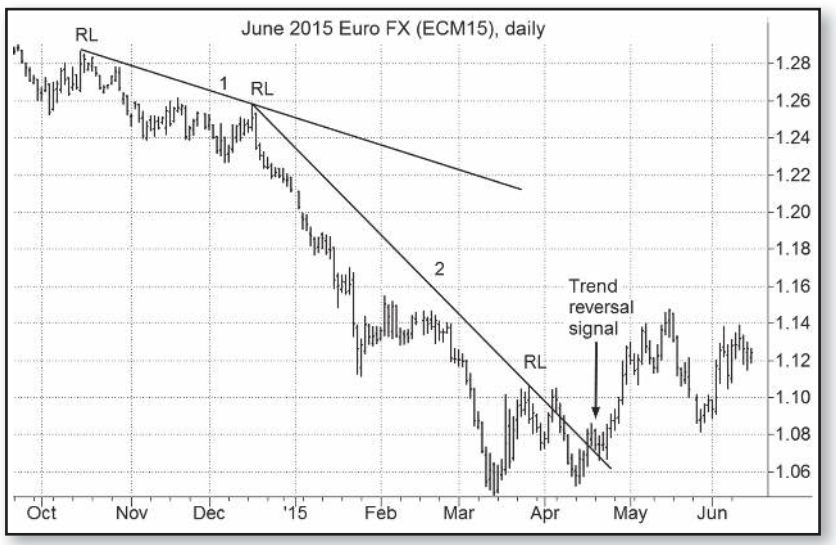

FIGURE 6.19 Succession of TD Downtrend Lines ($N = 10$): June 2015 Euro Futures
Note: Lines 1 and 2 are successive TD downtrend lines that use $N = 10$ to define relative highs (RH).

illustrates TD downtrend lines that would be implied as new relative highs are defined ($N = 10$) until a trend reversal signal is received (again, based on three consecutive closes beyond the trend line).

Different values for N will yield very different trend lines. For example, Figures 6.20 through 6.22 contrast the TD uptrend lines implied by three different values of N for the same chart. The lower the value of N, the more frequently the trend line is redefined and the more sensitive the line is to penetration. For example, contrast the 21 trend lines generated by the $N = 2$ definition in Figure 6.22, versus the mere three trend lines that result when an $N = 10$ definition is used in Figure 6.20.

In analogous fashion, Figures 6.23 through 6.25 contrast the TD downtrend lines implied by three different values of N for the same chart. Similar to Figures 6.20 through 6.22, these charts also show that when the value of N is low, the prevailing downtrend line is redefined frequently and tends to be very sensitive. In Figure 6.23, which shows TD lines for $N = 10$, there are only three downtrend lines. For $N = 5$ the number of trend lines increases to five during the same period (Figure 6.24). Finally, for $N = 2$, 18 different trend lines are generated (Figure 6.25). As these illustrations make clear, the choice of a value for N will make a tremendous difference in the trend lines that are generated and the resulting trading implications.

DeMark's basic definition of trend lines is equivalent to the aforementioned definitions with $N = 1$. Although he acknowledges that trend lines can be defined using higher values of N—"TD lines of higher magnitude," in his terminology—his stated preference is for trend lines drawn using the basic definition. Personally, my own preference is quite the opposite. Although it is a truism that

FIGURE 6.20 Succession of TD Uptrend Lines ($N = 10$): August 2015 Gasoline
Note: Lines 1–3 are successive TD uptrend lines, using $N = 10$ to define relative lows (RL).
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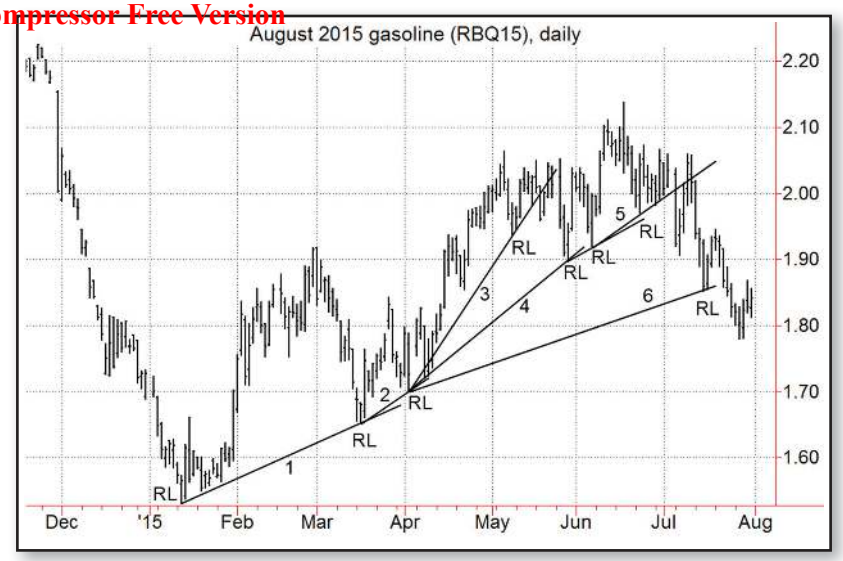

FIGURE 6.21 Succession of TD Uptrend Lines ($N = 5$): August 2015 Gasoline
Note: Lines 1–6 are successive TD uptrend lines, using $N = 5$ to define relative lows (RL).

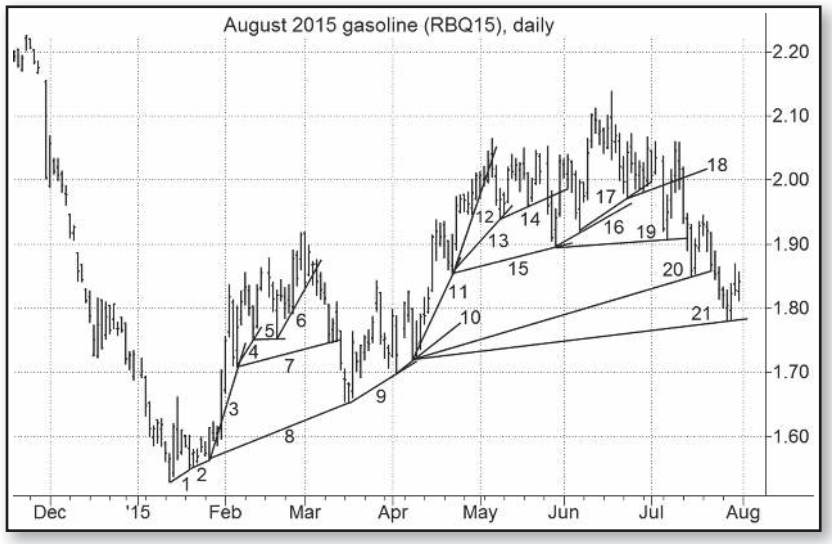

FIGURE 6.22 Succession of TD Uptrend Lines ($N = 2$): August 2015 Gasoline
Note: Lines 1–21 are successive TD uptrend lines, using $N = 2$ to define relative lows (RL).

FIGURE 6.23 Succession of TD Downtrend Lines ($N = 10$): Gold Continuous Futures
Note: Lines 1–3 are successive TD downtrend lines, using $N = 10$ to define relative highs (RH).

FIGURE 6.24 Succession of TD Downtrend Lines ($N = 5$): Gold Continuous Futures
Note: Lines 1–5 are successive TD downtrend lines, using $N = 5$ to define relative highs (RH)

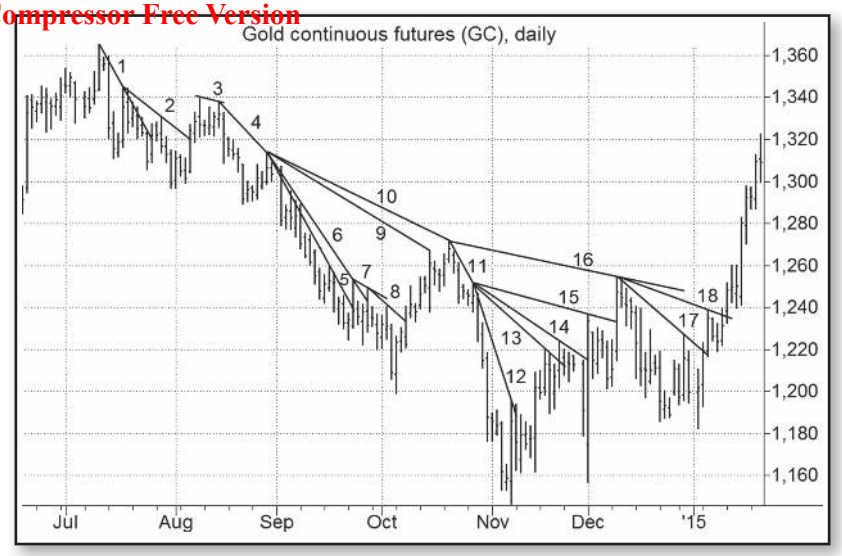

FIGURE 6.25 Succession of TD Downtrend Lines ($N = 2$): Gold Continuous Futures
Note: Lines 1–18 are successive TD downtrend lines, using $N = 2$ to define relative highs (RH).

using an $N = 1$ definition for trend lines will yield earlier signals for valid trend line breakouts, the critical trade-off is that such an approach will tend to provide very tight trend lines that are prone to far more false breakout signals. As a general principle, I think it is far more critical to avoid bad signals than to get the jump on good signals; hence, I strongly favor using higher values of N (e.g., $N = 3$ to $N = 12$) to define trend lines.

There is, however, no "right" or "wrong" choice for a value for N; it is strictly a matter of subjective preference. The reader is encouraged to experiment drawing trend lines using different values of N. Each trader will feel comfortable with certain values of N and uncomfortable with others. Generally speaking, short-term traders will gravitate to low values of N and long-term traders to higher values.

As a fine-tuning point, which becomes particularly important if trend lines are defined using $N = 1$, it is preferable to define relative highs and relative lows based on true highs and true lows rather than nominal highs and lows. These terms are defined as:

True high. The high or previous close, whichever is higher.
True low. The low or previous close, whichever is lower.

For most days, the true high will be identical to the high and the true low will be identical to the low. The differences will occur on downside gap days (days on which the entire trading range is below the previous day's close) and upside gap days (days on which the entire trading range is above the previous day's close). Although such gaps are much rarer (and, generally, smaller) than in the days

FIGURE 6.26 Nominal Low versus True Low: Lean Hog Continuous Futures
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before nearly 24-hour electronic trading, they do occasionally still occur, and can thus impact the identification of relative highs and lows. The use of true highs and true lows yields relative highs and relative lows that are more in line with our intuitive concept of what these points should represent.

For example, in Figure 6.26, using an $N = 3$ definition, bar A would be identified as a relative low based on the nominal low. This point is identified as a relative low, however, only because of the upside gap that occurred three days earlier; it hardly fits the intuitive concept of a relative low. In this case, using the true low instead of the nominal low would eliminate the low of Bar A as a relative low.

Internal Trend Lines

Conventional trend lines are typically drawn to encompass extreme highs and lows. An argument can be made, however, that extreme highs and lows are aberrations resulting from emotional excesses in the market, and that, as such, these points may be unrepresentative of the dominant trend in the market. An internal trend line does away with the implicit requirement of having to draw trend lines based on extreme price excursions. An internal trend line is a trend line drawn so as to best approximate the majority of relative highs or relative lows without any special consideration being given to extreme points. In a rough sense, an internal trend line can be thought of as an approximate best-fit line of relative highs and relative lows. Figures 6.27 through 6.34 provide a wide range of examples of internal uptrend and downtrend lines. For comparison, most of these charts also depict conventional trend lines, which are shown as dashed lines. (To avoid cluttering the charts, only one or two of the conventional trend lines that would have been implied in the course of a price move are shown.)

FIGURE 6.27 Internal Trend Line versus Conventional Trend Line: Euro Continuous Futures

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FIGURE 6.28 Internal Trend Line versus Conventional Trend Line: E-Mini S&P 500 Index Continuous Futures

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FIGURE 6.29 Alternate Internal Trend Lines: Coffee Continuous Futures
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FIGURE 6.30 Internal Trend Line: Soybean Continuous Futures
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FIGURE 6.31 Internal Trend Line versus Conventional Trend Line: Wheat Continuous Futures

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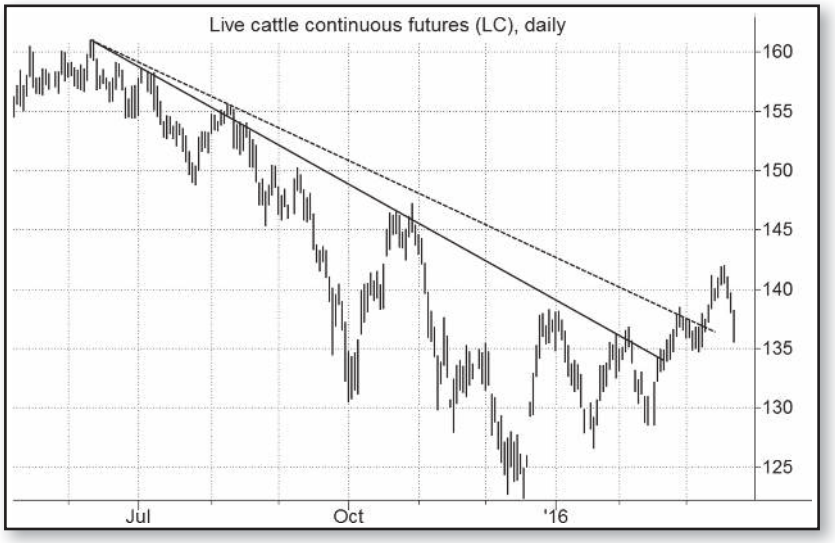

FIGURE 6.32 Internal Trend Line versus Conventional Trend Line: Live Cattle Continuous Futures

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FIGURE 6.33 Internal Trend Line versus Conventional Trend Lines: Platinum Continuous Futures

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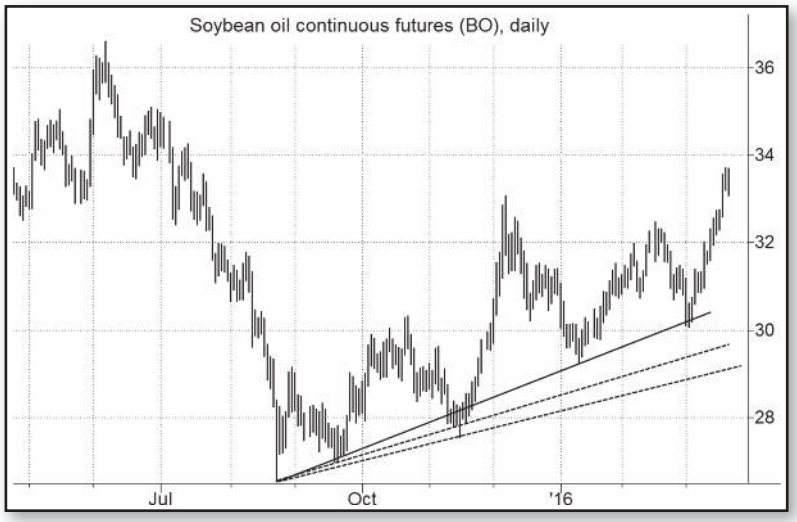

FIGURE 6.34 Internal Trend Line versus Conventional Trend Lines: Soybean Oil Continuous Futures

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One shortcoming of internal trend lines is that they are unavoidably arbitrary, perhaps even more so than conventional trend lines, which at least are anchored by the extreme highs or lows. In fact, there is often more than one plausible internal trend line that can be drawn on a chart—see, for example, Figure 6.29. Nevertheless, in my experience, internal trend lines are far more useful than conventional trend lines in defining potential support and resistance areas. An examination of Figures 6.27 through 6.34 will reveal the internal trend lines depicted in these charts generally provided a better indication of where the market would hold in declines and stall in advances than did the conventional trend lines. Of course, this sample of illustrations does not prove the superiority of internal trend lines over conventional trend lines, since it is always possible to find charts that appear to validate virtually any contention, and such a proof is certainly not intended or implied. Rather, the comparisons in these charts are intended only to give the reader a sense of how internal trend lines *might* provide a better indication of potential support and resistance areas.

The fact that I personally find internal trend lines far more useful than conventional trend lines proves nothing—the anecdotal observation of a single individual hardly represents scientific proof. In fact, given the subjective nature of internal trend lines, a scientific test of their validity would be very difficult to construct. My point, however, is that internal trend lines are a concept that should certainly be explored by the serious chart analyst. I am sure that by doing so many readers will also find internal trend lines more effective than conventional trend lines, or at least a worthwhile addition to the chart analyst's tool kit.

Moving Averages

Moving averages provide a very simple means of smoothing a price series and making any trends more discernible. A simple moving average is defined as the average close of the past *N* days, ending with the current day. For example, a 40-day moving average would be equal to the average of the past 40 closes, including the current day. (Typically, moving averages are calculated using daily closes. However, moving averages can also be based on opens, highs, lows, or an average of the daily open, high, low, and close. Also, moving averages can be calculated for time intervals of data other than daily, in which case the "close" would refer to the final price quote in the given time interval.) The term *moving average* refers to the fact that the set of numbers being averaged is continuously moving through time. Figure 6.35 illustrates a 40-day moving average superimposed on a price series. Note that the moving average clearly reflects the trend in the price series and smooths the meaningless fluctuations in the data. In choppy markets moving averages will tend to oscillate in a general sideways pattern, as illustrated in Figure 6.36.

One very simple method of using moving averages to define trends is based on the direction of change in a moving average's value relative to the previous day. For example, a moving average (and by implication the trend) would be considered to be *rising* if today's value was higher than yesterday's value and *declining* if today's value was lower.

Note that the basic definition of a rising moving average is equivalent to the simple condition that today's close is higher than the close *N* days ago. Why? Because yesterday's moving average is identical

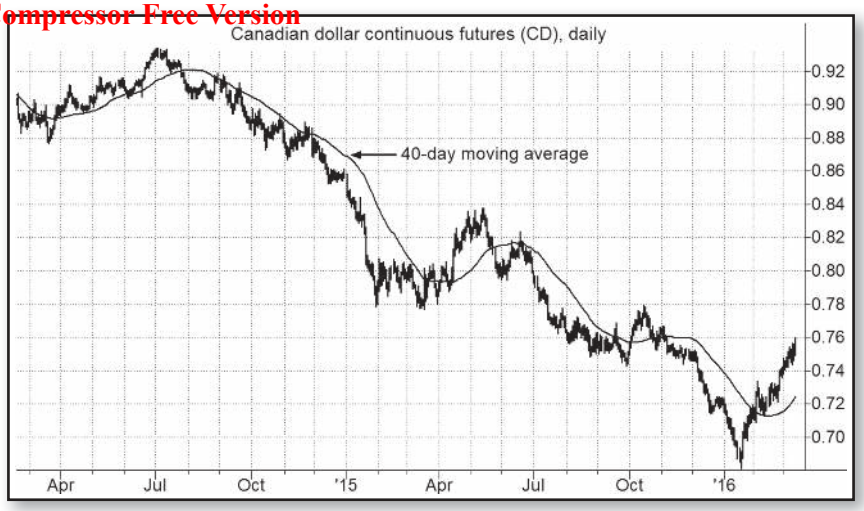

FIGURE 6.35 Moving Average (40-Day) in Trending Market: Canadian Dollar Continuous Futures

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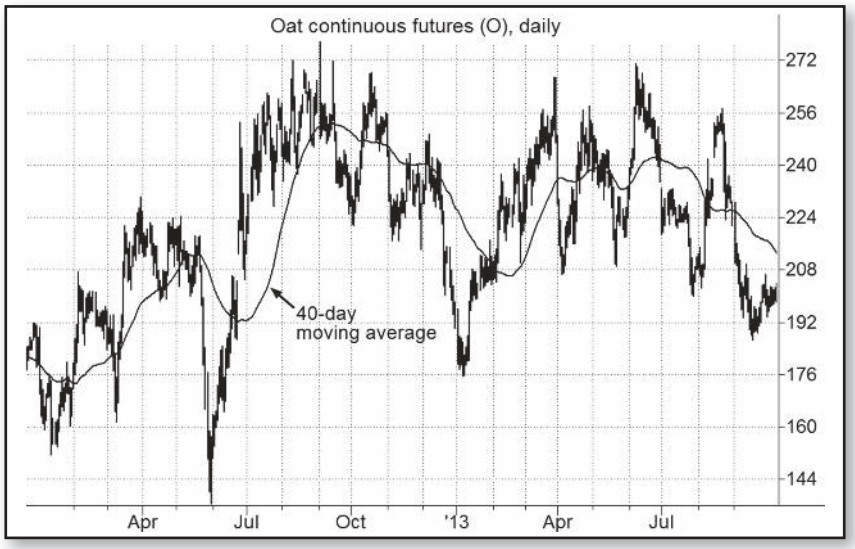

FIGURE 6.36 Moving Average (40-Day) in Sideways Market: Oat Continuous Futures

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to today's moving average with the exception that yesterday's moving average includes the close *N* days ago and does not include today's close. Therefore, if today's close is higher than the close of *N* days ago, then today's moving average will be higher than yesterday's moving average. Similarly, a declining moving average is equivalent to the condition that today's close is lower than the close *N* days ago.

The smoothing properties of moving averages are achieved at the expense of introducing lags in the data. By definition, since moving averages are based on an average of past prices, turning points in moving averages will always lag the corresponding transitions in the raw price series. This characteristic is readily evident in both Figures 6.35 and 6.36.

In trending markets, moving averages can provide a very simple and effective method of identifying trends. Figure 6.37 duplicates Figure 6.35, denoting buy signals at points at which the moving average reversed to the upside by at least 10 ticks and sell signals at points at which the moving average turned down by the same minimum amount. (The reason for using a minimum threshold reversal to define turns in the moving average is to keep trend signals from flipping back and forth—"whipsawing"—repeatedly at times when the moving average is near zero.) As Figure 6.37 shows, this extremely simple technique generated good trading signals. During the 24-month period shown, this method generated only seven signals. The first signal (long) was exited with a small profit in August. The short position triggered at this point captured a significant portion of the July 2014–March 2015 decline. The April 2015 buy was exited with a small loss in June 2015, but the ensuing short trade was exited profitably in October. The subsequent buy was reversed in late November at a loss, and the final short trade was exited with a profit in February 2016.

The problem is that while moving averages will do well in trending markets, in choppy, sideways markets they are apt to generate many false signals. For example, Figure 6.38 duplicates Figure 6.36, indicating buy signals at points where the moving average turned up by at least 10 ticks and sell signals at points witnessing equivalent downside reversals in the moving average. The same method that worked so well in Figure 6.37—buying on upturns in the moving average and selling on downturns in the moving average—proves to be a disastrous strategy in this market, yielding six losses and one essentially break-even trade.

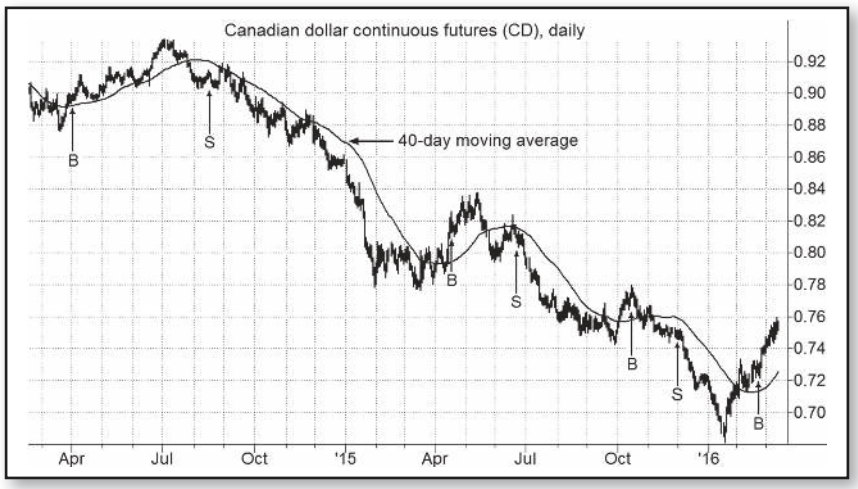

FIGURE 6.37 Moving-Average-Based Signals in Trending Market: Canadian Dollar Continuous Futures

Notes: Buy (B) = 10-tick rise in moving average off its low. Sell (S) = 10-tick decline in moving average off its high.

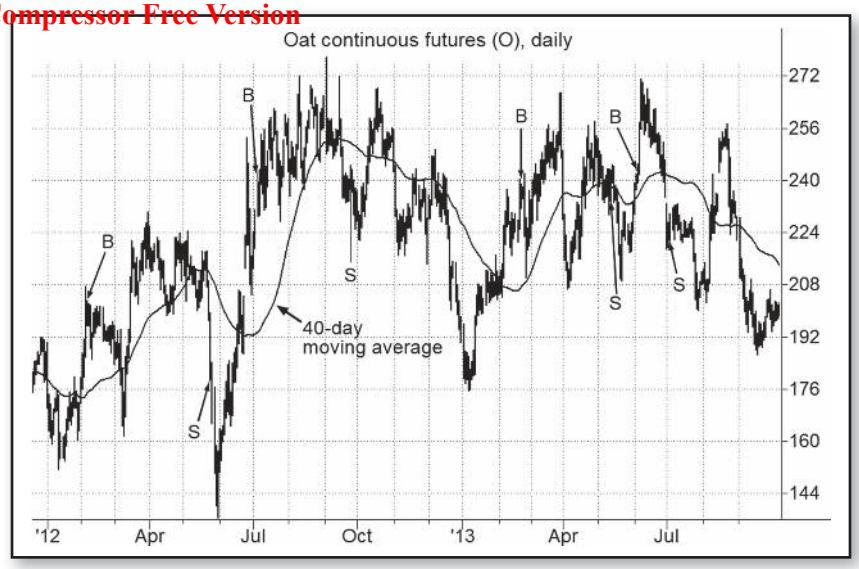

FIGURE 6.38 Moving-Average-Based Signals in Sideways Market: Oat Continuous Futures

Notes: Buy (B) = 10-tick rise in moving average off its low. Sell (S) = 10-tick decline in moving average off its high.

There are many other ways of calculating a moving average besides the simple moving average described in this section. Some of these other methods, as well as the application of moving averages in trading systems, are discussed in Chapter 16.

CHAPTER 7

Trading Ranges

There is the plain fool, who does the wrong thing at all times everywhere, but there is the Wall Street fool, who thinks he must trade all the time.

—Edwin Lefèvre

Trading Ranges: Trading Considerations

A trading range is a horizontal corridor that contains price fluctuations for an extended period. Generally speaking, markets tend to spend most of their time in trading ranges. Unfortunately, however, trading ranges are very difficult to trade profitably. In fact, most technical traders will probably find that the best strategy they can employ for trading ranges is to minimize their participation in such markets—a procedure that is easier said than done.

Although there are methodologies that can be profitable in trading ranges, the problem is that these same approaches are disastrous for trending markets, and while trading ranges are easily identifiable for the past, they are nearly impossible to predict. Also, it should be noted that most chart patterns (e.g., flags, pennants) are relatively meaningless if they occur within a trading range. (Chart patterns are discussed in Chapter 9.)

Trading ranges can often last for years. For example, the silver market remained in a trading range for much of the 1990s (see Figure 7.1). Figures 7.2, 7.3, and 7.4 show a multiyear crude oil trading range represented in continuous futures, nearest futures, and the December 2014 contract. These three charts illustrate that the trading range boundaries and periods will differ depending on whether depicted as continuous futures, nearest futures, or an individual contract, although there will typically be significant overlap between these alternative representations. Trading ranges also show up in shorter-term charts. Figure 7.5 shows an example on a 15-minute chart of euro futures.

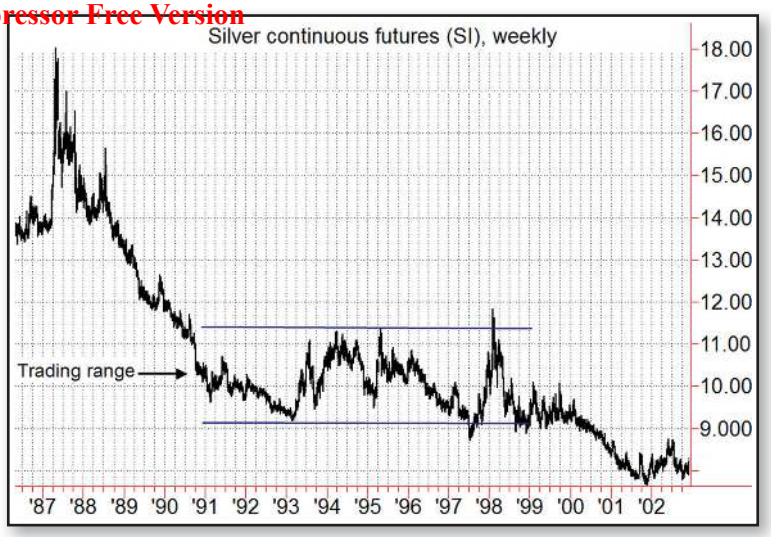

FIGURE 7.1 Multiyear Trading Range: Silver Continuous Futures
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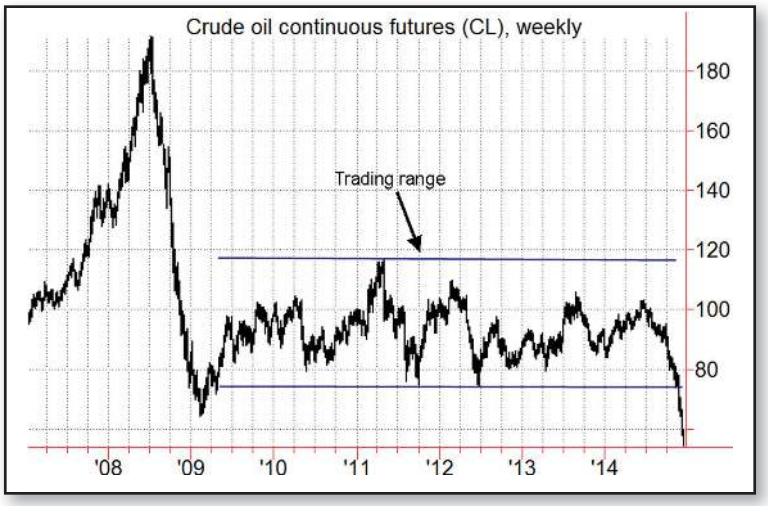

FIGURE 7.2 Multiyear Trading Range: Crude Oil Continuous Futures
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FIGURE 7.3 Multiyear Trading Range: Crude Oil Nearest Futures
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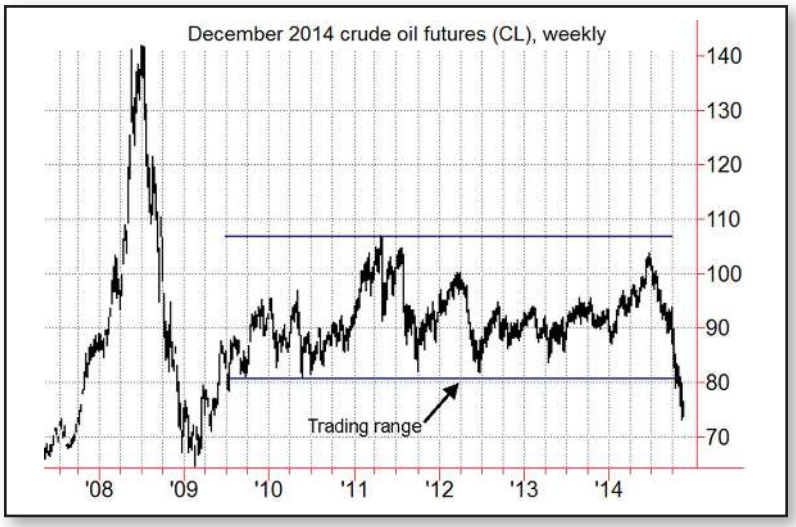

FIGURE 7.4 Multiyear Trading Range: December 2014 Crude Oil Futures
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FIGURE 7.5 Intraday Trading Range: December 2013 Euro Futures
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Once a trading range is established, the upper and lower boundaries tend to define *support* and *resistance* areas. This topic is discussed in greater detail in the next chapter. Breakouts from trading ranges can provide important trading signals—an observation that is the subject of the next section.

Trading Range Breakouts

A *breakout* from a trading range suggests an impending price move in the direction of the breakout. The significance and reliability of a breakout are often enhanced by the following three factors:

1. **Duration of the trading range.** The longer the duration of a trading range, the more potentially significant the eventual breakout. This point is illustrated using a weekly chart example in Figure 7.6 and a daily chart example in Figure 7.7.
2. **Narrowness of range.** Breakouts from narrow ranges tend to provide particularly reliable trade signals (see Figures 7.8, 7.9, and 7.10). Furthermore, such trades can be especially attractive since the meaningful stop point implies a relatively low dollar risk.
3. **Confirmation of breakout.** It is rather common for prices to break out from a trading range by only a small amount, or for only a few days, and then fall back into the range. One reason for this tendency is that stop orders are frequently clustered in the region beyond a

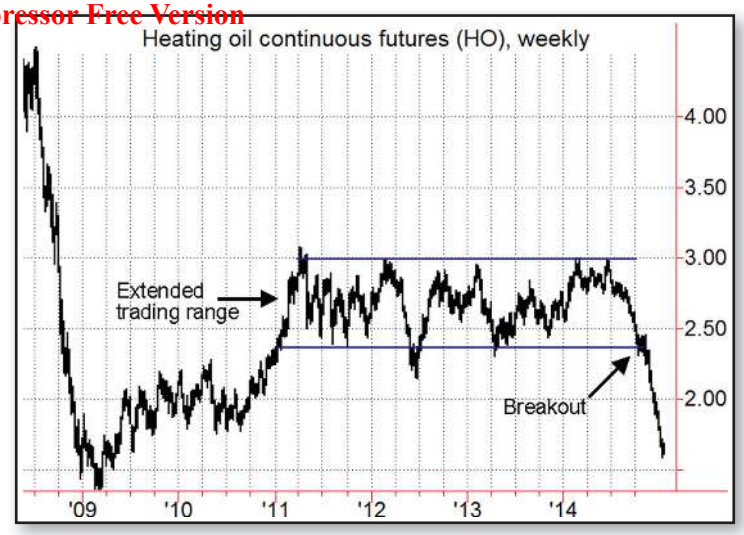

FIGURE 7.6 Downside Breakout from Extended Trading Range: Weekly Heating Oil Continuous Futures

trading range. Consequently, a move slightly beyond the range can sometimes trigger a string of stops. Once this initial flurry of orders is filled, the breakout will fail unless there are solid fundamental reasons and underlying buying (or overhead selling in the case of a downside breakout) to sustain the trend.

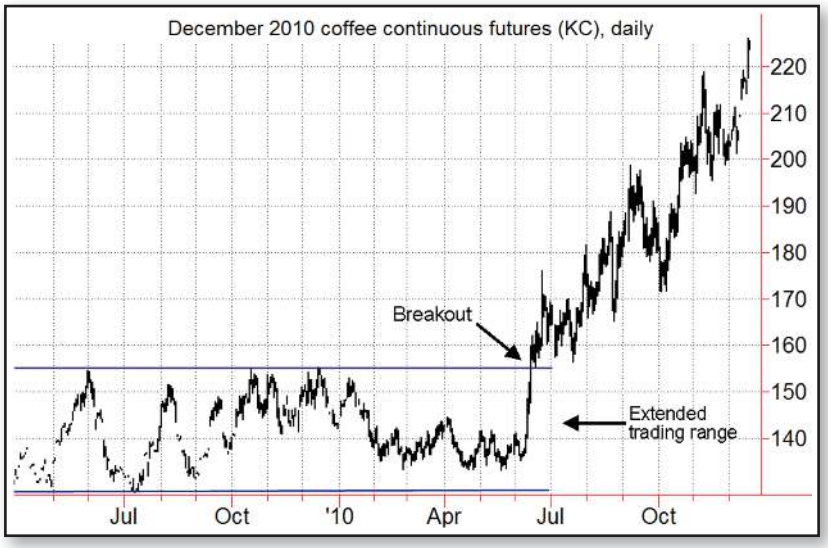

FIGURE 7.7 Upside Breakout from Extended Trading Range: December 2010 Coffee Continuous Futures

FIGURE 7.8 Downside Breakout from Narrow Trading Range: Japanese Yen Continuous Futures

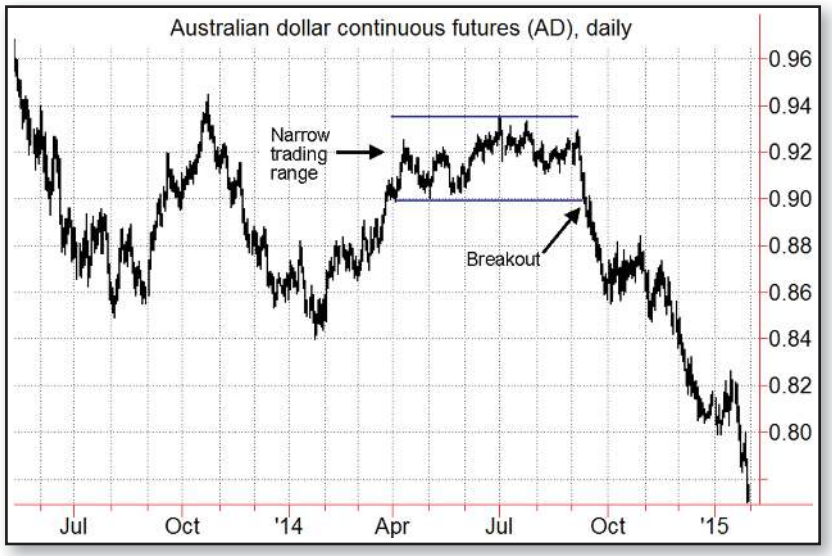

FIGURE 7.9 Downside Breakout from Narrow Trading Range: Australian Dollar Continuous Futures

FIGURE 7.10 Upside Breakout from Narrow Trading Range: U.S. Dollar Index Continuous Futures

In view of these behavioral considerations, the reliability of a breakout from a trading range as a signal for an impending trend is significantly improved if prices are still beyond the range after a number of days (e.g., five). Other types of confirmation can also be used—minimum percent penetration, a given number of *thrust days* (discussed in Chapter 9), and so on. Although waiting for a confirmation following breakouts will lead to worse fills on some valid signals, it will help avoid many "false" signals. The net balance of this trade-off will depend on the confirmation condition used and must be evaluated by the individual trader. The key point, however, is that the trader should experiment with different confirmation conditions, rather than blindly follow all breakouts.

CHAPTER 8

Support and Resistance

In a narrow market, when prices are not getting anywhere to speak of but move in a narrow range, there is no sense in trying to anticipate what the next big movement is going to be—up or down.

—Edwin Lefèvre

Nearest Futures or Continuous Futures?

For any application of technical analysis in which the accurate representation of price *moves* is essential, continuous futures, as opposed to nearest futures, are the only viable choice for depicting price series that extend across multiple contracts. However, in the case of support and resistance, actual past price *levels*, which are accurately represented by only the nearest futures, are also important. This consideration raises the question of which type of longer-term chart—nearest or continuous futures—should be used to determine support and resistance levels. There is no correct answer. Insofar as the accurate measurement of prior price *moves* is important in determining support and resistance, continuous futures charts should be used. Insofar as past actual price *levels* are important in determining support and resistance, nearest futures charts should be used. Essentially, strong arguments can be made for using both types of charts for defining support and resistance levels. Traders need to experiment with whether they find nearest or continuous futures charts more useful in identifying support and resistance levels, or, for that matter, if they find consulting both of these charts the most effective method.

Trading Ranges

Once a trading range is established (at least one to two months of sideways price movement on the daily time frame), prices will tend to meet resistance at the upper end of the range and support at the lower end of the range. Although chart analysis is best suited as a tool to signal trend-following trades, some agile traders adopt a strategy of selling rallies and buying declines in a trading range situation. Generally speaking, such a trading approach is difficult to pull off successfully. Furthermore, it should be emphasized that fading minor trends within a trading range can lead to disaster unless losses are limited (e.g., by liquidating the position if prices penetrate the range boundary by a specified minimum amount, or the market trades beyond the range for a minimum number of bars, or both).

After prices break out from a trading range, the interpretation of support and resistance is turned on its head. Specifically, once prices witness a sustained breakout above a trading range, the upper boundary of that range becomes a zone of price support. The extended lines in Figures 8.1 and 8.2 indicate the support levels implied by the upper boundaries of the prior trading ranges. In the case of a sustained breakout below a trading range, the lower boundary of that range becomes a zone of price resistance. The extended lines in Figures 8.3 and 8.4 indicate the resistance levels implied by the lower boundaries of preceding trading ranges.

FIGURE 8.1 Support Near Top of Prior Trading Range: Euro Stoxx 50 Continuous Futures

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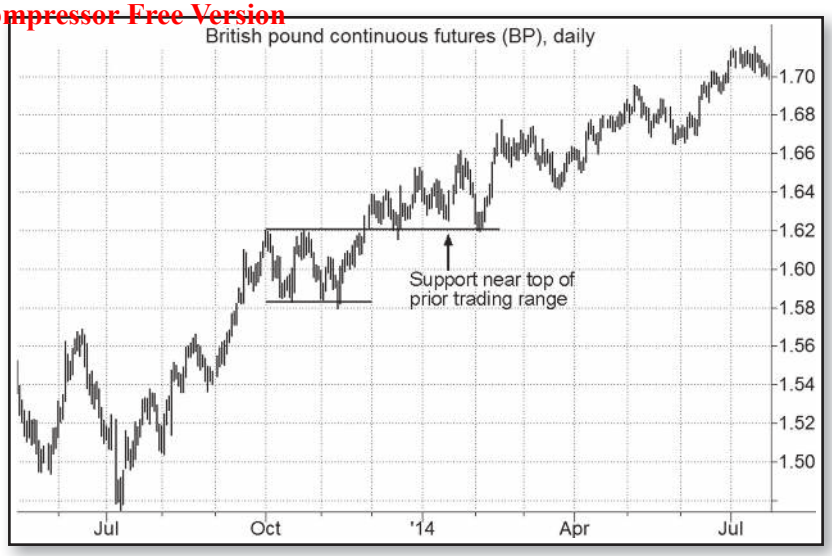

FIGURE 8.2 Support Near Top of Prior Trading Range: British Pound Continuous Futures

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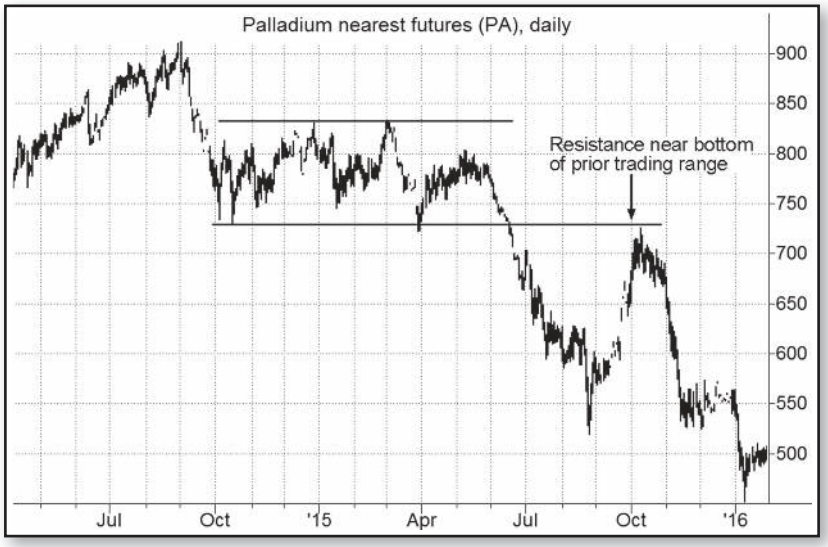

FIGURE 8.3 Resistance Near Bottom of Prior Trading Range: Palladium Nearest Futures

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FIGURE 8.4 Resistance Near Bottom of Prior Trading Range: Platinum Continuous Futures

Prior Major Highs and Lows

Normally, resistance will be encountered in the vicinity of previous major highs and support in the vicinity of major lows. Figures 8.5, 8.6, and 8.7 illustrate both behavioral patterns. For example, in Figure 8.5 the late 2003 low acted as a support level for subsequent lows in 2004, 2007, and 2008, while the 2005 high provided a resistance level for the 2009 highs. In Figure 8.6 the late 2009 and early 2010 highs formed near the resistance level of the 2008 high, while the late 2011 low provided support for the 2012 and 2013 lows. Subsequently, the 2014 high functioned as resistance for the 2015 highs, while the early 2016 low formed just above the support level of the early 2015 low. Although the concept of resistance near prior peaks and support near prior lows is perhaps most important for weekly or monthly charts, such as Figures 8.5 and 8.6, the principle also applies to daily charts, such as Figure 8.7. In this chart, the June and August 2013 highs occurred near the March 2013 peak.

It should be emphasized that a prior high does not imply subsequent rallies will fail *at or below* that point, but rather that resistance can be anticipated in the *general vicinity* of that point. Similarly, a prior low does not imply that subsequent declines will hold *at or above* that point, but rather that support can be anticipated in the *general vicinity* of that point. Some practitioners of technical analysis treat prior highs and lows as points endowed with sacrosanct significance: If a prior high was 1,078, then they consider 1,078 to be major resistance, and if, for example, the market rallies to 1,085, they consider resistance to be broken. This is nonsense. Support and resistance should be considered approximate areas, not precise points. Note that although prior major highs and lows proved highly

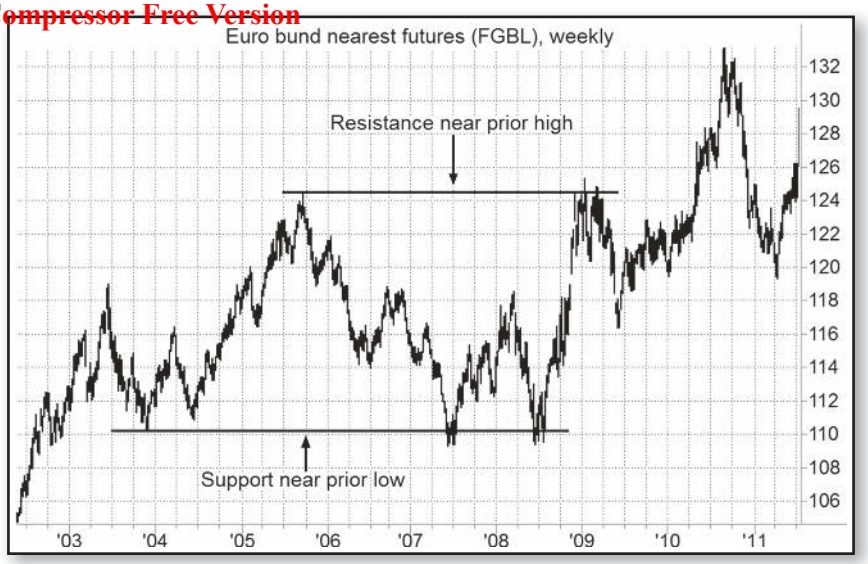

FIGURE 8.5 Resistance at Prior High and Support at Prior Low: Euro Bund Nearest Futures

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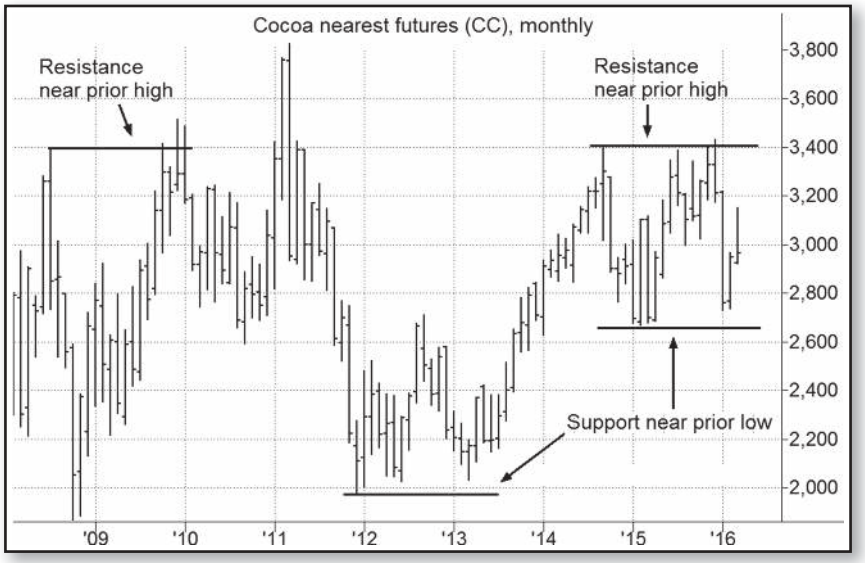

FIGURE 8.6 Resistance at Prior Highs and Support at Prior Lows: Cocoa Nearest Futures

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FIGURE 8.7 Resistance at Prior High: Cotton Nearest Futures
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significant as resistance and support in all three of the preceding charts, reversals mostly occurred before price reached a given level or after penetrating it by a notable amount (although usually not closing beyond it); reversals that occur very near the precise levels of prior highs or lows are the exception rather than the rule.

The penetration of a previous high can be viewed as a buy signal, and the penetration of a prior low can be viewed as a sell signal. Similar to the case of breakouts from trading ranges, to be viewed as trading signals penetrations of highs and lows should be significant in terms of price magnitude, time duration, or both. Thus, for example, as should be clear from the preceding discussion regarding Figures 8.6 and 8.7, a one-period (one-day for daily chart, one-week for weekly chart, etc.) penetration of a prior high or low would not prove anything. A stronger confirmation than a mere penetration of a prior high or low should be required before assuming such an event represents a buy or sell signal. Some examples of possible confirmation conditions include a minimum number of closes beyond the prior high or low, a minimum percent price penetration, or both requirements.

Figures 8.8 and 8.9 illustrate examples of penetrations of previous highs as buy signals, assuming a confirmation condition of three closes above the high. Similarly, Figures 8.10 and 8.11 provide examples of penetrations of previous lows as sell signals, using an analogous confirmation condition. In Figure 8.9 price turned lower in late 2012 a little above the resistance level of the early 2012 high. In January 2014 the market posted its third weekly close above the late 2012 high (dashed line), triggering a buy signal. Incidentally, this chart also provides a good example of a prior low (formed in 2013) holding as support more than two years later.

Following a *sustained* penetration of a prior high or low, the interpretation of support and resistance is turned on its head. In other words, the area of a prior high becomes support and the area of

FIGURE 8.8 Penetration of Previous High as Buy Signal: Russell 2000 Mini Nearest Futures

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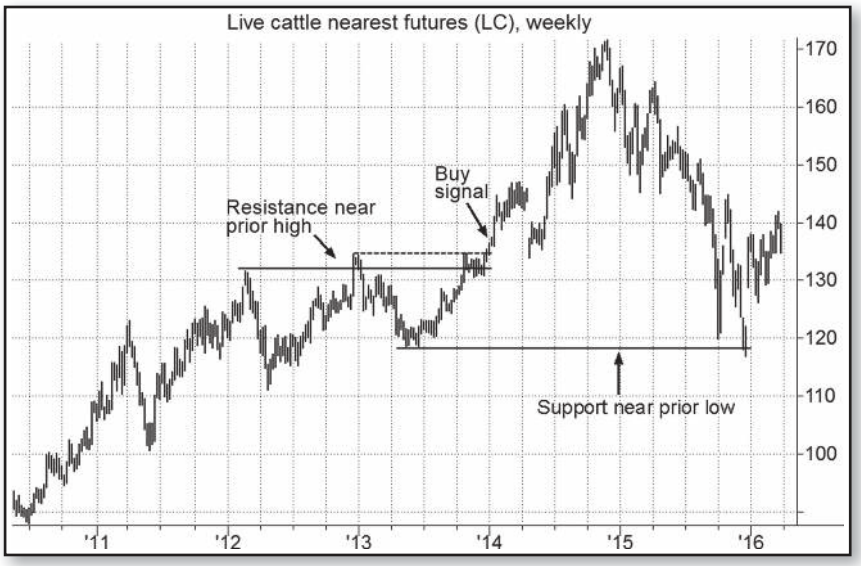

FIGURE 8.9 Penetration of Previous High as Buy Signal: Live Cattle Nearest Futures

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a previous low becomes resistance. For example, in Figure 8.12 the resistance level from Figure 8.9 subsequently became support in April 2014 when the market pulled back temporarily before rallying to new highs. In Figure 8.13, which extends the support line of Figure 8.10, the September 2011

FIGURE 8.10 Penetration of Previous Low as Sell Signal: Silver Nearest Futures
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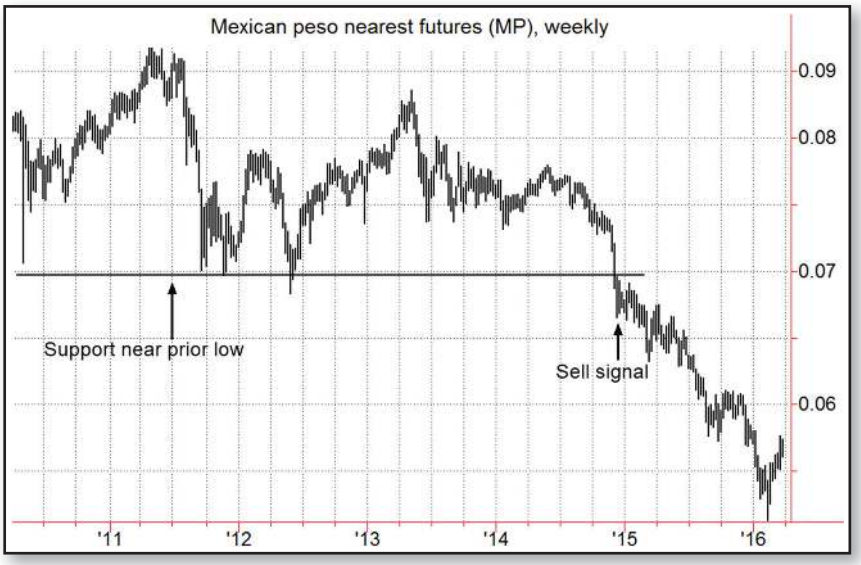

FIGURE 8.11 Penetration of Previous Low as Sell Signal: Mexican Peso Nearest Futures
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low provides a support area for the December 2011 and June 2012 lows. When this support level is subsequently penetrated in April 2013, this same level then proves to be a resistance area for the June–August 2013 rebound. Figure 8.14 shows a remarkably similar pattern unfolding on the daily silver chart: The late June 2013 low provided support for subsequent lows between November 2013

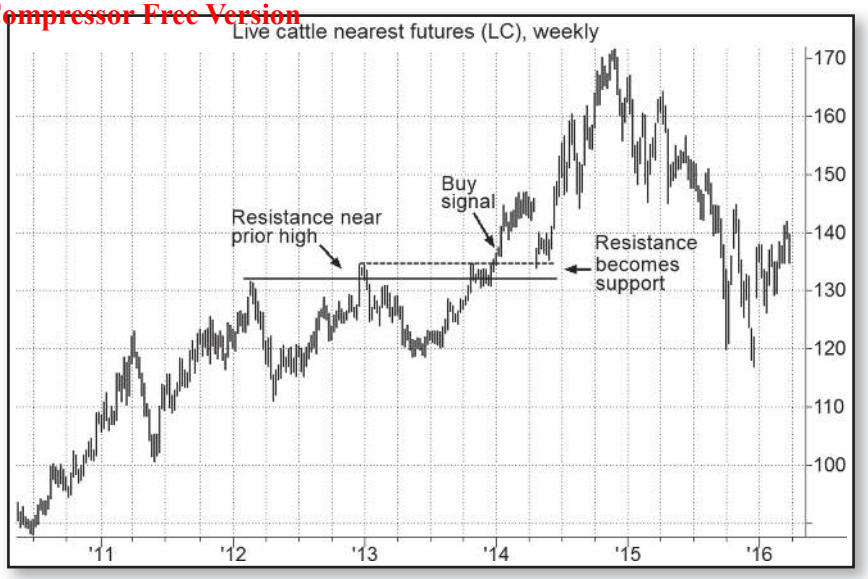

FIGURE 8.12 Previous Resistance Becomes Support: Live Cattle Nearest Futures
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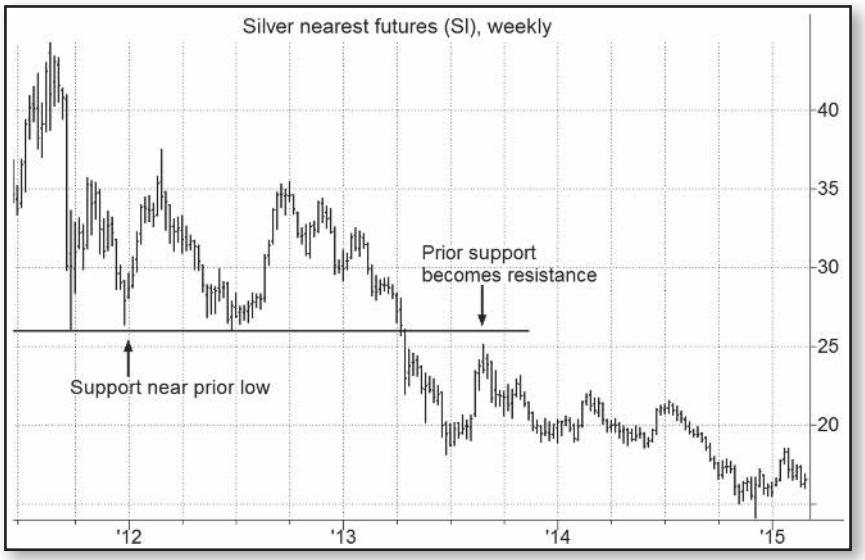

FIGURE 8.13 Previous Support Becomes Resistance: Silver Nearest Futures
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and June 2014. This support level subsequently functioned as resistance in January and May 2015 after the market rallied off its late 2014 lows. In Figure 8.15, the support level that was penetrated to the downside in August 2015 functioned as resistance for the October 2015 rebound as well as the rally that peaked in March 2016.

FIGURE 8.14 Previous Support Becomes Resistance: Silver Nearest Futures
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FIGURE 8.15 Previous Support Becomes Resistance: Live Cattle Nearest Futures
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Concentrations of Relative Highs and Relative Lows

The previous section dealt with support and resistance at prior major highs and lows—single peaks and nadirs. In this section we are concerned with support and resistance at price zones with concentrations of relative highs and relative lows rather than absolute tops and bottoms. Specifically, there is often a tendency for relative highs and relative lows to be concentrated in relatively narrow zones. These zones imply support regions if current prices are higher and resistance areas if current prices are lower. This approach is particularly useful for anticipating support and resistance areas in long-term nearest futures charts, which, as the reader will recall, accurately reflect past price *levels* (in contrast to continuous futures, which accurately reflect past price *swings*). Figures 8.16 through 8.21 provide weekly chart examples of support or resistance occurring at prior concentrations of relative lows and relative highs (or relative lows alone). In Figure 8.21, a support zone initially defined by multiple relative highs from 2007 to 2010 subsequently functions as a resistance zone in 2013–2014 after the market sells off.

The approach of using concentrations of prior relative highs and lows to define support and resistance can also be applied to daily continuous or nearest futures charts of sufficient duration—for example, two years. (The life span of most individual futures contracts is too short for this method to be effectively applied on such charts.) Figures 8.22 through 8.24 provide daily chart examples of support and resistance occurring at prior concentrations of relative highs and relative lows. Figure 8.24 is similar to Figure 8.21 in that a support zone transforms into a resistance zone.

FIGURE 8.16 Support Zone Defined by Concentration of Prior Relative Lows and Highs: Swiss Franc Nearest Futures
Note: ↑ = relative low; ↓ = relative high.

FIGURE 8.17 Support Zone Defined by Concentration of Prior Relative Lows and Highs: Gasoline Nearest Futures
Note: ↑ = relative low; ↓ = relative high.

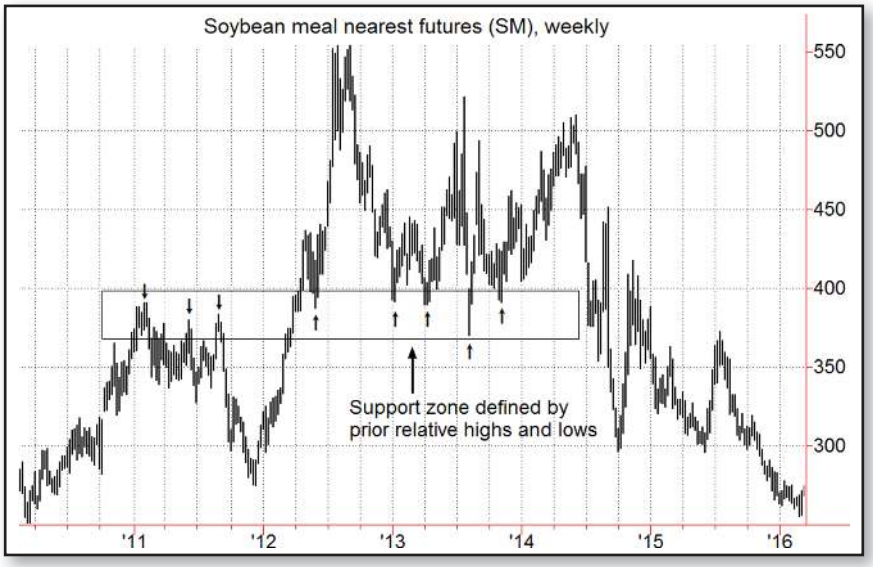

FIGURE 8.18 Support Zone Defined by Concentration of Prior Relative Highs and Lows: Soybean Meal Nearest Futures
Note: ↑ = relative low; ↓ = relative high.

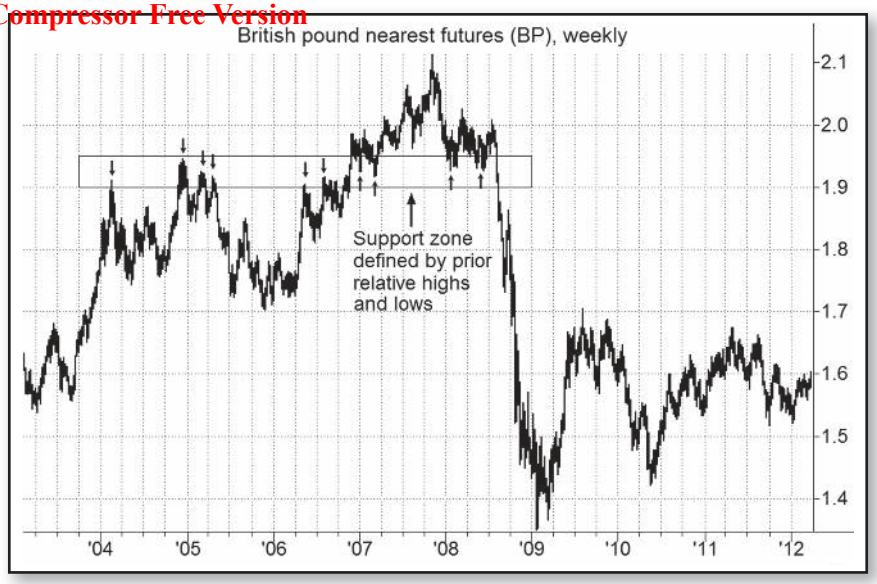

FIGURE 8.19 Support Zone Defined by Concentration of Prior Relative Highs and Lows: British Pound Nearest Futures

Note: ↑ = relative low; ↓ = relative high.

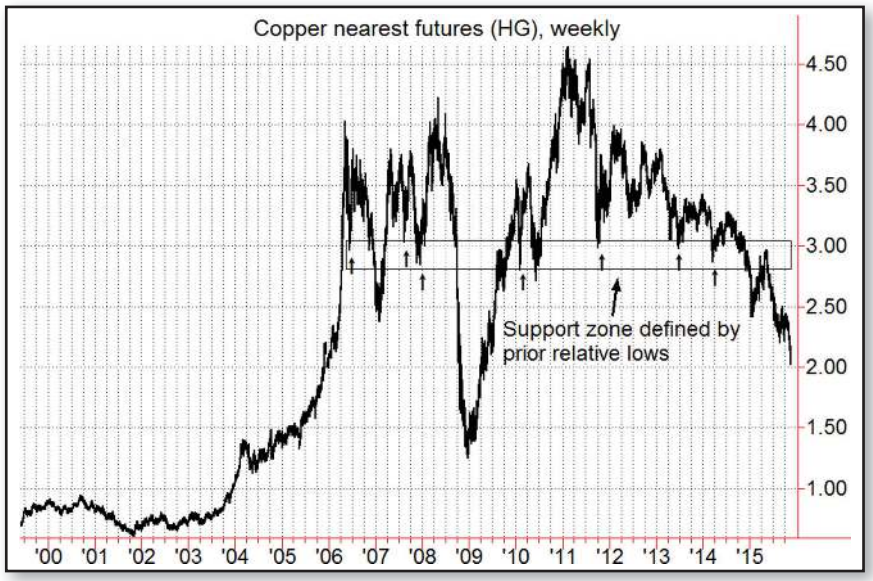

FIGURE 8.20 Support Zone Defined by Concentration of Prior Relative Lows: Copper Nearest Futures

Note: ↑ = relative low.

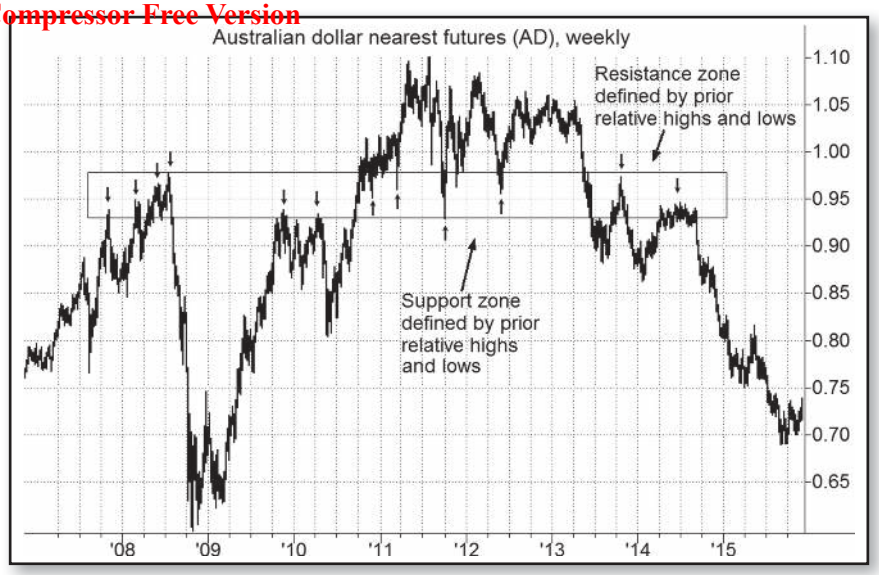

FIGURE 8.21 Support and Resistance Zones Defined by Concentration of Prior Relative Highs and Lows: Australian Dollar Nearest Futures

Note: ↑ = relative low; ↓ = relative high.

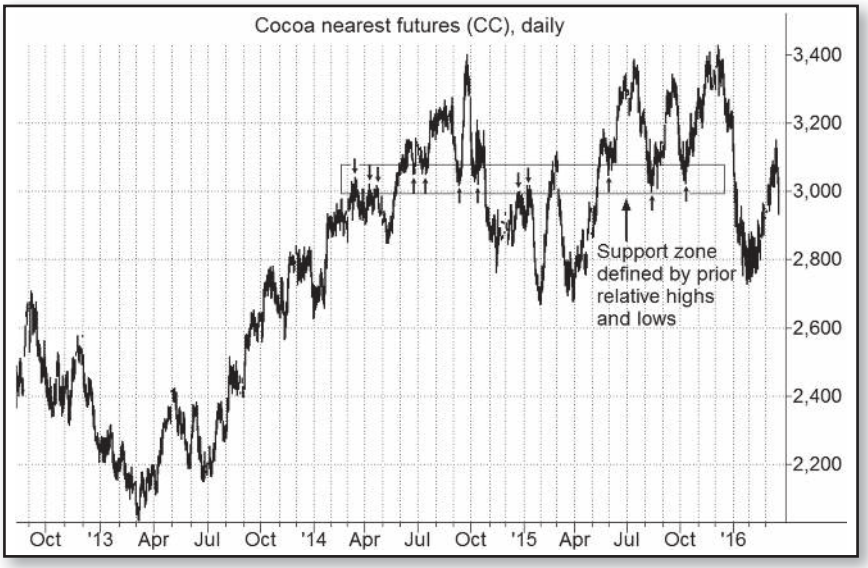

FIGURE 8.22 Support Zone Defined by Concentration of Prior Relative Lows and Highs: Cocoa Nearest Futures

Note: ↑ = relative low; ↓ = relative high.

FIGURE 8.23 Resistance Zone Defined by Concentration of Prior Relative Highs and Lows: Mexican Peso Nearest Futures
Note: ↑ = relative low; ↓ = relative high.

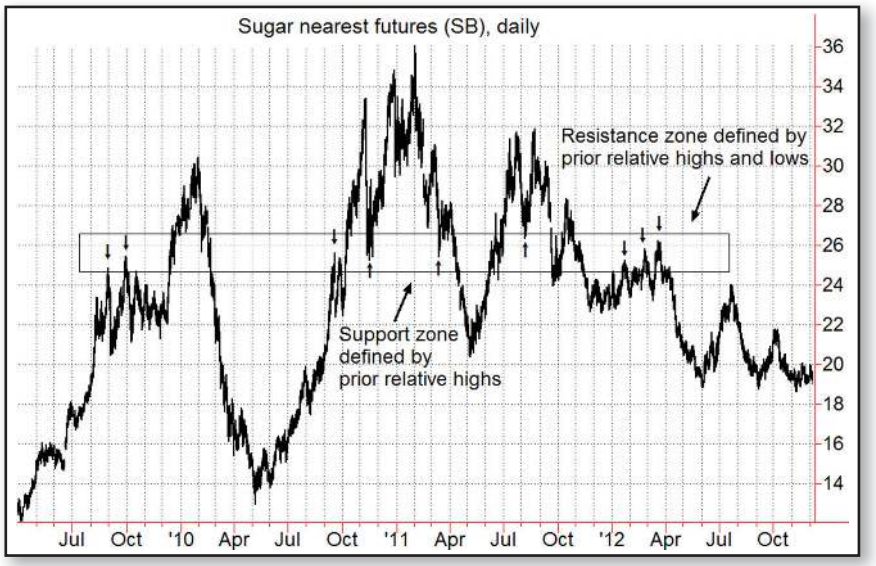

FIGURE 8.24 Support and Resistance Zones Defined by Concentration of Prior Relative Highs and Lows: Sugar Nearest Futures
Note: ↑ = relative low; ↓ = relative high.

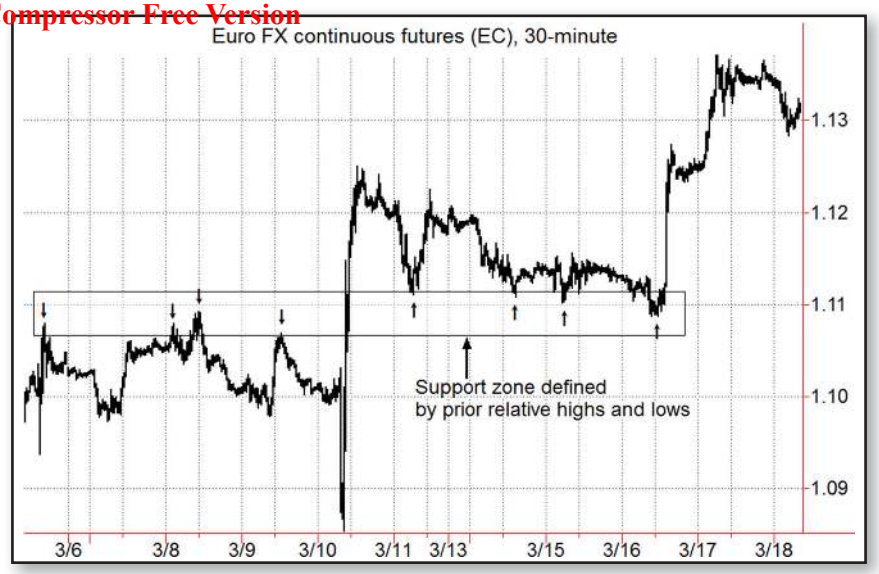

FIGURE 8.25 Support Zone Defined by Concentration of Prior Relative Highs and Lows: Euro Continuous Futures
Note: ↑ = relative low; ↓ = relative high.

Although best suited to longer-term charts, the technique of using prior concentrations of relative highs and lows as support and resistance zones can also be applied to shorter-term charts. Figure 8.25 provides an intraday example: a support zone defined by a series of prior relative highs and lows on a 30-minute chart.

Trend Lines, Channels, and Internal Trend Lines

The concept that trend lines, channel lines, and internal trend lines indicate areas of potential support and resistance was detailed in Chapter 6. Again, as previously discussed, based on personal experience, I believe that internal trend lines are more reliable in this regard than conventional trend lines. However, the question of which type of trend line is a better indicator is a highly subjective matter, and some readers may well reach the opposite conclusion. In fact, there is not even a mathematically precise definition of a trend line or an internal trend line, and how these lines are drawn will vary from individual to individual.

Price Envelope Bands

A price envelope band can be derived from a moving average. The upper band of the price envelope is defined as the moving average plus a given percentage of the moving average. Similarly, the lower band of the price envelope is defined as the moving average minus a given percentage of the moving average. For example, if the current moving average value is 600 and the percentage value is defined as 3 percent, the upper band value would be 618 and the lower band value would be 582. By selecting an appropriate percent boundary for a given moving average, a trader can define an envelope band so that it encompasses most of the price activity, with the upper boundary approximately coinciding with relative highs and the lower boundary approximately coinciding with relative lows.

Figure 8.26 illustrates a price envelope band for the Australian dollar continuous futures using a 20-day moving average and a 2.5 percent value. The price envelope provides a good indication of support and resistance for much of the period captured in the chart, especially when the market is moving sideways (e.g., February–April 2015 and September 2015–January 2016). An alternative way of expressing the same concept is that the price envelope indicates "overbought" and "oversold" levels. Price envelope bands can also be applied to data for other than daily time intervals. For example, Figure 8.27 illustrates a 1.25 percent price envelope band applied to 60-minute bars of the March 2016 E-mini S&P 500 contract.

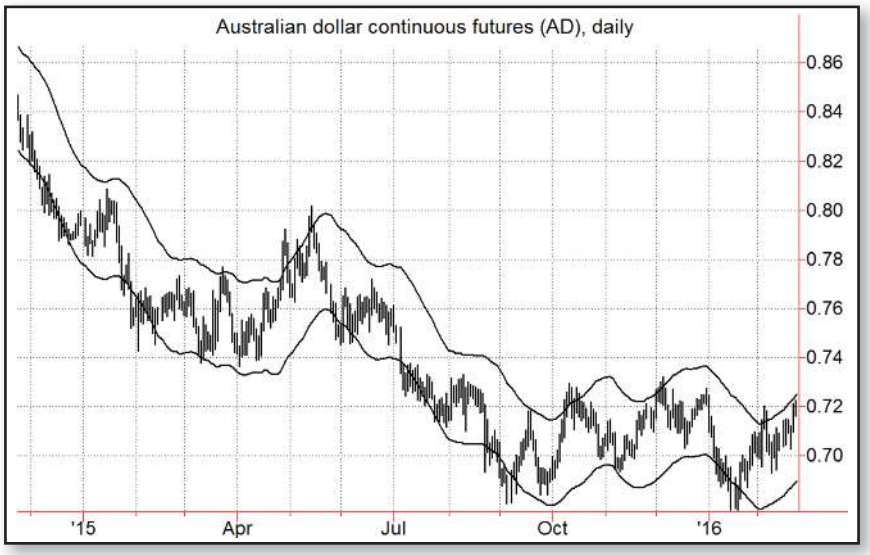

FIGURE 8.26 Price Envelope Band as Indication of Support and Resistance in Daily Bar Chart: Australian Dollar Continuous Futures

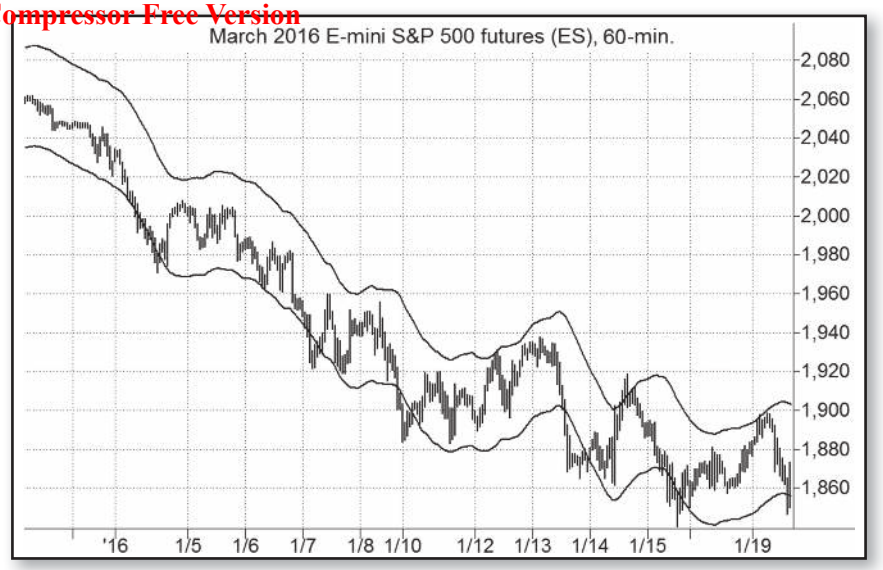

FIGURE 8.27 Price Envelope Band as Indication of Support and Resistance on 60-Minute Bar Chart: March 2016 E-Mini S&P 500 Futures

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It should be noted, however, that the price envelope is not as effective a tool as it might appear to be. Although it provides a reasonably good indication of when the market may be nearing a turning point, prices can continue to hug one end of the price envelope during extended trends. This pattern, for example, is evident at the beginning of Figure 8.26 (November–December 2014), as well as the middle of the chart (July and August–September 2015). Thus, while it is true that price excursions beyond the price envelope band tend to be limited and temporary, the fact that prices are near one of the boundaries of the envelope does not necessarily mean that a price turning point is imminent. On balance, the price envelope provides one means of gauging potential areas of support and resistance, but it is also susceptible to multiple false signals.

CHAPTER 9

Chart Patterns

Never confuse brilliance with a bull market.

—Paul Rubink

One-Day Patterns

Spikes

A spike high is a day whose high is sharply above the highs of the preceding and succeeding days. Frequently, the closing price of a spike high day will be near the lower end of the day's trading range. A spike high is meaningful only if it occurs after a price advance, in which case it can often signify at least a temporary climax in buying pressure, and hence can be viewed as a potential relative high. Sometimes spike highs will prove to be major tops.

Generally speaking, the significance of a spike high will be enhanced by the following factors:

1. A wide difference between the spike high and the highs of the preceding and succeeding days.
2. A close near the low of the day's range.
3. A substantial price advance preceding the spike's formation.

The more extreme each of these conditions, the greater the likelihood that a spike high will prove to be an important relative high or even a major top.

In analogous fashion, a spike low is a day whose low is sharply below the lows of the preceding and succeeding days. Frequently, the closing price on a spike low day will be near the upper end of the day's trading range. A spike low is meaningful only if it occurs after a price decline, in which case it can often signify at least a temporary climax in selling pressure and hence can be viewed as a potential relative low. Sometimes spike lows will prove to be a major bottom.

Generally speaking, the significance of a spike low will be enhanced by these three factors:

1. A wide difference between the lows of the preceding and succeeding days and the spike low.
2. A close near the high of the day's range.
3. A substantial price decline preceding the spike's formation.

The more extreme each of these conditions, the greater the likelihood that a spike low will prove to be an important relative low or even a major bottom.

Figures 9.1 through 9.4 contain several examples of spike highs and spike lows on daily and weekly charts. The massive spike high in Figure 9.3 marked a multiyear top in the Swiss franc futures. Figure 9.4 contains two examples of spike lows that marked swing bottoms.

The preceding descriptions of spike highs and lows listed three essential characteristics that typify such days. However, the definition of these conditions was somewhat imprecise. Specifically, how great must the difference be between a day's high (low) and the highs (lows) of the preceding and succeeding days in order for it to qualify as a spike high (low)? How close must the close be to the low (high) for a day to be considered a spike high (low)? How large must a preceding advance (decline) be for a day to be viewed as a possible spike high (low)? The answer to these questions is that there are no precise specifications; in each case, the choice of a qualifying condition is a subjective one. However, Figures 9.1 through 9.4 should provide an intuitive sense of the types of days that qualify as spikes.

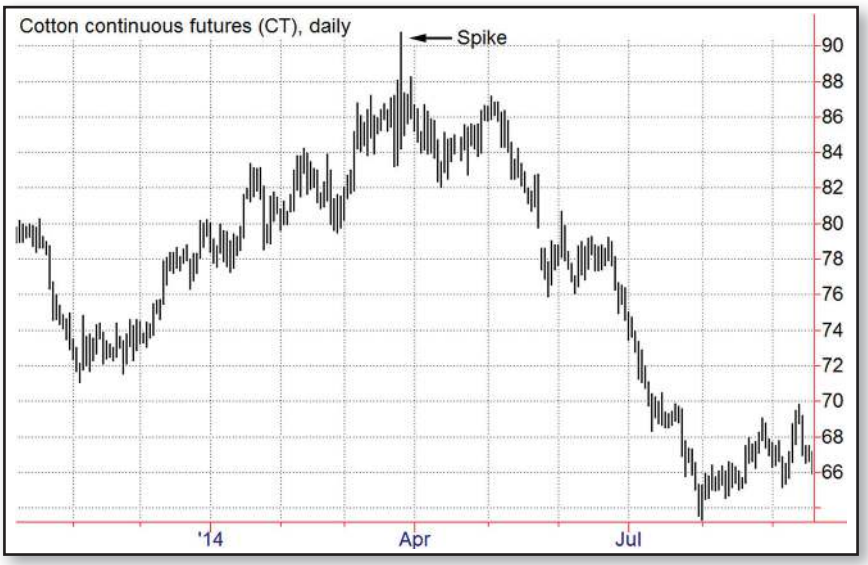

FIGURE 9.1 Spike High: Cotton Continuous Futures

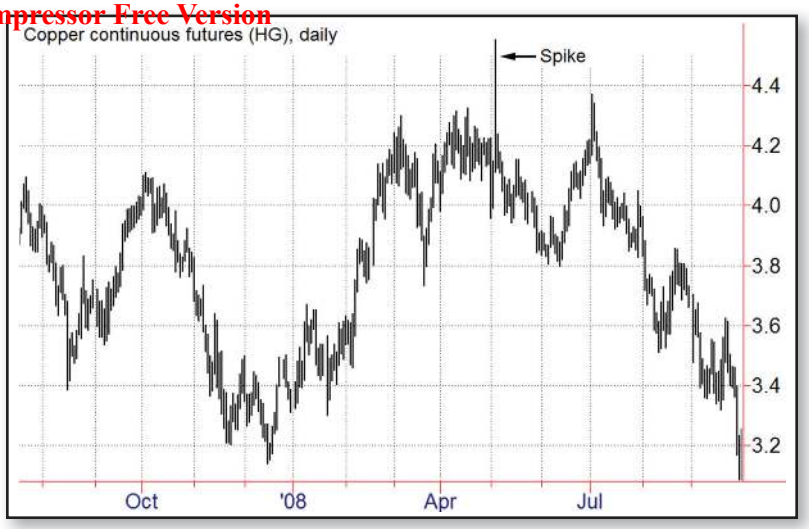

FIGURE 9.2 Spike High: Copper Continuous Futures
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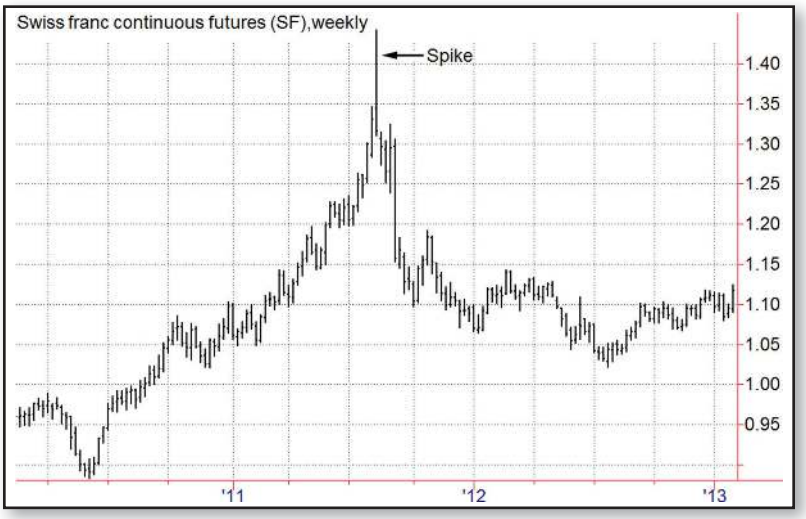

FIGURE 9.3 Spike High: Swiss Franc Continuous Futures
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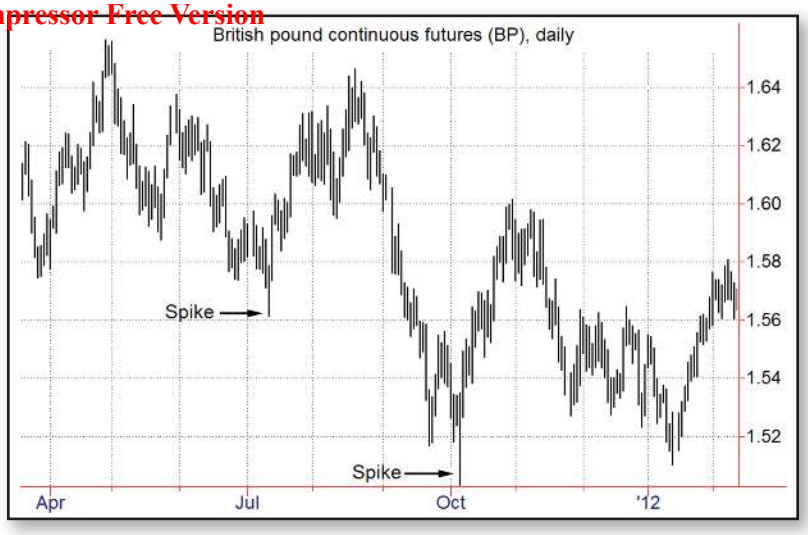

FIGURE 9.4 Spike Lows: British Pound Continuous Futures
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It is possible, though, to construct a mathematically precise definition for spike days. An example of such a definition for a spike high might be a day that fulfilled all three of the following conditions (the definition for a spike low day would be analogous):

1. $H_t - \text{Max}(H_{t-1}, H_{t+1}) > k \cdot \text{ADTR}_{10}$,
   where H_t = high on given day
   H_{t-1} = high on preceding day
   H_{t+1} = high on succeeding day
   k = multiplicative factor that must be defined (e.g., $k = 0.75$)
   ADTR_{10} = average daily true range during past 10 days[1]
2. $H_t - C_t > 3 \cdot (C_t - L_t)$,
   where C_t = close on given day
   L_t = low on given day
3. $H_t >$ maximum high during past N days, where N = constant that must be defined (e.g., $N = 50$)

The first of the preceding conditions assures us that the spike high will exceed the surrounding highs by an amount at least equal to three-quarters of the past 10-day average true range (assuming the value of k is defined as 0.75). The second condition assures us that the spike day's close will be in the lower quartile of its range. The third condition, which requires that the spike day's high exceed the highest high during the past 50 days (assuming $N = 50$), guarantees that

[1] The true range is equal to the true high minus the true low. The true high is the maximum of the current day's high and the previous day's close. The true low is the minimum of the current day's low and the previous day's close.

the day was preceded by an upswing. (Generally speaking, higher values of *N* will require larger prior advances.)

The three-part definition just provided for a spike high day is only intended to offer an example of how a mathematically precise definition can be constructed. Many other definitions are possible.

Reversal Days

The standard definition of a reversal high day is a day that makes a new high in an upmove and then reverses to close below the preceding day's close. Analogously, a reversal low day is a day that makes a new low in a decline and then reverses to close above the preceding day's close. The following discussion focuses on reversal high days, but mirror-image comments would apply to reversal low days.

Similar to spike highs, a reversal high day is generally interpreted as suggesting a buying climax and hence a relative high. However, the condition required for a reversal high day by the standard definition is a relatively weak one, meaning that reversal high days are fairly common. Hence, while many market highs are reversal days, the problem is that the majority of reversal high days are not market highs. Figure 9.5, which illustrates this point, is fairly typical. It shows the final leg of the crude oil market's historic rally to its all-time high in July 2008 and its equally impressive sell-off in the following months. Note that although a reversal high day occurred just a few days before the July top, it had been preceded by eight other reversal days since late February, only one of which (the seventh, in late

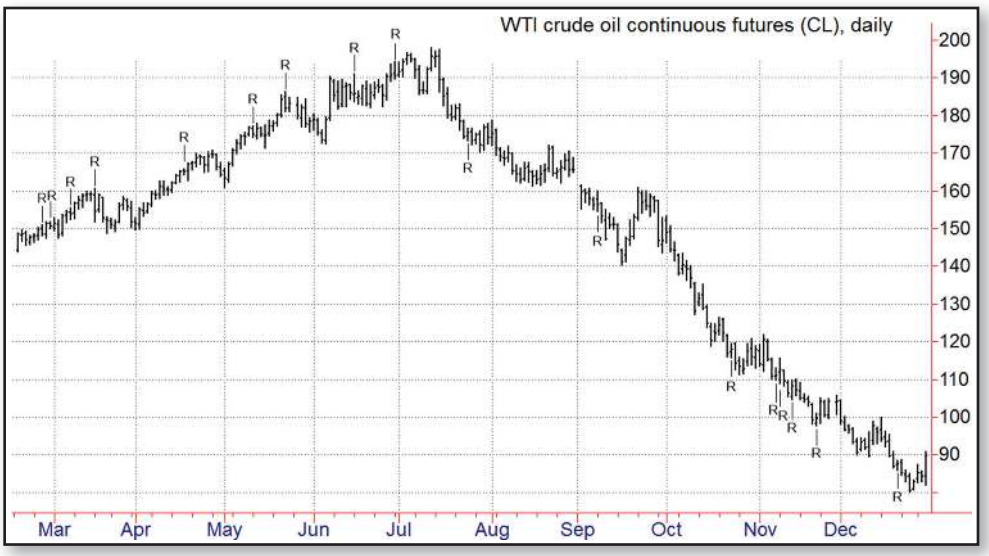

FIGURE 9.5 Reversal Days: WTI Crude Oil Continuous Futures

Note: R = reversal day.

May) was followed by a downswing of any significance. The reversal low days that occurred from late July to December paint a similar picture: Given crude oil futures fell another $20 before bottoming in February 2009 (not shown), even the final signal in December 2008 was extremely premature. Figure 9.6 depicts another example of the commonplaceness of premature reversal day signals. In this case, a reversal day actually occurred at the exact peak of a major rally dating back to the beginning of 2009. This incredible sell signal, however, was preceded by eight other reversal days, the majority of which occurred far earlier in the advance. Anyone who might have traded this market based on reversal signals would probably have thrown in the towel well before the valid signal finally materialized.

In the examples just provided, at least a reversal day signal occurred at or near the actual high. Frequently, however, an uptrend will witness a number of reversal highs that prove to be false signals and then fail to register a reversal high near the actual top. It can be said that reversal high days successfully call 100 out of every 10 highs. In other words, reversal days provide occasional excellent signals, but far more frequent false signals.

In my opinion, the standard definition of reversal days is so prone to generating false signals that it is worthless as a trading indicator. The problem with the standard definition is that merely requiring a close below the prior day's close is much too weak a condition. Instead, I suggest defining a reversal high day as a day that witnesses a new high in an upmove and then reverses to close below the preceding day's *low*. (If desired, the condition can be made even stronger by requiring that the close be below the low of the prior two days.) This more restrictive definition will greatly reduce the number of false reversal signals, but it will also knock out some valid signals. For example, this

FIGURE 9.6 Reversal Days: Copper Continuous Futures

Note: R = reversal day.

revised definition would have eliminated all but the fourth signal in Figure 9.5. In Figure 9.6 the more restrictive definition for a reversal day would have avoided all but the fourth signal and the ninth (final and valid) signal.

A reversal day may sound somewhat similar to a spike day, but the two patterns are not equivalent. A spike day will not necessarily be a reversal day, and a reversal day will not necessarily be a spike day. For example, a spike high day may not close below the previous day's low (or even below the previous day's close, as specified by the standard definition), even if the close is at the day's low. As an example of the reverse case, a reversal high day may not *significantly* exceed the prior day's high, as required by the spike high definition, or exceed the subsequent day's high at all, since the subsequent day's price action is not part of the reversal day definition. Also, it is possible that a reversal day's close may not be near the low, a standard characteristic of a spike day, even if it is below the previous day's close.

Occasionally, a day will be both a reversal day and a spike day. Such days are far more significant than days that are only reversal days. An alternative to using the more restrictive definition for a reversal day is using the standard definition, but requiring that the day also fulfill spike day conditions. (Although a day that met both the strong reversal day condition and the spike day conditions would be most meaningful of all, such days are fairly rare.) Figure 9.7 provides an example of a day that met both spike and reversal low day conditions. Figure 9.8 highlights three days: a spike and reversal high day that marked the high of the rally, a spike and reversal low day several days later that was followed by a few days of sideways price action, and a spike and reversal low day that was followed by a correction within the prevailing downtrend.

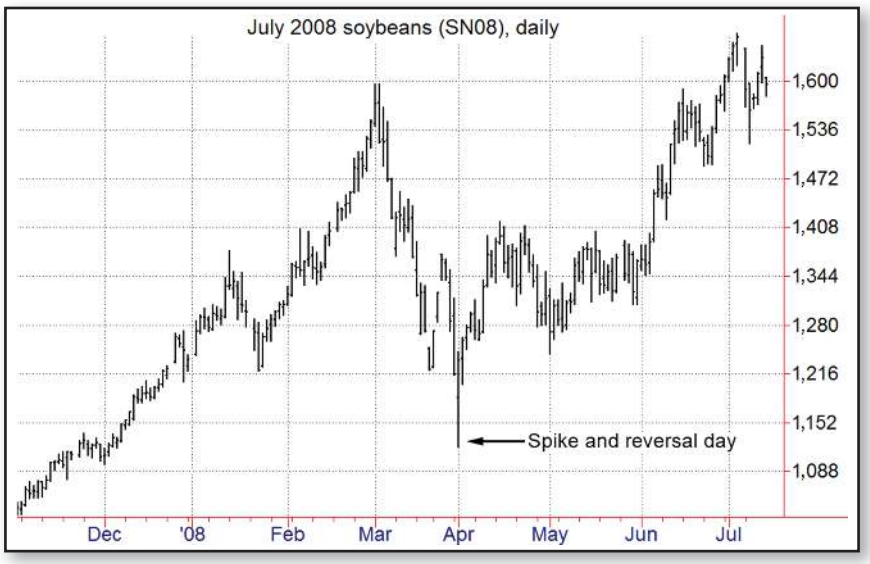

FIGURE 9.7 Spike and Reversal Day: July 2008 Soybeans

Chart created using TradeStation.

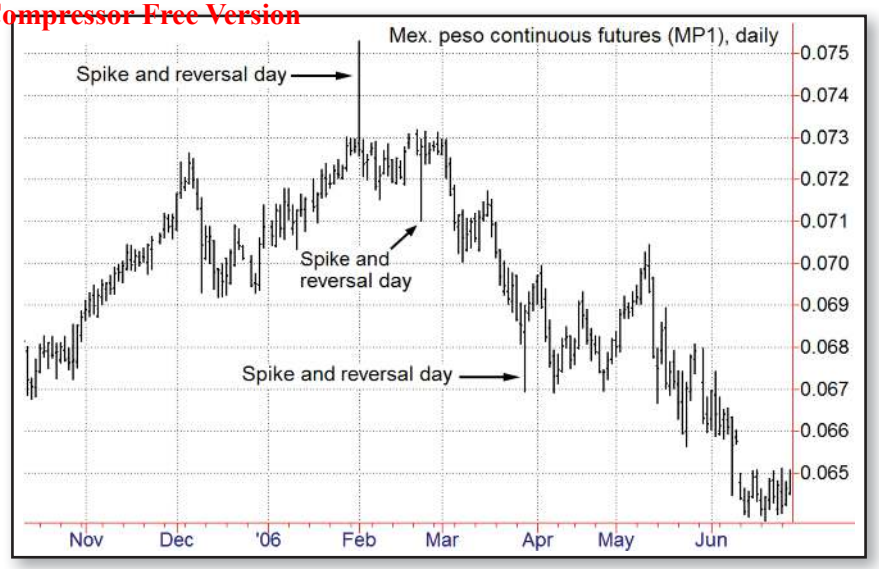

FIGURE 9.8 Spike and Reversal Days: Mexican Peso Continuous Futures
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Thrust Days

An upthrust day is a day with a close above the previous day's high, while a downthrust day is a day with a close below the previous day's low. The significance of thrust days is tied to the concept that the close is by far the most important price of the day. A single thrust day is not particularly meaningful, since thrust days are quite common. However, a series of upthrust days (not necessarily consecutive) would reflect pronounced strength. Similarly, a series of downthrust days would reflect pronounced market weakness.

During bull markets upthrust days significantly outnumber downthrust days—see, for example, the especially bullish mid-May to early July period in Figure 9.9. Conversely, in bear markets downthrust days significantly outnumber upthrust days—see the July–September period in Figure 9.10. And, as should come as no surprise, in sideways markets, upthrust and downthrust days tend to be in rough balance—for example, the March to mid-April period in Figure 9.9 and the October–November period in Figure 9.10.

Run Days

A run day is a strongly trending day. Essentially, a run day is a more powerful version of a thrust day (although it is possible for a run day to fail to meet the thrust day condition). Run days are defined as follows:

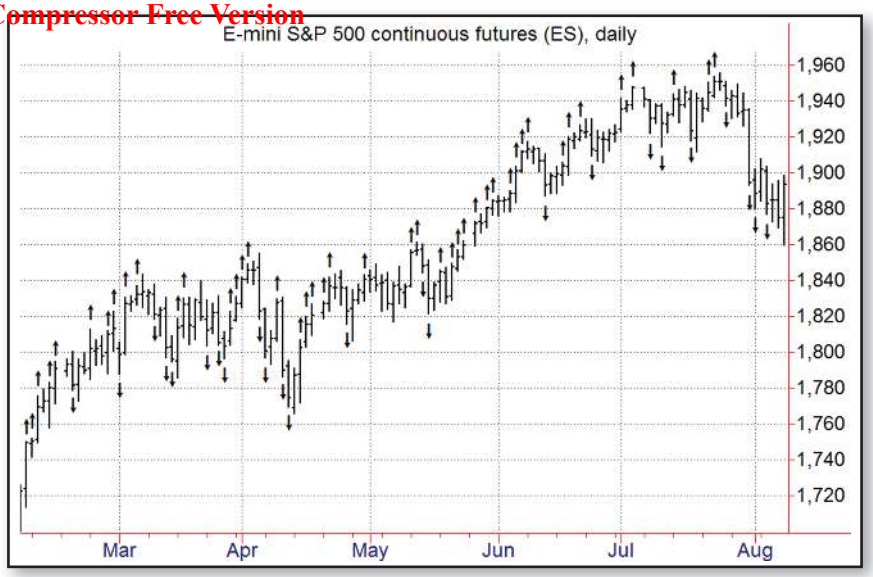

FIGURE 9.9 Upthrust and Downthrust Days in Bull Market: E-Mini S&P 500 Continuous Futures

Note: ↑ = upthrust day; ↓ = downthrust day.

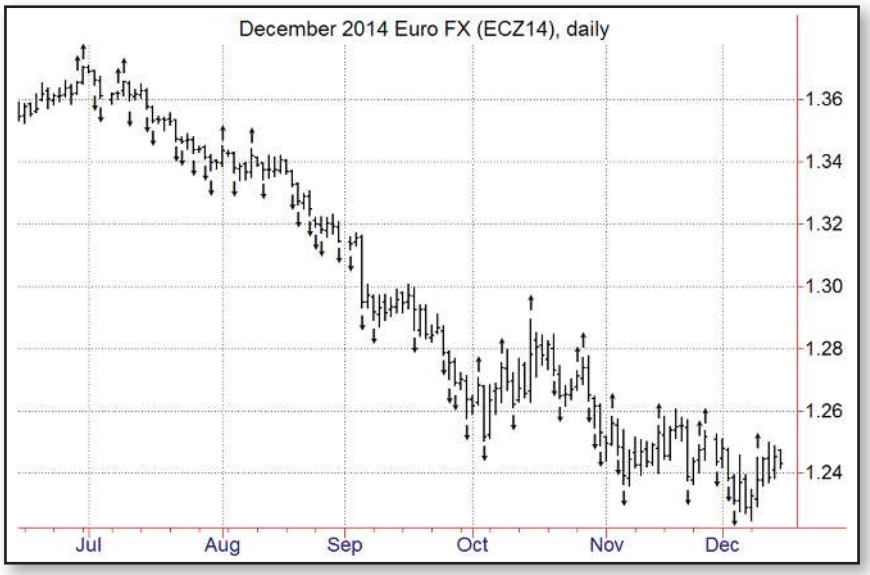

FIGURE 9.10 Upthrust and Downthrust Days in Bear Market: December 2014 Euro

Note: ↑ = upthrust day; ↓ = downthrust day.

Up run day. A day that meets the following two conditions:

1. The true high of the run day is greater than the maximum true high of the past *N* days (e.g., $N = 5$).
2. The true low on the run day is less than the minimum true low on the subsequent *N* days.

Down run day. A day that meets the following two conditions:

1. The true low of the run day is less than the minimum true low of the past *N* days.
2. The true high on the run day is greater than the maximum true high on the subsequent *N* days.

As can be seen by these definitions, run days cannot be defined until *N* days after their occurrence. Also, note that although most run days are also thrust days, it is possible for the run day conditions to be met on a day that is not a thrust day. For example, it is entirely possible for a day's low to be lower than the past five-day low, its high to be higher than the subsequent five-day high, and its close to be *higher* than the previous day's low.

Figures 9.11 and 9.12 provide examples of run days (based on a definition of $N = 5$). As these charts show, run days tend to occur when a market is in a trend run—hence the name. The materialization of up run days, particularly in clusters, can be viewed as evidence the market is in a bullish phase (see Figure 9.11). Similarly, a predominance of down run days provides evidence the market is in a bearish state (see Figure 9.12). In Chapter 17, we use the concept of run days to construct trading systems.

FIGURE 9.11 Run Days in Bull Market: Euro Stoxx 50 Continuous Futures
Note: ↑ up run day; ↓ down run day.
Chart created using TradeStation. ©TradeStation Technologies, Inc. All rights reserved.

FIGURE 9.12 Run Days in Bear Market: March 2015 Sugar
Note: ↑ = up run day; ↓ = down run day.
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Note: Although the basic premise of thrust days and run days would apply to longer time frames, it does not hold on intraday charts. The closing prices of intraday bars—especially on very short time frames, such as one or two minutes—do not carry the same weight as the closing prices of daily and weekly bars, which mark the end of significant trading periods.

Wide-Ranging Days

A wide-ranging day is a day whose volatility significantly exceeds the average volatility of recent trading days. Wide-ranging days are defined as follows:

> ***Wide-ranging day.*** A day the *volatility ratio* (VR) is greater than k (e.g., $k = 2.0$). The VR is equal to today's true range divided by the average true range of the past N-day period (e.g., $N = 15$).

Wide-ranging days can have special significance. For example, a wide-ranging day with a strong close that materializes after an extended decline often signals an upside trend reversal. Similarly, a wide-ranging day with a weak close that occurs after an extended advance can signal a downside reversal. In Figure 9.13, strong-closing wide-ranging days marked the reversals of two downswings in euro futures. (Note that although the back-to-back wide-ranging days in July did not close in the upper reaches of their respective ranges, both closed near or above the previous days' highs.) Figure 9.14 features two sets of consecutive weak-closing wide-ranging days that

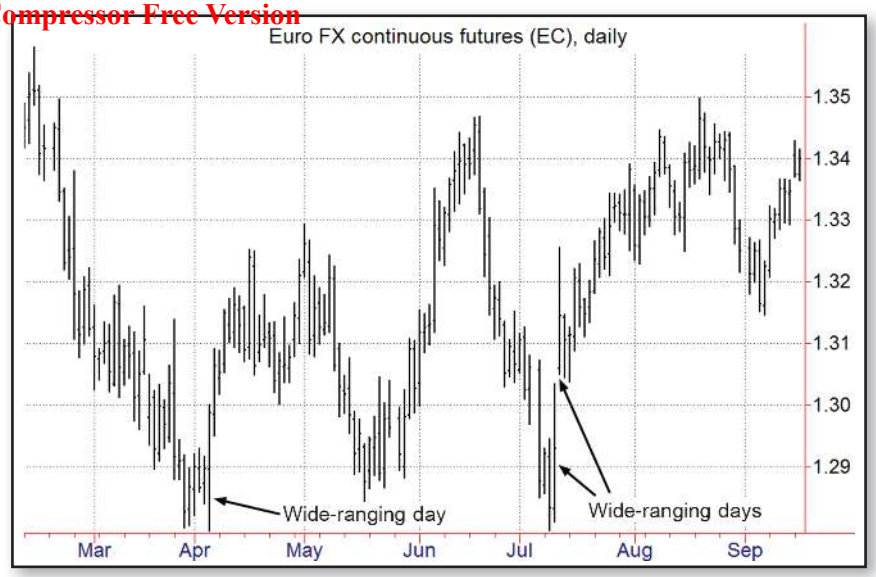

FIGURE 9.13 Wide-Ranging Up Days: Euro Continuous Futures
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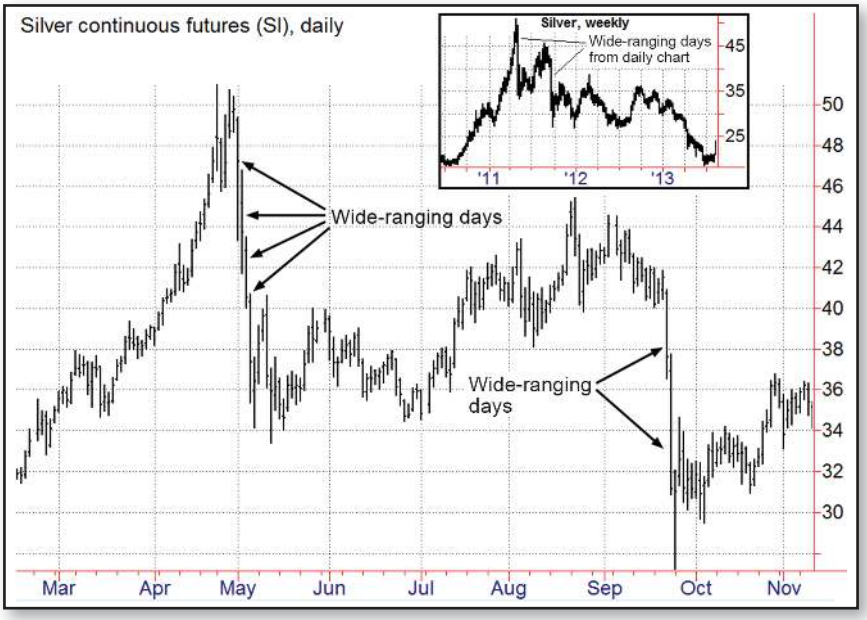

FIGURE 9.14 Wide-Ranging Down Days: Silver Continuous Futures
Chart created using TradeStation. ©TradeStation Technologies, Inc. All rights reserved.

ended rallies in silver in dramatic fashion. The weekly chart inset shows these events marked the effective end of the market's longer-term uptrend, ushering in an extended period of sideways-to-lower price action.

Figures 9.15 and 9.16 highlight days that satisfy the previously described example of wide-ranging day criteria: The true range of each wide-ranging day is greater than twice the average true range of the preceding 15 days. In Figure 9.15, the first of these days, a weak-closing wide-ranging day in May 2012 marked the definitive end of a WTI crude oil rally following the consolidation that had formed near the market highs. The second downside wide-ranging day had no special significance, as it formed after a large decline had already occurred. The third (strong-closing) wide-ranging day signaled a major market reversal to the upside.

In Figure 9.16 there are four wide-ranging days, the first three of which were the start of major trend reversals; the fourth failed to witness any follow-through price action. However, there is an important caveat: The "wide-ranging day" in early May, which signaled a reversal near the market top, did not, in fact, strictly meet the wide-ranging day criteria based on the parameters we used as an example (2.0 multiple and 15 days)—its true range was only 1.94 times the size of the 15-day average true range. Had we instead chosen a multiple of 1.9 instead of 2.0 to define wide-ranging days, this day would have represented a wide-ranging day without any qualification. There is nothing special about the parameter values of 2.0 and 15 days chosen in our example. Moderate shifts of these values up or down would still preserve the spirit of the wide-ranging day, as was indeed the case with the early May wide-ranging day, which had a larger-than-normal range with a very weak close following a major uptrend. There is a trade-off in choosing the parameter value for the multiple: The lower the multiple chosen to define wide-ranging days, the greater the probability of capturing valid wide-ranging day reversal signals, but the greater the chance of identifying wide-ranging days that are meaningless. In this context, it may make sense for a trader to use more than one set of parameter values to define wide-ranging days to be aware of days that just miss the selected definition. Of course, days defined by higher multiples would carry greater weight.

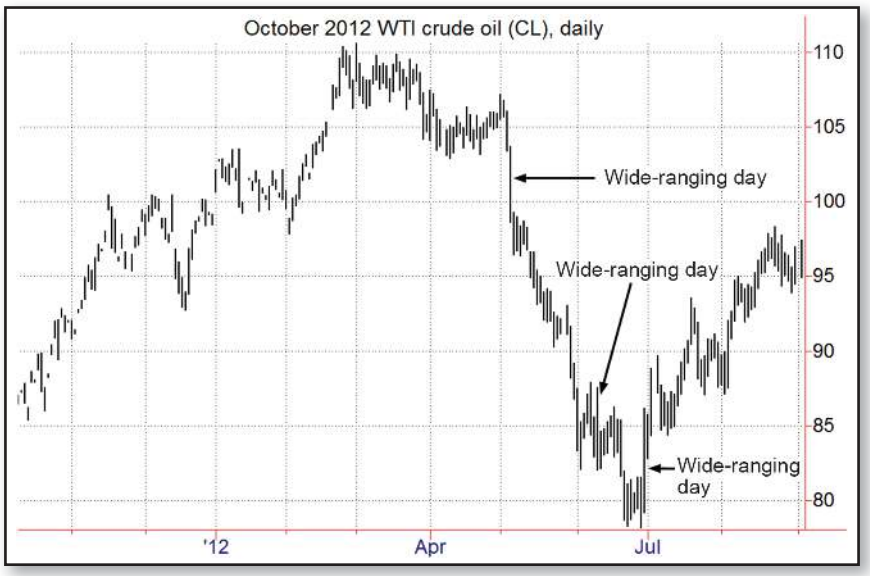

FIGURE 9.15 Wide-Ranging Up and Down Days: October 2012 WTI Crude Oil
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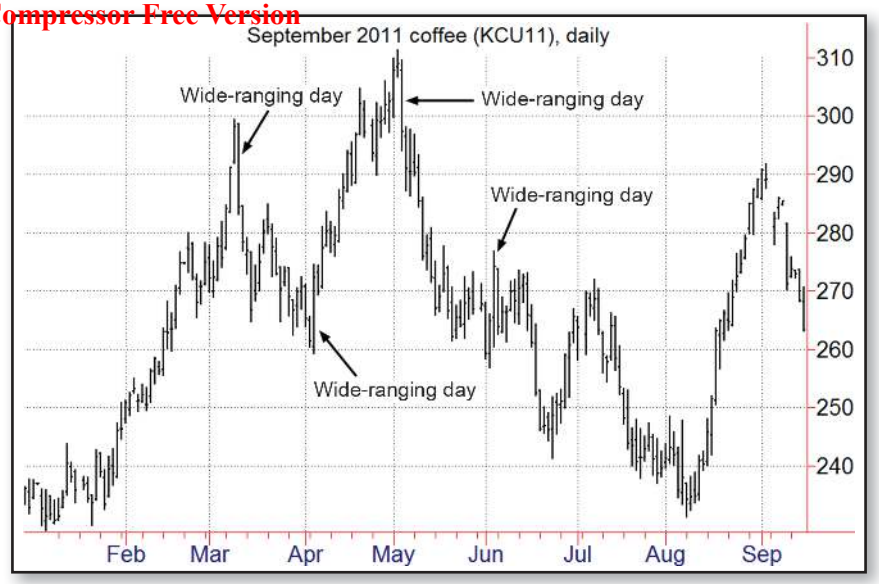

FIGURE 9.16 Wide-Ranging Up and Down Days: September 2011 Coffee
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Figures 9.17 and 9.18 show instances of wide-ranging bars on different timeframes. The wide-ranging weeks in Figure 9.17 marked the beginning of an uptrend in Japanese yen futures that extended into early 2012, as shown in the monthly chart inset. In Figure 9.18 the weak-closing wide-ranging hourly bar reversed a seven-day advance. In Chapter 17, we will use the concept of wide-ranging days as the primary element in constructing a sample trading system.

Continuation Patterns

Continuation patterns are various types of congestion phases that materialize within long-term trends. As the name implies, a continuation pattern is expected to be resolved by a price swing in the same direction that preceded its formation.

Triangles

There are three basic types of triangle patterns: symmetrical (see Figures 9.19 through 9.21), ascending (Figures 9.22 and 9.23), and descending (Figures 9.24 and 9.25). A symmetrical triangle is usually followed by a continuation of the trend that preceded it, as in Figures 9.19 through 9.21. Conventional chart wisdom suggests that nonsymmetrical triangles will yield to a trend in the direction of the slope of the hypotenuse, as is the case in Figures 9.22 through 9.25. However, the direction of the breakout from a triangle formation is more important than the type. For example, in Figure 9.26, although the two congestion patterns are descending triangles—and the second is preceded by a price decline—both break out to the upside and are followed by rallies.

FIGURE 9.17 Wide-Ranging Up Weeks: Japanese Yen Continuous Futures
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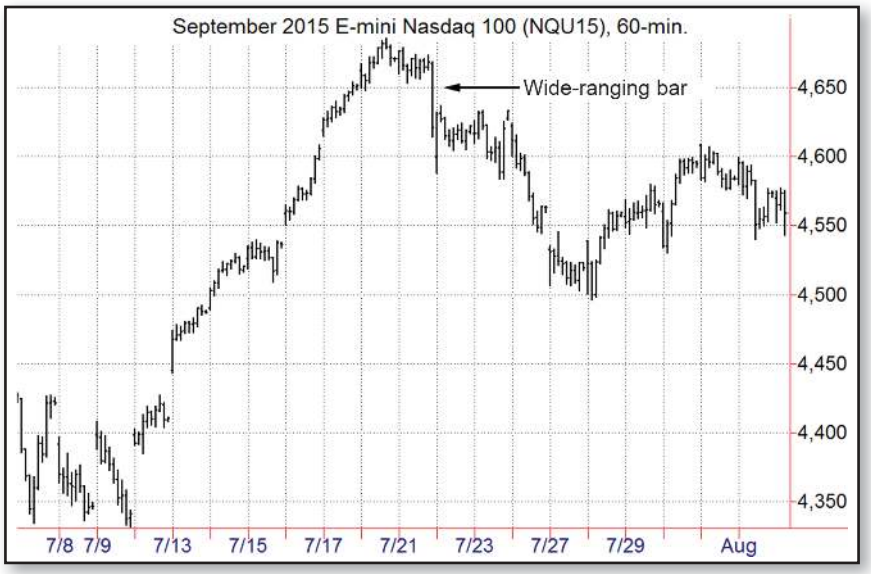

FIGURE 9.18 Wide-Ranging Down Bar: September 2015 E-Mini Nasdaq 100 Futures
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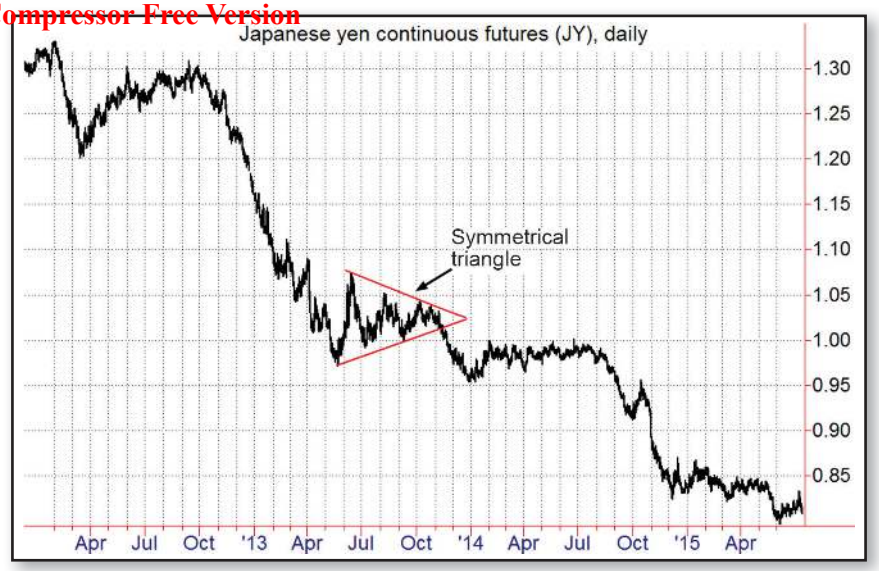

FIGURE 9.19 Symmetrical Triangle: Japanese Yen Continuous Futures
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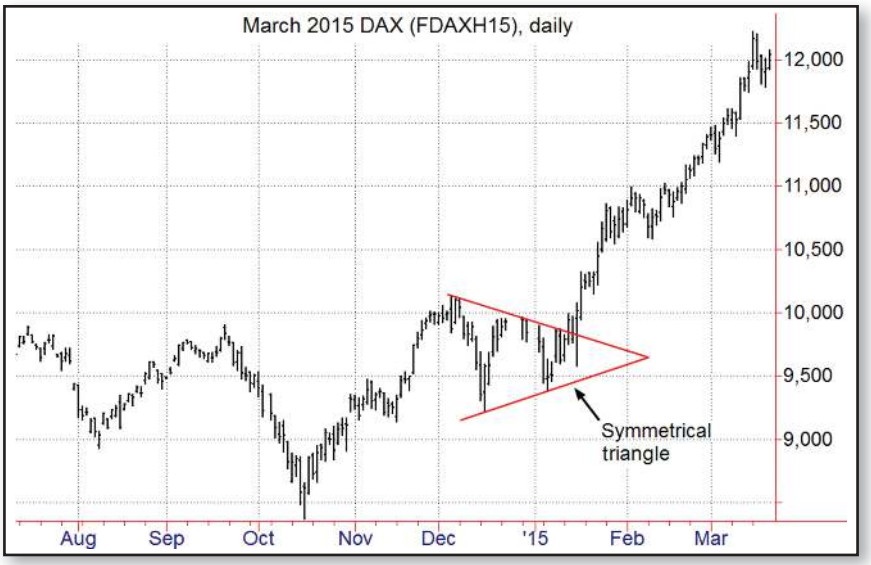

FIGURE 9.20 Symmetrical Triangle: March 2015 DAX
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FIGURE 9.21 Symmetrical Triangle: Copper Continuous Futures
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FIGURE 9.22 Ascending Triangle: Euro Stoxx 50 Continuous Futures
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FIGURE 9.23 Ascending Triangle: Euro Continuous Futures
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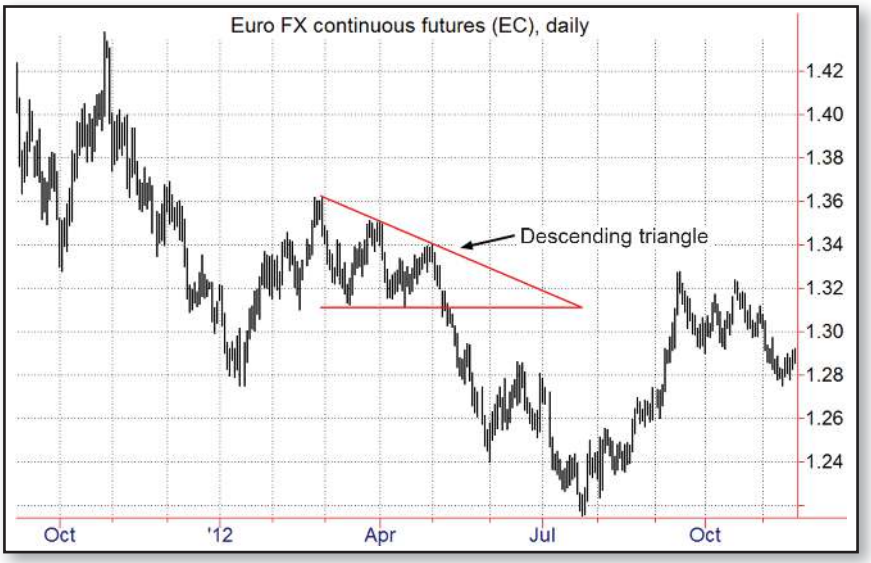

FIGURE 9.24 Descending Triangle: Euro Continuous Futures
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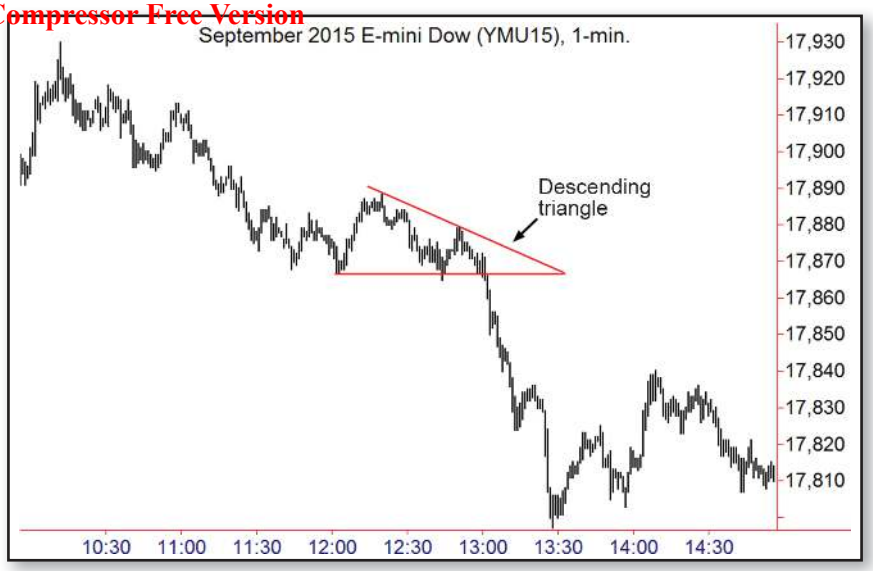

FIGURE 9.25 Descending Triangle: September 2015 E-Mini Dow
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FIGURE 9.26 Descending Triangles with Upside Breakouts: 10-Year T-Note Continuous Futures
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Flags and Pennants

Flags and pennants are narrow-band, short-duration (e.g., one to three weeks) congestion phases within trends. The formation is called a flag when it is enclosed by parallel lines and a pennant when the lines converge. Figures 9.27 through 9.31 illustrate both types of patterns. Figure 9.29 shows flags forming on a weekly chart, while Figure 9.30 shows flags and pennants on an intraday chart.

Pennants may appear to be similar to triangles, but they differ in terms of time: the triangle has a longer duration. Similarly, the difference between a horizontal flag and a trading range is a matter of duration. Among the many flags and pennants in Figure 9.27, for example, there are two congestion patterns (in August–September 2011 and January–February 2012) that could be classified as either long flags or pennants or short trading ranges or triangles. Regardless of which name these patterns are given, their implication is the same: flags and pennants typically represent pauses in a major trend. In other words, these patterns are usually followed by price swings in the same direction as the price swings that preceded their formation.

A breakout from a flag or pennant can be viewed as a confirmation the trend is continuing and a trading signal in the direction of the trend. Since breakouts are usually in the direction of the main trend, however, I prefer to enter positions during the formation of the flag or pennant, anticipating the probable direction of the breakout. This approach allows for more advantageous trade entries, without a significant deterioration in the percentage of correct trades, since reversals following breakouts from flags and pennants are about as common as breakouts in the counter-to-anticipated direction. Following a breakout from a flag or pennant, the opposite extreme of the formation can be used as an approximate stop-loss point.

FIGURE 9.27 Flags and Pennants: Natural Gas Continuous Futures
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FIGURE 9.28 Flags and Pennants: March 2015 Wheat
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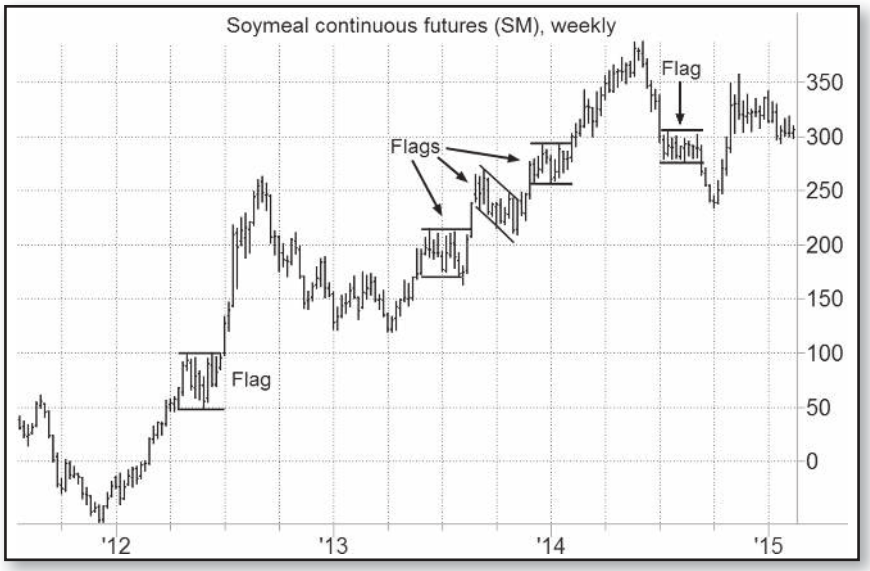

FIGURE 9.29 Flags and Pennants: Soymeal Continuous Futures
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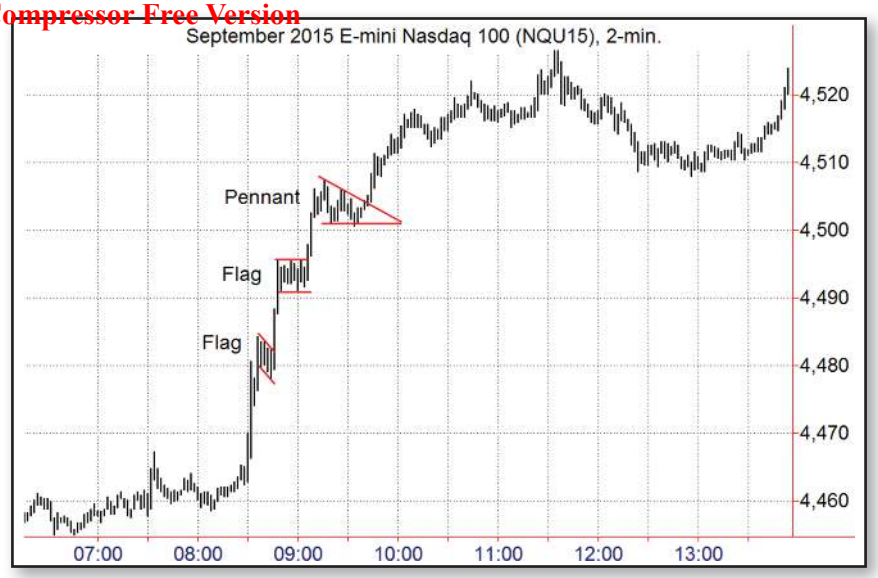

FIGURE 9.30 Flags and Pennants: September E-Mini Nasdaq 100
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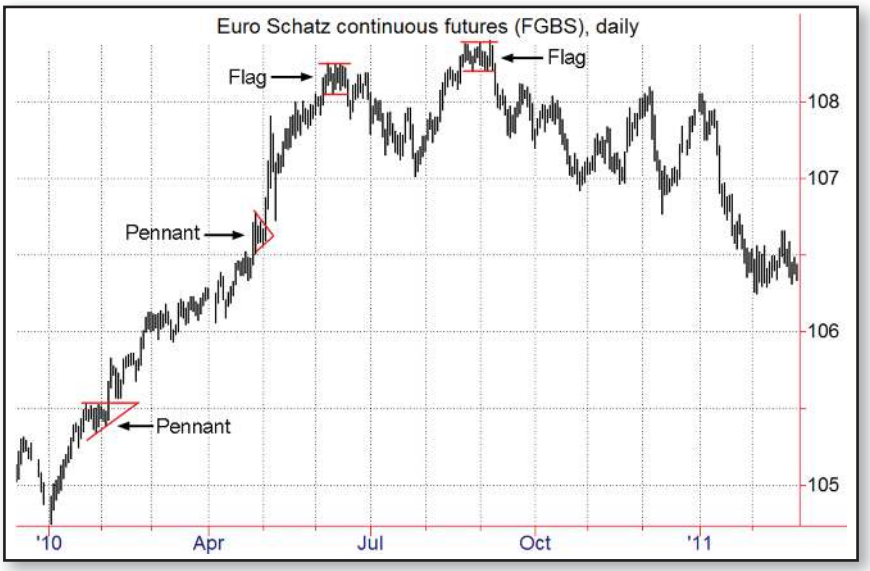

FIGURE 9.31 Flags and Pennants: Euro Schatz Continuous Futures
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A significant penetration of a flag or pennant in the opposite-to-anticipated direction—that is, counter to the main trend—can be viewed as a signal of a potential trend reversal. For example, in Figure 9.31 note that after a strong rally that included pennant breakouts in the direction of the main trend, downside breakouts from the two flags that formed in June and August–September marked short-term and longer-term highs.

Flags and pennants typically point in the opposite direction of the main trend. This characteristic is exhibited by the majority of flags and pennants illustrated in Figures 9.27 through 9.31. The direction in which a flag or pennant points, however, is not an important consideration. In my experience, I have not found any significant difference in reliability between flags and pennants that point in the same direction as the main trend as opposed to the more usual opposite slope.

Flags or pennants that form near the top or just above a trading range can be particularly potent bullish signals. In the case where a flag or pennant forms near the top of a trading range, it indicates that the market is not backing off despite having reached a major resistance area—the top of the range. Such price action has bullish implications and suggests that the market is gathering strength for an eventual upside breakout. In the case where the flag or pennant forms above the trading range, it indicates that prices are holding above a breakout point, thereby lending strong confirmation to the breakout. Generally speaking, the more extended the trading range, the greater the potential significance of a flag or pennant that forms near or above its top. Figures 9.32 through 9.34 provide examples of flags or pennants that materialized near the top or above trading ranges and proved to be precursors of price advances.

FIGURE 9.32 Flag Near Top of Trading Range as Bullish Signal: U.S. Dollar Index Continuous Futures

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FIGURE 9.33 Flag Above Top of Trading Range as Bullish Signal: Live Cattle Continuous Futures

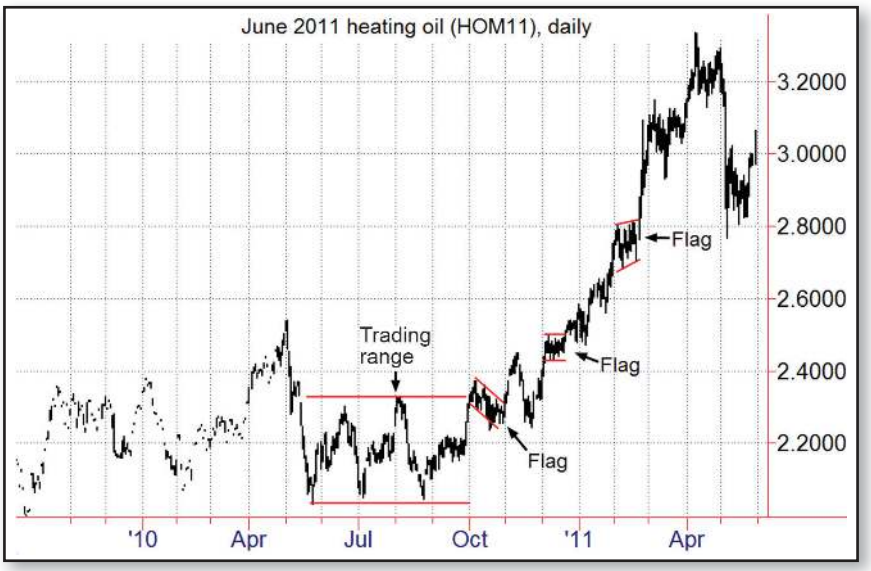

FIGURE 9.34 Flag Near Top of Trading Range as Bullish Signal: June 2011 Heating Oil

For similar reasons, flags or pennants that form near the bottom or just below trading ranges are particularly bearish patterns. Figures 9.35 through 9.37 provide examples of flags or pennants that materialized near the bottom or below trading ranges and proved to be harbingers of price declines.

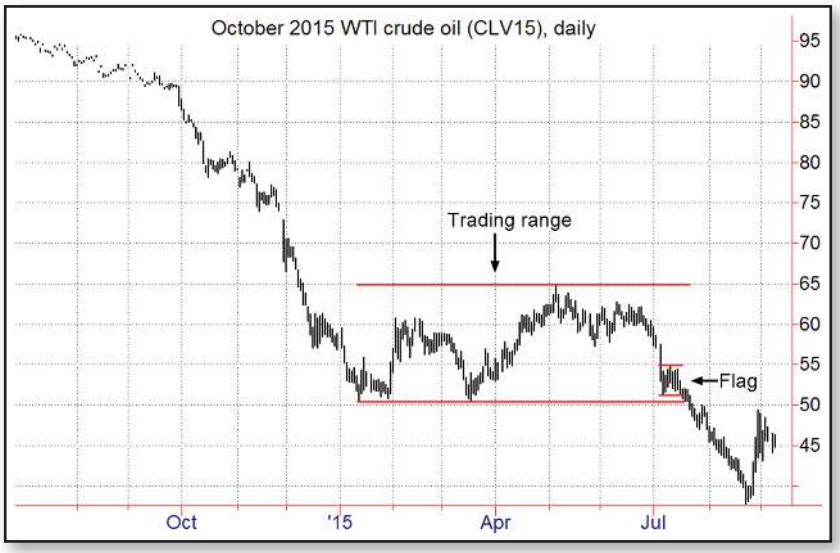

FIGURE 9.35 Flag Near Bottom of Trading Range as Bearish Signal: October 2015 WTI Crude Oil

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FIGURE 9.36 Flag Near Bottom of Trading Range as Bearish Signal: Japanese Yen Continuous Futures

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FIGURE 9.37 Flag Near Bottom of Trading Range as Bearish Signal: Copper Continuous Futures

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Top and Bottom Formations

V Tops and Bottoms

The "V" formation is a turn-on-a-dime type of top (see Figure 9.38) or bottom (see Figure 9.39). One problem with a V top or bottom is that it is frequently difficult to distinguish from a sharp correction unless accompanied by other technical indicators (e.g., prominent spike, significant reversal day, wide gap, wide-ranging day). The V top in Figure 9.38 did contain such a clue—a spike day—whereas the V bottom in Figure 9.39 was unaccompanied by any other evidence of a trend reversal.

Double Tops and Bottoms

Double tops and bottoms are exactly what their names imply. Of course, the two tops (or bottoms) that make up the pattern need not be exactly the same, only in the same general price vicinity. Double tops and bottoms that materialize after large price moves should be viewed as strong indicators of a major trend reversal. Figure 9.40 illustrates a major double top in weekly Euro Bobl futures, while Figure 9.41 shows a double top on the daily chart for Canadian dollar futures. (Continuous futures are used for most of the charts illustrating double tops and bottoms because the liquid trading period for most individual contracts is usually not long enough to display the time span encompassing these

FIGURE 9.38 "V" Top: Wheat Continuous Futures
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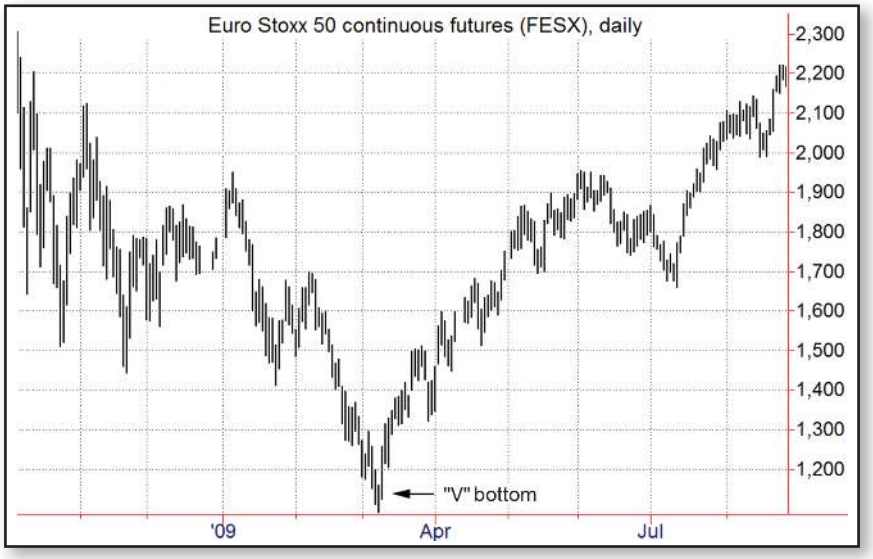

FIGURE 9.39 "V" Bottom: Euro Stoxx 50 Continuous Futures
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patterns and the preceding and succeeding trends.) Figure 9.42 shows a major double bottom in the E-mini Nasdaq 100 futures. Figure 9.43 depicts a double bottom on a two-minute chart: In this case the pattern preceded an explosive upmove (nearly 1 percent in less than an hour) in the June 2015 Mini Russell 2000 futures.

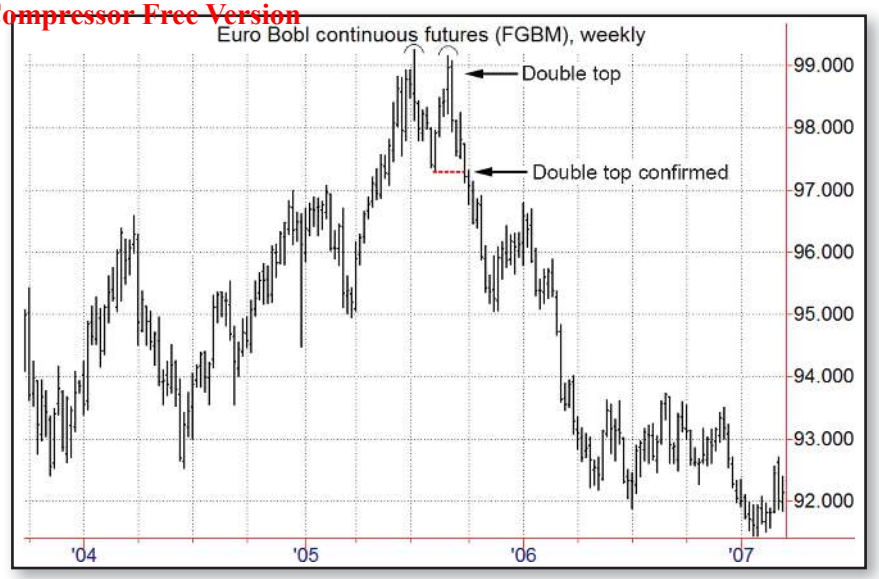

FIGURE 9.40 Double Top: Euro Bobl Weekly Continuous Futures
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FIGURE 9.41 Double Top: Canadian Dollar Continuous Futures
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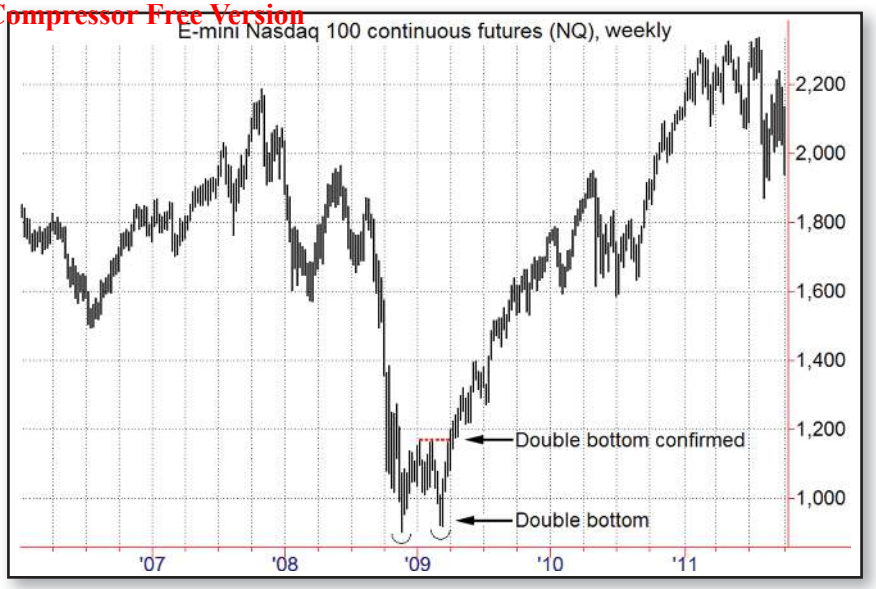

FIGURE 9.42 Double Bottom: E-Mini Nasdaq 100 Continuous Futures
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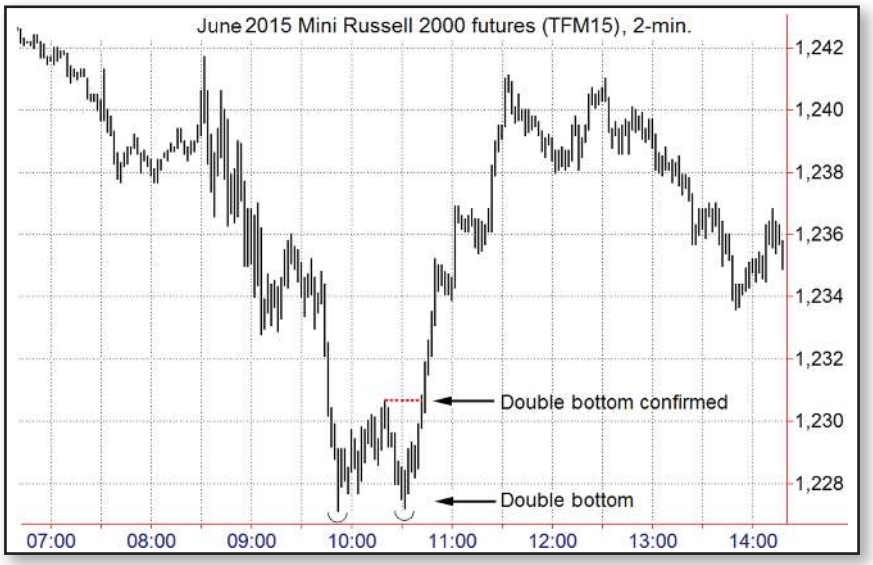

FIGURE 9.43 Double Bottom: June 2015 Mini Russell 2000 Futures
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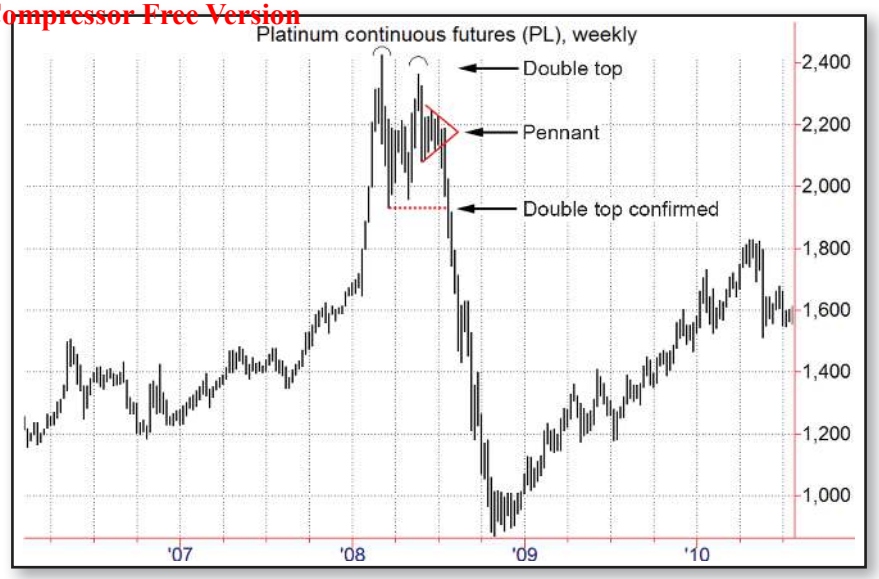

FIGURE 9.44 Double Top: Platinum Continuous Futures
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As illustrated in Figures 9.40 through 9.43, a double top (bottom) is considered completed when prices move below (above) the reaction low (high) between the two tops (bottoms) of the formation. When the intervening reaction is relatively deep, as for example in Figure 9.44, it is impractical to wait for such an "official" confirmation, and a trader may have to anticipate that the pattern has formed based on other evidence. For example, in Figure 9.44, the confirmation of the double top did not occur until the market had dropped nearly 20 percent from the May 2008 high (the second peak of the double top). However, the pennant pattern that formed after the initial downswing from that high implied the next price swing would also be down. Based on this clue, a trader could have reasonably concluded a double top was in place, even though the pattern had not yet been completed according to the standard definition. Top and bottom formations with more repetitions (e.g., triple top or bottom) occur rather infrequently but would be interpreted in the same fashion. Figure 9.45 shows a triple top in weekly DAX futures.

Head and Shoulders

The head-and-shoulders pattern is one of the best-known chart formations. The head-and-shoulders top is a three-part formation in which the middle high is above the high points on either side (see Figure 9.46). Similarly, the head-and-shoulders bottom is a three-part formation in which the middle low is below the low point on either side (see Figures 9.47 and 9.48). Perhaps one of the most common mistakes made by novice chartists is the premature anticipation of the head-and-shoulders formation. The head-and-shoulders pattern is not considered complete until the neckline—a line

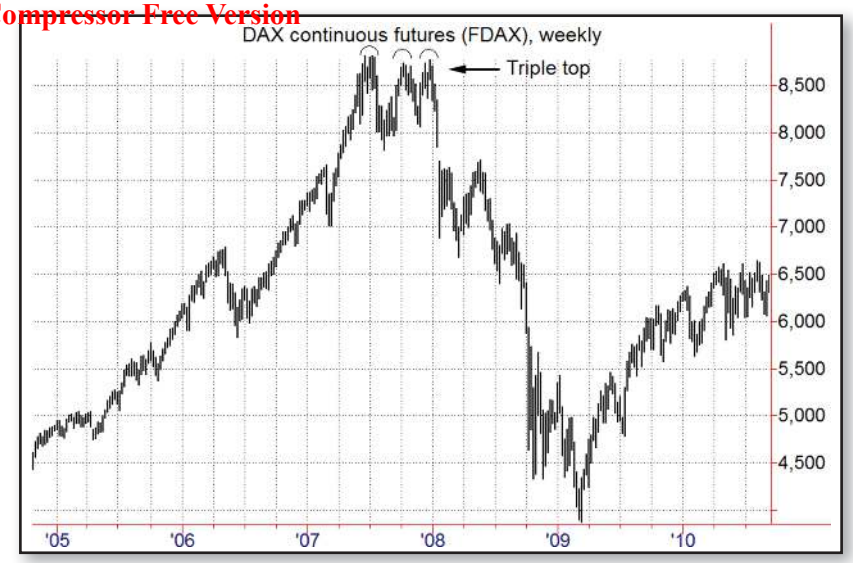

FIGURE 9.45 Triple Top: DAX Continuous Futures
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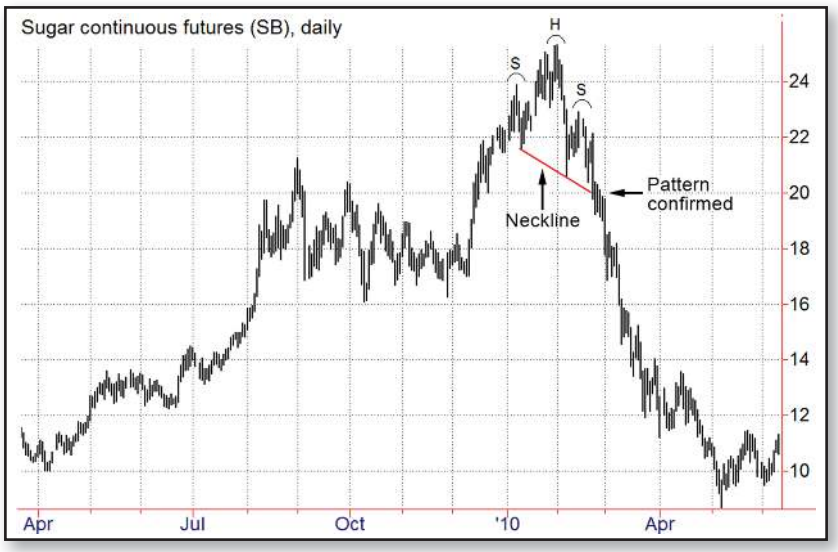

FIGURE 9.46 Head-and-Shoulders Top: Sugar Continuous Futures
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connecting the reaction lows or highs separating the shoulders from the head—is penetrated, as illustrated in these charts. Furthermore, a valid head-and-shoulders pattern is formed only after a major price move has occurred. Patterns that bear the shape of a head-and-shoulders formation but lack this requirement can be misleading.

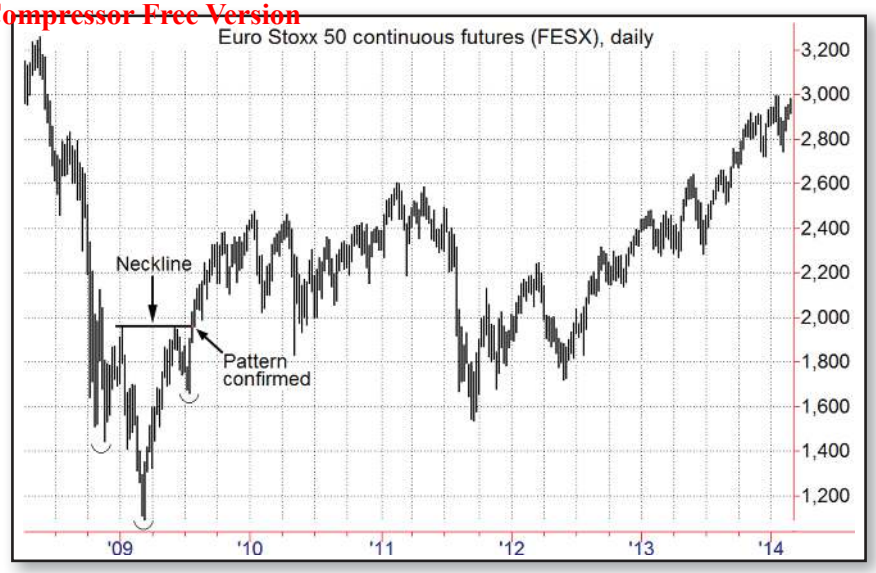

FIGURE 9.47 Head-and-Shoulders Bottom: Euro Stoxx 50 Continuous Futures
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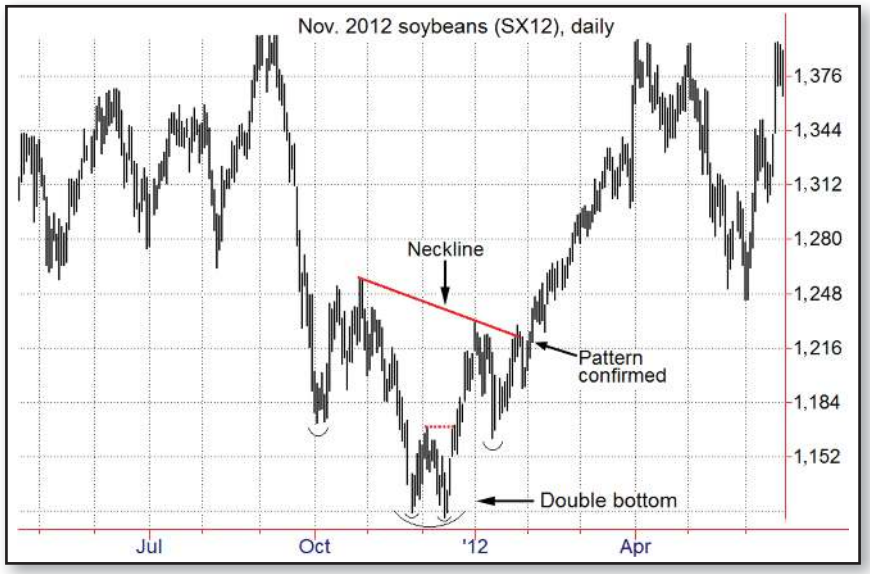

FIGURE 9.48 Head-and-Shoulders Bottom: November 2012 Soybeans
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Figure 9.48 is noteworthy in that the "head" of the head-and-shoulders bottom consists of twin lows that constitute a double bottom, a pattern that would have been confirmed when price traded above the early December high (short dashed line), as discussed in the previous section. The penetration of the head-and-shoulders neckline occurred approximately six weeks later.

Sometimes the distinction between a head-and-shoulders pattern and a triple top (or bottom) pattern is not clear-cut. For example, Figure 9.49 shows a major long-term top in the U.S. Dollar Index futures in which the ultimate high has slightly lower highs on either side. This formation could reasonably be categorized as either pattern—regardless, its implication as a top pattern is the same.

Rounding Tops and Bottoms

Rounding tops and bottoms (also called *saucers*) occur somewhat infrequently, but are among the most reliable top and bottom formations. Figure 9.50 shows a Nikkei 225 continuous futures chart with a rounding top that formed at the apex of a multiyear high and was followed by a sharp sell-off. Ideally, the pattern would not contain any "jags," as this chart does (e.g., the sharply lower low in late June); however, I consider the main criterion to be whether the outer perimeter conforms to a rounding shape. Figure 9.51 depicts a rounding top pattern that formed a major peak in soybean continuous futures in 2014. Although the late-April to early-May price dip prevented a perfect rounding top pattern, the outer boundary of the March–May price action conformed well to a rounding pattern.

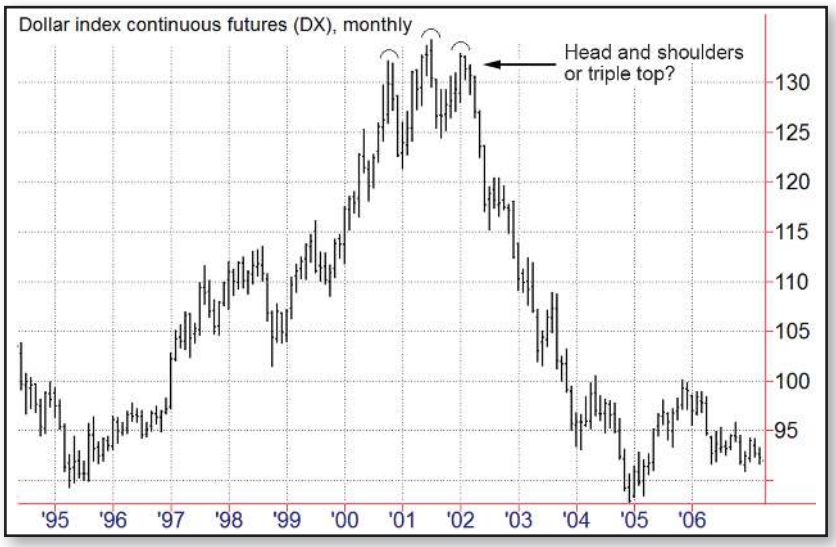

FIGURE 9.49 Head-and-Shoulders or Triple Top? Dollar Index Continuous Futures
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FIGURE 9.50 Rounding Top: Nikkei 225 Continuous Futures
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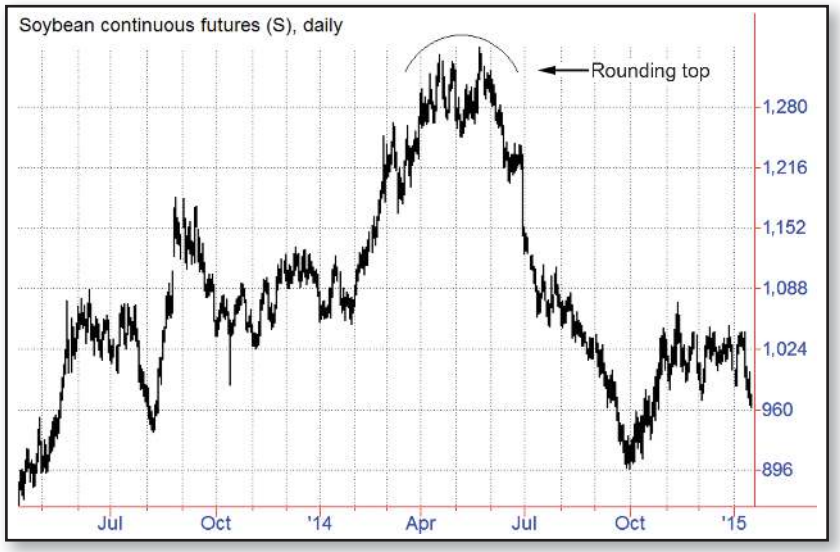

FIGURE 9.51 Rounding Top: Soybean Continuous Futures
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Figure 9.52 provides a textbook instance of a rounding bottom pattern in lean hog continuous futures. Notice that in this example the price action during the bottoming process was relatively smooth and mostly free of the occasional jagged moves that were present in the previous examples. This rounding bottom was followed by an explosive upmove that began in mid-February 2014. Figure 9.53 shows a briefer rounding bottom in the Swiss franc that marked the transition from a downturn to an uptrend.

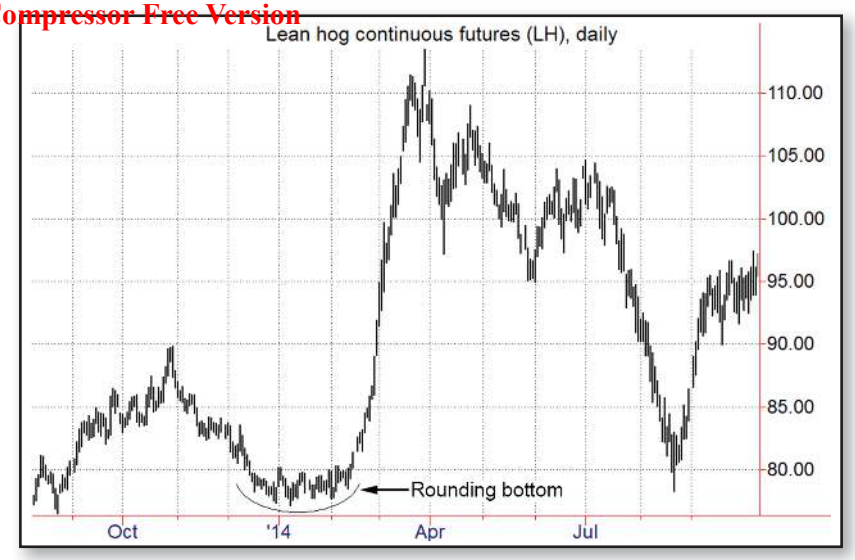

FIGURE 9.52 Rounding Bottom: Lean Hog Continuous Futures
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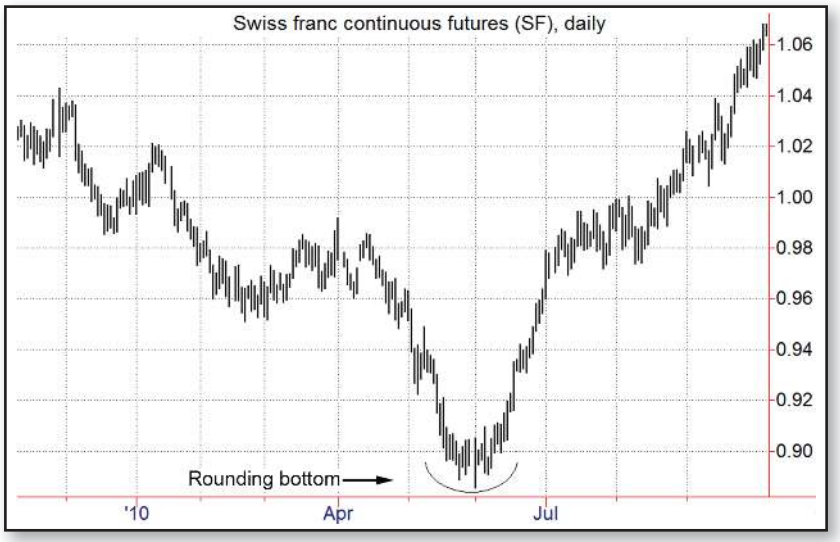

FIGURE 9.53 Rounding Bottom: Swiss Franc Continuous Futures
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Triangles

Triangles, which are among the most common continuation patterns, can be top and bottom formations as well. Figures 9.54 through 9.57 illustrate triangle tops and bottoms. As in the case of the continuation pattern, the key consideration is the direction of the breakout from the triangle.

FIGURE 9.54 Triangle Top: Platinum Continuous Futures
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FIGURE 9.55 Triangle Top: Orange Juice Continuous Futures
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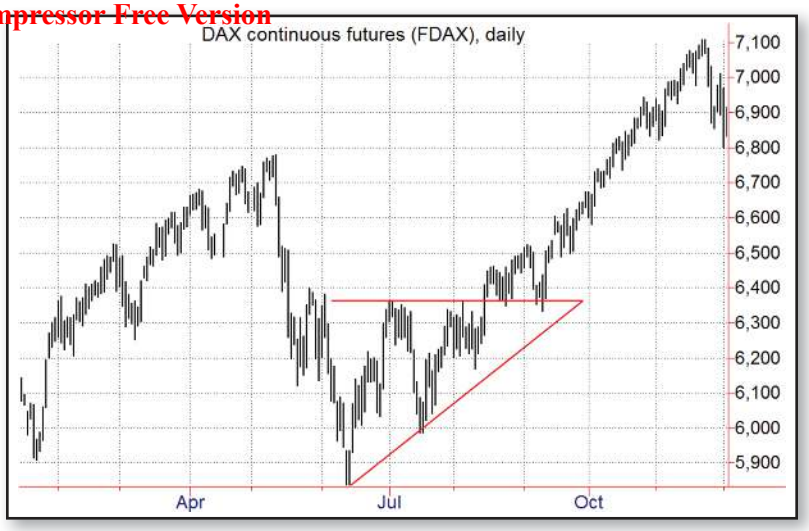

FIGURE 9.56 Triangle Bottom: DAX Continuous Futures
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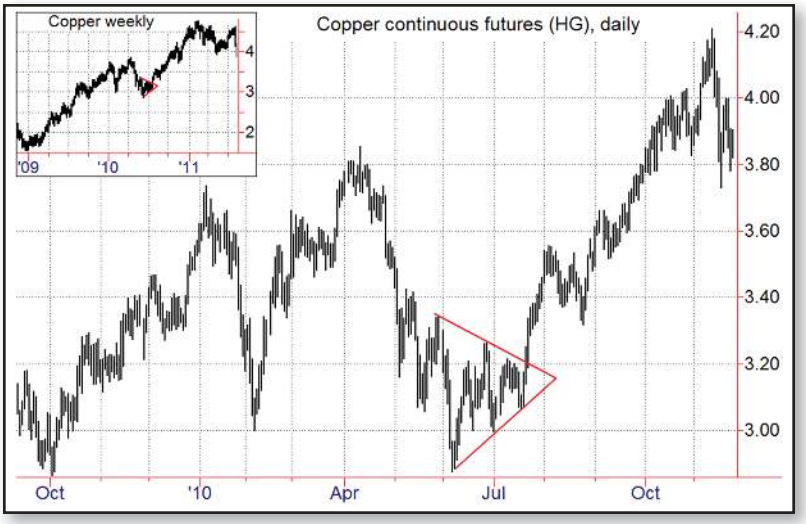

FIGURE 9.57 Triangle Bottom: Copper Continuous Futures
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The tops in Figures 9.54 and 9.55 took the form of large descending triangles. The downside breakouts out of both patterns were followed by energetic sell-offs. (Notice also in Figure 9.55 the two flags that formed during the March–May downtrend that followed the penetration of the triangle's lower boundary. Each would have given traders who missed the initial breakout a chance to capture at least some of the downmove.) Figure 9.56 shows a triangle bottom in DAX continuous futures that was followed by a major uptrend. The symmetrical triangle bottom that formed on the daily copper chart in 2010 (Figure 9.57) is shown in the weekly inset to be part of a correction in the market's longer-term uptrend.

Major tops and bottoms may often be consistent with more than one type of pattern. For example, a case could have been made for defining the preceding triangular tops and bottoms as head-and-shoulders formations with, generally speaking, similar pattern confirmation points.

Wedge

In a rising wedge, prices edge steadily higher in a converging pattern (see Figure 9.58). In instances when the successive highs form in a relative tight band, as they do here, the inability of prices to accelerate on the upside, despite continued probes into new high ground, suggests the existence of strong scale-up selling pressure. A sell signal occurs when prices break below the lower wedge line. Figure 9.59 provides an example of a declining wedge. Wedge patterns can sometimes take an extremely long time to complete. The wedge in Figure 9.59 formed over the course of a year, and even longer-term wedges have been known to occur.

FIGURE 9.58 Rising Wedge: Euro Continuous Futures
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FIGURE 9.59 Declining Wedge: Sugar Continuous Futures
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Spikes and Reversal Days

These one-day patterns, which often mark relative highs and relative lows, and sometimes major peaks and bottoms, were discussed in an earlier section of this chapter.

CHAPTER 10

Is Chart Analysis Still Valid?

I always laugh at people who say, "I've never met a rich technician." I love that! It is such an arrogant, nonsensical response. I used fundamentals for nine years and got rich as a technician.

—Marty Schwartz

Most traders who have never used chart analysis (and even some who have) are quite skeptical about this approach. Some of the commonly raised objections include: "How can such a simple analytical approach work?" "Since key chart points are hardly a secret, won't large professional traders sometimes push the market enough to trigger chart stops artificially?" "Even if chart analysis worked before it was detailed in scores of websites, books, and magazines, isn't the method too well publicized to still be effective?"

Although the points raised by these questions are basically valid, a number of factors explain why chart analysis remains an effective trading approach:

1. Trading success does not depend on being right more than half the time—or, for that matter, even half the time—as long as losses are rigidly controlled and profitable trades are permitted to run their course. For example, consider a trader who in March 1991 assumed that September 1992 eurodollars had entered another trading range (see Figure 10.1) and decided to trade in the direction of any subsequent closing breakout. Figure 10.2 shows the initial trade signals and liquidation points that would have been realized as a result of this strategy. The implicit assumption is that stops are placed at the midpoint of the trading range. (The relevant considerations in choosing a stop point are discussed in detail in Chapter 13.) As can be seen in Figure 10.2, the first two trades would have resulted in immediate losses. Figure 10.3, however, shows the third signal was the real thing—a long position that would have occurred in time to benefit from a major price advance that far exceeded the combined price swings on the prior two adverse trades. (Note the relevant trading range is redefined— that is, widened—after each of the false breakouts.)

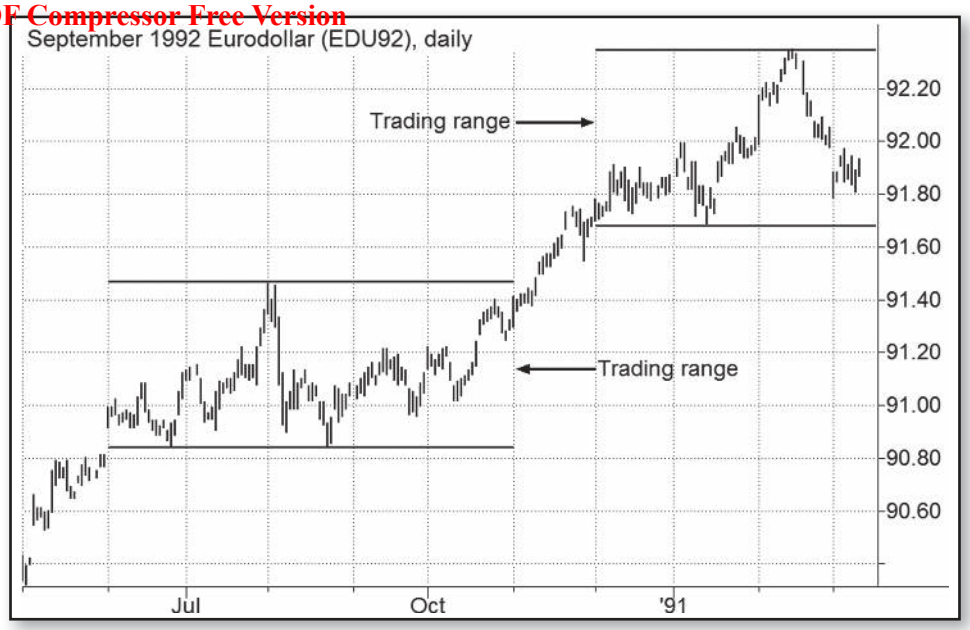

FIGURE 10.1 Trading Range Market: September 1992 Eurodollar
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It is noteworthy that although two out of three trades were losers, on balance the trader would have realized a large net profit. The key point is that a disciplined adherence to money management principles is an essential ingredient in the successful application of chart analysis.

2. Chart analysis can be made much more effective by requiring confirmation conditions for trade entry, rather than blindly following all technical signals. There is a natural trade-off in the choice of confirmation rules: the less restrictive the conditions, the greater the number of false signals; the more restrictive the conditions, the greater the potential surrendered profit due to late entry. Some of the key methods that can be used to construct confirmation conditions might include the following: time delays, minimum percent penetration, and specific chart patterns (e.g., the trade must be confirmed by two subsequent thrust days in the direction of the signal).

   There is no such thing as a best set of confirmation conditions. In any list of tested alternatives, the indicated best strategy will vary from market to market as well as over time. Thus, the ultimate choice of confirmation rules will depend on the trader's analysis and experience. In fact, the specific choice of confirmation conditions is one of the pivotal ways in which chart analysis is individualized.

   As an illustration of how confirmation conditions might be used, consider the following set of rules:

   a. Wait three days after signal is received.
   b. For a buy signal, enter trade if the close is above the high since signal was received, or on the first subsequent day fulfilling this condition. An analogous condition would apply to sell signals.

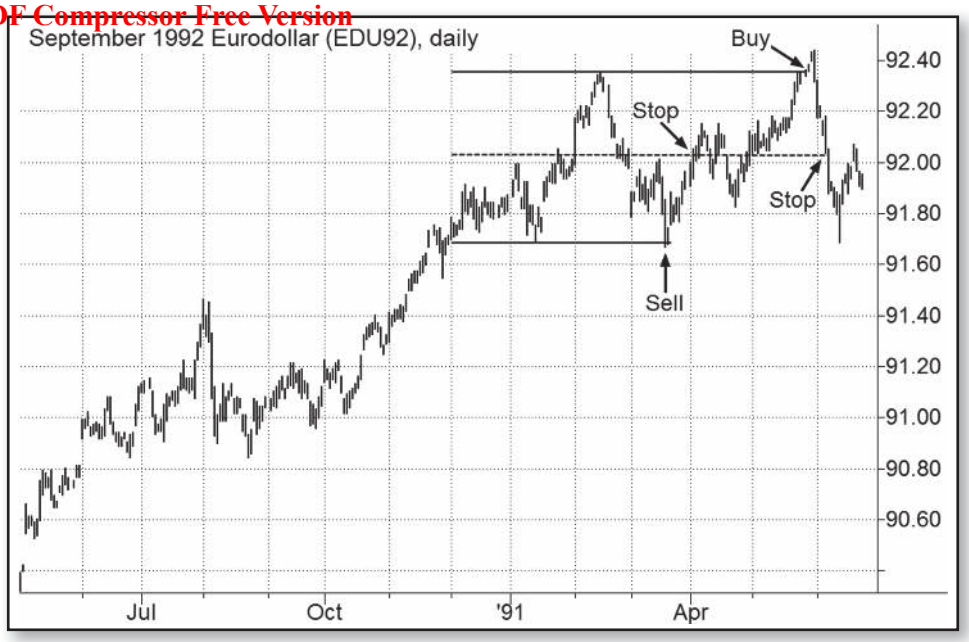

FIGURE 10.2 False Breakout Signals: September 1992 Eurodollar
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As can be seen in Figure 10.2, these rules would have filtered out the losing March and May signals while only modestly delaying the entry point for the subsequent highly profitable buy signal. Of course, one could also construct examples in which the use of confirmation conditions is detrimental to the trading results. However, the key point is that the use of confirmation rules is one of the primary means of transforming classical chart concepts into a more powerful trading approach.

3. Chart analysis is more than just the recognition and interpretation of individual patterns. One of the earmarks of the successful chart trader is an ability to synthesize the various components of the overall picture. For example, the trader who recognizes just a trading range in September 1992 Eurodollars (see Figure 10.1) would treat upside and downside breakouts equivalently. However, the more experienced chartist will also consider the broader picture. For example, by examining the long-term weekly continuous futures chart in early 1991 (see Figure 10.4), the analyst could have noted that the market had just formed a flag pattern near the top of a five-year trading range. This extremely bullish long-term chart picture would have strongly cautioned against accepting any apparent sell signals on the daily chart. Such a more comprehensive chart analysis could therefore have helped the analyst avert the false sell signal in March (see Figure 10.2) and adopt a much more aggressive trading stance from the long side than would have been warranted if the situation were viewed as just another trading range.

   Figures 10.5 and 10.6 illustrate a similar example in June 2012 natural gas futures. In early 2011 a trader who decided to trade in the direction of a breakout of the October 2010–January 2011 trading range (again, assuming a stop point in the middle of the range) would have

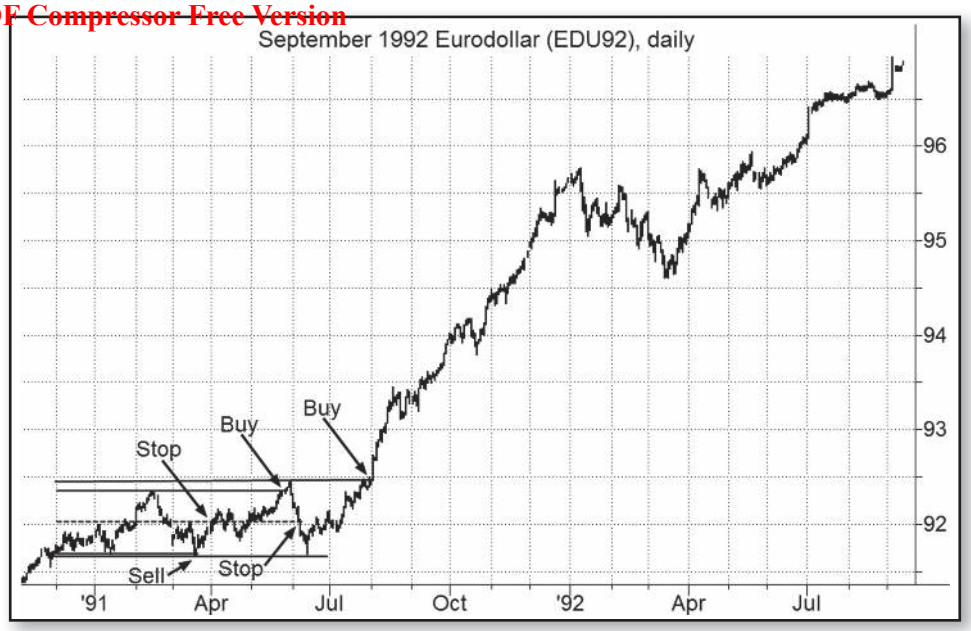

FIGURE 10.3 Winning Breakout Signal after Two False Signals: September 1992 Eurodollar
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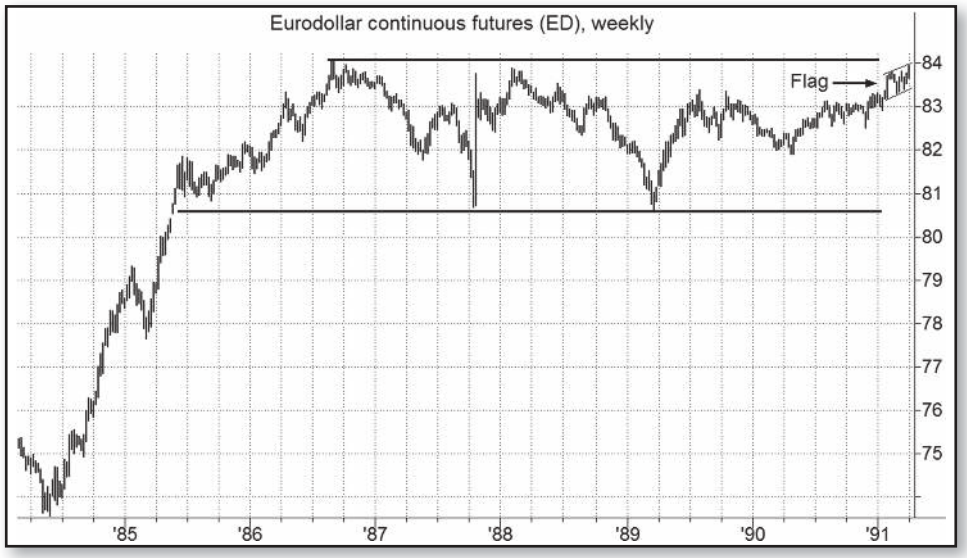

FIGURE 10.4 Long-Term Chart as Part of Comprehensive Analysis: Eurodollar Continuous Futures
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FIGURE 10.5 False and Winning Breakout Signals: June 2012 Natural Gas Futures
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experienced five losing trades (three buys and two sells) before the August 2011 sell signal that was followed by an extended downmove. The context provided by the weekly chart (Figure 10.6), however, suggests a trader who was aware of the longer-term downtrend that preceded the consolidation could have reasonably chosen to ignore upside breakouts and focus exclusively on downside breakouts in expectation of a continuation of that trend.

Of course, the preceding examples benefit from hindsight. However, the point is not to prove the application of chart analysis would have conclusively indicated the probable continuation of a long-term bull market in eurodollar futures in early 1991 or the likely perpetuation of the extended downtrend in natural gas futures in 2011, but rather to illustrate the multifaceted analytical process of the experienced chart trader. It should be clear that the skill and subjectivity implied in this approach place chart analysis in the realm of an art that cannot be mimicked by merely following a set of textbook rules. This is a crucial point in understanding how the chartist approach can remain valid despite widespread publicity.

4. Assuming some skill in fundamental forecasting (i.e., a better than 50/50 accuracy rate), chart analysis can be combined with fundamental projections *to provide a more effective approach*. Specifically, if the long-term fundamental forecast indicates the probability of much higher (lower) prices, only bullish (bearish) chart signals would be accepted. If the fundamental projection was neutral, both buy and sell signals would be accepted. Thus, the chart analyst who is also a competent fundamental analyst would have a decided edge over the majority of traders basing their trading decisions solely on chart-oriented input.

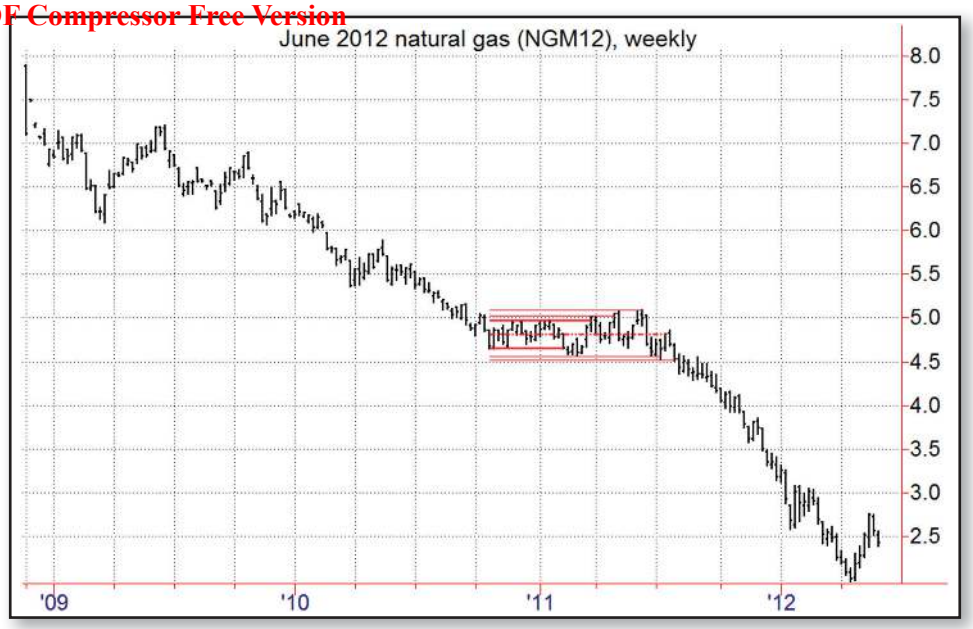

FIGURE 10.6 Long-Term Chart as Part of Comprehensive Analysis: June 2012 Weekly Natural Gas Futures

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5. The failure of a market to follow through in the direction of a key chart signal is a crucial item of information often overlooked by novice chartists. Recognizing and acting on these situations can greatly enhance the effectiveness of the chartist approach. This subject is discussed in detail in Chapter 15.

In conclusion, the skeptics are probably correct in claiming that a Pavlovian response to chart signals will not lead to trading success. However, this assertion in no way contradicts the contention that a more sophisticated utilization of charts, as suggested by the cited factors, can indeed provide the core of an effective trading plan. In any case, chart analysis remains a highly individualistic approach, with success or failure critically dependent on the trader's skill and experience. It would be unreasonable to expect to play the violin well without some degree of practice and innate talent. Chart analysis is no different—the sour notes of novice practitioners notwithstanding.

CHAPTER 11

Technical Indicators

Any intelligent fool can make things bigger, more complex, and more violent. It takes a touch of genius—and a lot of courage to move in the opposite direction.

— Ernst F. Schumacher

What Is an Indicator?

Technical indicators are mathematical formulas based on market data—most often prices, but also occasionally volume and open interest. (In the equity market, other data, such as the number of advancing or declining issues, are sometimes incorporated in these calculations.) The implicit goal of most technical indicators is to signal potential changes in market direction that might not be apparent through direct price analysis or fundamental analysis. The implicit *assumption* underlying this approach is that indicators extract or distill useful forecasting information from market data.

Most indicators attempt to translate price action into directional signals in one of two ways:

1. Comparing current price levels to past price levels to determine the prevailing direction and magnitude of price change.
2. Using a smoothing function, such as a moving average, to filter out what are deemed to be random fluctuations ("noise"), thus revealing a market's prevailing trend.

There are any number of ways to accomplish either of these goals, or to combine them. Consider the simple case of comparing today's closing price with the most recent 20 days of price action to determine how much price has changed and whether the close is relatively strong or weak. The following are only some of the possible approaches:

1. Calculate the difference between the current close and the close 20 days ago.
2. Calculate the percentage change (ratio) of the current close and the close 20 days ago.

3. Determine the current closing price's position within the 20-day high-low range, or its position within the range of the highest and lowest closing prices of the past 20 days.
4. Measure how much the current closing price varies from the "typical" price of the past 20 days by comparing it (as either a difference or a ratio) to the average (or median) of the other closing prices during this period.
5. Alternatively, a shorter-term moving average (or median) value could be substituted for the closing price in the previous calculation, in which case the indicator would become the difference between (or ratio of), say, a 3-day moving average and the 20-day moving average.
6. Use a statistical measurement, such as percentile rank, to determine where the current close places among the 20 most recent closes, or within the 20-day range.
7. Rather than using the most recent closing price as the reference point, the direction and pace of price changes over the past 20 days could alternatively be measured by comparing the period's aggregate (or average) gains to its aggregate (or average) losses. One example: Divide the sum (or average) of the positive close-to-close changes over the past 20 days by the sum (or average) of the absolute negative close-to-close changes over the past 20 days.

All these calculations provide some gauge of how far, and in what direction, a market has moved over the past 20 days. Moreover, any of the foregoing indicators could be based on values other than 20, expanding the list of possible indicators by another dimension. If this list of possible indicators seems excessive (or redundant), peruse any trading website, app, or analysis platform, and you are likely to be confronted by dozens—sometimes in excess of 100—technical indicators, all purportedly designed to help interpret and forecast market activity. Grappling with the sheer number of indicators, and their often cryptic formulas and names, can be a daunting prospect for the new trader or analyst, who might understandably assume each of these tools has unique properties and specific purposes.

The truth, however, is that despite the wide array of indicators and the properties ascribed to them by various proponents and followers, the majority of these tools are based on a handful of basic mathematical formulas. In fact, variations and combinations of the previously listed seven calculations provide the basis for a surprisingly large percentage of the most widely referenced technical tools. One critical consequence of this observation is that there is a high degree of correlation among technical indicators, even if they might seem to be unrelated at a glance.

Rather than risking a descent down the rabbit hole of comparing the supposed applications and idiosyncrasies of dozens of technical indicators, the following discussion instead focuses on the basic types of calculations underlying these indicators and what they can and cannot convey about market behavior. The goal is to provide the reader with a logical foundation for objectively interpreting and analyzing technical indicators. In short, readers looking for answers to questions such as "What's the best technical indicator?" or "What are the best settings for indicator *xyz*?" or "Which indicators are best for trading currency (or grain, or stock index) futures?" should look elsewhere. These are, in fact, meaningless questions because they presuppose a degree of differentiation among indicators that does not exist and assume a stability in the performance of individual indicators that is unsupported by empirical evidence.

The Basic Indicator Calculations

Most technical indicators incorporate one or more of the following five calculations:

1. A smoothing function, such as a moving average or moving median.
2. A comparison of the current data point to a specific past data point, as either a difference (e.g., today's close minus the close 10 days ago) or a ratio (today's close divided by the close 10 days ago).
3. A comparison of the current data point to an average (e.g., today's close minus the average close of the past 10 days).
4. A comparison of an average to another average of a different length (e.g., the 10-day moving average minus the 30-day moving average).
5. A comparison of the current data point to a past range (e.g., the difference between today's close and the lowest low of the past 10 days divided by the difference between the highest high of the past 10 days and the lowest low of the past 10 days).

Beyond the number of price bars used (the "look-back period"), these calculations allow for a great deal of variation without altering the basic characteristics of the indicator. For example, a smoothing function could take the form of a simple moving average, a weighted moving average, an exponential moving average, or an "adaptive average" that adjusts its length according to changes in market volatility. Moreover, any of these averages could be based on a bar's closing price, high, low, open, or midpoint.

Comparing Indicators

Figures 11.1 through 11.5 illustrate the five types of indicator calculations defined in the previous section and highlight the relationships between them. For reference, we'll use the following shorthand to identify these formulas:

Indicator 1: MA (moving average).
Indicator 2: Close – Close (difference) or **Close/Close** (ratio).
Indicator 3: Close – MA (difference between close and moving average) or **Close/MA** (ratio of close and moving average).
Indicator 4: MA – MA (difference between two moving averages) or **MA/MA** (ratio of two moving averages).
Indicator 5: CS (closing strength).

In all cases, subscripts are used to denote the look-back period—for example, "MA_{30}" refers to a 30-bar moving average, "Close – $Close_{10}$" refers to the difference between the current close and the close 10 bars ago, and so on.

In Figure 11.1, a daily price chart of WTI crude oil from August 2015 to May 2016 is overlaid with 10- and 30-day simple moving averages (thin and thick lines, respectively). The lower portion of the chart contains two indicators. The first is the difference between the most recent close and the close

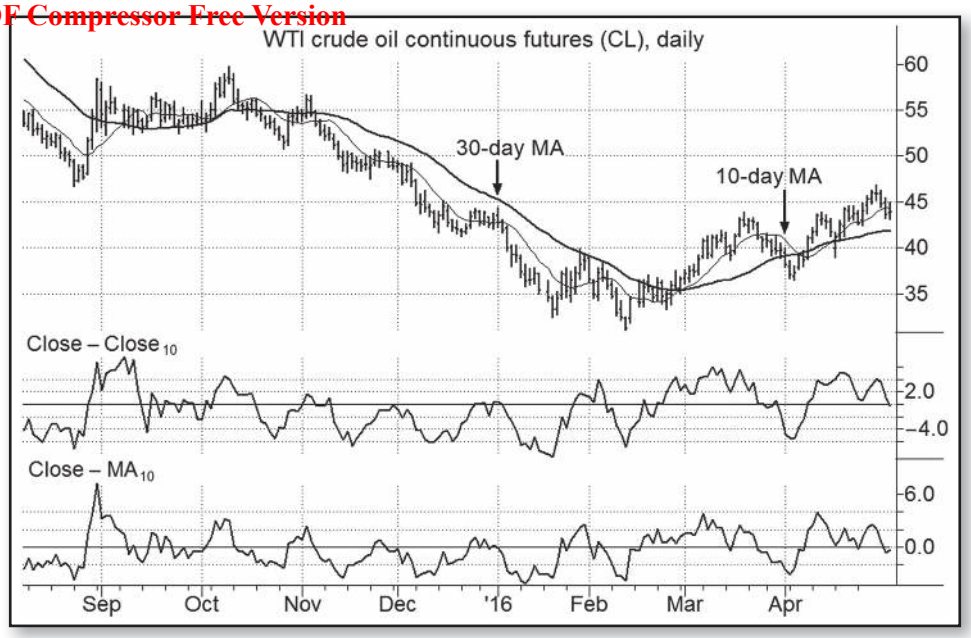

FIGURE 11.1 Difference Indicators: Close – Close vs. Close – MA
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10 days earlier (Close – $Close_{10}$), while the second is the difference between the close and the 10-day moving average (Close – MA_{10}). Both calculations provide a snapshot of the price movement over the most recent 10 days—how much price has moved relative to each indicator's respective reference price. For the first indicator, positive values occur when the current close is above the close 10 days ago; negative values occur when the current close is below the close 10 days ago. For the second indicator, positive or negative values reflect closing prices above or below the 10-day average price. Notice that although the two indicators have minor differences, their fluctuations closely mirror each other.

The indicators in Figure 11.2 are the ratio versions of the indicators in Figure 11.1—that is, the result of dividing the current close by the close 10 days ago (Close/$Close_{10}$), and dividing the current close by the 10-day moving average (Close/MA_{10}). Note that they appear to be the same as the indicators in Figure 11.1 except for their scaling. In fact, the indicators in Figure 11.2 are perfectly correlated to their counterparts in Figure 11.1. In other words, in terms of trading signal generation, there is absolutely no difference between the two sets of indicators.

Figure 11.3 returns to the difference calculations used in Figure 11.1, except the look-back period for both is 30 days instead of 10 days. Again, the indicators appear very similar, although each is significantly different from its counterpart in Figure 11.1 because of the longer look-back period: The 30-day indicators in Figure 11.3 highlight far fewer of the shorter-term price highs and lows and instead trace the contour of the intermediate-term price action. For example, during the

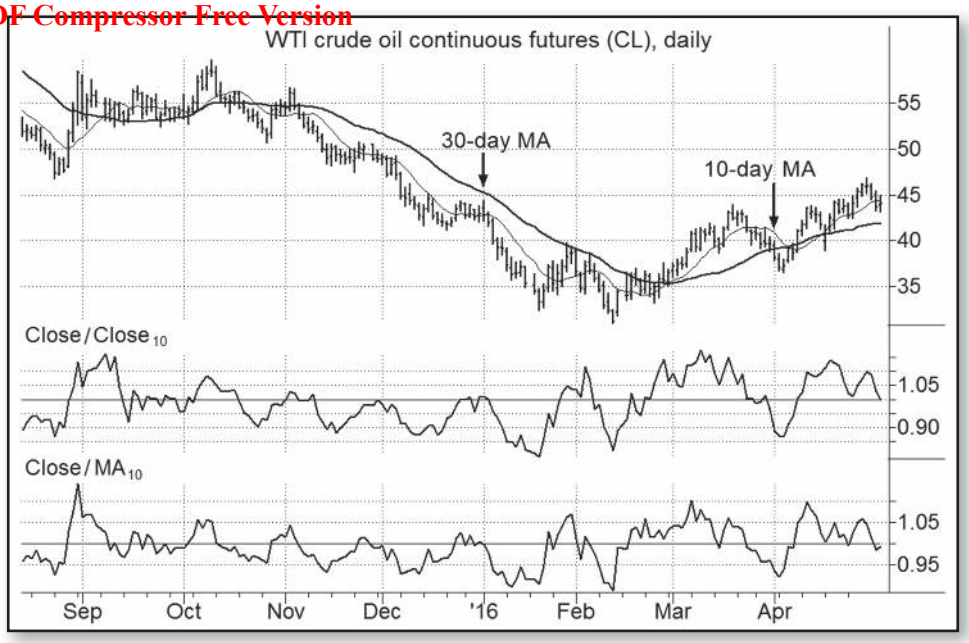

FIGURE 11.2 Ratio Versions of Difference Indicators
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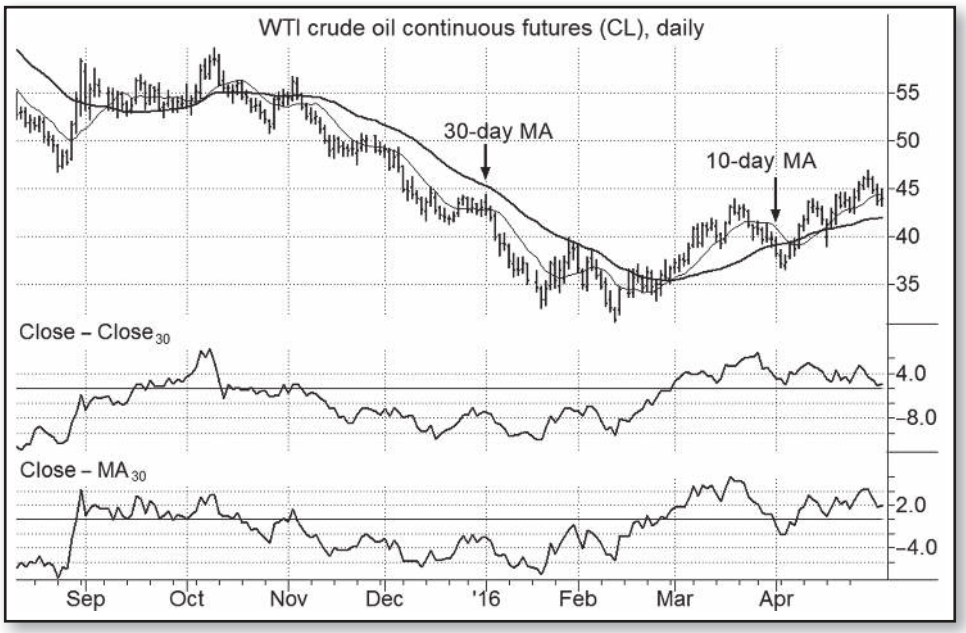

FIGURE 11.3 30-Day Versions of Close – Close and Close – MA Indicators
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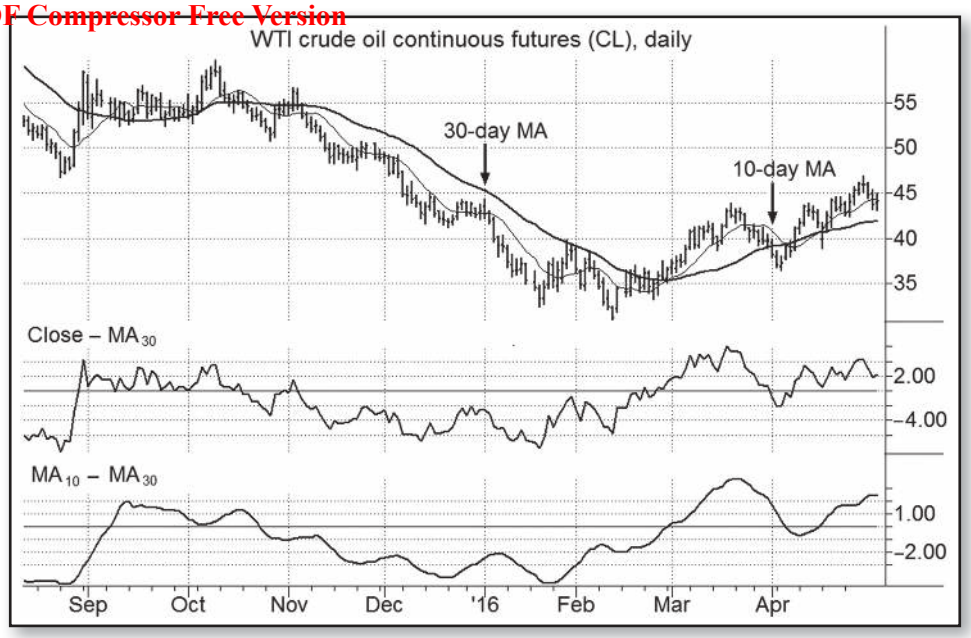

FIGURE 11.4 Price – MA vs. MA – MA Indicators
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October–December 2015 period, both indicators are smoother and have a more pronounced downward bias than their 10-day counterparts in Figure 11.1.

Figure 11.4 compares the Close – MA_{30} indicator from Figure 11.3 with the $MA_{10} – MA_{30}$ indicator, which represents the difference between the 10-day moving average and 30-day moving average. The use of two moving averages produces an indicator that is closely related to the Close – MA indicator, but is smoother and a bit less timely (e.g., note the delay between the $MA_{10} – MA_{30}$ and the Close – MA_{30} indicator in reflecting the early-April price low).

Finally, Figure 11.5 compares the Close/$Close_{10}$ indicator from Figure 11.2 with the CS_{10} indicator, which shows where the current close falls within the range (high–low) of the most recent 10 days (e.g., if the close is the highest price of the most recent 10 days, the indicator reading is 1.00, or 100 percent).

The similarities between the indicators in Figures 11.1 through 11.5 are substantial and not specific to the time window represented in these charts. Table 11.1 shows the correlation coefficients[1] for all six pair combinations of the four 10-day indicator calculations (Close – Close, Close – MA, CS, and MA – MA[2])

[1] The correlation coefficient, which measures the linear relationship between two data samples, ranges from –1.00 to +1.00, with –1.00 representing a perfect negative correlation (values moving in exact opposition) and +1.00 representing perfect positive correlation (values moving exactly in tandem).

[2] The MA – MA calculations in Table 11.1 use three days for the short-term moving average and 10 days for the long-term moving average.

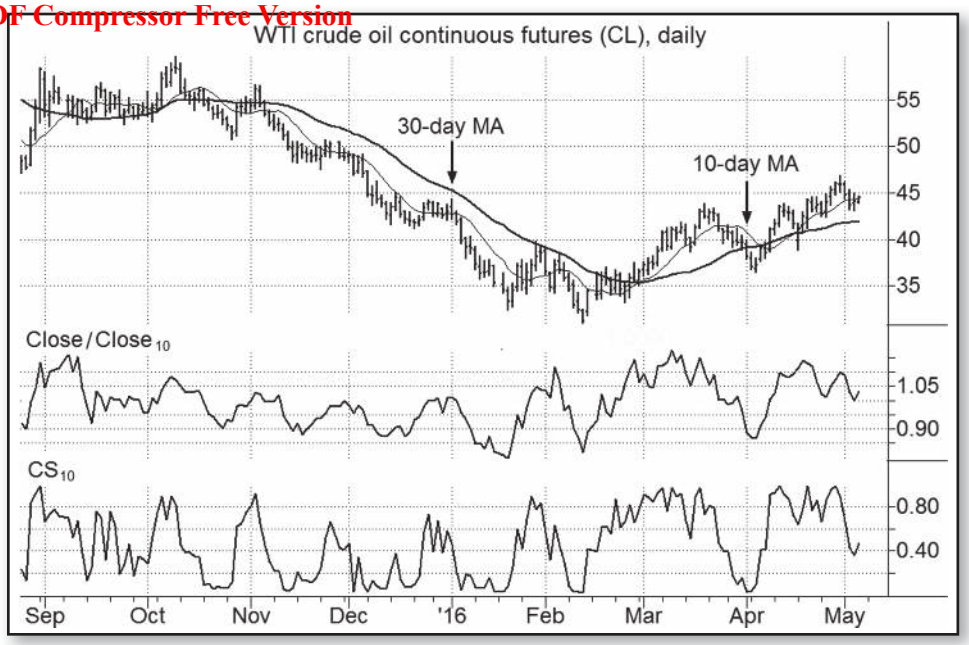

FIGURE 11.5 Close/Close vs. Closing Strength Indicators
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during two periods: August 14, 2015 through May 5, 2016 (the period shown in Figures 11.1 through 11.5); and a much longer period, May 5, 2005 through May 5, 2016. The lowest correlation between any two indicators during the August 2015–May 2016 period was 0.81. The correlations for the 2005–2016 period were similar, with some pairs registering modestly higher correlations and other pairs modestly lower correlations. Even the lowest figure in Table 11.1 (0.77, for the May 2005–May 2016 Close – Close vs. CS indicator comparison) reflects a significant level of positive correlation.

TABLE 11.1 10-Day Indicator Correlations, Crude Oil

	Close – Close vs. Close – MA	Close – Close vs. MA – MA	Close – Close vs. CS	Close – MA vs. MA – MA	Close – MA vs. CS	MA – MA vs. CS
Aug. 2015–May 2016	0.81	0.83	0.81	0.89	0.93	0.83
May 2005–May 2016	0.84	0.86	0.77	0.90	0.87	0.78

TABLE 11.2 20-Day Indicator Correlations

		Close – Close vs. Close – MA	Close – Close vs. MA – MA	Close – Close vs. CS	Close – Close vs. U/D Avg.	Close – MA vs. MA – MA	Close – MA vs. CS	Close – MA vs. U/D Avg.	MA – MA vs. CS	MA – MA vs. U/D Avg.	CS vs. U/D Avg.
Crude oil	Aug. '15–May '16	0.84	0.81	0.84	0.88	0.72	0.95	0.72	0.68	0.69	0.72
	May '05–May '16	0.88	0.88	0.79	0.57	0.80	0.87	0.52	0.69	0.51	0.53
Corn	Aug. '15–May '16	0.77	0.84	0.71	0.33	0.53	0.91	0.15	0.45	0.34	0.19
	May '05–May '16	0.86	0.90	0.71	0.59	0.69	0.80	0.52	0.55	0.53	0.51
S&P 500	Aug. '15–May '16	0.90	0.84	0.81	0.81	0.71	0.68	0.79	0.90	0.64	0.66
	May '05–May '16	0.88	0.84	0.74	0.51	0.67	0.57	0.44	0.86	0.43	0.48
Euro	Aug. '15–May '16	0.80	0.86	0.77	0.77	0.58	0.90	0.74	0.55	0.61	0.75
	May '05–May '16	0.86	0.90	0.76	0.65	0.70	0.87	0.59	0.61	0.57	0.62
	Average:	*0.85*	*0.86*	*0.77*	*0.64*	*0.68*	*0.82*	*0.56*	*0.66*	*0.54*	*0.56*
	Median:	*0.86*	*0.85*	*0.77*	*0.62*	*0.69*	*0.87*	*0.55*	*0.64*	*0.55*	*0.58*

Table 11.2 extends the same analysis to three additional markets—corn, E-mini S&P 500, and euro futures—and from 6 to 10 indicator-pair combinations, based on adding a sixth calculation: the Up/Down Average ("U/D Avg."), which is defined as the average positive close-to-close change over the past *N* days divided by the average (absolute) negative close-to-close change over the past *N* days, normalized so that it fluctuates in a range from zero to 1.00.[3] Table 11.2 also differs from Table 11.1 in that it is based on 20-day look-back periods (instead of 10), except for the MA – MA indicator, which uses a short-term moving average length of 10 days and a long-term moving average length of 30 days.

Although Table 11.2 contains some readings well below the lowest correlation figure in Table 11.1 (mostly for pairs involving the Up/Down Average indicator), the average and median correlations for the ten indicator combinations shown are still uniformly strong, ranging from a low of 0.54 to a high of 0.87. Table 11.3, which replicates the analysis of Table 11.2 using 60-day look-back periods instead of 20 (and 20-day and 60-day moving average lengths for the MA – MA indicator), demonstrates very similar results, with the average/median correlations ranging from a low of 0.49 to a high of 0.90.

The significance of the similarity between the indicator formulas discussed thus far is that they are the building blocks of a host of popular indicators, especially those known as momentum indicators, or "oscillators." This group includes, but is by no means limited to, momentum, rate-of-change (ROC), the stochastic oscillator, the relative strength index (RSI), %R, moving average

[3]The formula for normalizing the indicator values between 0 and 1.00 is: $1 - \{1/[1 + (UA/DA)]\}$, where UA is the average positive close-to-close change over the past *n* bars and DA is the absolute value of the average negative close-to-close change over the past *n* bars.

TABLE 11.3 60-Day Indicator Correlations

		Close – Close vs. Close – MA	Close – Close vs. MA – MA	Close – Close vs. CS	Close – Close vs. U/D Avg	Close – MA vs. MA – MA	Close – MA vs. CS	Close – MA vs. U/D Avg	MA – MA vs. CS	MA – MA vs. U/D Avg	CS vs. U/D Avg
Crude oil	Aug. '15–May '16	0.85	0.90	0.82	0.60	0.88	0.95	0.83	0.83	0.67	0.75
	May '05–May '16	0.91	0.92	0.76	0.27	0.90	0.86	0.43	0.74	0.26	0.50
Corn	Aug. '15–May '16	0.23	0.05	0.42	0.53	0.56	0.90	0.07	0.46	0.22	0.22
	May '05–May '16	0.87	0.85	0.76	0.68	0.84	0.82	0.61	0.66	0.59	0.58
S&P 500	Aug. '15–May '16	0.62	0.13	0.57	0.22	0.82	0.96	0.70	0.81	0.77	0.66
	May '05–May '16	0.64	0.18	0.60	0.24	0.83	0.88	0.44	0.70	0.40	0.41
Euro	Aug. '15–May '16	0.80	0.74	0.78	0.79	0.70	0.93	0.90	0.60	0.73	0.85
	May '05–May '16	0.85	0.86	0.78	0.62	0.84	0.88	0.59	0.72	0.53	0.64
	Average:	*0.72*	*0.58*	*0.69*	*0.49*	*0.80*	*0.90*	*0.57*	*0.69*	*0.52*	*0.58*
	Median:	*0.82*	*0.80*	*0.76*	*0.56*	*0.84*	*0.89*	*0.60*	*0.71*	*0.56*	*0.61*

convergence-divergence (MACD), the price (or moving average) oscillator, the commodity channel index (CCI), and the money flow index (MFI). (*Note:* There is little consistency in the technical indicator lexicon, especially with regard to more generic indicators. Terms such as *momentum, rate of change,* and *price oscillator* sometimes refer to different calculations in different sources. The names used here are widely applied, but may conflict with other sources. The calculations, not the names, are what are important.)

Figure 11.6 compares five popular indicators: momentum, the "fast" stochastic oscillator, CCI, RSI, and the MFI. "Momentum" is simply the Close – Close indicator. The fast stochastic is a three-day moving average of the CS indicator. (The second, thinner line in the stochastic plot in Figure 11.6 is a three-day moving average of the primary indicator line.) The CCI divides the difference between price and a moving average (similar to the Close – MA indicator) by a measure of the absolute total price deviation during the look-back period. The RSI is essentially the U/D Average indicator, except it uses an exponential smoothing function instead of a simple moving average and is scaled from zero to 100 instead of zero to 1. The MFI is basically a volume-weighted version of the RSI that magnifies indicator readings that are accompanied by high trade volume. The precise formulas for these indicators (which are readily available online) are less important than the fact that they are all derived from our basic indicator calculations and are all highly correlated to each other. Table 11.4 summarizes the average correlations for 20-day versions of the 10 pair combinations of these five common indicators for the same periods shown in Tables 11.2 and 11.3. As Table 11.4 clearly demonstrates, these five popular indicators are all highly correlated, with correlations ranging from a low of 0.67 to a high of 0.94.

The takeaway from this analysis is that all technical indicators that measure the magnitude and direction of prices over a given time period must inevitably compare at least two price points or

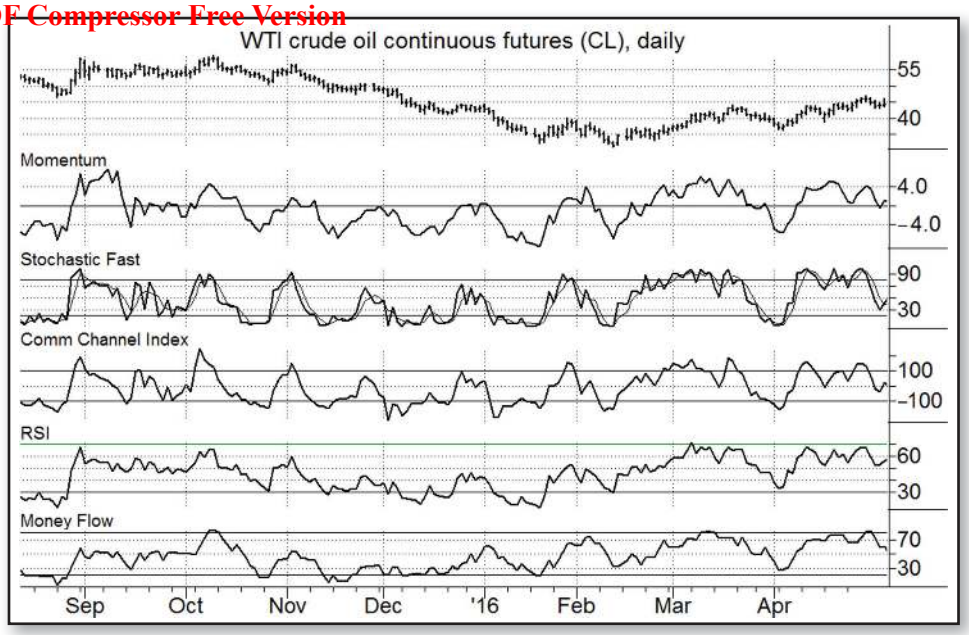

FIGURE 11.6 Popular Indicator Comparison
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groups of prices, which means they must incorporate at least one of the indicator formulas we have outlined, or a closely related calculation. Figures 11.1 through 11.6 and Tables 11.1 through 11.4 suggest the specific type of calculation used is far less important than the time period it surveys in terms of differentiating one indicator from another. This characteristic of indicators is starkly illustrated in Figure 11.7, which compares three indicator calculations (top to bottom): Close – $Close_{10}$, $MA_3 - MA_{10}$, and $MA_{20} - MA_{100}$. Although the upper and middle indicators use a different type of calculation, they are very similar. In contrast, the middle and lower indicators use the same type of calculation but are radically different. The key point is that the upper and middle indicators are similar because they both track a similar trend length, while the middle and lower indicators are very different because the time length surveyed by the lower indicator is much longer. *In short, it's the time length, not the indicator, that matters.*

TABLE 11.4 Correlations of Common Indicators, Daily Crude Oil

	Mom vs. Stoch	Mom vs. CCI	Mom vs. RSI	Mom vs. MFI	Stoch vs. CCI	Stoch vs. RSI	Stoch vs. MFI	CCI vs. RSI	CCI vs. MFI	RSI vs. MFI
Aug. '15–May '16	0.81	0.77	0.87	0.82	0.94	0.87	0.68	0.86	0.69	0.82
May '05–May '16	0.78	0.71	0.84	0.82	0.93	0.87	0.72	0.83	0.67	0.81

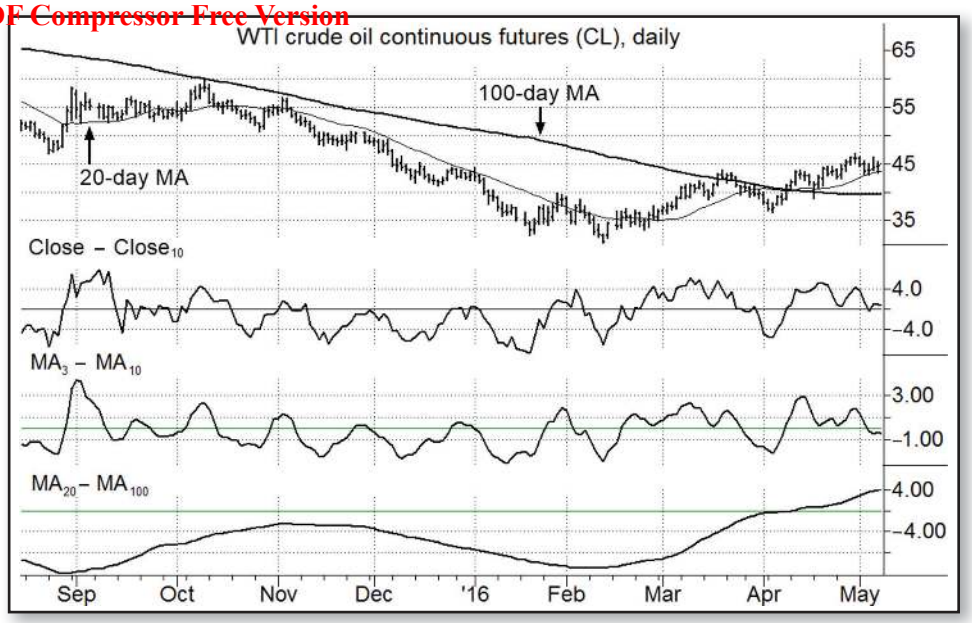

FIGURE 11.7 Indicator Length vs. Calculation Type
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Moving Average Types

Moving averages, which are incorporated in many indicators, can be calculated in different ways. Whereas a simple moving average (SMA) weights all prices equally (i.e., a 10-day average is the sum of the closing prices of the past 10 days divided by 10), the weighted moving average (WMA) and exponential moving average (EMA) use multipliers to increase the influence of more recent data in the calculation (see Chapter 16 for details). The logic behind weighting a moving average is based on an implicit assumption (not necessarily true) that recent price action is more important than more distant price action when attempting to forecast future price direction. The intent of weighting a moving average is to reduce lag by creating an indicator that is more responsive to directional changes—a seemingly logical goal, but one that can have drawbacks as well as advantages.

Table 11.5 shows the results of testing the same basic trading system using simple, weighted, and exponential moving averages. The system goes long when prices close above the moving average and goes short when prices close below the moving average. The system was tested on three markets: the E-mini S&P 500 futures (ES), WTI crude oil futures (CL), and euro futures (EC), using daily data from January 30, 2006, through January 28, 2016. In all cases, one contract was traded per signal, and the moving average length was set to 60 days.

The results, while based on a small sample of markets, are illustrative. In each market, a different type of moving average produced the highest net profit and highest profit factor (gross profit/gross loss).

TABLE 11.5 Simple, Weighted, and Exponential Moving Average Signals

	Net Profit[a]	No. Trades	Win %	Profit Factor[b]
ES				
Exponential	$5,440	163	23.31%	0.98
Simple	–$1,635	163	19.63%	0.92
Weighted	–$30,860	209	23.44%	0.76
CL				
Simple	$175,050	161	24.22%	1.87
Exponential	$113,870	178	23.03%	1.42
Weighted	$102,010	225	20.44%	1.3
EC				
Weighted	$59,763	186	24.19%	1.36
Exponential	$46,350	202	21.78%	1.29
Simple	$29,325	154	21.43%	1.18

[a]Closed trades plus open trade profit/loss (P/L) at end of test period.
[b]Reflects closed trades only.

The implication is that the search for the "best" smoothing approach is likely to be a fruitless one. Over time, applied across multiple markets and parameter values, a particular smoothing calculation is unlikely to demonstrate a meaningful advantage over another. Figure 11.8 helps illustrate why. The daily crude oil prices in this chart are overlaid with 60-day simple (dashed line), weighted (thick solid line), and exponential (thin solid line) moving averages. In just a single roughly six-month period, there are multiple instances of the varying degrees of lag among the three moving averages helping or

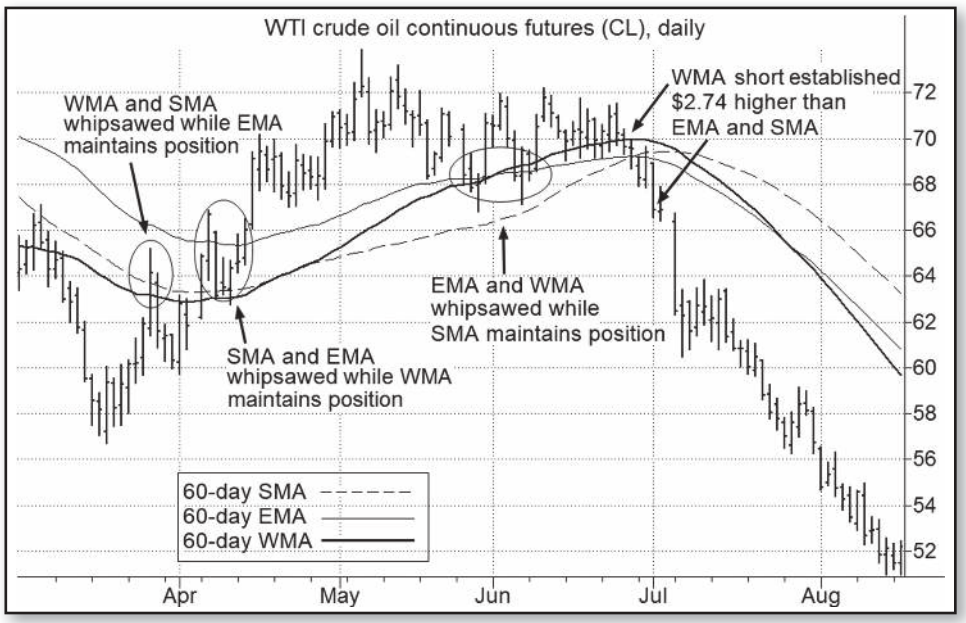

FIGURE 11.8 Moving Average Comparison
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hurting performance. For example, in March 2015, the market closed above both the WMA and SMA (triggering long positions) before reversing to close below both averages the next day (triggering short positions)—a classic example of a "whipsaw" loss that occurs in trend-following strategies during congested or volatile market conditions. The EMA escaped this loss. However, in other instances of whipsaw trades evident in the chart, it was the WMA or SMA that avoided the losing trade, while the other two averages did not. Also, note that after the WMA suffered a whipsaw loss in early June while the SMA did not, in late June the WMA then provided a better short entry as the market turned sharply lower. Multiply the offsetting benefits and drawbacks illustrated in this chart by similar occurrences in multiple markets over many years, and it is easy to see why one smoothing approach is unlikely to significantly outperform another, other than by chance.

Ultimately, the look-back period will be more important than the particular smoothing technique. Over time, the difference between using a 40-period EMA and a 40-period SMA will be much less significant than the difference between using a 40-period EMA and an 80-period EMA. Once again, it is the time length used in the calculation rather than the calculation type that matters.

Oscillators and Trading Signals

The most common type of indicator by far is the one commonly referred to as the *momentum indicator* or *oscillator,* which is a calculation designed to highlight shorter-term swing points and so-called overbought and oversold levels. All the basic calculations and indicators in Figures 11.1 through 11.7 (using shorter-term look-back periods) could be placed in this category. The popularity of oscillators is probably driven by the desire of many traders to capture as many of a market's twists and turns as possible. The popularity of oscillators, however, is arguably inversely correlated to their usefulness. To see why, let's examine a few examples of applying oscillators as trading tools.

Figure 11.9 depicts the 10-year T-note futures with a 10-day fast stochastic oscillator line (i.e., a three-day moving average of the CS calculation). The indicator's two horizontal lines at 80 and 20 are default overbought and oversold levels that, according to oscillator conventional wisdom, are used to indicate points at which price moves are overextended and likely to correct. Thus, overbought readings (above 80) signal selling opportunities, and oversold readings (below 20) signal buying opportunities. Although the oscillator does seem to signal all the price turning points, it does so prematurely.

The astute reader might argue that the simplistic use of the oscillator to signal trades whenever it enters overbought/oversold zones may be a suboptimal application of the indicator. What if, instead, we waited for the indicated reversal to be confirmed before generating a trade signal? For example, a buy signal might be triggered by the following dual conditions:

1. The oscillator declines into oversold territory (<20), suggesting an environment potentially conducive to long positions.
2. The oscillator then rises back above the oversold threshold (>20), confirming the anticipated trend reversal from down to up.

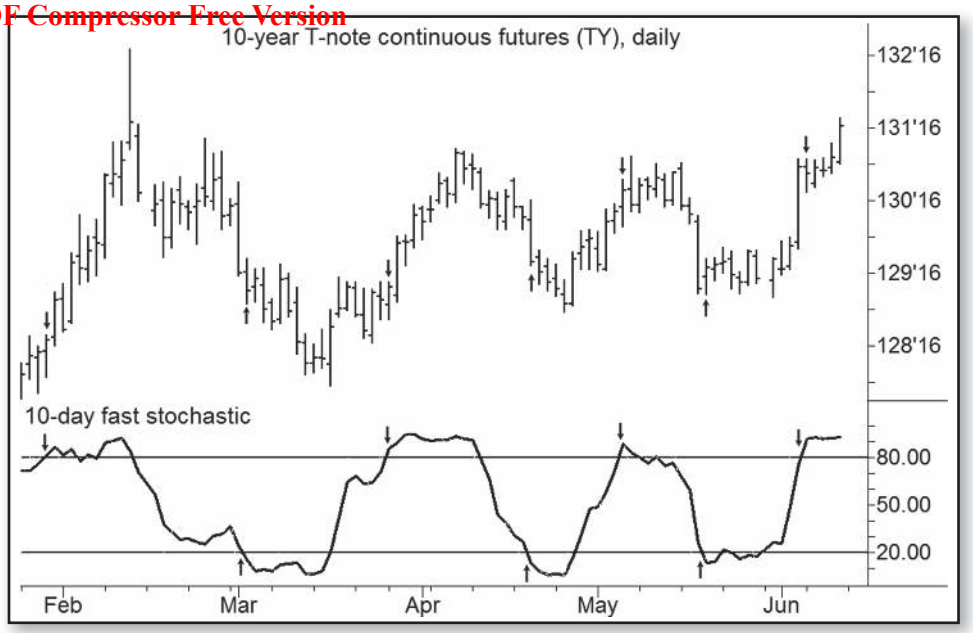

FIGURE 11.9 Oscillator Signals: Initial Penetration
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A trade would be signaled only after the second condition is met. An analogous set of dual conditions would apply to sell signals. Figure 11.10 is the same chart as Figure 11.9 except it illustrates signals based on adding the confirmation condition. Now, the oscillator seems to perform spectacularly well as a trading tool, generating sells near relative highs and buys near relative lows! Many novice traders will see a chart such as Figure 11.10 and think they have discovered the perfect trading system. In fact, it is not uncommon for some vendors to market systems using similar approaches, illustrating the purported wonderful performance of their system with charts that look very much like Figure 11.10.

So what is wrong with such a dual-condition oscillator application for generating trading signals? Nothing, as long as you can predict that the market will stay in a trading range *in the future*. The period shown in Figure 11.10 (late January to mid-June 2016) represents nearly ideal conditions for short-term indicators such as oscillators to track price swings: the market moved sideways and the price swings were relatively similar in magnitude. In such environments oscillators can appear to be almost foolproof trading tools. If, however, the same approach is applied to a trending market—and keep in mind it's impossible to know whether a trending or trading range market will prevail in the future—the results can be disastrous. Figure 11.11 shows the signals that would have resulted from applying the same dual-condition trade rules in a trending market. In this case, during an eight-month period when the euro futures declined approximately 16 percent, the same oscillator triggered exactly one sell signal while issuing nine buy signals, including seven consecutive losing buys from August 2014 to January 2015.

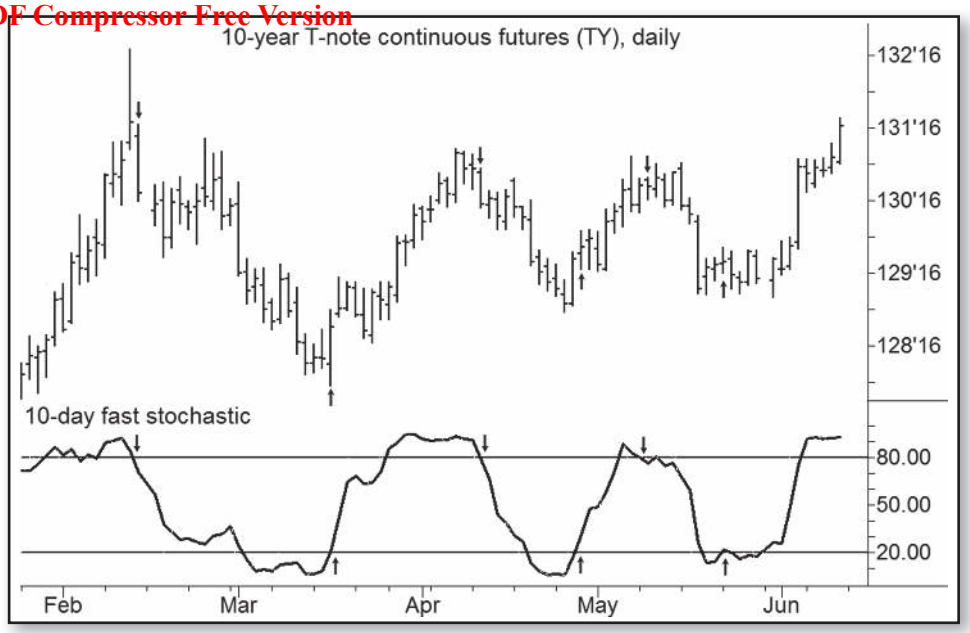

FIGURE 11.10 Oscillator Dual-Condition Signals
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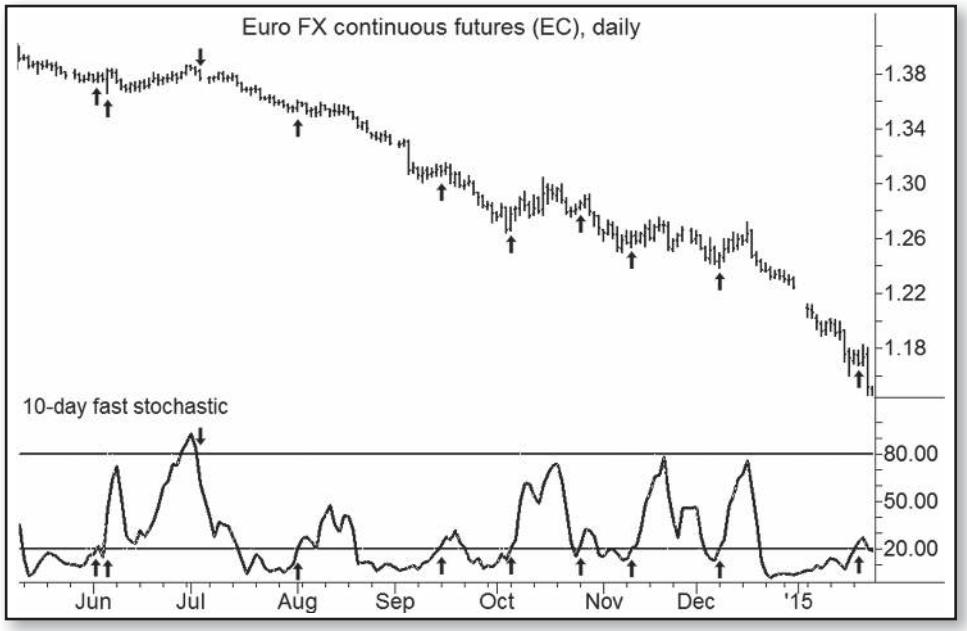

FIGURE 11.11 Oscillator Signals in Trending Market
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The bottom line is that oscillators will work well as contrarian trading tools if we can assume the market will move in a trading range. If the market instead embarks on an extended trend, oscillator-based signals can lead to huge losses. And while it is easy to identify past trading ranges for which an oscillator-based trading strategy will produce magnificent hypothetical results, we don't know whether a trading range or trending market will prevail in the immediate future. In other words, we don't know whether the upcoming market environment will be conducive or adverse to the use of oscillators. As a subjective observation, on balance, oscillators have probably harmed traders more than helped them. However, if a trader fully understands their limitations, these tools could still provide reasonable trading signals. For example, if a trader has good reason to expect that a trading range market is more likely to prevail—and uses rigorous risk management to control losses if this projection proves wrong—then an oscillator could be used as a trading tool.

Indicator Myths

Through repetition over decades, certain bits of "common wisdom" regarding technical indicators have become entrenched in trading literature, despite the ability of traders to disprove such misleading ideas through testing. The following list is far from exhaustive, but it touches upon some of the most dangerously misleading, and easily refutable, examples of such myths.

The Confirmation Myth

Traders are often exhorted to consult multiple technical indicators to "confirm" a potential trade signal. This advice may sound sensible, but given the high correlation among so many indicators, such confirmation is often an illusion. Unless the indicators being consulted are uncorrelated—say, if they use radically different look-back periods (which is usually not the case)—they are probably simply repeating the same information, with any apparent variations between the indicators likely meaningless. The similarities between the indicators shown in Figures 11.1 through 11.7 illustrate how easy it is to generate false "confirmation" from calculations that are, more or less, the same indicator.

The "Magic Number" Myth

This misconception revolves around the belief that a specific indicator parameter (typically, the look-back period) provides universally optimal performance or otherwise possesses special properties. Popular examples include the nearly ubiquitous use of a 14-day look-back period as the default setting for short-term countertrend indicators and references in the financial media regarding the importance of the penetration of a 200-day moving average. The reality is that such parameter values will be optimal only in isolated markets as a function of chance. The question of what values work best for a specific portfolio over a specific time range can be answered only by computer testing. And even then, the answer would apply only to past data and could not be presumed to be indicative of the optimal values for the future. Chapter 19, which addresses the issue of optimization, provides a more in-depth discussion of this point.

The Leading Indicator Myth

Some technical tools are commonly referred to as "leading" indicators for their supposed ability to signal a market move before the price series itself gives any indication of a change in direction. Although it might be fair to say that a price-based indicator could (to some eyes) highlight an aspect of price action with predictive properties, the inescapable fact is that an indicator can never "lead" price action because, by definition, it is based on historical prices. If a certain indicator reading or pattern proves (through testing) to have predictive value, that information *must* be present in the price series itself.

The Divergence Signal Myth

This belief is a subset of the leading indicator myth. Divergence is most commonly used to describe the phenomenon of an indicator (usually one designated as a "countertrend" tool) moving in opposition to a price series, and thus supposedly giving advance warning of vulnerability in the prevailing price trend. For example, prices might make a new high in an uptrend, while the countertrend indicator makes a lower high, suggesting the new price peak has been established on weaker momentum, which in turn implies that a correction or reversal is imminent. Such patterns are, in fact, quite common at market turning points. Unfortunately, though, they are also quite common at other times as well, often generating one false reversal signal after another during extended market trends. Figure 11.12, which depicts crude oil prices during the market's extended sell-off in 2014 and into early 2015, highlights

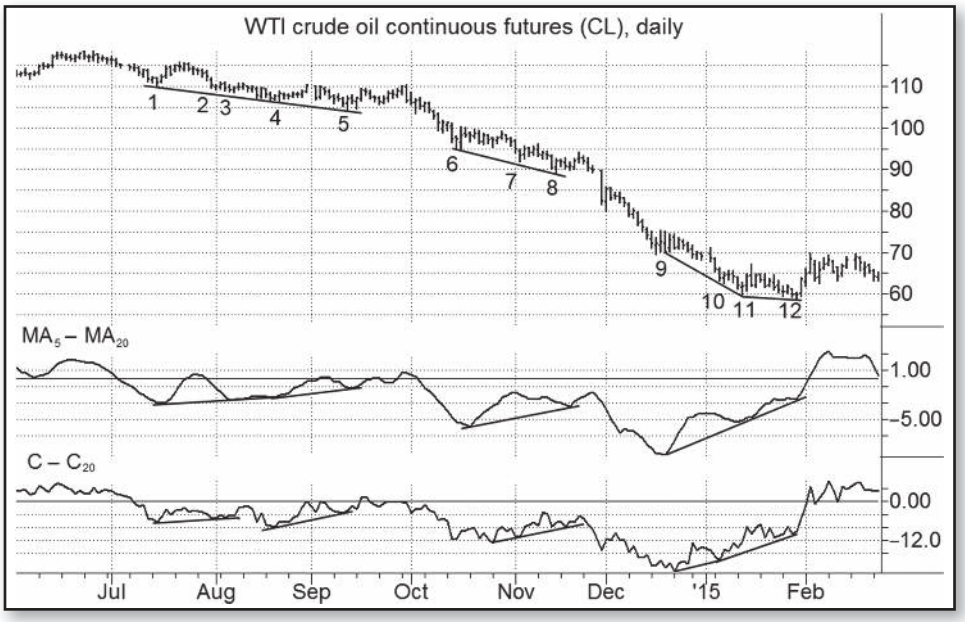

FIGURE 11.12 Price-Indicator Divergences

a series of successive price lows that were accompanied by higher lows in the $MA_5 - MA_{20}$ and Close $- Close_{20}$ indicators. These divergences between price and the indicators began signaling the potential for a significant correction or reversal as soon as the trend began—approximately six months and $50/bl. before the market staged a modest bounce in late January 2015. The situation is even worse than it looks because Figure 11.12 omits some smaller false divergences that were left unmarked to avoid cluttering the chart.

Indicator "Types"

Indicators are typically categorized according to whether they are intended to identify longer-term trends or emphasize shorter-term price swings and countertrend moves. While it is true that smoothing functions, such as moving averages, lend themselves to trend analysis because they simplify price action, such classifications usually have more to do with an indicator's look-back period than any inherent characteristic of the calculation. For example, although moving average crossovers are "classic" trend-following signals, an $MA_3 - MA_{10}$ calculation (three-day moving average minus 10-day moving average), which conforms to the standard moving-average crossover form, could hardly be described as a long-term trend-following indicator (see Figure 11.13). By contrast, the basic C – C momentum calculation, most often used to highlight short-term price swings, will nonetheless reflect longer-term trends as its look-back period increases, as evidenced by the $C - C_{100}$ calculation shown in Figure 11.13.

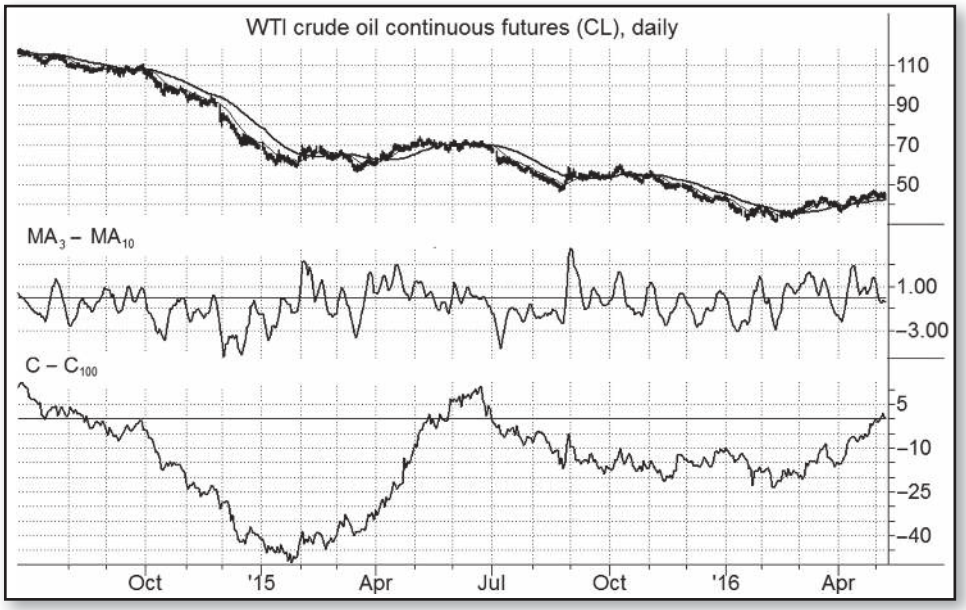

FIGURE 11.13 Length vs. Indicator Type
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Conclusion

Because they are derivatives of price, it can be argued that technical indicators—when used to generate trading signals—actually distance traders and analysts from the data they are attempting to understand. Although indicators can, perhaps, highlight certain aspects of market action that might not be immediately evident by looking at a chart or a spreadsheet, they cannot create information that is not already present in the market data itself.

Simplicity is generally a virtue with regard to technical indicators. There are only so many ways to measure the direction and magnitude of price changes, and the slight differences between approaches are unlikely to produce meaningful differences in trading signals. The more inputs an indicator has (and the more arcane those inputs are), the more likely that either it is obscuring, rather than clarifying, the market action it is intended to interpret, or it is merely a more complex version of a simpler calculation.

Perhaps the most important insight the reader can take away from this chapter is that indicators that tend to work well in nontrending conditions will unavoidably perform miserably in trending conditions, whereas tools designed for trends will fare poorly in trendless markets. Unfortunately, markets do not ring bells when they are switching from one phase to the other. As a result, no single indicator or parameter input (such as the look-back period) can be expected to perform consistently well across multiple markets and time frames.

PART III

Applying Chart Analysis to Trading

CHAPTER 12

Midtrend Entry and Pyramiding

Nobody can catch all the fluctuations.

—Edwin Lefèvre

For many reasons, you may find yourself considering whether to enter a new position after the market has already made a substantial price move. Examples include: (1) you were not previously following the market; (2) in an effort to get a better price, you futilely waited for a price correction that never developed; (3) you were previously skeptical about the sustainability of the trend, but have now changed your opinion.

Faced with such a situation, many traders will be extremely reluctant to trade the market. This attitude can be easily explained in psychological terms. The act of entering a new position after a trend is already well underway in a sense represents an admission of failure. Even if the trade is profitable, traders know their gains would have been much greater if they had acted earlier. Thus, even when you have a strong sense of probable market direction, you might be tempted to think: "I've missed so much of the move, why bother?"

As an example, consider chart-oriented traders examining the coffee market in mid-February 2014 (see Figure 12.1) after not having participated in the sharp price advance prior to that time. Such traders would have noted the market had broken out above the resistance level defined by the January 2014 and October 2013 highs, with prices remaining in new high ground for two weeks—a very bullish chart configuration. In addition, prices had just formed a flag pattern after an upmove—price action indicative of another imminent upswing. However, observing that prices had already advanced more than 37 percent since the November 2013 low (and more than 25 percent in just seven days in late January and early February), traders might have been reluctant to enter a new long position belatedly, reasoning the market was overextended.

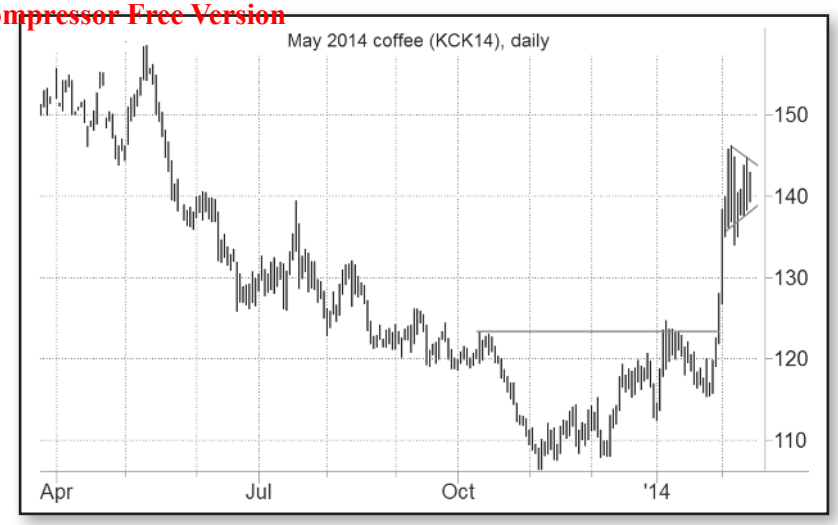

FIGURE 12.1 Missed Price Move? (May 2014 Coffee)
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Figure 12.2 vividly illustrates the folly of this conclusion. Incredibly, as of mid-February 2014, coffee prices had completed only about 35 percent of their ultimate advance to the March high. The moral of this tale is provided by an observation in *Reminiscences of a Stock Operator* by Edwin Lefèvre: "[Prices] are never too high to begin buying or too low to begin selling."

The key question is how one enters the market in the midst of a major trend. Actually, the goals in implementing a midtrend position are the same as those for initiating any position: favorable timing

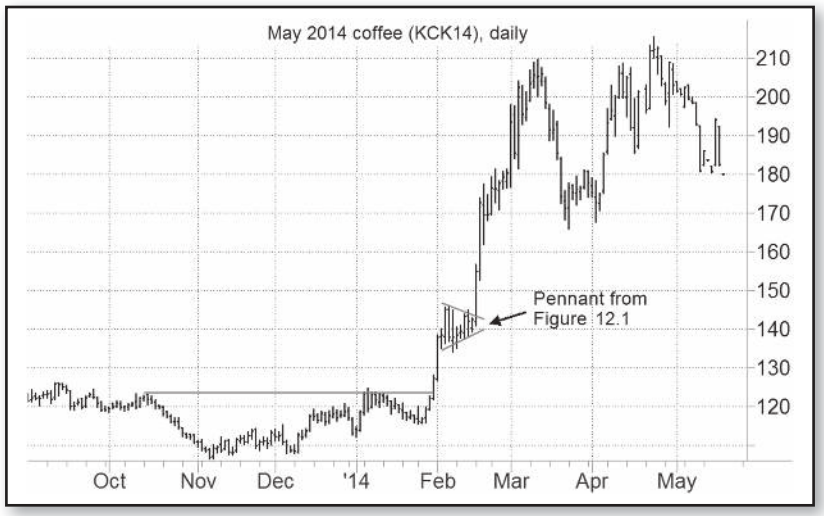

FIGURE 12.2 How It Turned Out (May 2014 Coffee)
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of entry and risk control. The following are four key strategies that could be employed to achieve these objectives:

1. **Percent retracement.** This approach attempts to capitalize on the natural tendency of a market to partially retrace prior price swings. Generally speaking, one might initiate the position anytime the market retraces a given percentage of the price swing from the last relative low or relative high. A reasonable choice for this percentage would be a figure in the 35 to 65 percent range. Figure 12.3 illustrates the entry points using this approach, assuming a 50 percent retracement criterion. Notice two of these retracements are based on rallies (A–D and C–D, respectively) that are defined by the same relative high but different relative lows. The main advantage of this method is that it is capable of providing superior entry points. However, it is also subject to a major disadvantage: frequently, the necessary retracement condition may not be fulfilled until the trend has carried much further, or possibly even reversed.
2. **Reversal of minor reaction.** This approach is based on waiting for a minor reaction to materialize and then entering on the first signs of a resumption of the major trend. Of course, the precise method would depend on how a reaction and trend resumption were defined. The choices are virtually limitless. For illustration purposes, we will provide one possible set of definitions.

   A "reaction" is identified whenever the *reaction count* reaches 4. The reaction count is initially set to 0. In a rising market, the count would be raised to 1 any day in which the high and low were equal or lower than the corresponding points on the day on which the high of the move was set. The count would be increased by 1 each day the high and low are equal to or lower than the high

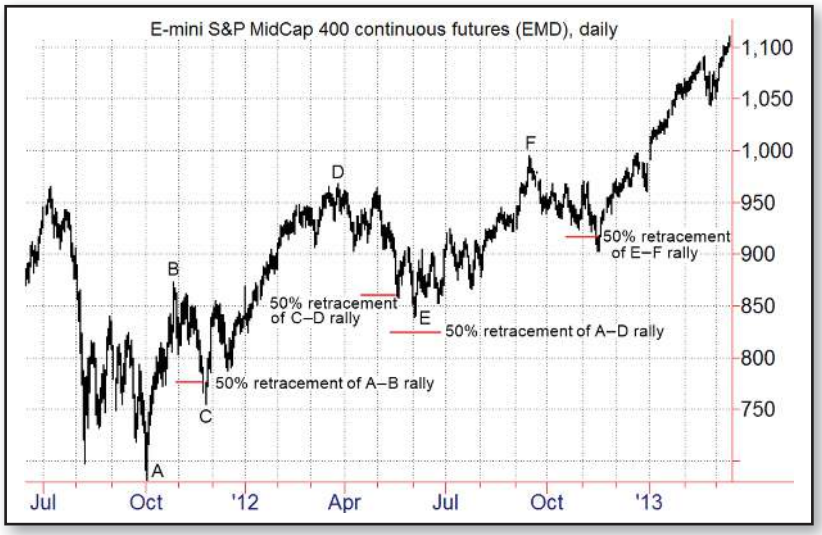

FIGURE 12.3 Buy Signals on 50 Percent Retracements (E-Mini S&P MidCap 400 Continuous Futures)

and low of the most recent day on which the count was increased. The count would be reset to 0 anytime the market moved to new highs. Analogous conditions would apply to a declining market.

The resumption of the major trend would be indicated whenever the *thrust count* reached 3. The thrust count would initially be set to 0 and would begin being monitored after a reaction was defined. In the case of a reaction in a rising market, the thrust count would increase by 1 on each upthrust day and would be reset to 0 anytime the reaction low was penetrated. (Thrust days were defined in Chapter 9.) Once a signal was received, the reaction low could be used as a stop-loss reference point. For example, the position might be liquidated anytime the market closed below the reaction low. Once again, an analogous set of conditions could be used for defining a resumption of the trend in a declining market.

Figure 12.4 illustrates the reversal of minor reaction approach using the specific definitions just detailed. The points at which reactions are defined are denoted by the symbol *RD,* with the numbers prior to these points indicating the reaction count values. Buy signals are indicated at the points at which the thrust count equals 3, with the letters prior to these points indicating the thrust count values. For any given entry point, stop-loss liquidation would be signaled by a close below the most recent stop level, which in this case is the lowest relative low between the identification of the reaction and the completion of the thrust count.

3. **Continuation pattern and trading range breakouts.** The use of continuation patterns and trading ranges for entry signals was discussed in Chapter 9. Since to some extent chart patterns are in the eye of the beholder, this approach will reflect a degree of subjectivity. Figure 12.5 offers one interpretation of continuation patterns (implicit assumption:

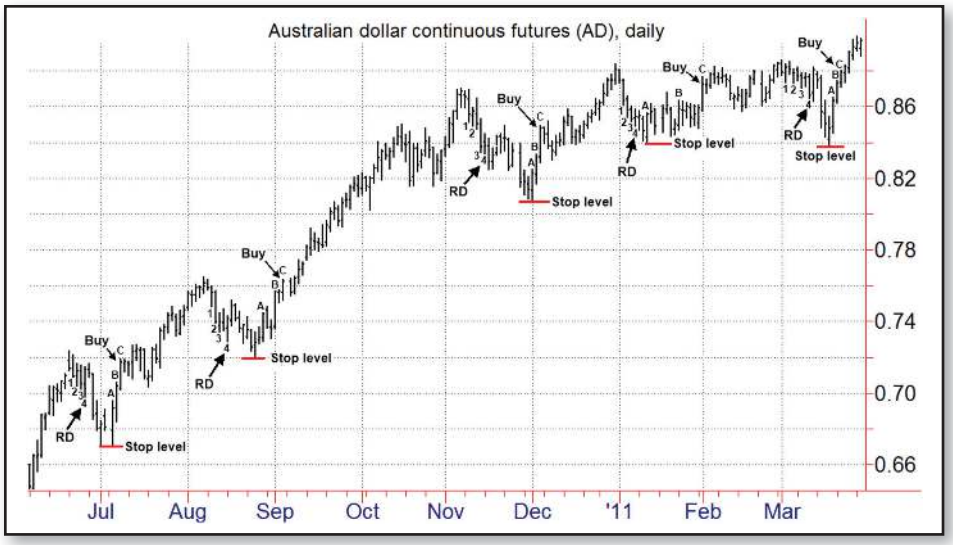

FIGURE 12.4 Reversal of Minor Reaction (Australian Dollar Continuous Futures)
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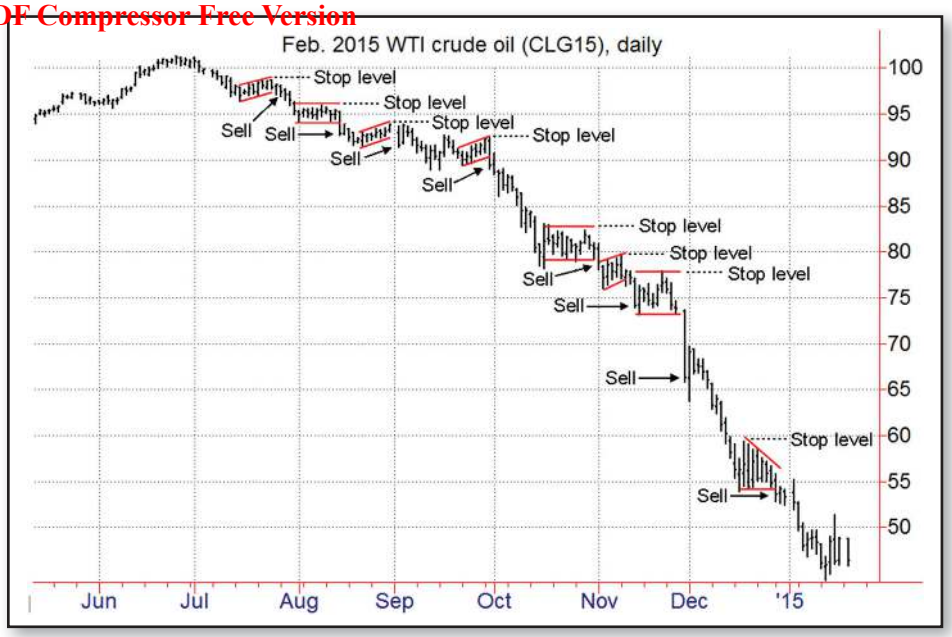

FIGURE 12.5 Continuation Pattern Breakouts as Entry Signals (February WTI Crude Oil)
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at least five trading days are required to form a continuation pattern), and the corresponding sell points reflect closes below these consolidations. It should be noted, however, that once a trend is considered established, it is not absolutely necessary to wait for penetrations of continuation patterns as confirmation of trade entry signals. By definition, these patterns are expected to be resolved by price swings in the same direction as the price moves that preceded their formation. Thus, for example, in a downtrend, short positions could be established within consolidation patterns based on an expectation of an eventual downside breakout. The high prices in the patterns depicted in Figure 12.5 could be used as reference points for the placement of protective stops (as marked on the chart) following the downside breakouts of these patterns.

4. **Reaction to long-term moving average.** Price retracements to a moving average of the price series can be viewed as signals that the reaction to the main trend is near an end. Specifically, if a trader believed that an uptrend was in place, long positions could be entered anytime prices declined to below a specified moving average. Similarly, if a downtrend were believed to be in effect, short positions could be initiated on rallies above the moving average. Figure 12.6, which superimposes a 40-day moving average over continuous E-mini S&P 500 futures, provides an illustration of this approach. For example, traders who were bullish on the stock market during the period depicted and looking to enter on a correction could have used price pullbacks below the 40-day moving average as entry signals for long positions. The arrows in Figure 12.6 indicate potential buy entry levels based on this approach.

FIGURE 12.6 Reaction to Long-Term Moving Average (E-Mini S&P 500 Futures)
Note: ↑ = buy entry signal based on a reaction to below the 40-day moving average.
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Chapter 16 illustrates how crossovers of moving averages can be used as *trend-reversal* signals. In the application just described, we have used moving average crossover points to signal *countertrend* trade entry signals. There is no contradiction. When moving average crossovers are employed for generating trend reversal signals, typically, two moving averages are used so that the smoothing of both data series will reduce false trend-reversal signals. In the method just detailed, we deliberately defined crossover points based on the price series itself, which is more sensitive than a moving average since it contains no smoothing of the data, and one moving average. In other words, we would use more sensitive definitions of moving average crossovers for countertrend applications than we would for trend-identification applications.

It should be noted that the problem of midtrend entry is identical to the problem of *pyramiding*, which is the implementation of additional units to an existing position. Both transactions involve implementing a position after the market has already witnessed a substantial move in a given direction. Consequently, the strategies discussed in this chapter for a midtrend entry could also be applied to the timing of pyramid positions.

A few additional guidelines are necessary for pyramiding. First, one should not add to any existing position unless the last unit placed shows a profit. Second, one should not add to an existing position if the intended stop point would imply a net loss for the entire position. Third, pyramid units should be no greater than the base (initial) position size.