

## Chapter 12— RealWorld Chart Analysis

*The spectator's chief enemies are always boring from within. It is inseparable from human nature to hope and to fear. In when the market speculation goes against you, you hope that every day will be the last day—and you lose more than you should have not listened to hope—to the same ally that is so potent a successbringer to empire builders and pioneers, big and little. And when the market goes your way you become angry that the next day will take away your profit, and you get out—too soon. Fear keeps you from making as much money as you ought to. The successful trader has to fight these two deepseated instincts. He has to reverse what you might call his natural impulses. Instead of hope he must fear; instead of fearing he must hope. He must fear that his loss may develop into a much bigger loss, and hope that his profit may become a big profit.*

—Edwin Lefevre

It is always easy to analyze a chart with the benefit of hindsight. It is quite another matter to analyze a chart in real time, with actual trading decisions dependent on the outcome. The chart examples in this chapter represent a handful of the trade recommendations I issued in my role as director of futures research at Prudential Securities. For each trade, I noted the reasons for entry and exit, as well as any lessons provided by the trade after the smoke had cleared. To provide a rounded perspective, both winning and losing trades are included. Knowing what can go wrong in a trade is often more important than knowing what can go right.

## How to Use This Chapter

1. Do not read this chapter out of sequence. It is essential that Part One be read before this chapter.
2. For maximum benefit, reading this chapter should be a handson experience. It is suggested that the reader first copies all the odd (righthand) pages of the charts that follow.
3. Each trade contains the reasons for entering the position. Consider whether you interpret the chart the same way. Even technical analysts using the same patterns may interpret these patterns differently. One analyst's double top is another's trading range consolidation, and so on. In short, secondguessing is strongly encouraging. Remember, many of these trades turned out to be losers.
4. The illustrations in the following charts emphasize the analytical tools and chart patterns that I tend to rely on most heavily. This by no means that these methods are the most important or accurate, only that they are the ones I am most comfortable using. Chart analysis is a very subjective endeavor.

There are many techniques that have been described in this book that are not applied in the following illustrations. Some readers may find these other analytical tools helpful as supplemental input or even as substitute methodologies. The mix of methods I feel most comfortable with is likely to be quite different from the approach that will be most suitable for each individual reader. In essence, each practitioner of chart analysis must choose an individual set of technical tools and define a personal analytical style.

5. Analyze the chart on each odd (righthand) page using your favorite approach, specifically detailing your own strategy. If you have made photocopies, you can mark these copies up to your heart's content. Then turn to the next (even) page to see how your analysis (and mine) turned out in the real world; this page contains the reasons for trade exit and observations related to the trade.

By following this procedure instead of passively reading the chapter, you will obtain the maximum learning benefit.

### **RealWorld Chart Analysis**

Begin your analysis with the chart on the opposite page. Finish detailing your strategy before turning the page.



Figure 12.1a  
December 1993 Tbond.

**Trade Entry Reasons**

1. The breakout above the triangular consolidation implied a continuation of the bull move.
2. The pullback brought prices close to the major support level indicated by both an extended internal trend line and the top of the triangle.

**Do you agree or disagree with the analysis?  
Evaluate the situation before turning page.**



Figure 12.1b  
December 1993 Tbond.

#### **Trade Exit**

The significant downside penetration of the lower end of the triangle invalidated the original trade signal.

#### **Comment**

A trade should always be liquidated once the primary premise for the trade is violated. In this instance, prices should have held above or near the top of the triangle. Once prices broke meaningfully below the low end of the triangle, the validity of the prior breakout seemed highly questionable. Getting out on the first sign that the market had violated the original trade premise helped keep the loss on the trade relatively small. As can be seen in Figure 12.1b, even a small amount of procrastination would have been very expensive.

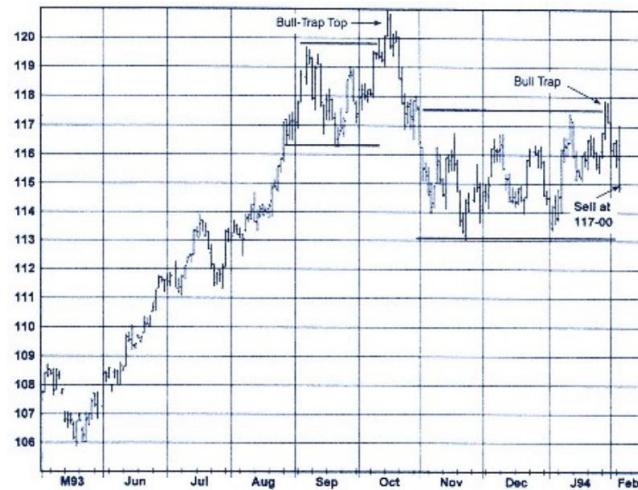


Figure 12.2a  
March 1993 Tbond.

#### **Trade Entry Reasons**

1. The October bulltrap top, which formed in record high territory after a very extended price advance, suggested that a major peak had been established. At the time shown, prices had only retraced a small portion of the prior advance, which extended back well before the start of this chart, implying significant further downside potential.
2. The late January upside breakout above the November–January trading range and the subsequent pullback deep into the range represented another bull trap.

Note that the trade recommendation called for selling on a rebound back to 11700 as opposed to going short at the market.

**Do you agree or disagree with the analysis?  
Evaluate the situation before turning page.**

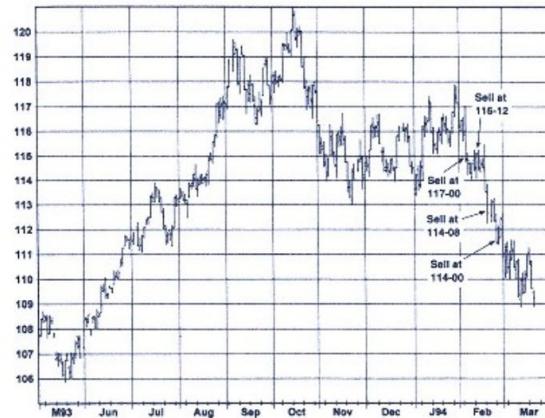


Figure 12.2b  
March 1993 Tbond.

#### Comment

As can be seen on the chart, the market failed to rebound to the recommended sell point at 11700. As shown, the sell point was subsequently lowered on three separate occasions. In each instance, the market failed to reach the recommended sell level. As a result, even though the original trade idea was excellent, with the market witnessing a large and rapid price move in the anticipated direction, the trade opportunity was entirely missed.

In every trade there is a tradeoff between getting a better entry price and assuring that the position is implemented. This trade highlights the potential pitfall in waiting for a better entry level instead of initiating the position at the market. As in this example, such a more cautious approach can result in missing major winning trades. This observation is not intended to imply that one should always implement intended trades at the market, but it does serve to emphasize the attribute of market orders: They assure that trading opportunities will not be missed. In particular, market orders should be favored in longterm trades that are believed to offer a large profit potential—as was the case in this illustration. Even so, the error made in this trade was not the initial use of a limit order, which could have been justified based on the dominant trading range pattern, but rather the failure to convert to a market entry once the price action (eg, the flag consolidations formed after the initial recommendation) suggested that a rebound was unlikely.

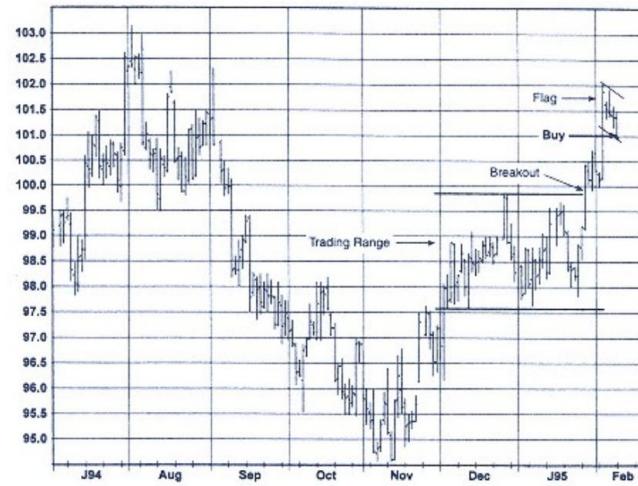


Figure 12.3a  
Tbond continuous futures.

***Trade Entry Reasons***

1. Sustained upside breakout above prior trading range.
2. Flag consolidation formed above prior trading range.

**Do you agree or disagree with the analysis?  
Evaluate the situation before turning page.**



Figure 12.3b  
Tbond continuous futures.

#### **Trade Exit**

The trade was liquidated on a raised protective stop. The stop had been brought in relatively close because a spike high that had remained intact for nearly two weeks suggested that a top might be in place.

#### **Comment**

The exit on this trade proved highly premature, as the market subsequently moved much higher. Although, as cited, the existence of a spike high provided some justification for a close stop, it is significant that the stop had been raised above the closest meaningful point, which was probably the midpoint of the prior trading range. The lesson is that bringing in stop points closer than meaningful levels will often result in exiting good trades far too early.



Figure 12.4a  
December 1994 British pounds.

***Trade Entry Reasons***

1. Sustained upside breakout above triangle consolidation.
2. Pennant consolidation following an upswing.

**Do you agree or disagree with the analysis?  
Evaluate the situation before turning page.**

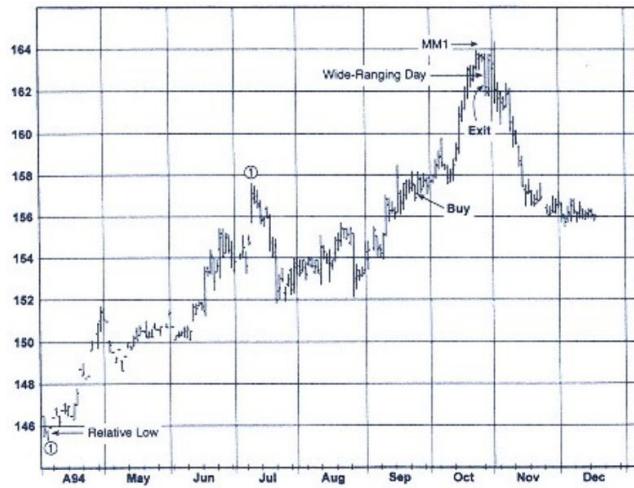


Figure 12.4b  
December 1994 British pounds.

#### **Trade Exit**

The trade was liquidated on the downside wideranging day following the approximate attainment of a major measured move objective (MM1).

#### **Comment**

This trade had originally been recommended several weeks before the indicated buy point, using a limit order within the triangle consolidation (see Figure 12.4a), in anticipation of an eventual upside breakout from this formation. This buy point was never reached, and eventually a long position was recommended at the market. This action helped salvage the significant remaining profit potential in the trade. The general lesson illustrated by this trade is that if a market fails to reach a limit entry price and starts to move in the anticipated direction, it often makes sense to enter the trade somewhat belatedly at a less favorable price, as opposed to abandoning the idea as a missed trade.

This trade also illustrates how using the approach of a measured move objective as an indicator to exit a trade on the first sign of failure can greatly help limit the surrender of large open profits.

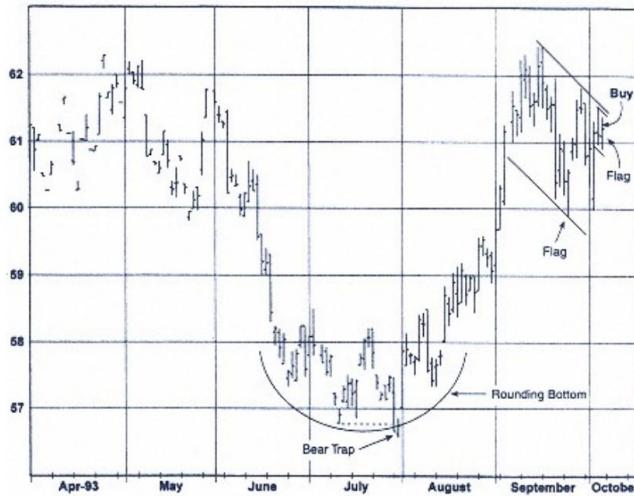


Figure 12.5a  
December 1993 deutsche mark.

#### ***Trade Entry Reasons***

1. Rounding price base and bear trap low both suggested a major bottom was in place.
2. Both narrow flag and overall flag suggest the likelihood of an upside breakout.

**Do you agree or disagree with the analysis?  
Evaluate the situation before turning page.**

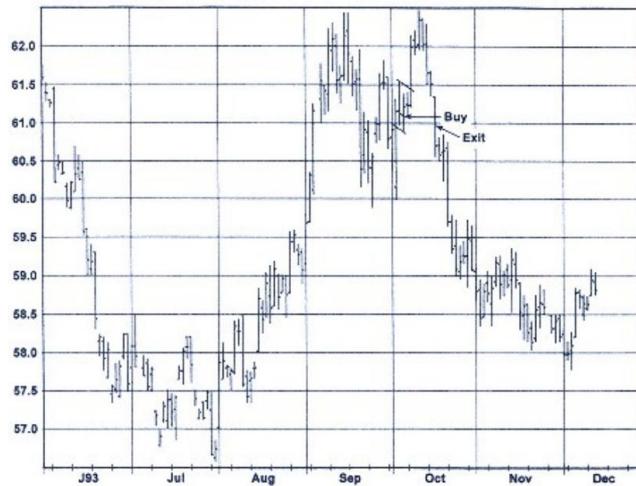


Figure 12.5b  
December 1993 deutsche mark.

#### ***Trade Exit***

Although the market did break out on the upside initially, there was little followthrough, and the subsequent retracement back below the midpoint of the prior flag pattern suggested a price failure.

#### ***Comment***

Exit on the first sign of a technical failure kept the loss on the trade very small.

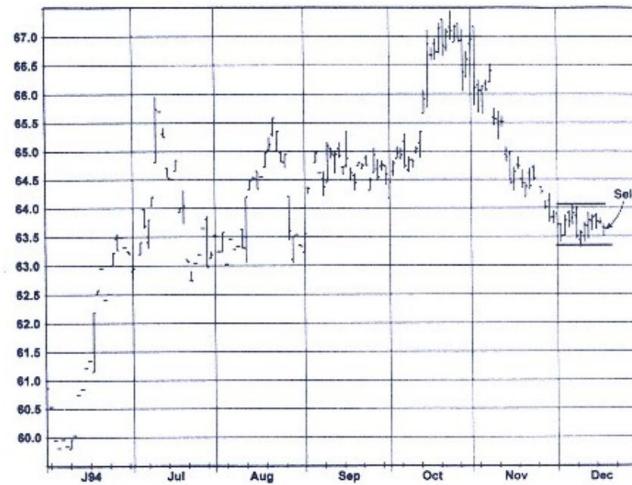


Figure 12.6a  
March 1995 deutsche mark.

**Trade Entry Reason**

Narrow consolidation formed after steep price slide suggested a probable continuation of downtrend.

**Do you agree or disagree with the analysis?  
Evaluate the situation before turning page.**

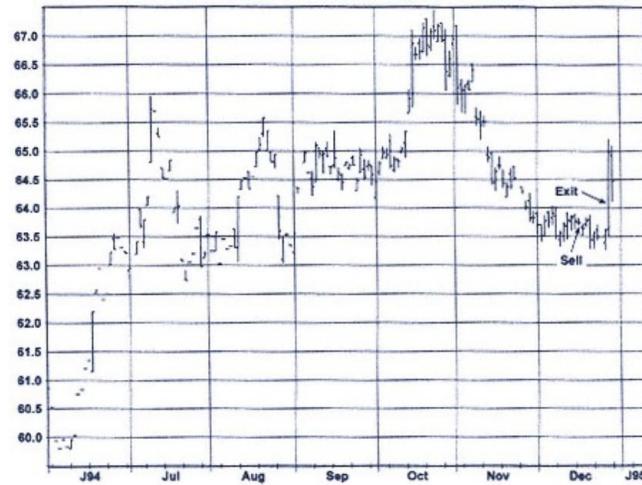


Figure 12.6b  
March 1995 deutsche mark.

**Trade Exit**

Countertoanticipated breakout from consolidation violated a basic premise of trade.

**Comment**

Exit on the first sign of an invalidation of the trade premise kept the loss small.

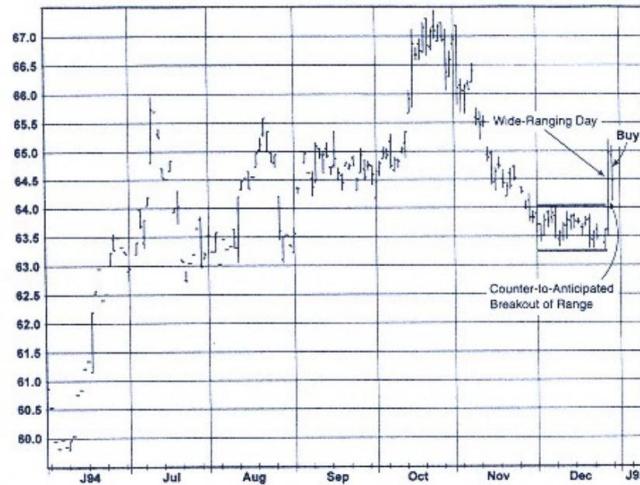


Figure 12.7a  
March 1995 deutsche mark.

#### ***Trade Entry Reasons***

1. Countertoanticipated penetration of a narrow consolidation suggests an upside reversal. (Same reason why prior trade liquidated—see Figure 12.6b.)
2. A wideranging day formed near a relative low is often an early sign of a trend reversal.

**Do you agree or disagree with the analysis?  
Evaluate the situation before turning page.**

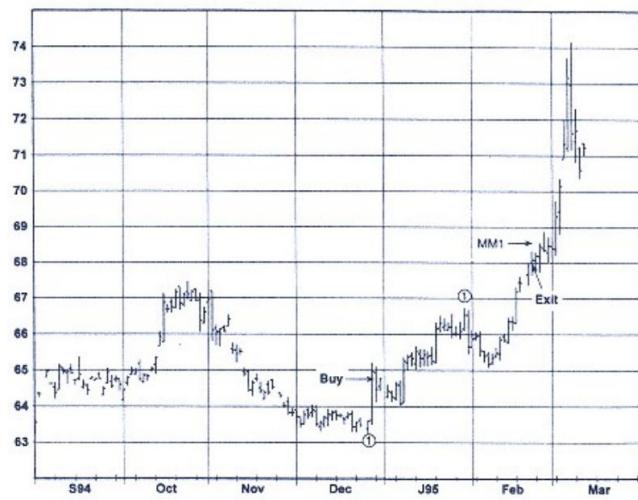


Figure 12.7b  
March 1995 deutsche mark.

#### ***Trade Exit***

The trade was liquidated on a sharply raised stop because of the proximity of the measured move objective.

#### ***Comment***

This trade provides a perfect example of the desirability of quickly reversing a trade opinion if market conditions change. Only two days before implementation of a long position in this trade, I had been bearish and short (see Figure 12.6b). However, the same factors that had suggested covering short also supported the idea of going long. Unfortunately, I am usually not this wise without the benefit of hindsight.

In this instance, getting out of a winning trade because of the proximity of an important objective sacrificed a significant further advance. Sometimes getting out near an objective is the right decision (see, for example, Figure 12.4b); sometimes letting the position ride would be the right decision, as was the case here.



Figure 12.8a  
October 1993 gold.

#### ***Trade Entry Reasons***

1. Confirmed bull trap top.
2. Sustained downside gap.
3. Wideranging down day.
4. Flag consolidation formed after the downswing.

**Do you agree or disagree with the analysis?  
Evaluate the situation before turning page.**

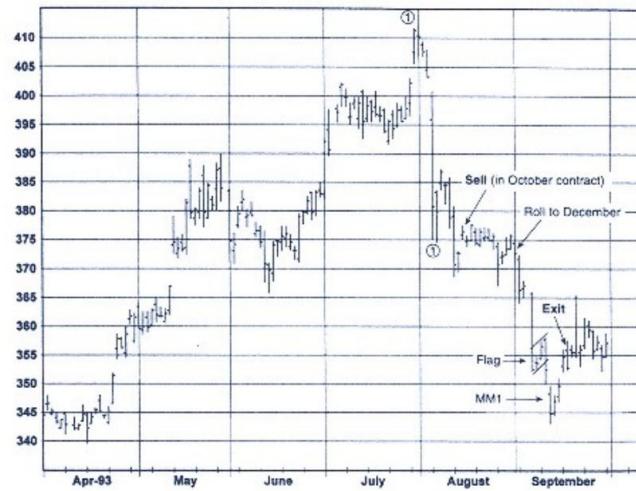


Figure 12.8b  
October 1993 gold.

#### ***Trade Exit***

1. Stop brought in very close once the measured move objective (MM1) was achieved.
2. Rebound to upper portion of prior flag provided the first sign of a possible trend reversal.

#### ***Comment***

Confirmed bull traps are among the most reliable chart signals of a major top. Also note that the achievement of a measured move objective can be used as a signal for bringing in a stop very close—an action that locks in a major portion of profits, while still leaving open the opportunity for additional profits if the price move continues uninterrupted (which, of course, was not the case here).

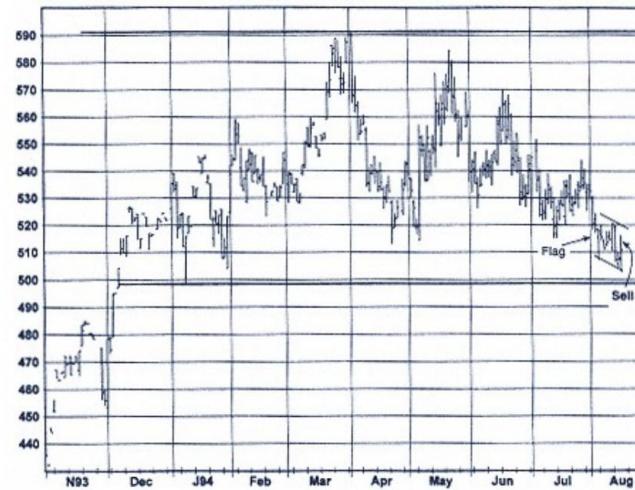


Figure 12.9a  
September 1994 silver.

***Trade Entry Reason***

Flag pattern formed near the bottom of an extended, broad trading range is often an excellent sell signal.

**Do you agree or disagree with the analysis?  
Evaluate the situation before turning page.**

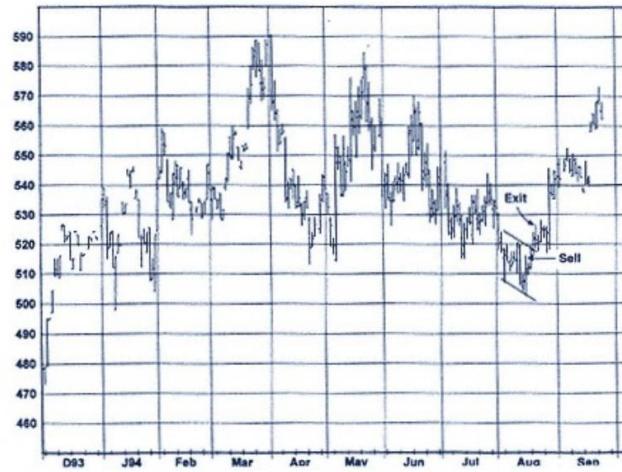


Figure 12.9b  
September 1994 silver.

#### **Trade Exit**

Countertoanticipated upside breakout of flag pattern violated the trade premise.

#### **Comment**

A chart pattern does not need to be right more than 50% of the time—or, for that matter, even close to 50% of the time—to be valuable. For example, when the pattern that motivated this trade—a flag near the low end of a trading range—proves correct, it can allow the trader to capture a major downswing. On the other hand, when it is wrong, evidence of the failure is provided quickly—a modest upside penetration of the flag pattern. In other words, trading this pattern will naturally allow for much larger average gains on winning trades than average losses on losing trades. Consequently, the pattern can be a beneficial tool even if it leads to significant more losses than gains.

In general, it is a mistake to focus on the percentage of winning trades generated by a system or methodology. The key factor is the expected gain per trade. (The expected gain per trade is equal to the percentage of winning trades times the average profit per winning trade minus the percentage of losing trades times the average loss per losing trade.)

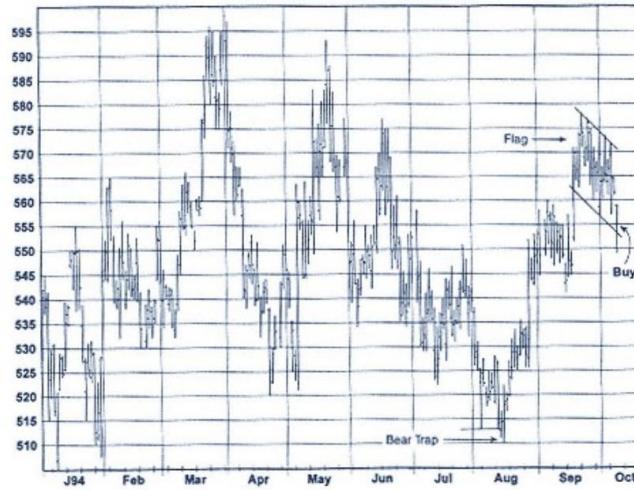


Figure 12.10a  
December 1994 silver.

**Trade Entry Reasons**

1. Sustained bear trap suggested that a major low had been established.
2. Flag pattern formed following the upswing implied that the next market price swing would be on the upside.
3. Buy initiated near support implied at the lower end of the broad flag consolidation.

**Do you agree or disagree with the analysis?  
Evaluate the situation before turning page.**

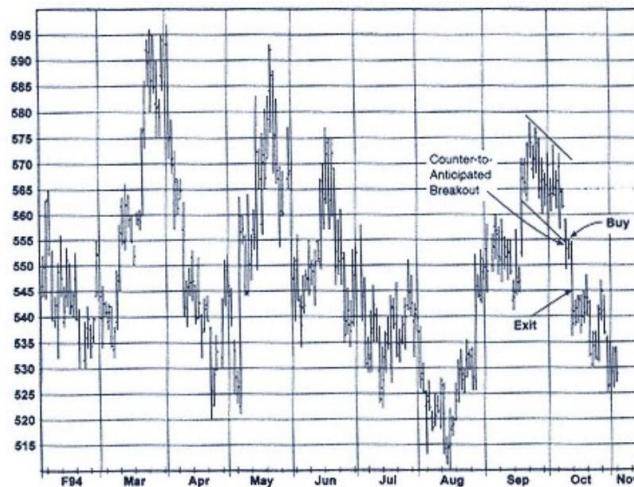


Figure 12.10b  
December 1994 silver.

#### ***Trade Exit***

Countertoanticipated penetration downside of the flag pattern strongly suggested the trade idea was wrong.

#### ***Comment***

When the market doesn't behave as expected, get out! Although the loss on this particular trade was relatively small (\$500), some readers may wonder if the loss might not have been kept even smaller by getting out closer to the countertoanticipated breakout point. Perhaps, but only by a marginal amount. Generally speaking, it is not a good idea to place stops too close to critical points. For example, in the case of flag patterns, the shape of the flag can change as it evolves, or the pattern may be interrupted by a oneday spike without any followthrough. In both instances, keeping a stop very close to a breakout point can result in liquidating a position even though the flag ultimately remains intact and the original trade idea proves successful.

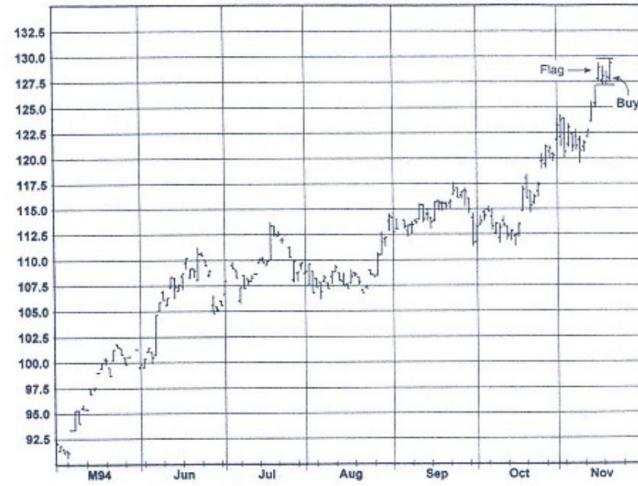


Figure 12.11a  
March 1995 copper.

**Trade Entry Reason**

A flag consolidation formed in new high ground usually leads to at least a shortterm upswing.

**Do you agree or disagree with the analysis?  
Evaluate the situation before turning page.**

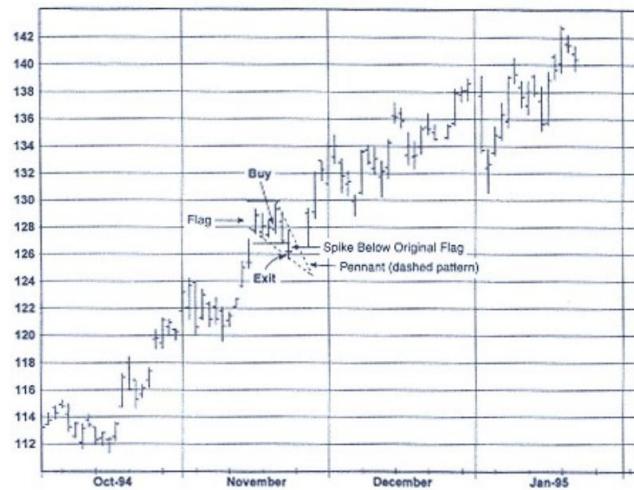


Figure 12.11b  
March 1995 copper.

#### ***Trade Exit***

Trade liquidated on a downside penetration of the flag pattern.

#### ***Comment***

Although this trade idea ultimately proved correct and could have been very profitable, in reality, the trade resulted in a loss. The reason for this disappointing outcome is that I was of a trading error: specifically, the stop was brought in too close. Flag and pennant consolidations frequently change their shape as they evolve. It is also quite common for such consolidations to be interrupted by oneday spikes. consequently, it is important that stops in such trades allow for a meaningful margin beyond the existing boundary of the pattern. The illustrated trade can be viewed as either one of the advancements—that is, as either a oneday spike below the original flag pattern or a change in the shape of the consolidation (from a flag to a pennant).

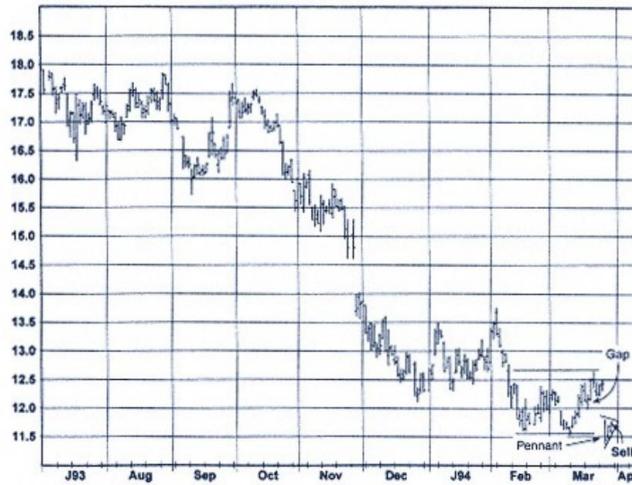


Figure 12.12a  
Crude oil continuous futures.

***Trade Entry Reasons***

1. Pennant consolidation formed near the low end of the trading range suggested the potential for another downswing.
2. Wide downside gap immediately preceding pennant consolidation.

**Do you agree or disagree with the analysis?  
Evaluate the situation before turning page.**

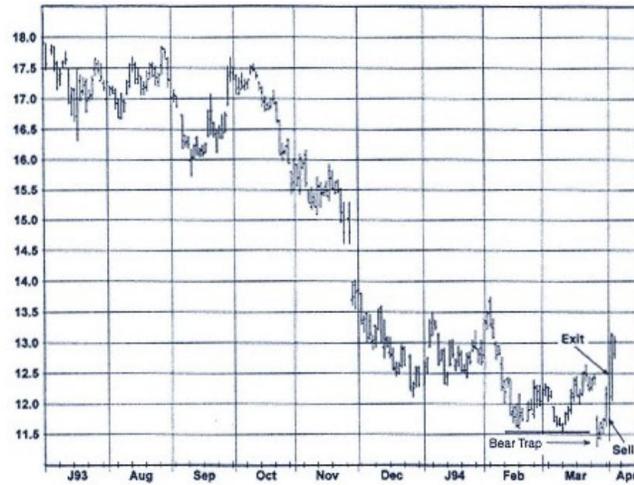


Figure 12.12b  
Crude oil continuous futures.

**Trade Exit**

Subsequent rebound back to near the top of the trading range left the low of the pennant consolidation looking like a bear trap reversal.

**Comment**

See next trade.

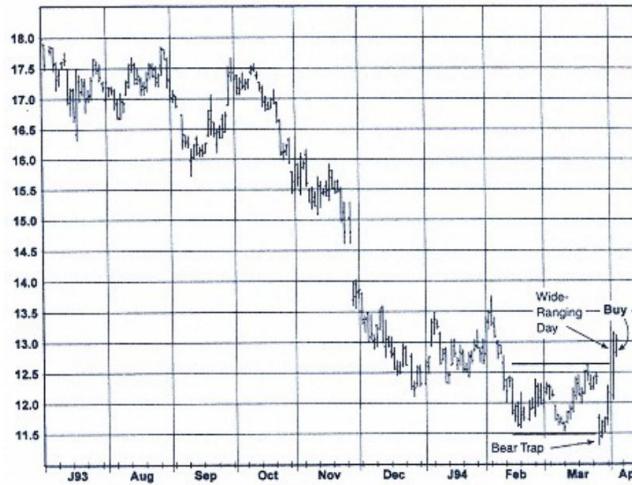


Figure 12.13a  
Crude oil continuous futures.

***Trade Entry Reasons***

1. Bear trap low.
2. Wideranging up day formed near the low of an extended decline.

If this chart looks familiar, it is because the trade was implemented on the day following the activation of the stop in the prior trade.

**Do you agree or disagree with the analysis?  
Evaluate the situation before turning page.**

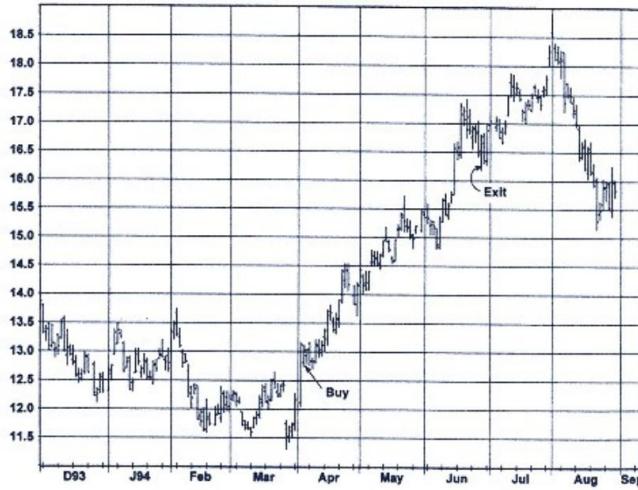


Figure 12.13b  
Crude oil continuous futures.

#### ***Trade Exit***

Position was liquidated on a trailing stop, which at the time of exit was kept close because of large open profits.

#### ***Comment***

This trade was motivated by failure signals related to the prior trade. Flexibility in a trade was wrong and reversing (not merely liquidating) the original position made it possible to capture a large gain in a trade sequence that began by going bottom at the virtual market! (See Figure 12.12a.) This important trade dramatically illustrates the concept that the ability to decisively respond to the market's constantly changing price action is a far more attributable skill in making market calls. (Note continuous futures charts were used to illustrate this trade because the position was rolled through several contracts.)

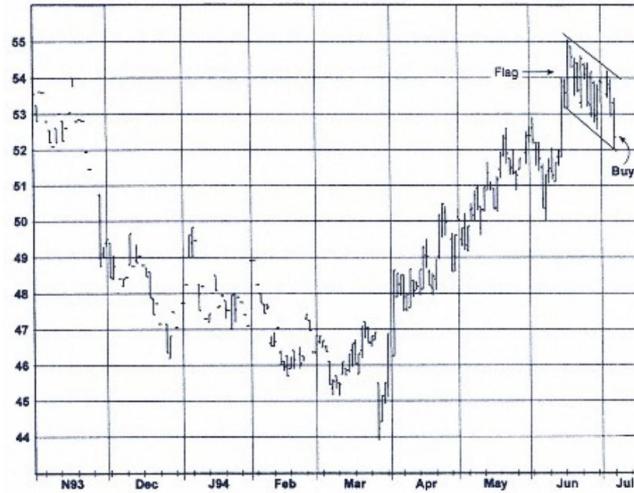


Figure 12.14a  
September 1994 unleaded gas.

**Trade Entry Reasons**

1. Flag consolidation in an uptrend suggested the likelihood of another upswing.
2. Buy implemented near support implied by lower boundary of flag.

**Do you agree or disagree with the analysis?  
Evaluate the situation before turning page.**

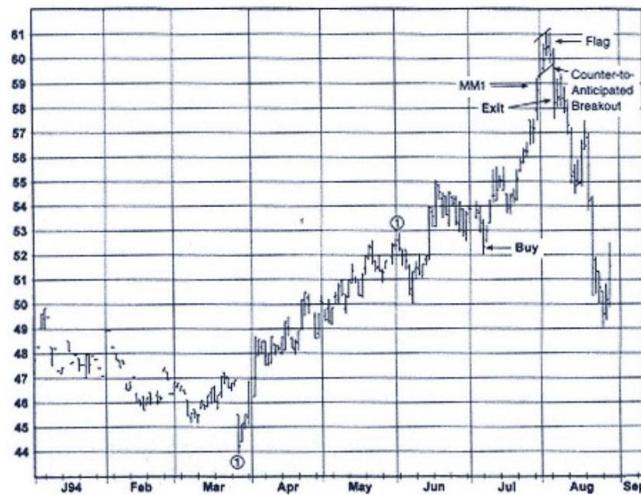


Figure 12.14b  
September 1994 unleaded gas.

#### **Trade Exit**

Trade was liquidated following the countertoanticipated penetration of a flag pattern formed after a major measured move objective had been achieved.

#### **Comment**

Countertoanticipated breakouts from flag patterns can sometimes provide liquidation (or reversal) signals reasonably close to major turning points—particularly when such failure signals occur after a major measured move objective has been experienced.

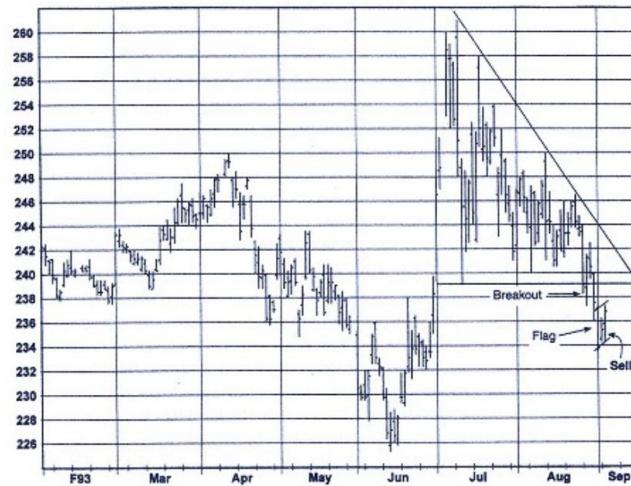


Figure 12.15a  
December 1993 corn.

***Trade Entry Reasons***

1. Downside breakout of a huge descending triangle.
2. Flag formed below the triangle suggested the likelihood of a continued downtrend.

**Do you agree or disagree with the analysis?  
Evaluate the situation before turning page.**

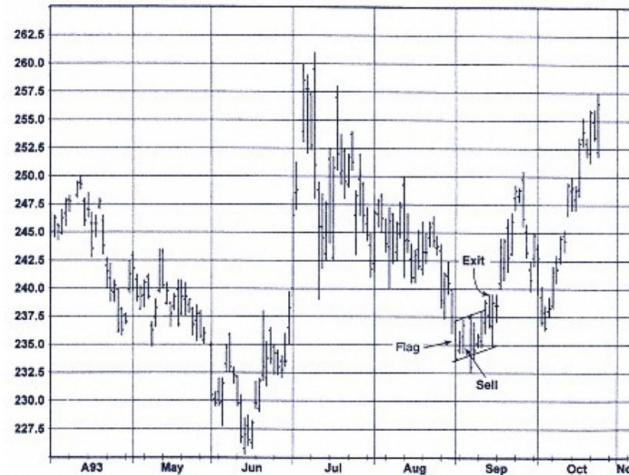


Figure 12.15b  
December 1993 corn.

#### ***Trade Exit***

Countertoanticipated breakout of flag suggested that an upside reversal had occurred.

#### ***Comment***

Exiting on the first sign of violation of the trade premise kept loss very small even though the trade idea was dead wrong.



Figure 12.16a  
December 1993 wheat.

**Trade Entry Reason**

Flag formed after the breakout above the trend channel suggested the likelihood of a continued price advance.

**Do you agree or disagree with the analysis?  
Evaluate the situation before turning page.**

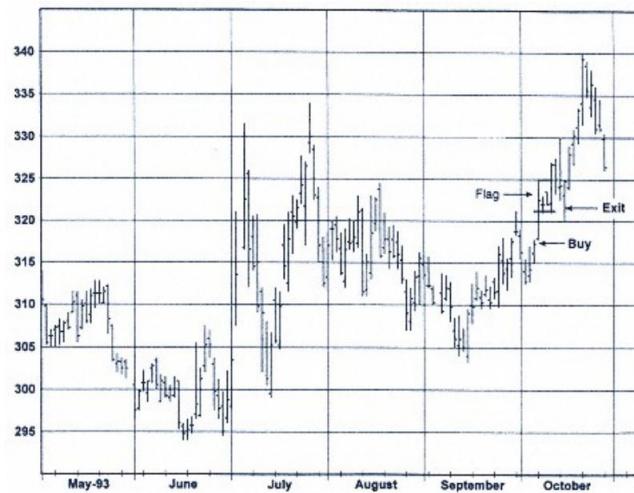


Figure 12.16b  
December 1993 wheat.

#### ***Trade Exit***

Pullback to the low end of the most recent flag pattern represents a shortterm failure signal.

#### ***Comment***

Even though this trade was net profitable, placing the protective stop at a point represents the first sign of a market failure resulting in missing the bulk of the price move. There is a tradeoff in using stops equivalent to the closest meaningful point: In some cases, this approach will provide very timely exits; In other instances, however, this procedure will result in the highly premature liquidation of good positions (as was the case in this illustration). There is no absolute right or wrong answer regarding the use of such stops; it is significantly a matter of personal choice. One possible compromise approach is to avoid bringing the stop in closer than breakeven for the first two weeks of the trade. Such a rule would have prevented the premature exit in this trade.

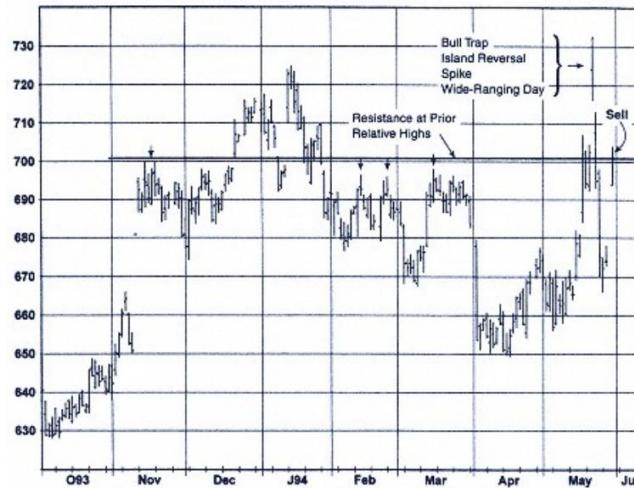


Figure 12.17a  
July 1994 soybeans.

#### **Trade Entry Reasons**

1. Rebound to resistance area implied by the concentration of prior relative highs (denoted by downward-pointing arrows).
2. Apparent peak in place based on the following factors:
  - a. Bull trap
  - b. Island reversal
  - c. Spike
  - d. Wideranging day

It is noticeable that all four of the listed bearish patterns occurred on a single day! (Of course, in the case of the island reversal, by definition, the pattern also included the preceding and succeeding days.)

**Do you agree or disagree with the analysis?  
Evaluate the situation before turning page.**

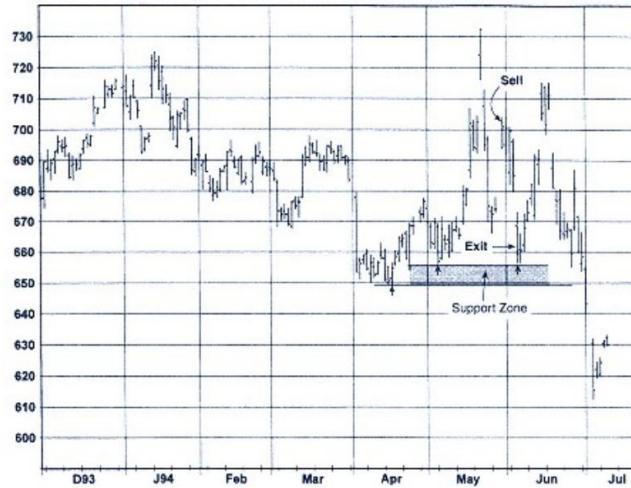


Figure 12.17b  
July 1994 soybeans.

#### **Trade Exit**

Trade was liquidated on a retracement to the support zone implied by the concentration of prior relative lows (denoted by upwardpointing arrows).

#### **Comment**

Although as a general rule it is desirable to try to ride a trade until there is at least some sign of a reversal, a reasonable exception is provided by trades that meet the following combined conditions:

1. Very quick, pronounced move in anticipated direction.
2. Proximity of major support (or major resistance, in the case of long positions).

The reasoning is that these trades are particularly prone to abrupt pullbacks, and such corrective moves can easily result in trade being liquidated at a much worse price (eg, activation of protective stop), even if the trend eventually continues.



Figure 12.18a  
July 1994 coffee.

**Trade Entry Reasons**

1. Extreme spike high after an extended advance suggested a possible major top.
2. Flag pattern formed after downswing implied that the next price swing would also be on downside.

**Do you agree or disagree with the analysis?  
Evaluate the situation before turning page.**

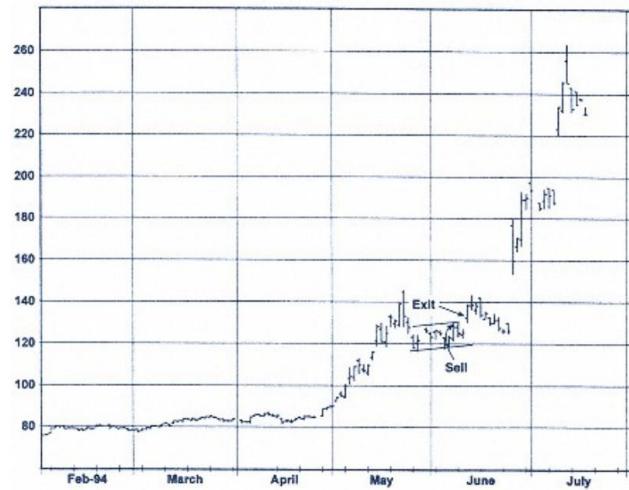


Figure 12.18b  
July 1994 coffee.

#### ***Trade Exit***

The countertoanticipated upside breakout of the flag pattern contradicted one of the basic premises for the trade.

#### ***Comment***

Sometimes what appears to be a major top proves to be only a minor peak. This trade provides a good example of why traders who do not routine employ a trade exit plan are unlikely to stay in the game very long.

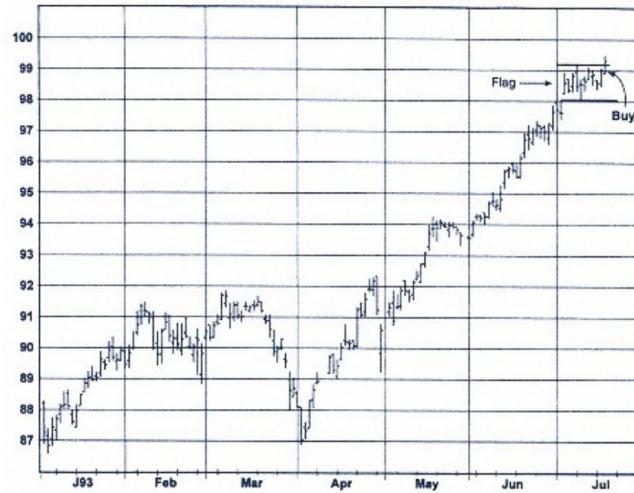


Figure 12.19a  
Italian bond continuous futures (daily).

**Trade Entry Reason**

Flag consolidation after an uptrend suggested continuation of the uptrend.

**Do you agree or disagree with the analysis?  
Evaluate the situation before turning page.**

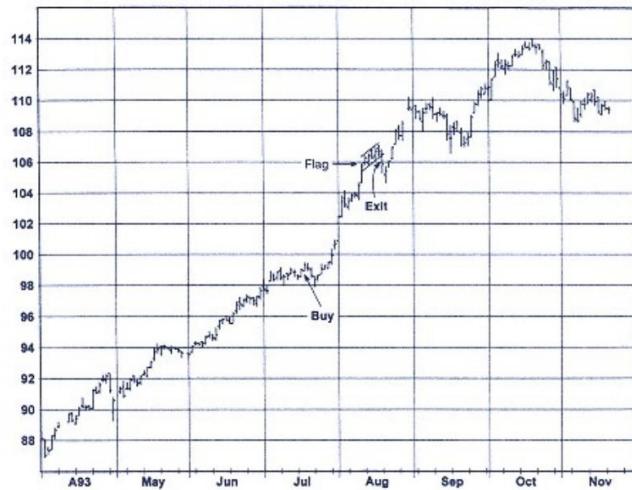


Figure 12.19b  
Italian bond continuous futures (daily).

#### **Trade Exit**

Downside penetration of the flag pattern after a large advance suggested danger of at least a temporary reversal. (Continuous futures are used to depict all the Italian bond trades, because virtually all the trading in this market duration is concentrated in the nearest contract until near expiration, making it impossible to generate individual contract charts of sufficient to perform an adequate chart analysis.)

#### **Comment**

This trade provides a good illustration of two concepts:

1. Just because the market has already witnessed a large advance does not definitely mean it's too late to buy.
2. By waiting for an appropriate chart pattern, it is possible to select a relatively close, technically meaningful stop, even if the market has experienced a large advance. (In this trade, the initial stop was placed below the narrow consolidation formed prior to entry.)

## **PART THREE— TRADING SYSTEMS**

## **Chapter 13— Charting and Analysis Software**

One of the most welcome developments in technical analysis has been the proliferation of powerful computers and software that has liberated traders from the painstaking pencil-and-paper charting techniques of the relatively recent past. There are any number of software programs available which enable traders to load price data, construct various price charts (bar, point-and-figure, close-only, candlestick, daily, weekly, monthly, hourly, etc.), apply a host of analytical tools and indicators, and design and test trading ideas. Such programs are indispensable to the serious trader and technical analyst. This chapter will review the important considerations in selecting such software.

There are dozens of technical analysis software packages, many of which specialize in particular techniques or markets. For example, one piece of software may be specifically for Elliott Wave analysis; another program may be designed solely to analyze mutual fund data. Our concern here, however, is with general based programs that allow traders to apply a wide variety of analytical tools (and alternately, trading system testing capabilities) to different data types—stocks, futures, mutual funds, various cash data, and in some cases options.

### **A Word on Price Data**

Technical analysis programs, of course, need price data to analyze. The type of analysis and trading a trader wishes to engage in will determine the type of data he or she purchases, which will in turn influence the program used. (Alternately, a trader who has already decided on an analysis program may have a limited selection of data sources.) There are any number of data vendors who specialize in providing price data in a variety of formats. The three most common formats are:

1. Historical Price Data. Historical data refers to price data spanning a specific time period: 3 years, 10 years, 20 years, and so on. Data vendors (and often individual stock and futures exchanges) offer various data packages encompassing different markets—US stocks, futures, indexes, mutual funds, etc.—for different time periods, with daily data being the default time scale (historical intraday data is available, but is generally more expensive). The longer the time period, the higher the price. Fortunately, the cost of historical daily data has dropped in recent years; many software programs often include a database of historical prices with their product—for example, three years of daily continuous futures prices and 20 years of daily stock prices on disk or CDROM .
2. EndOfDay Price Data. Endofday prices are just what they sound like: the high, low, closing, and, usually, opening prices for each day, generally available within a few hours after the markets close. To be able to use such data, your software program must have a price download feature—very common in most mid to upperlevel packages—and you must be able to communicate electronically with your data vendor (usually via modem or Internet, although other mediums are available). The trader can then build a price database of the instruments he or she follows, or add these prices on to an existing historical database. Endofday data is more expensive than historical data. Some data vendors will give you access to an extended historical price database when you subscribe to their endofday service, in effect, killing two birds with one stone.
3. RealTime (or "Tick") Price Data These are prices transmitted throughout the day, as trades occur, with as little delay (barring technical problems or exceptional market conditions) as a few seconds. data, but is essential to anyone except fulltime professional traders who must watch the markets all day, every day Traders, however, may purchase delayed intraday price quotes—say, 10, 15, or 30 minutes behind the markets—at a fraction of the cost of nondelayed data.

While endofday prices are increasingly available for little or no money exchanges— happens directly from an exchange, an important service professional data vendors provide is to correct data flaws (prices incorrectly reported or communicated by— happens) and format prices before forwarding them to customers. Traders may opt to gather

prices directly themselves, but they must then assume responsibility for "cleaning" the data, and, if necessary, formatting the prices for use in an analysis program—a timeconsuming, probably tedious, and potentially impossible task for the computer amateur. Data vendors, however, are not perfect; traders must always be on the lookout for data errors like missing days and inexplicable price spikes.

Using a particular analysis program or data source may limit your choices of the other—that is, certain programs accept only certain "brands" of price data. Most programs, however, will give you a choice of at least a few competitively priced data sources.

Note: Futures traders should make sure they're getting the specific kind of historical data they need: individual futures contract data, nearest futures, or continuous futures. Continuous futures are the most desirable for historical testing of trading systems. (The advantages and disadvantages of each kind of data were discussed in Chapter 2.)

### **Software Considerations**

Before purchasing such software, a trader should take an inventory of his or her trading needs and computer skills. Charting and analysis software ranges in price from less than \$100 to thousands of dollars; for less experienced traders especially, there is a risk of paying premium for highlevel features that serve no practical purpose. Furthermore, many vendors that sell both entrylevel and more advanced software allow users to upgrade to the more sophisticated product at a reduced price. To help select an appropriate product, it is useful to consider:

- Time Frame/Trading Style. Except for those interested in very shortterm or intraday trading (using hourly, halfhour, 10minute, etc., charts), trading software that enables you to import manipulate and realtime price data is unnecessary. One of the greatest price differences in software is that between realtime programs and endofday programs, which allows you to import and manipulate daily and historical price data only. And as mentioned earlier, the cost of realtime price data is exponentially higher than endofday or historical data.
- Analytical Goals. What do you wish to accomplish with your software? Are you simply looking for a "digital chart"—an easy way to track markets, perform simple chart analysis (draw trend lines and chart patterns, etc.), and apply a few indicators? Or, do

you want a program that will help you design and test your own indicators and trading strategies? Not surprisingly, the latter is more expensive than the former. Again, there is no point in paying for features you will not use.

• **Computer Skills.** *Most lower* to midlevel analytical programs are fairly intuitive and userfriendly, allowing you to perform simple charting and analysis functions without having to be a computer expert. Software programs with system testing capabilities are a different story, however. While most use simplified programming languages (usually complemented by a library of preprogrammed technical studies or systems) designed specifically for non—computer users, the on the trader increases with the capabilities of the program and the complexity of the trading ideas being tested. This may make testing sophisticated systems more wishful thinking than a realistic goal unless the trader is committed to mastering basic programming as well as technical analysis skills. A trader who only needs to test fairly straightforward ideas has no need for a demanding (and probably more expensive) program that will only add to the difficulty of performing market analysis. The object of using such tools is to simplify the analytical process, not complicate it.

It is also important to be aware of certain terminology distinctions. Analytical programs—those that allow you to perform your own analysis, based on your own opinions—should not be confused with trading programs, which are packaged mechanical trading systems that generate buy and sell recommendations for whatever price data is fed into them. The issue can become confused because some trading programs include an analysis component in addition to the trading system. In most instances, however, what you're paying for is the system, not the analytical features.

A midlevel technical analysis program might allow you to:

1. Download historical and endofday prices (stocks, futures, mutual funds, possibly options).
2. Create several types of charts (bar, closeonly, candlestick, pointandfigure) in a variety of time frames (monthly, weekly, daily).
3. Perform chart analysis and apply and modify a variety of technical indicators. For example, you could apply your choice of simple, weighted, or exponential averages, and adjust the number of days in the average as needed.
4. If the program has a testing feature, you might be able to test the

trading performance of various indicator signals, or design and test relatively simple original indicators and trading ideas.

These features would allow you to apply virtually all the techniques described in this book. A lowerlevel program might only allow you to create bar charts and apply a handful of simple technical indicators and chart analysis drawing tools. A more advanced program might allow you to use realtime data, perform advanced statistical analysis, and construct elaborate trading models, using both technical and fundamental data, on a portfolio of instruments.

### **Research Software**

Those interested in purchasing analytical software and price data can consult a variety of sources: the Internet (both investmentrelated web sites and newsgroups), and *industry magazines like the American Association of Individual Investors (AAII) Journal, Technical Analysis of Stocks & Commodities, Futures , and Commodity Traders Consumer Report (CTCR)*. In addition to regular features on software products, some of these publications offer additional supplements exclusively concerned with analytical software. (AAII, for example, publishes an updated investment software guidebook every year.) But the Internet is the prime source of information for traders interested in learning about or sampling the various kinds of available programs. Many software vendors offer downloadable trial or demonstration versions of their products on the Web.

## **Chapter 14— Technical Trading Systems: Structure and Design**

*There are only two types of trendfollowing systems: fast and slow.*  
—Jim Orcutt

### **What This Book Will and Will Not Tell You about Trading Systems**

Be forewarned. If you are expecting to find the blueprint for a heretofore secret trading system that consistently makes 100% plus per year in reallife trading with minimal risk, you'll have to look elsewhere. For one thing, I have not yet discovered such a surething money machine. But in a sense, that is beside the point. For obvious reasons, this book will not offer detailed descriptions of the best trading systems I have designed—systems that at this writing are being used to manage about \$40 million. Quite frankly, I have always been somewhat puzzled by advertisements for books or computer software promising to reveal the secrets of systems that make 100%, 200%, and more! Why are they selling such valuable information for \$99, or even \$2,999?

The primary goal of this chapter is to provide the reader with the background knowledge necessary to develop his or her own trading system. The discussion focuses on the following areas:

1. An overview of some basic trendfollowing systems
2. The key weaknesses of these systems

3. Guidelines for transforming "generic" systems into more powerful systems
4. Countertrend systems
5. Diversification as a means of improving performance

Some of this information must be put into the proper trading context. For example, stock traders, few of whom will short the market, should concentrate on those aspects of system design relevant to timing market entry and liquidating long positions, with the goal of bettering the risk/return profile of a buyandhold approach.

### **The Benefits of a Mechanical Trading System**

Is paper trading easier than real trading? Most speculators would answer yes, even though both tasks require an equivalent decision process. This difference is explained by a single factor: emotion. Overtrading, premature liquidation of good positions because of rumors, jumping the gun on market entry to get a better price, holding on to a losing position—these are but a few of the negative of emotion in actual trading. Perhaps the greatest value of a mechanical system is that interested emotion from trading, helping the speculator avoid many of the common errors just described. Furthermore, the removal of the implied need for constant decision significantly reduces tradingrelated stress and anxiety.

Another benefit of a mechanical system is that it ensures a consistency of approach—that is, the trader follows all signals indicated by a common set of conditions. This is important, since even profitable trading strategies can lose money if applied selectively. To illustrate this point, consider the example of a market letter writer whose recommendations yield a net profit over the long run (after allowances for commissions and poor executions). Will his readers make money if they only implement trades in line with his recommendations? Not sure. Some subscribers will pick and choose trades, invariably missing some of the largestprofit trades. Others will stop following the recommendations after the advisor has a losing streak, and as a result may miss a string of profitable trades. The point is that a good trading strategy is not sufficient; success also depends upon consistency.

A third advantage of mechanical trading systems is that they normally provide the trader with a method for controlling risk. Money management is an essential ingredient of trading success. Without a plan for

limiting losses, a single bad trade can lead to disaster. Any properly constructed mechanical system will either contain explicit stoploss rules or specify conditions for reversing a position given a sufficient adverse price move. As a result, following signals generated by a mechanical trading system will normally prevent the possibility of huge losses on individual trades (except in extreme circumstances when one is unable to liquidate a position because a futures market is in the midst of a string of locked limit moves). Thus, the speculator using a mechanical system may end up losing money due to the cumulative effect of a number of negative trades, but at least his or her account will not be decimated by one or two bad trades.

Of course, money management does not definitely require the use of a trading system. Risk control can also be achieved by initiating a goodtillcanceled stop order whenever a new position is taken, or by predetermining the exit point upon entering a trade and sticking to that decision. However, many traders lack sufficient discipline and will be tempted to give the market just a little more time once too often.

### **Three Basic Types of Systems**

The number of categories used to classify trading systems is completely arbitrary. The following three division classification is intended to emphasize the key conceptual differences in possible trading approaches:

TrendFollowing. A trendfollowing system waits for a specified price move and then initiates a position in the same direction based on the implicit assumption that the trend will continue.

Countertrend. A countertrend system waits for a significant price move and then initiates a position in the opposite direction on the assumption that the market is due for a correction.

Pattern Recognition. In a sense, all systems can be classified as pattern recognition systems. After all, the conditions that signal a trend or a countertrend trade are a type of pattern (eg, close beyond 20day high or low). However, the implication here is that the chosen patterns are not based preeminent on directional moves as is the case in trendfollowing and countertrend systems. For example, a patternrecognition system might generate signals on the basis of spike days. In this case, the key consideration is the pattern itself (eg, spike) rather than the extent of any preceding price move. Of course, this example is too simple. In practice, the patterns

used for determining trading signals will be more complex, and several patterns may be incorporated into a single system.

It should be highlighting that the division lines between the preceding categories are not always clearcut. As modifications are incorporated, a system of one type may begin to more closely approximate the behavioral pattern of a different system category.

### **TrendFollowing Systems**

By definition, trendfollowing systems never sell near the high or buy near the low, since a meaningful opposite price move is required to signal a trade. Thus, in using this type of system, the trader will always miss the first part of a price move and may surrender a significant portion of profits before an opposite signal is received (assuming the system is always in the market). There is a basic tradeoff involved in the choice of the sensitivity, or speed, of a trendfollowing system. A sensitive system, which responds quickly to signs of a trend reversal, will tend to maximize profits on valid signals, but it will also generate far more false signals. A nonsensitive, or slow, system will reflect the reverse set of characteristics.

Although in some markets fast systems consistently outperforms slow systems, in most markets the reverse is true, as the minimization of losing trades and commission costs in slow systems more than offsets the reduced profits in the good trades. This observation is only intended as a cautionary note against the natural tendency towards seeking out more sensitive systems. However, in all cases, the choice between fast and slow systems must be determined on the basis of empirical observation and the trader's subjective preferences.

There are a wide variety of possible approaches in favor of a trendfollowing system. In this chapter we focus on two of the most basic methods: moving average systems and breakout systems.

### **Moving Average Systems**

The moving average for a given day is equal to the average of that day's closing price and the closing prices on the preceding N 1 days, where N is equal to the number of days in the moving average. For example, in a 10day moving average, the appropriate value for a given day would be the average of the 10 closing prices culminating with that day. The term moving average refers to the fact that the set of numbers being averaged is continuously moving through time.

Since the moving average is based on past prices, in a rising market the moving average superior will be below the price series, while in a declining market the moving average superior will be above the price series. Thus, when a price trend reverses from up to down, prices must cross the moving average from above. similarly, when the trend reverses from down to up, prices must cross the moving average from below. In the most basic type of moving average system, these crossover points are viewed as trade signals: A buy signal is indicated when prices cross the moving average from below; a sell signal is indicated when prices cross the moving average from above. The crossover should be determined based on closing prices. Table 14.1 illustrates the calculation of a moving average and shows the trade signal points implied by this simple scheme.

Figure 14.1 illustrates the December 1993 Tbond contract and a 35day moving average. The nonbordered buy and sell signals indicated on the chart are based on the simple moving average system just described. (For now ignore the diamondbordered signals; they will be explained later.) Note that although the system catches the major uptrend, it also generates many false signals. Of course, this problem can be mitigated by increasing the length of the moving average, but the tendency toward excessive false signals is a characteristic of the simple moving average system. The reason for this is that temporary, sharp price fluctuations, sufficient to trigger a signal, are commonplace market events.

One school of thought suggests the problem with the simple moving average system is that it weights all days equally, whereas more recent days are more important and therefore should be weighted more heavily. Many different weighting schemes have been proposed for good moving averages. Two of the most common weighting approaches are the linearly weighted moving average (LWMA) and the exponentially weighted moving average (EWMA). The formulas for these moving averages are given in the Appendix.

In my view, there is no strong empirical evidence to support the idea that linearly or exponentially weighted moving averages provide a substantive and consistent improvement over simple moving averages. Sometimes weighted moving averages will do better; sometimes simple moving averages will do better. Experimentation with different weighted moving averages probably does not represent a particularly fruitful path for trying to improve the simple moving average system.

A far more meaningful improvement is provided by the crossover moving average approach. In this system, trade signals are based upon the interaction of two moving averages, as opposed to the interaction be

TABLE 14.1 Calculating a Moving Average			
Day	Closing Price	10 Day Moving Average	Crossover Signal
-	80.50		
2	81.00		
3	81.90		
4	81.40		
5	83.10		
6	82.60		
7	82.20		
8	83.10		
9	84.40		
10	85.20	82.54	
11	84.60	82.95	
12	83.90	83.24	
13	84.40	83.49	
14	85.20	83.87	
15	86.10	84.17	
16	85.40	84.45	
17	84.10	84.64	Sell
18	89.50	84.68	
19	83.90	84.60	
20	83.10	84.42	
21	82.50	84.21	
22	81.90	84.01	
23	81.80	83.69	
24	81.60	83.33	
25	82.20	82.94	
26	82.80	82.68	Buy
27	89.40	82.61	
28	83.80	82.64	
29	83.90	82.64	
30	83.50	82.68	

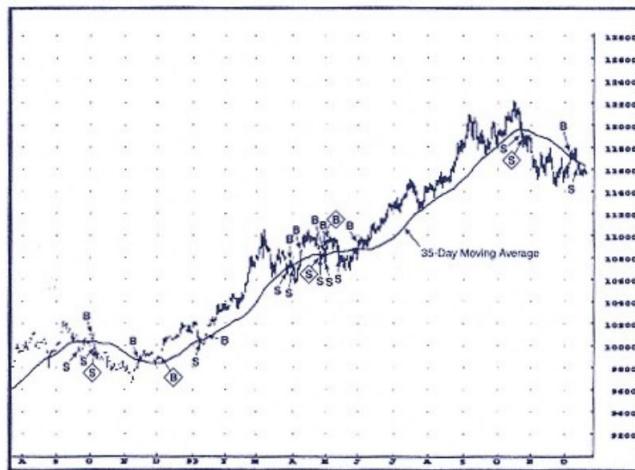


Figure 14.1  
December 1993 Tbond and 35day moving average.

Source: FutureSource;

copyright © 1986–1994; all rights reserved.

Notes: B = buy signal: prices cross moving average from below and close above line; S = sell signal: prices cross moving average from above and close below line;

= sell signal not eliminated by filter.

tween a single moving average and price. The trading rules are very similar to those of the simple moving average system: A buy signal is generated when the shorter term (eg, 10day) moving average crosses above the longerterm (eg, 30day) moving average; a sell signal is generated when the shorterterm moving average crosses below the longerterm moving average. (In a sense, the simple moving average system can be thought of as a special case of the crossover moving average system, in which the shortterm moving average is equal to 1.) Since trade signals for the crossover system are based on two smoothed series (as opposed to one smoothed series and price), the number of false signals is significantly reduced. Figures 14.2, 14.3, and 14.4 compare trading signals indicated by a simple 12day moving average system, a simple 48day moving average system, and the crossover system based on these two averages. Generally speaking, the crossover moving average system is far superior to the simple moving average. (However, it should be noted that

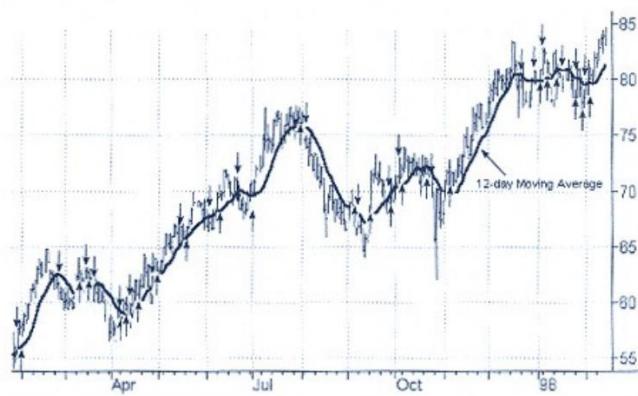


Figure 14.2  
Procter & Gamble and 12day moving average. Chart created with TradeStation® by  
Omega Research, Inc.

Notes: = buy signal: prices cross moving  
average from below and close above line; = sell signal: prices cross  
moving average from above and close below line.

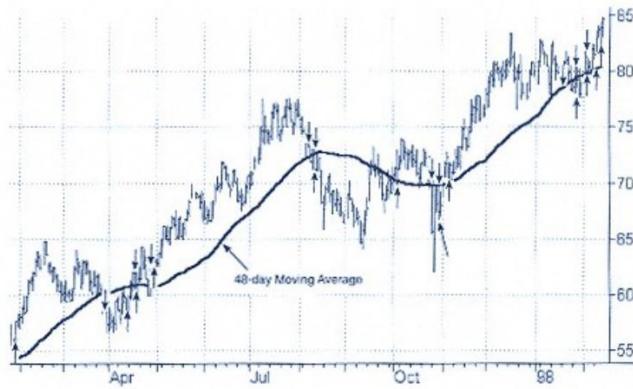


Figure 14.3  
Procter & Gamble and 48day moving average. Chart created with TradeStation® by  
Omega Research, Inc.

Notes: = buy signal: prices cross moving  
average from below and close above line; = sell signal: prices cross  
moving average from above and close below line.

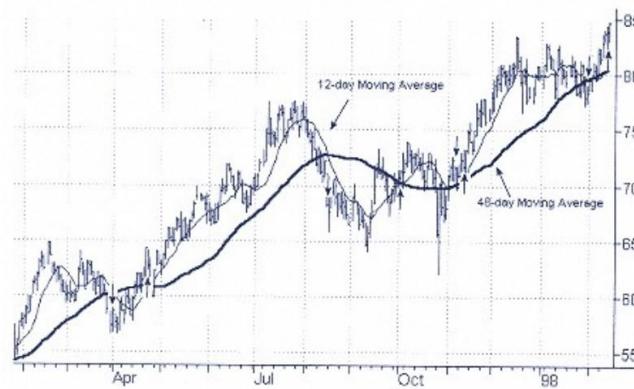


Figure 14.4  
Procter & Gamble and crossover moving average. Chart created with  
TradeStation® by Omega Research, Inc.  
Notes: = buy signal: shortterm moving average (12day)  
crosses longterm moving average from  
below; = sell signal: shortterm moving average crosses  
longterm moving average from above.

by including some of the trendfollowing system modifications discussed shortly, even the simple moving average system can provide the core for a viable trading approach.) The weaknesses of the crossover moving average system and possible improvements are discussed later.

### **Breakout Systems**

The basic concept underlying breakout systems is very simple: The ability of a market to move to a new high or low indicates the potential for a continued trend in the direction of the breakout. The following set of rules provides an example of a simple breakout system:

1. Cover short and go long if today's close exceeds the prior Nday high.
2. Cover long and go short if today's close is below the prior Nday low.

The value chosen for N will define the sensitivity of the system. If a shortduration period is used for comparison to the current price (eg,

$N = 7$ ), the system will indicate trend reversals fairly quickly, but will also generate many false signals. On the other hand, the choice of a longerduration period (eg,  $N = 40$ ) will reduce false signals, but at the cost of slower entry. This is analogous to using shorter or longerterm moving averages in the simple moving average system or the moving average crossover system.

A comparison of the trade signals generated by the preceding simple breakout system using  $N = 7$  and  $N = 40$  are illustrated in Figures 14.5 and 14.6, respectively. The following observations, which are evidenced in these figures, are also valid as generalizations describing the tradeoffs between fast and slow breakout systems:

1. A fast system will provide an earlier signal of a major trend transition. For example, compare the early March 1996 sell signal (the first sell signal in the late February to July 1996 down move) in Figure 14.5 to the April sell signal in Figure 14.6.
2. A fast system will generate far more false signals, eg, the signals in Figure 14.5 during the July 1997 to February 1998 trading range (as well as the signals immediately following the March 1996 sell signal discussed above).

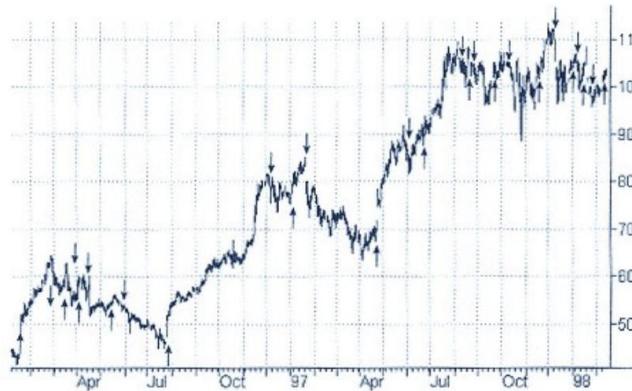


Figure 14.5  
"Fast" breakout system signals: IBM.  
Chart created with TradeStation® by Omega Research, Inc.

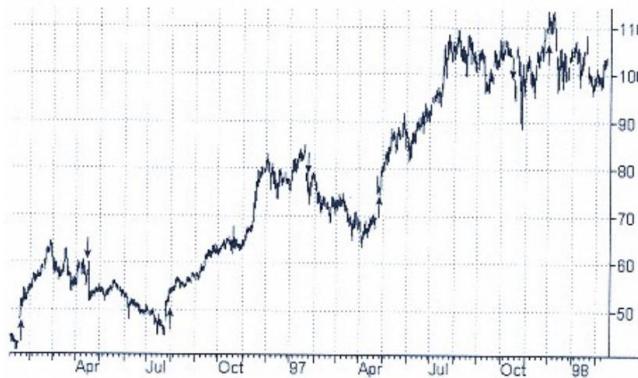


Figure 14.6  
"Slow" breakout system signals: IBM.  
Chart created with TradeStation® by Omega Research, Inc.

3. The loss per trade in the slower system will be greater than the loss for the corresponding trade in the faster system. In some cases, a fast system might even realize a small profit on a minor trend that results in a significant loss in a slower system. For example, from December 1996 to April 1997, the 40day breakout system in Figure 14.6 generated one sell and one buy signal for a loss of nearly four points. The sevenday system over the same period, by comparison, generated two buy and sell signals, the first pair of which produced a fractional loss while the second produced a sevenpoint gain.

Although fast and slow systems will each work better under different circumstances, empirical evidence suggests that, in most markets, slower systems tend to work better than fast systems. However, the choice between a fast and slow system must be based on up-to-date empirical testing.

The previous example of a breakout system was based on the current day's close and prior period's high and low. It should be noted that these choices were arbitrary. Other alternative combinations might include current day's high or low versus prior period's high or low; current day's close versus prior period's high close and low close; and current day's high or low versus prior period's high close or low close. Although the choice of

the condition that defines a breakout will affect the results, the differences between the variations just given (for the same value of N) will be significant random and not overwhelming.

The pitfalls of breakouttype systems are basically the same as those of moving average systems and are detailed in the following section.

#### **Ten Common Problems with Standard TrendFollowing Systems**

1. Too Many Similar Systems. Many different trendfollowing systems will generate similar signals. Thus it is not unusual for a number of trendfollowing systems to signal a trade during the same onetofiveday period. In futures markets especially, since many speculators and funds base their decisions on basic trendfollowing systems, their common action can cause a flood of similar orders that results in poor execution prices.
  2. Whipsaws. Trendfollowing systems will signal all major trends; the problem is that they will also generate many false signals. A major frustration experienced by traders using trendfollowing systems is that markets will often move far enough to trigger a signal and then reverse direction. This unpleasant event can even occur several times in succession, thus the term whipsaw. For example, Figure 14.7, which indicates the trade signals generated by a breakout system (close beyond prior Nday high or low) for N = 10, provides a vivid illustration of the dark side of trendfollowing systems.
  3. Failure to Exploit Major Price Moves. Basic trendfollowing systems always assume an equalunitsize position—for example, a fixeddollar amount or a fixed number of shares, or one futures contract, per buy or sell. As a result, given an extended trend, the best such a system can do is to indicate a oneunit position in the direction of the trend. For example, in Figure 14.8 a breakout system with N = 40 would signal a long position in December 1994 and remain long throughout the entire uptrend. Although this is hardly profitable, could be enhanced if the trendfollowing system were able to take advantage of such extended trends by generating signals indicating increases in the base position size.
- 4. Tendency of Nonsensitive (Slow) Systems to Surrender a Large Percentage of Profits. Although slow variations of trendfollowing**

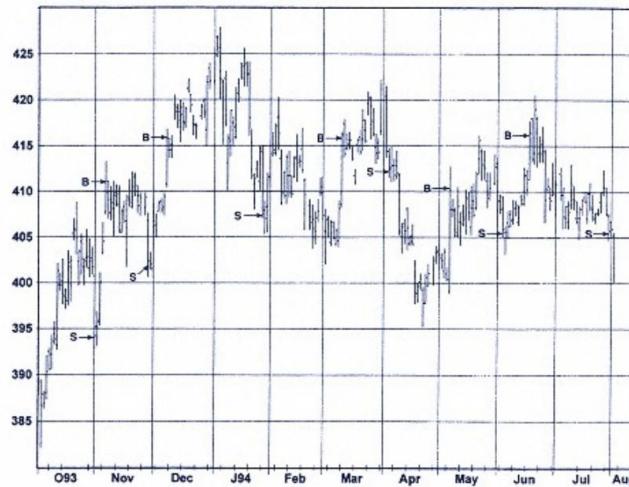


Figure 14.7  
Breakout signals in trading range market: gold continuous futures.  
Notes: B = buy signal: close above prior 10day high; S = sell signal: close below prior 10day low.

systems may often work best, one disturbing feature of such systems is that they may sometimes surrender a large portion of open profits. For example, while the breakout signal in Figure 14.8 provided a favorable entry into a massive uptrend, it surrendered almost half the gain before an offsetting signal was received.

5. Inability to Make Money in Trading Range Markets. The best any trendfollowing system can do during a period of sideways price action is to break even—that is, generate no new trade signals. In most cases, however, trading range markets will be used by whipsaw losses. This is a particularly significant consideration since sideways price action represents the predominant state of most markets.

6. Temporary Large Losses. Even an excellent trendfollowing system may witness transitory periods of sharp equity retracement.

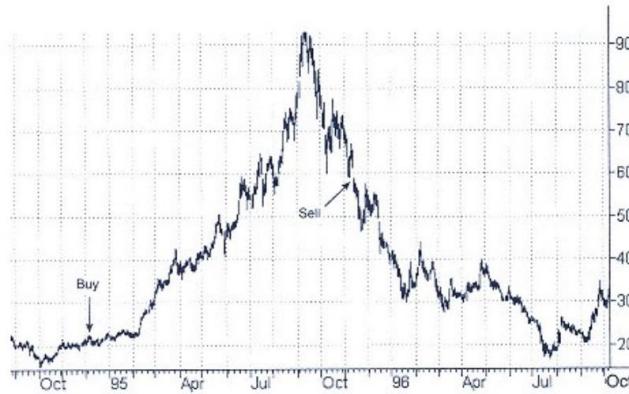


Figure 14.8  
Failure of system to exploit major price move and surrender of profits: Micron  
Technology.  
Chart created with TradeStation® by Omega Research, Inc.

Such events can be distressing to the trader who enjoys a profit cushion, but they can be disastrous to the trader who has just begun following the system's signals.

7. Extreme Volatility in BestPerforming Systems. In some cases, the trader may find that the most profitable trendfollowing systems are also subject to particularly sharp retracements, thereby implying an unsuccessful level of risk.
8. Systems That Work Well in Testing but Then Bomb. This is perhaps the most common tale of woe among traders who have used mechanical trading systems.
9. Parameter Shift. Frequently, the trader may perform an exhaustive search to find the best parameter variation of a system based on past data (eg, the optimum value of N in a breakout system) only to find that the same variation performs poorly (relative to other variations) in the ensuing period.
10. Slippage. Another common experience: The system generates profits on paper, but simultaneously loses money in actual trading. Slippage is discussed in Chapter 15.

### Possible Modifications for Basic TrendFollowing Systems

Based upon the experience of the past two decades, even simple systems, such as moving average or breakout systems, will probably prove profitable if traded consistently over a broad range of markets for a sufficient length of time (eg, three to five years or longer). However, the simplicity of these systems is a vice as well as a virtue. In essence, the rules of these systems are perhaps too simple to adequately account for the wide variety of possible market situations. Even if net profitable over the long run, simple trendfollowing systems will typically leave the trader exposed to periodic sharp losses. In fact, the natural proclivity of many, if not most, users of such systems to abandon the approach during a losing period will lead them to experience a net loss even if the system proves profitable over the longer run.

This section discusses some of the primary avenues for modifying basic trendfollowing systems in an effort to improve their performance. For simplicity, most illustrations are based on the previously described simple breakout system. However, the same types of modifications could also be applied to other basic trend following systems (eg, crossover moving average).

#### ***Confirmation Conditions***

An important modification that can be made to a basic trendfollowing system is the requirement for additional conditions to be met before a signal is accepted, with the goal of reducing false signals. If these conditions are not realized before an opposite direction signal is received, no trade occurs. The range of possible choices for confirmation conditions is limited only by the imagination of the system designer. Below are three examples:

1. Penetration. A trade signal is accepted only if the market moves a specified minimum amount beyond a given reference level (eg, the trade signal price). Penetration could be measured in either nominal or percentage terms. Figure 14.9 compares the trade signals generated by a standard breakout system with  $N = 12$  and the corresponding system with a confirmation rule requiring a close that penetrates the prior  $N$  day high (or low) by at least 2%. Note that in this example, although the confirmation rule results in worse entry levels for valid signals, it concerned all seven false signals. (The buy signals follow the

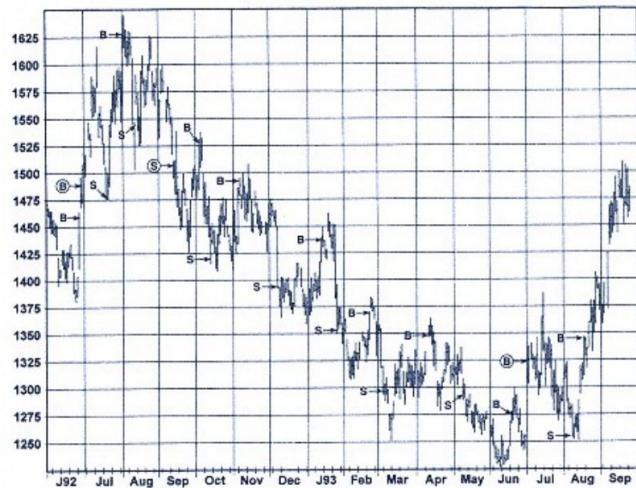


Figure 14.9  
Penetration as confirmation condition: cocoa continuous futures.

Notes: B, S = signals for breakout system with  $N = 12$ ;

$\odot$  = signals for breakout system with  $N = 12$  and 2%  
closing penetration confirmation.

nonconfirmed sell signals are also eliminated, since the system is already long at that point. similarly, the sell signals following the nonconfirmed buy signals are also eliminated, since the system is already short at that point.)

2. Time Delay. In this approach, a specified time delay is required, at the end of which the signal is reevaluated. For example, a confirmation rule may specify that a trade signal is taken if the market closes beyond the signal price (higher for a buy, lower for a sell) at any time six or more days beyond the original signal date. Figure 14.10 compares the signals generated by a basic breakout system with  $N = 12$ , and the corresponding system with the sixday time delay confirmation condition. In this case, the confirmation rule six of the seven false signals.

3. Patterns. This is a catchall term for a wide variety of confirmation rules. In this approach, a specified pattern is required to validate

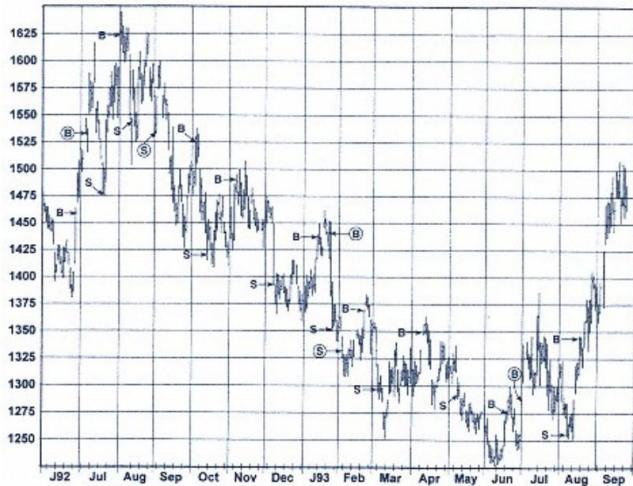


Figure 14.10  
Time delay as a confirmation condition: cocoa continuous futures.

Notes: B, S = signals for breakout system with  $N = 12$ ;  
 $\textcircled{S}$  = signals for breakout system with  $N = 12$  and 6day time delay confirmation.

the basic system signals. For example, the confirmation rule might require three subsequent thrust days beyond the signal price. Figure 14.11 compares the signals generated by the basic breakout system with  $N = 12$  and the signals based on the corresponding system using the *threethrustday* validation condition. The thrust day count at confirmed signals is indicated by the numbers on the chart. Here too, the rule confirmation all seven false signals.

The advantage of confirmation conditions is that they will greatly reduce whipsaw losses. However, it should be noted that confirmation rules also have an undesirable side effect—they will delay entry on valid signals, thereby reducing gains on profitable trades. For example, in Figures 14.9–14.11, note that the confirmation rules result in worse entry prices for the trades respectively to the June 1992 buy signal, August 1992 sell signal, and the June 1993 buy signals in the basic system. The confirma

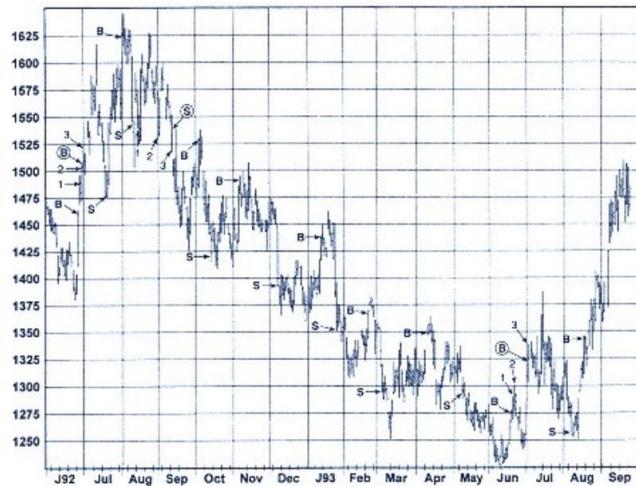


Figure 14.11  
Example of a pattern confirmation condition: cocoa continuous futures.

Notes: B, S = signals for breakout system with N = 12;  
 ③ = signals for breakout system with N = 12 and 3 thrust day confirmation.

tion condition will be beneficial as long as reduced profits are more than offset due to delayed losses. A system that includes confirmation conditions will not always outperform its basic system counterpart, but if properly designed, it will perform significantly better over the long run.

### **Filter**

The purpose of a filter is to eliminate those trades that are supposed to have a lower probability of success. For example, the technical system might be combined with a fundamental model that classifies the market as bullish, bearish, or neutral. Technical signals would then be accepted only if they were in agreement with the fundamental model's market designation. In cases of disagreement, a neutral position would be indicated. In most cases, however, the filter condition(s) will also be technical in nature. For example, if one could derive a set of rules that had some accuracy in

defining the presence of a trading range market, signals that were received when a trading range market was indicated would not be accepted. In essence, in developing a filter, the system designer is trying to find a common denominator applicable to the majority of losing trades.

We will use the frequently unsatisfactory simple moving average system to provide a specific example of a filter condition. The nonbordered signals in Figure 14.1 illustrates the typical tendency of the simple moving average system to generate many false signals—even in trending markets. These whipsaw trades can be significantly reduced by applying the filter rule that only signals consistently with the trend of the moving average are accepted. For example, prices crossing the moving average from below and closing above the moving average would be accepted as a buy signal only if the moving average was up relative to the previous day's level. This filter condition makes intuitive sense because it adheres to the basic technical concept of trading with the major trend.

Two points should be regarding the application of this rule:

1. A rejected signal could be activated at a later point, if the moving average subsequently turned in the direction of the signal before an opposite direction crossover of the price and moving average.
2. Signals that occur after rejected signals are ignored because the net position is already consistent with the implied trade. This is true because the simple moving average system is always in the market.

The diamondshaped signals in Figure 14.1 indicates the trades that would have been accepted (either at the time of the crossover or after a delay) if the filter rule just described were applied. As can be seen, on balance the benefits clearly outweigh the disadvantages. Most empirical testing would reveal that, more often than not, the inclusion of the type of filter rule depicted in Figure 14.1 will tend to improve performance.

In fact, a crossover between price and the moving average that is opposite to the direction of the moving average trend can often provide a good signal to add to rather than reverse the original position (per the example of the "Reaction to LongTerm Moving Average" midtrend entry technique described in Chapter 8).

It should be noted that, in a sense, the confirmation conditions detailed in the previous section one type of filter, insofar as signals that fulfill a subsequent set of conditions, while those that do not are accepted. However, the distinction here is that a filter implies a set of screening rules applied at the time the base system signal is received. consequently, a system can include both a filter and a confirmation.

tion rule. In such a system, only signals that were accepted based on the filter definition and subsequently validated by the confirmation rule(s) would actually result in trades.

### ***Market Characteristic Adjustments***

One criticism of simple trendfollowing systems is that they treat all markets alike. For example, in a breakout system, with  $N = 20$ , both highly volatile and very quiet markets will require the same conditions for a buy signal—a 20day high. Market characteristic adjustments seek to compensate for the fact that the best parameter values for a system will depend on market conditions. For example, in the case of a breakout system, instead of using a constant value for  $N$ , the relevant value for  $N$  might be contingent on the volatility classification of the market. As a specific illustration, the average twoday price range during the past 50day period might be used to place the market into one of five volatility classifications. The value of  $N$  used to generate signals on any given day would then depend on the prevailing volatility classification.

Volatility appears to be the most logical choice for classifying market states, although other criteria could also be tested (eg, basic based conditions, average volume level, etc.). In essence, this type of modification seeks to transform a basic trendfollowing system from a static to a dynamic trading method.

### ***Differentiation between Buy and Sell Signals***

Basic trendfollowing systems typically assume analogous conditions for buy and sell signals (eg, buy on close above 20day high, sell on close below 20day low). However, there is no reason to make this assumption automatically. It can be that bull and bear markets behave differently. For example, a survey of a broad spectrum of historical price charts would reveal that price breaks from major tops tend to be more rapid than price rallies from major bottoms. This observation suggests a rationale for using more sensitive conditions to generate sell signals than those used to generate buy signals. However, the system designer using such an *approach should be particularly sensitive to the danger of overfitting the system—a pitfall discussed in detail in Chapter 15*.

### ***Pyramiding***

One inherent weakness in basic trendfollowing systems is that they automatically assume a constant unit position size under all conditions. It

would seem desirable to allow for the possibility of larger position sizes in the case of major trends, which are almost entirely responsible for the success of any trend following system. One reasonable approach for adding units to a base position in a major trend is to wait for a specified reaction and then initiate the additional units on evidence of a resumption of the trend. Such an approach seeks to optimize the timing of pyramid units, as well as to provide exit rules that reasonably limit the potential losses that could be incurred by such added positions. An example of this type of approach was detailed in Chapter 8. Another example of a possible pyramid strategy would be provided by the following set of rules:

1. A reaction is defined when the net position is long and the market closes below the prior 10day low.
2. Once a reaction is defined, an additional long position is initiated on any subsequent 10day high if the following conditions are met:
  - a. The pyramid signal price is above the price at which the most recent long position was initiated.
  - b. The net position size is less than three units. (This condition implies that there is a limit of two pyramid units.)

Conditions are reversed for sell signals.

Figure 14.12 illustrates the addition of this pyramid plan to a breakout system with  $N = 40$  applied to the September 1992 coffee contract.

Risk control becomes especially important if a pyramiding component is added to a system. Generally speaking, it is usually recommended to use a more sensitive condition for liquidating a pyramid position than the condition required to generate an opposite signal. The following is one example of a set of stop rules that might be employed in a system that uses pyramiding. Liquidate all pyramid positions whenever condition is fulfilled:

1. An opposite trendfollowing signal is received.
2. Market closes above (below) the high (low) price since the most recently defined reaction that was followed by a pyramid sell (buy). Figure 14.12 illustrates the stop levels implied by this rule in the case of September 1992 coffee.

#### ***Trade Exit***

The existence of a trade exit rule in a system would permit the liquidation of a position prior to receiving an opposite trendfollowing signal. Such a

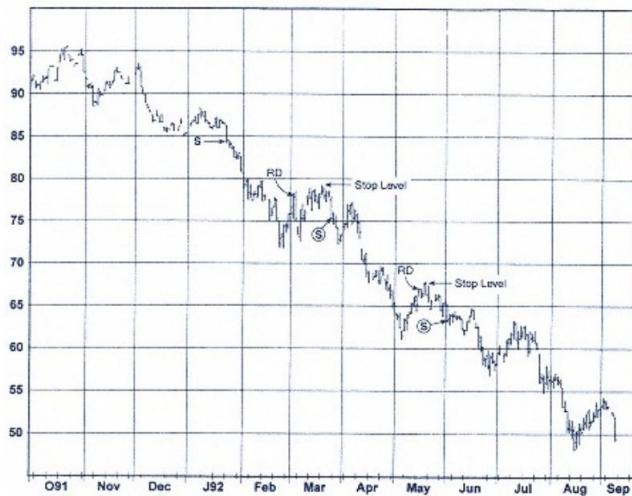


Figure 14.12  
 Pyramid signals: September 1992 coffee.  
 Notes: S = base position sell signal; =  
 Ⓛ pyramid sell signal; RD = reaction defined.

rule would serve to limit losses on losing trades as well as limit the amount of open profits surrendered on winning trades. Although these are highly desirable goals, the tradeoff implied by using a trade exit rule is relatively severe. If a trade exit rule is used, rules must be specified for reentering the position; otherwise, the system will be vulnerable to missing major trends.

The danger in using a trade exit rule is that it may result in the premature liquidation of a good trade. Although the reentry rule will serve as a backstop, the combination of an activated trade exit rule and a subsequent reentry is a whipsaw loss. Thus, it will not be at all uncommon for the addition of a trade exit rule (and implied reentry rule) to have a negative impact on performance. However, although it is not easy, for some systems, it will be possible to structure trade exit rules that improve *performance on balance*. (*In terms of return, and usually in terms of return/risk measures as well, if a trade exit rule helps performance, the use of the trade exit rule as a reversal signal—as opposed to just a liquidation signal—will help performance even more.*) Trade exit rules can also be

made dynamic. For example, the trade exit condition can be made increasingly sensitive as a price move becomes more extended in either magnitude or duration.

## **Countertrend Systems**

### ***General Considerations regarding Countertrend Systems***

Countertrend systems often appeal to many traders because their ultimate goal is to buy low and sell high. Unfortunately, the difficulty of achieving this goal is inversely proportional to its desirability. A critical distinction to keep in mind is that whereas a trendfollowing system is basically self-correcting, a countertrend system implies unlimited losses. Therefore, it is essential to include some stoploss conditions in any countertrend system (unless it is traded simultaneously with trendfollowing systems). Otherwise, the system could end up being long for the duration of a major downtrend or short for the duration of a major uptrend. (Stoploss conditions are optional for most trendfollowing systems, since an opposite signal will usually be received before the loss on a position becomes extreme.) One important advantage of using a countertrend system is that it provides the opportunity for excellent diversification with simultaneously employed trendfollowing systems , thereby reducing overall volatility (see "Diversification" section, below).

### ***Types of Countertrend Systems***

The following are some types of approaches that can be used to try to construct a countertrend system.

Fading Minimum Move. This is perhaps the most straightforward countertrend approach. A sell signal is indicated each time the market ralls by a certain minimum amount above the low point since the last countertrend buy signal. similarly, a buy signal is indicated whenever the market declines by a minimum amount below the high point since the last countertrend sell signal. The magnitude of the price move required to generate a trade signal can be expressed in either nominal or percentage terms. Figure 14.13 illustrates the trade signals that would be generated by this type of countertrend system for a 4% threshold level in the October 1993–July 1994 gold market. Note that this is the same market that was previously used

in this chapter to illustrate whipsaw losses for a sensitive trendfollowing system (Figure 14.7). This is no accident. Countertrend systems will tend to work best under those types of market conditions in which trendfollowing systems fare poorly. Additionally, a confirmation condition, such as a thrust day in the direction of the countertrend reversal, can be used to avoid false signals.

Oscillators. A countertrend system could use oscillators (see Chapter 6) as an indicator for generating trade signals. It should be noted, however, that although using oscillators to signal countertrend trades may work well in a tradingrange market, in a trending market such an approach can be disastrous.

Contrary Opinion. A countertrend system might use contrary opinion as an input in timing trades. For example, once the contrary opinion rose above a specified level, a short position would

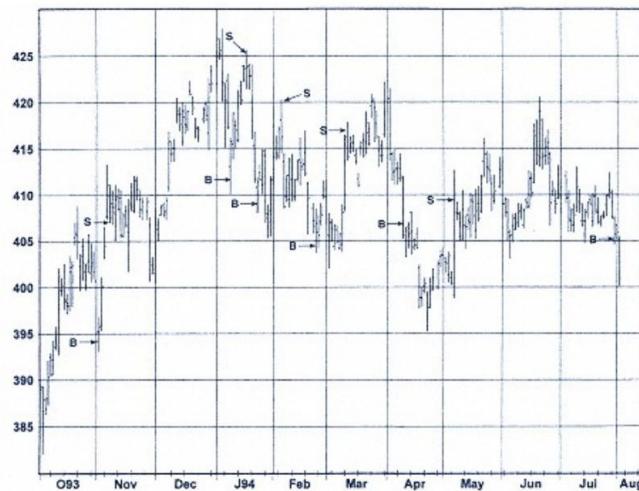


Figure 14.13  
Countertrend signals: gold continuous futures.  
Notes: Percentages are calculated as price changes in continuous futures  
divided by corresponding nearest futures price levels.  
B = buy signal: 4% decline from prior high; S = sell signal: 4% advance from prior  
low.

be indicated contingent on confirmation by a very sensitive technical indicator. (Contrary opinion was discussed in Chapter 10.)

### Diversification

The standard interpretation attached to the term diversification is that trading is spread across a broad range of markets. Although this is the single important type of diversification (assuming the most availability of sufficient funds), there are two additional levels of possible diversification. First, each market can be traded with several systems. Second, several variations of each system can be used. For example, if two lots (100share units) of a stock are being traded using the breakout system, each lot can be traded using a different value of N (ie, the number of days whose high or low must be penetrated to trigger a signal ).

In the following discussion, we will use the term single market system variation (SMSV) to refer to the concept of a specific variation of a given system traded in a single market. Thus, the simple breakout system, with  $N = 20$ , traded in the cocoa market would be an example of an SMSV.

There are three important benefits to diversification:

1. Dampened Equity Retracement. Different SMSVs will not witness their losses at precisely the same periods. Thus, by trading a wide variety of SMSVs, the trader can achieve a smoother equity curve. This means that trading 10 SMSVs with equivalent profit/risk characteristics would require significant less reserve funds than trading 10 units of a single SMSV, resulting in a higher percent return. Or equivalently, at the same level of fund allocation, the diversified trading portfolio would achieve the same percentage return at a lower risk level. Up to a point, diversification would be beneficial even if the portfolio included SMSVs with poorer expected performance. A key consideration would be a given SMSV's correlation with the other SMSVs in the portfolio.
2. Ensure Participation in Major Trends. Since the majority of trades in most trendfollowing systems will lose money, it is essential that the trader participates in the largeprofit trades—that is, major trends. This is a key reason for the importance of diversification across markets.
3. Bad Luck Insurance. Systems trading, like baseball, is a game of inches. Given the right combination of circumstances, even a minute difference in the price movement on a single day could

have an extraordinary impact on the profitability of a specific SMSV. If, for example, two versions of an identical breakout system using two slightly different confirmation conditions signal a particular trade one day apart, that could be dramatic if the market gaps sharply higher or lower or witnesses a string of lockedlimit moves in the case of a futures market.

By trading several variations of a system, the speculator could mitigate the impact of such isolated, abnormally poor results that might result from using only one variation. Of course, in so doing, the trader would also eliminate the possibility of gains far exceeding the average performance of the system. On balance, however, this prospect represents a desirable tradeoff, since it is assumed that the basic trading goal is consistent performance rather than windfall profits.

#### Ten Common Problems with Standard TrendFollowing Systems Revisited

We are now ready to consider possible solutions to the previously enumerated problems with standard trendfollowing systems. The problems and the possible solutions are summarized in Table 14.2.

<b>TABLE 14.2 Problems with Standard TrendFollowing Systems and Possible Solutions</b>	
<i>Problem with Standard Trend Following Systems</i>	<i>Possible Solutions</i>
1. Too many similar systems	1a. Try to construct original systems in order to avoid the problem of "trading with the crowd." 1b. If trading more than one contract, spread out entry.
2. Whipsaws	2 a. Employee confirmation conditions. 2b. Develop filter rules. 2 C. Employee diversification.
3. Failure to exploit major price moves	3. Add pyramiding component.
<i>continued</i>	

**TABLE 14.2 Continued**

<i>Problem with Standard Trend Following Systems</i>	<i>Possible Solutions</i>
4. Tendency of nonsensitive (slow) systems to surrender a large percentage of profits.	4. Employ trade exit rules.
5. Inability to make money intrading range markets	5. Trade trendfollowing systems in conjunction with countertrend systems.
6. Temporary large losses	6a. If funds permit, trade more than one system in each market. 6b. When beginning to trade a system, trade more lightly if entering positions at a point after the signal has been received.
7. Extreme volatility in bestperforming systems	7. Employ diversification to be able to allocate some funds to a highprofit potential system that is too risky to trade on its own.
8. Systems that work well in testing but then bomb	8. Reduce the danger of such a development by properly testing systems. This subject is discussed in detail in Chapter 15.
9. Parameter shift	9a. If permit funds vary, by trading several variations of each system. 9b. Experiment with systems that incorporate market characteristic adjustments.
10. Slippage	10. Use realistic assumptions (discussed in Chapter 15).

## **Chapter 15— Testing and Optimizing Trading Systems**

*Every decade has its characteristic folly, but the basic cause is the same: people persist in believing that what has happened in the recent past will go on happening into the indefinite future, even while the ground is shifting under their feet.*

—George J. Church

Some of the material in this chapter may be somewhat beyond the reach of the novice; it does, however, underscore the unnecessary complexity of the system design and testing process. While some of the concepts may not be immediately applicable, they are crucial to developing sound system testing habits and will become more important to traders as they gain experience in technical system trading. The following section is adapted from an article that first appeared in Futures magazine in September 1984.

### **The WellChosen Example**

You've plunked down your \$895 to attend the 10th annual "Secret of the Millionaires" trading seminar. At that price, you figure the speakers will be revealing some very valuable information.

The current speaker is explaining the SuperRazzleDazzle (SRD) trading system. The slide on the huge screen reveals a price chart with "B" and "S" symbols representing buy and sell points. The slide is impressive: All of the buys seem to be lower than the sells.

This point is brought home even more significantly in the next slide,

which reveals the equity stream that would have been realized trading this system—a nearperfect uptrend. Not only that, but the system is also very easy to keep up.

As the speaker says, "All it takes is 10 minutes a day and a knowledge of simple arithmetic."

You never realized making money could be so simple. You could kick yourself for not having attended the first through ninth annual seminars.

Once you get home, you select 10 diversified markets and begin trading the SRD system. Each day you plot your equity. As the months go by, you notice a strange development. Although the equity in your account exhibits a very steady trend, just as the seminar example did, there is one small difference: The trend on your equity chart is down. What went wrong?

The fact is, you can find a favorable illustration for almost any trading system. The mistake is in extrapolating probable future performance on the basis of an isolated and wellchosen example from the past.

A truelife example may help illustrate this point. Back in 1983, when I had been working on trading systems for only a couple of years, I read an article in a trade magazine that presented the following very simple trading system:

1. If the sixday moving average is higher than the previous day's corresponding value, cover short and go long.
2. If the sixday moving average is lower than the previous day's corresponding value, cover long and go short.

The article used the Swiss franc in 1980 as an illustration. Without going into the details, suffice it to say that applying this system to the Swiss franc in 1980 would have resulted in a profit in a profit of \$17,235 per contract (assuming an average roundturn of \$80). Even allow for a conservative fund allocation of \$6,000 per contract, this implied an annual gain of 287%! Not bad for a system that can be summed up in two sentences. It is easy to see how traders, presented with such an example, might eagerly abandon their other trading approaches for this apparent money machine.

I couldn't believe such a simple system could do so well. So I decided to test the system over a general period—1976 to mid83—and a wide group of markets.

Beginning with the Swiss franc, I found that the total profit during this period was \$20,473. In other words, excluding 1980, the system made only \$3,238 during the remaining six and onehalf years. Thus, assuming that you allocated \$6,000 to trade this approach, the average an

nual percent return for those years was a meager 8%—quite a comedown from 287% in 1980.

But wait. It gets worse. Much worse.

When I applied the system to a group of 25 markets from 1976 through mid1983, the system lost money in 19 of the 25 markets. In 13 of the markets—more than half of the total survey—the loss exceeded \$22,500, or \$3,000 per year, per contract! In five markets, the loss exceeded \$45,000, equivalent to \$6,000 per year, per contract!

Also, it should be noted that, even in the markets where the system was profitable, its performance was well below gains exhibited for these markets during the same period by most other trendfollowing systems.

There was no question about it. This was truly a bad system. Yet, if you looked only at the wellchosen example, you might think you had stumbled upon the trading system Jesse Livermore used in his good years. Talk about a gap between perception and reality.

This system witnessed such large, broadly based losses that you may well wonder why fading the signals of such a system might not provide an attractive trading strategy. The reason is that most of the losses are the result of the system being so sensitive that it generates large transaction costs. (Transaction costs include commission costs plus slippage. The concept of slippage is discussed later in this chapter.) This sensitivity of the system occasionally is beneficial, as was the case for the Swiss franc in 1980. However, on balance, it is the system's major weakness.

Losses due to transaction costs would not be realized as gains by fading the system. Moreover, doing the opposite of all signals would generate equivalent transaction costs. Thus, once transaction costs are incorporated, the apparent attractiveness of a contrarian approach to using the system evaporates.

The moral is simple: Don't draw any conclusions about a system (or an indicator) on the basis of isolated examples. The only way you can determine if a system has any value is by testing it (without benefit of hindsight) over an extended time period for a broad range of markets.

### **Basic Concepts and Definitions**

*A trading system is a set of rules that can be used to generate trade signals. A parameter is a value that can be freely assigned in a trading system in order to vary the timing of signals.* For example, in the basic breakout system, N (the number of prior days whose high or low must be exceeded to indicate a signal) is a parameter. Although the operation of the rules in the system will be identical whether  $N = 7$  or  $N = 40$ , the timing

of the signals will be vastly different. (For an example, see Figures 14.5 and 14.6 in Chapter 14.)

Most trading systems will have more than one parameter. For example, in the crossover moving average system there are two parameters: the length of the shortterm moving average and the length of the longterm moving average. Any combination of parameter values is called a parameter set. For example, in a crossover moving average system, moving averages of 10 and 40 would represent a specific parameter set. Any other combination of moving average values would represent another parameter set. In systems with only one parameter (eg, breakout), the parameter set would consist of only one element.\*

Most "generic" systems are limited to one or two parameters. However, the design of more creative and flexible systems, or the addition of modifications to basic systems, will usually imply the need for three or more parameters. For example, adding a confirmation time delay rule to the crossover moving average system would imply a third parameter: the number of days in the time delay. As a general principle, it is wise to use the simplest form of a system (ie, least number of parameters) that does not imply any significant deterioration in performance relative to the more complex versions. However, one should not drop parameters that are deemed important simply to reduce the number of implied parameter sets. In this case, a more reasonable approach would be to limit the number of parameter sets actually tested.

Even in a simple one or twoparameterset system, it is not necessary to test all possible combinations. For example, in a simple breakout system in which one wishes to test the performance for values of  $N = 1$  to  $N = 100$ , it is not necessary to test each integer in this range. A far more efficient approach would be to first test the system using spaced values for  $N$  (eg, 10, 20, 30, . . . , 100), and then, if desired, the trader could focus in on any areas that appeared to be of particular interest. For example, if the system exhibits particularly favorable performance for the parameter values  $N = 40$  and  $N = 50$ , the trader might want to test some other values of  $N$  in this narrower range as well. Such an additional step, however, is probably unnecessary, since, as is discussed later in this chapter, performance differences in parameter set values—particularly values in such close proximity—are probably a matter of chance and therefore lack any significance.

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\*Note that the terms parameter set and system variation (the latter was used in Chapter 14) refer to identical concepts. The introduction of the term parameter set was merely deferred until this chapter because doing so appeared to allow for a more logically ordered presentation of the material.

### Choosing the Price Series

Historical stock prices represent continuous, unbroken data series, suitable for testing purposes (assuming the trade size adjustment discussed in Chapter 2). For futures traders, the first step in testing a system in a given market is choosing the appropriate price series. The issues related to this selection have already been fully detailed in Chapter 2. Generally speaking, a continuous futures series is the preferred choice, although actual contract data could be used for shortterm trading systems.

### Choosing the Time Period

Generally speaking, the longer the test period, the more reliable the results. If the time period is too short, the test will not reflect the system's performance for a reasonable range of market situations. For example, a test of a counter trend system on the stock shown in Figure 15.1 that used only two recent years of data (roughly January 1996 to February 1998)—a period dominated by a protracted trading range—would yield highly misleading results in terms of the system's probable longterm performance.

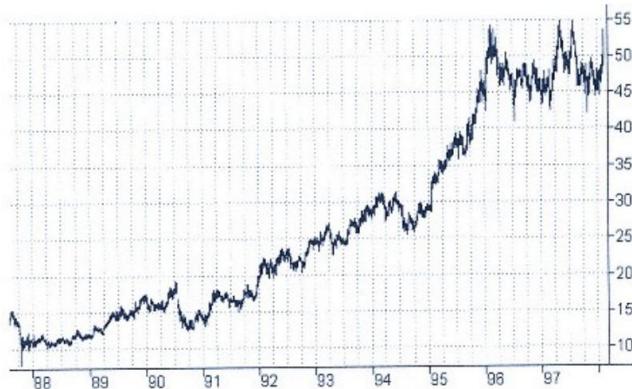


Figure 15.1  
Trading range as unrepresentative price sample: McDonald's Corp.  
Chart created with TradeStation by Omega Research, Inc.

On the other hand, if too long a period is used for testing a system, the earlier years in the survey period might be extremely unrepresentative of current market conditions. For example, it would probably be better not to extend a test of commodity markets back far enough to include 1973–1976—a time interval that witnessed unprecedented massive price advances and subsequent steep price collapses in a number of commodity markets. An inclusion of this highly unrepresentative period would tend to greatly exaggerate the potential performance of most trendfollowing systems. In other words, the enormous profits realized by most trend following systems during this period would be unlikely to be duplicated in the future.

Although it is impossible to provide a decisive answer as to the optimum number of years to be used in testing, 10 to 20 years seems to be a reasonable range. For shortterm trading systems (average duration of trades equal to a few weeks or less), a shorter test period (eg, 5 to 10 years) would probably be sufficient. Trading system test results based on time periods significantly shorter than these guidelines should be suspect. In fact, it is rather incredible that some published studies on trading systems were based on test periods of two years or less.

Ideally, one should test a system using a longer time period (eg, 15 years) and then evaluate the results for the period as a whole and various shorter time intervals (eg, individual years). Such an approach is important in determining the degree of time stability in the system—the relative consistency of performance from one period to the next. Time stability is important because it is confident regarding a system's potential for consistent favorable performance in the future. Most people would be quite hesitant about using a system that generated significant net profits over a 15year period due to three spectacularly performing years, but then witnessed losses or near breakeven results in the remaining 12 years—and rightly so. In contrast, a system that registered moderate net gains during the 15year period and was profitable in 14 of the 15 years would undoubtedly be viewed as more attractive by most traders.

### **Realistic Assumptions**

Users of trading systems often discover that their actual results are significantly worse than the paper trading results implied by the system. In fact, this situation is so common that it even has its own name: slippage. Assuming that the divergence in the results is not due to errors in the program, slippage is basically a consequence of a failure to use realistic assumptions in testing the system. Basically there are two types of such faulty assumptions:

1. Transaction Costs. Most traders don't realize that merely adjusting for actual commission costs in testing a system is not an adequate rigid assumption. The reason for this is that commissions account for only a portion of transaction costs. Another less intangible, but no less real, cost is the difference between the theoretical execution price and the actual fill price for stop, market, open, and close orders. A simple way to address this problem is the assumption to use a transaction cost per trade much greater than the actual historical commission costs (eg, \$100 per trade).
2. Limit Days. Unless it is programmed otherwise, a computerized trading system will indicate executions on the receipt of each signal. However, in the real world, execution may not be possible because a market is locked at the daily permissible limit. If one assumes execution in such a situation, the paper results may dramatically overstate actual performance. Figure 15.2 shows hypothetical trading signals and the corresponding implied execution

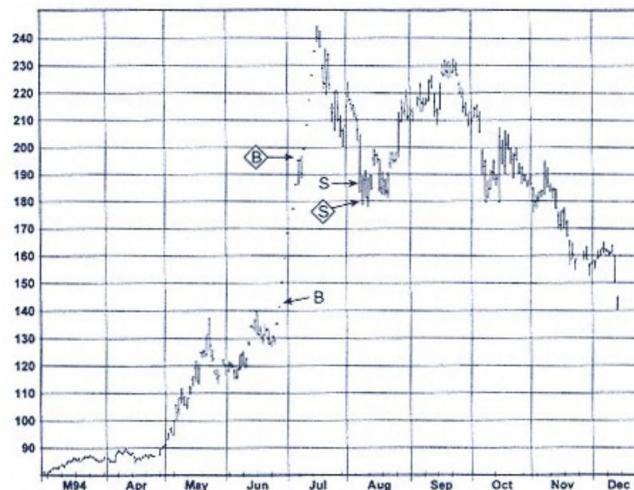


Figure 15.2  
Wide gap between signal price and actual entry—impact of limit days:  
December 1994 coffee.

Notes: B, S = signal prices;  = execution prices.

prices. Note that while the signal prices suggest a profit of 42.4¢ (\$15,900), the actual trade would have resulted in a loss of 16.2¢ (\$6,075 per contract).

The potential systems trader may find that attractive trading systems disintegrate once realistic assumptions are employed. This is particularly true for very active systems, which generate very large transaction costs. However, it is far better to make this discovery in the analytical testing stage than in actual trading.

### Optimizing Systems

Optimization refers to the process of finding the best performing parameter set(s) for a given system applied to a specific market. The underlying premise of optimization is that parameter sets that worked best in the past have a greater probability of superior performance in the future. For example, if a trader tested a crossover moving average system on 10 years of price data and found the best performing combination of short and long moving average lengths was 10 and 40, he or she would trade the system using these values with the expectation that they would produce the best results in future trading. (The question of whether this assumption is valid is addressed later in the section.)

A basic question that must be considered in optimization is what criteria should be used for defining "best performance." Frequently, best performance is simply interpreted as largest equity gain. in performance comparisons:

1. Percent Return. Return measured relative to funds needed to trade the system. Two systems that return \$10,000 per year may seem equally attractive until you find out one requires a \$40,000 trading account and the other a \$200,000 account.
2. Risk Measure. In addition to percent gain, it is also important to employ some measure of equity fluctuations (eg, variability in rate of gain, retracements in equity). Consider two systems that each return \$10,000 per year and require a \$40,000 trading account. However, the maximum drawdown shown in historical testing for one system is \$20,000 (50%) while the maximum drawdown for the other is \$5,000 (12.5%). Under these circumstances, there is no reason to trade the former system rather than

the latter. Besides the obvious psychological reasons for wishing to avoid parameter sets and systems with high volatility, a risk measure is particularly significant because one might pick an unfavorable starting date for trading the system (ie, there is no way to know when a drawdown might occur) . For example, if a trader using the first system had the misfortune of experiencing the \$20,000 drawdown in the first few months of trading it, he or she might be too discouraged to continue trading long enough to profit with the system.

3. Parameter Stability. It is not sufficient to find a parameter set that performs well. It is also necessary to ascertain that the parameter set does not reflect a fluke in the system. In fact, the goal of optimization should be to find broad regions of good performance rather than the single best performing parameter set.

For example, if in testing a simple breakout system one found that the parameter set  $N = 7$  exhibited the best percent return/risk characteristics but that performance dropped off very sharply for parameter sets  $N < 5$  and  $N > 9$ , while all sets in the range  $N = 25$  to  $N = 54$  performed relatively well, it would make much more sense to choose a parameter set from the latter range. Why? Because the exceptional performance of the set  $N = 7$  appears to be a peculiarity of the historical price data that is not likely to be repeated. The fact that surrounding parameter sets performed poorly suggests that there is no basis for confidence in trading the parameter set  $N = 7$ . In contrast, the broad range of stability for sets in the region  $N = 25$  to  $N = 54$  suggests that a set drawn from the center of this range would have a better prospect for success.

4. Time Stability. As detailed in a previous section, it is important to ascertain that favorable performance for the period as a whole is truly representative of the total period rather than a reflection of a few isolated intervals of extraordinary performance.

Realistically speaking, many traders will find elaborate performance evaluations impractical. In this regard, the trader can draw solace from the fact that for comparisons involving different parameter sets for the same system, the preceding factors tend to be highly correlated. Generally, the parameter sets with the best gain will also be the sets that exhibit the smallest equity retracements. consequence, for the optimization of a single system, the use of a basic return/risk measure, or even a simple percent return measure, will usually yield similar results to a complex

performance evaluation that incorporates a number of performance measures. However, if one is comparing parameter sets from completely different systems, the explicit consideration of risk, parameter stability, and time stability is more important.

The results of empirical tests I have suggested the following key conclusions conclusions optimization:

1. Any system—any system—can be made to appear very profitable in historical testing through optimization. If you ever find a system that can't be optimized to show good profits in the past, congratulations—you have just discovered a machine (by doing the opposite, unless transaction costs are exorbitant). Therefore, a wonderful past performance for a system that has been optimized may be nice to look at, but it doesn't mean very much.
2. Optimization will always—always—overstate the potential future performance of a system, usually by a wide margin (say, three trailer trucks' worth). *Therefore, optimized results should never—never—be used to evaluate a system's merit.*
3. For many if not most systems, optimization will improve future performance only marginally, if at all.
4. If optimization has any value, it is usually in defining the broad boundaries for the ranges from which parameter set values in the system should be chosen. Finetuning of optimization is at best a waste of time and at worst selfdelusion.
5. In view of the preceding items, sophisticated and complex optimization procedures are a waste of time. The simplest optimization procedure will provide as much meaningful information (assuming that there is any meaningful information to be derived).

In summary, contrary to widespread belief, there is some reasonable question as to whether optimization will yield meaningfully better results over the long run than randomly picking the parameter sets to be traded. Lest there be any confusion, let me explicitly state that this statement is not intended to imply that optimization is never of any value. First, as indicated previously, optimization can be useful in defining poorly performing parameter ranges that should be excluded from the selection of parameter set values. Also, it is possible that for some systems, optimization may provide some edge in parameter set selection, even after suboptimal extreme ranges are excluded. However, I do mean to imply that the

degree of improvement provided by optimization is far less than generally perceived and that traders would probably save a lot of money by first proving any assumptions they are making about optimization rather than taking such assumptions on blind faith.

### **Testing Versus Fit**

Perhaps the most critical error made by users of trading systems is the assumption that the performance of the optimized parameter sets during the test period provides an approximation of the potential performance of those sets in the future. Unfortunately, such assumptions will lead to grossly overstated evaluations of a system's true potential. It must be understood that price fluctuations are subject to a great deal of randomness. Thus, the ugly truth is that the question of which parameter sets will perform best during any given period is significantly a matter of chance. The laws of probability indicate that if enough parameter sets are tested, even a meaningless trading system will yield some sets with favorable past performance. Evaluating a system based on the optimized parameter sets (ie, the best performing sets during the survey period) would be best described as fitting the system to past results rather than testing the system. If optimization can't be used to gauge performance, how then do you evaluate a system? The following sections describe two meaningful approaches.

#### ***Blind Simulation***

In the blind simulation approach the system is optimized using data for a time period that deliberately excludes the most recent years. The performance of the system is then tested using the selected parameter sets for subsequent years. Ideally, this process should be repeated several times.

For example, trading system results for a 1985–1992 testing period could be used to determine the best performing parameter sets for a system, which could then be tested for the years 1993–1994. Next, the system results for the 1987–1994 period could be used to determine the best performing parameter sets, which could then be tested for the years 1995–1996. Finally, the system results for a 1989–1996 period could be used to determine the best performing parameter sets, which could then be tested for the years 1997–1998.

Note that the error of fitting results is selected performance because the parameter sets used to measure in any given period are entirely on the basis of prior rather than concurrent data. In a sense, this testing

approach mimics real life (ie, one must decide which parameter sets to trade on the basis of past data). The essential point is that simulation and optimization periods should not be allowed to overlap. Simulations that are run over the same period as the optimization are worthless.

#### **Average Parameter Set Performance**

Finding the average parameter set performance requires defining a complete list of all parameter sets that one wishes to test before running any simulations. Simulations are then run for all the parameter sets selected, and the average of all sets tested is used as an indication of the system's potential performance. The point is that this average should be calculated across all parameter sets, not just those sets that prove profitable.

The blind simulation approach probably comes closest to duplicating real-life trading circumstances. However, the average parameter set performance is probably as conservative and has the advantage of requiring far less calculation. Both approaches represent valid procedures for testing a system.

One important caveat: In the advertised claims for given systems, the term "simulated results" is often used loosely as a euphemism for optimized results (instead of implying that the results are based on a blind simulation process). If this is the case, the weight attached to the results should equal the amount of money invested in the system: zero. The commonplace misuse and distortion of simulated results is examined in detail in the next section.

#### **The Truth about Simulated Results**

Although the value of optimization in improving a system's future performance is open to debate, there is absolutely no question that the use of optimized results will greatly distort the implied future performance of a system. The reason for this is that there is very little, if any, correlation between the best performing parameters in a system for one period and the best performing parameters in a subsequent period. Hence, the assumption that the performance parameters implied by the best performing parameters could have been achieved in the past is totally unrealistic.

After years of experience, my attitude towards simulated results is summarized by what I call Schwager's corollary of simulations to Gresham's law of money. As readers may recall from Economics 101, Gresham's proposi

tion was that "Bad money drives out good." Gresham's contention was that if two types of money were in circulation (eg, gold and silver) at some arbitrarily defined ratio (eg, 16:1), the bad money (ie, the money overvalued at the fixed rate of exchange) would drive out the good. Thus, if gold were worth more than 16 ounces of silver, a 16:1 ratio would result in silver driving gold out of circulation (as people would tend to hoard it).

My corollary is: "Bad simulations drive out good." The term "bad" means simulations derived based on highly tenuous assumptions, not bad in terms of indicated performance. On the contrary, truly "bad" simulations will show eyepopping results.

I frequently get flyers hawking systems that supposedly make 200%, 400%, or even 600% a year. Let's be conservative—and I use the term loosely—and assume a return of only 100% per year. At this level of return, \$100,000 would grow to over \$1 billion in just over 13 years! How can such claims possibly be true, then? The answer is that they can't. The point is that, given enough hindsight, it is possible to construct virtually any type of pastperformance results. If anyone tried to sell a system or a trading program based on truly realistic simulations, the results would appear laughably puny relative to the normal promotional fare. It is in this sense that I believe that bad (unrealistic) simulations drive out good (realistic) simulations.

How are simulated results distorted? There are a number of primary means including:

1. The WellChosen Example (revisited). In meaningful a wellchosen example, the system promoter selects the best market, in the best year, using the best parameter set. Assuming a system is tested on 25 markets for 15 years and uses 100 parameter set variations, there would be a total of 37,500 (25 15 100) oneyear results. It would be difficult to construct a system in which not one of these 37,500 possible outcomes showed superlative results. For example, if you tossed a group of 10 coins 37,500 times, don't you think you would get 10 out of 10 heads sometimes? Absolutely. In fact, you would get 10 out of 10 heads on the average of one out of 1,024 times.
2. Kitchen Sink Approach. By using hindsight to add parameters and create additional system rules that conveniently take care of past losing periods, it is possible to generate virtually any level of past performance.
3. Ignoring Risk. Advertised system results frequently calculate return as a percent of margin or as a percent of an unrealistically

low multiple of margin. This one item alone can multiply the implied returns severalfold. Of course, the risk would increase commensurately, but the ads don't provide those details.

4. Overlooking Losing Trades. It is hardly uncommon for charts in system brochures or advertisements to indicate buy and sell signals at the points at which some specified rules were met, but fail to indicate other points on the same chart where the same conditions were met and the resulting trades were losers .

5. Optimize, Optimize, Optimize. Optimization (ie, selecting the best performing parameter sets for the past) can greatly magnify the past performance of a system. Virtually any system ever conceived would look great if the results were based on the best parameter set (ie, the parameter set that had the best past performance) for each market. The more parameter sets tested, the wider the selection of past results, and the greater the potential simulated return.

6. Unrealistic Transaction Costs. Frequently, simulated results include only commissions but not slippage (the difference between the assumed entry level and the actual fill that would be realized by using a market or stop order). For fast systems, ignoring slippage can make a system that would wipe out an account in real life look like a money machine.

7. Fabrication. Even though it is significantly easy to construct system rules with great performance for the past, some promoters don't even bother doing this much. For example, one infamous individual keeps on emerging with promotions for various \$299 systems that are outright frauds. Bruce Babcock of Commodity Traders Consumers Report has labeled this fellow appropriately enough the "\$299 man."

The preceding is not intended to indict all system promoters or all those using simulated results. Certainly, there are many individuals who construct simulated results in appropriate strict fashion. However, the sad truth is that the extraordinary misuse of simulations over many years has virtually made simulated results worthless. Advertised simulated results are very much like restaurant reviews written by the proprietors—you would hardly expect to ever see a bad review. I can assure you that you will never see any simulated results for a system that shows the system long the S&P as of the close of October 16, 1987. Can simulated results ever be used? Yes, if you are the system developer and you know what you're doing (eg, use the simulation methods detailed in the previ

ous section), or equivalently, if you have absolute faith in the integrity and competence of the system developer.

### Multimarket System Testing

The actual application of portfolio system testing is beyond the scope of the beginner. However, an understanding of the subject is worthwhile because of the critical importance of diversification, as was detailed in Chapter 14.

Although it is probably unrealistic to expect any single system to work in all markets, generally speaking, a good system should demonstrate profitability in a large majority of actively traded futures markets (eg, 85% or more). In the case of stocks, assuming that a system is used for timing purchases and liquidating long positions (most traders will not short stocks), a good system should exhibit better return/risk characteristics than a buyandhold strategy in a majority of tested stocks. There are, of course, some important exceptions. A system employing fundamental input would, by definition, be applicable to only a single market. In addition, the behavior of some markets is so atypical (eg, stock indexes) that systems designed for trading such markets might well perform poorly over the broad range of markets.

In testing a system for a multimarket portfolio, it is necessary to predetermine the relative number of shares or futures contracts to be traded in each market. This problem is frequently handled by simply assuming that the system will trade one lot (100 shares) or one futures contract in each market. However, this is a rather naive approach, for two reasons: First, some markets are far more volatile than other markets. For example, a portfolio that included one contract of coffee and one contract of corn would be far more dependent on the trading results in coffee. Second, it may be desirable to trade fewer shares or contracts of highly correlated markets within a portfolio (eg, two oil stocks like Chevron and Amoco, or deutsche marks and Swiss francs).\*

In any case, the percentage allocation of available funds to each market should be determined to test a system. These relative weightings can then be used to establish the number of contracts to be traded in each market. Note that as long as gain is measured in percentage rather

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\*For purposes of realtime trading (as opposed to historical testing), historical performance might be a third relevant factor in determining contract weightings. However, this factor cannot be included as an input in the testing procedure because it would bias the results.

than in nominal terms, the total number of contracts assumed to be traded in each market is irrelevant—only the contract ratios between markets will be important.

### Negative Results

Analyzing the conditions under which a system performs poorly can sometimes reveal important weaknesses in the system that have been overlooked and thus provides clues as to how the system can be improved. The validity of any rule changes in the system would be confirmed only if such revisions generally tended to improve the results for a broad range of parameter sets and markets, not just a select few. The potential value of negative results as a source of ideas for how a system can be improved cannot be overstated. The concept that disorder is a catalyst for thought is a general truth that was perfectly expressed by the late novelist John Gardner: "In a perfect world, there would be no need for thought. We think because something goes wrong."

The idea of learning from poor results is generally applicable to a system that works in most markets and for most parameter sets, but performs badly in isolated cases. However, systems that exhibit disappointing results over a broad range of markets and parameter sets are likely to be lost causes, unless the results are spectacularly poor. In the latter case, a system that exactly reverses the trade signals of the original system might be attractive. For example, if tests of a new trendfollowing system reveal that the system consistently loses money in most markets, the implication is that one might have accidentally stumbled upon an effective countertrend system. Such discoveries may be difficult on the ego, but they should not be ignored. (The fact that a system exhibits stable poor performance does not certainly imply that the reverse system would perform favorably, because of the influence of transaction costs.)

### Steps in Building and Testing a Trading System

1. Obtain all data needed for testing.
2. Define the system concept.
3. Program rules to generate trades in accordance with this concept.
4. Select a small subset of stocks or futures markets and a subset of years for these instruments.

5. Generate system trading signals for these subsets for a given parameter set.
6. Generate charts for these markets and years and make several photocopy sets (futures traders: use continuous futures).
7. Denote trading signals on these charts. (Be sure the same price series was used to generate charts as to test the system.) This is an important step. I find it is much easier to debug a system by seemingly inspecting signals on charts than by working only with data printouts.
8. Check to see that the system is doing what was intended. Almost invariably, a careful check will reveal some inconsistencies due to either or both of the following reasons:
  - a. There are errors in the program.
  - b. Rules in the program do not anticipate some circumstances or create unforeseen consequences.

Some examples of the latter might include: the system failing to generate a signal, given an event at which a signal is intended; the system generating a signal when no signal is intended; the system rules inadvertently creating a situation in which no new signals can be generated or in which a position is held indefinitely. In essence these types of situations arise because there will always be some missed nuances.

The system rules need to be modified to correct both programming errors and predictive inconsistencies. It should be emphasized that corrections of the latter type are concerned only with making the system consistently operate with the intended concept and should be made without any regard as to whether the changes *help or hurt performance in the sample cases used in the developmental process*.

9. After making necessary corrections, repeat steps 7 and 8. Pay particular attention to changes in indicated signals versus previous run for two reasons:
  - a. To check whether the program changes the desired fix.
  - b. To make sure the changes did not have unintended effects.
10. Once the system is working as intended and all rules and contingencies have been fully defined, and only after such a point, test the system on the entire defined parameter set list across the

full price data base. (Be sure the intended trading portfolio has been defined before this test is run.)

11. As detailed earlier in this chapter, evaluate performance based on the average of all parameter sets tested or a blind simulation process. (The former involves far less work.)

12. Compare these results with the results of a generic system (eg, breakout, crossover moving average) for the corresponding portfolio and test period. The return/risk characteristics of the system should be measurably better than those of the generic system, or equivalent and diversified versus the generic system, if it is to be supposed to have any real value.

The preceding steps represent a strict procedure that is designed to avoid generating results that are upwardly biased by hindsight. As such, expect most system ideas to fail the test of merit in step 12. Designing a system with a truly superior performance is more difficult than most people think.

#### **A Note on System Testing Software**

There are several commercially available software programs that will enable you to execute most of the steps outlined in the previous section: define and program trading rules, organize price data for different tests, create charts showing trade signals, generate system performance statistics for analysis, and so on. The relevant issues regarding software selection were outlined in Chapter 13.

#### **Observations about Trading Systems**

1. In trendfollowing systems, the basic method used to identify trends (eg, breakout, crossover moving average) may well be the least important component of the system. In a sense, this is merely a restatement of Jim Orcutt's observation that "there are only two types of trendfollowing systems: fast and slow." Thus, in designing trendfollowing systems, it may make more sense to concentrate on modifications (eg, filters and confirmation rules to reduce bad trades, market characteristic adjustments, pyramiding rules, stop rules) than on trying to discover a better method for defining trends.

2. Complexity for its own sake is no virtue. Use the simplest form of a system that does not imply a meaningful sacrifice in performance relative to more complex versions.
3. The wellpublicized and very valid reason for trading a broad range of markets is risk control through diversification. However, for futures traders there is another very important reason for trading as many markets as possible: insurance against not missing any sporadic, giant price moves. The importance of catching all such major trends cannot be overstressed—it can make the difference between mediocre performance and great performance. The 1994 coffee market (see Figure 1.2 in Chapter 1) and the 1979–1980 silver market (see Figure 1.1 in Chapter 1) are two spectacular examples of markets that were critical to portfolio performance.
4. If trading funds are sufficient, diversification should be extended to systems as well as markets. Trading several systems rather than a single system could help smooth overall performance. Ideally, the greatest degree of diversification would be achieved if the mix of systems included countertrend and pattern recognition systems as well as trendfollowing systems. (However, this goal may be difficult to achieve because countertrend and pattern recognition systems are generally significant harder to design than trendfollowing systems.)
5. If sufficient funds are available, it is better to trade a number of diversified parameter sets than to trade a single set.
6. Generally speaking, the value of parameter optimization is far overstated.
7. The previous observation strongly suggests that optimized results should never be used for evaluating the relative performance of a system. Two meaningful methods for testing systems were discussed in the text: blind simulation and average parameter set performance.
8. Socalled simulated results are frequently optimized results (ie, derived with the benefit of hindsight) and, as such, virtually meaningless. This caveat is particularly relevant in regard to advertisement or directmail promotions for trading systems, which invariably use very wellchosen examples.
9. An analysis of the results of successful systems will almost always reveal the presence of many markets with one or more years of very large profits, but few instances of very large singleyear

losses. The implication is that a key reason for the success of these systems is that their rules adhere to the critical, albeit hackneyed, principle of letting profits run and cutting losses short.

10. A market should not be because its volatility increases sharply. In fact, the most volatile markets are often the most profitable.
11. Isolating negative results for a system that performs well on balance can provide valuable clues as to how the system can be improved.
12. A frequently overlooked fact is that trading results may often reflect more information about the market than the system. For example, in Figure 15.3, a trend following system that was long in late July or early August 1997 would have seen the profits from the dramatic upward spike evaporated by the time an offsetting sell signal appeared. Such an event would not certainly reflect inappropriate risk control. Any trendfollowing system would have experienced the same fate.

This example illustrates how the value of a system cannot be judged in a vacuum. In some cases, poor performance may reflect nothing more than the fact that market conditions would have resulted in poor results for the vast majority of systems.

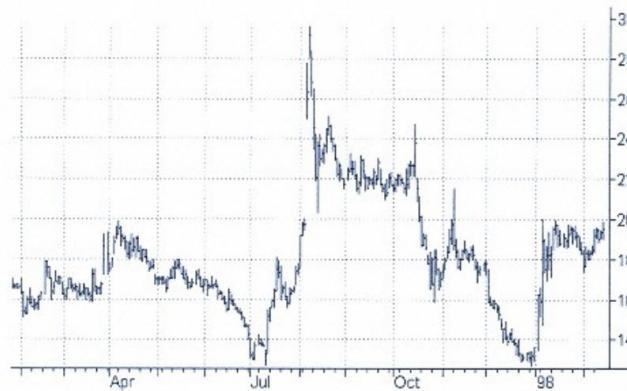


Figure 15.3  
Trading results reflect market, not system: Apple Computer.  
Chart created with TradeStation by Omega Research, Inc.

similarly, favorable results may also reflect the conditions of the market rather than any degree of superiority in the tested system. These considerations suggest that a meaningful assessment of a new system's performance should include a comparison to a benchmark (eg, the corresponding performance of standard systems, such as a crossover moving average or a simple breakout, during the same period for the same markets).

13. Use continuous futures prices for testing futures trading systems.
14. Use only a small portion of the database (ie, some markets for only a segment of the full time period) for developing and debugging a system.
15. Use charts with superimposed signal annotations as an aid to debugging systems.
16. In checking the accuracy and completeness of the signals generated by a system, make changes dictated by deviations from the intended operation of the system (due to oversights related to the full implications of the rules employed or unforeseen situations) with complete disregard to whether such changes increase or decrease profits in the sample tests.

## **PART FOUR— PRACTICAL TRADING GUIDELINES**

## **Chapter 16— The Planned Trading Approach**

*If making money is a slow process, losing it is quickly done.*  
—Ishara Saikaku

If the amount of money you risk in trading represents a minuscule fraction of your net worth, and your major motivation for speculation is entertainment, the shoot fromthehip might be fine approach. However, if your major trading objective is to make money, an organized trading plan is essential. This is not just a platitude. Search out successful speculators, and you will no doubt find that they all use a systematic, disciplined trading approach.

The following seven steps provide general guidelines for an organized trading plan.

### **Step One— Define a Trading Philosophy**

How do you plan to make your trading decisions? If your answer is something vague like "when my friend gets a hot tip from his broker," "when I get a trade idea from reading the newspaper," or "on market feel while watching the quote machine," you're not ready to begin trading A meaningful strategy would be based on either fundamental analysis, chart analysis, technical trading systems, or some combination of these approaches may use a synthesis of fundamental and chart analyzes to make trading decisions, while in other markets decisions may be based on chart analysis only.

The more specific the trading strategy, the better. For example, a trader who plans to base trades on chart analysis should be able to specify the types of patterns that would signal trades, as well as other details, such as confirmation rules. Of course, the most specific trading strategy would be one based on a mechanical trading system; however, such a fully automated approach may not appeal to a significant percentage of traders.

## **Step Two— Choose Markets to Be Traded**

After deciding on how he or she plans to pick trades, the speculator must choose the stocks or futures markets that will be followed. For most speculators, constraints related to time and available funds will be significant limit the number of instruments that can be monitored and traded. Three factors might be considered in selecting markets: suitability, diversification, and volatility.

### ***Suitability to Trading Approach***

A trader would choose those markets that appear to have the best potential for satisfactory performance, given one's planned approach. Of course, such a determination can only be made on the basis of either past trading experience or historical testing of a specific trading strategy.

### ***Diversification***

The multiple benefits of diversification were discussed in Chapter 14. However, the essential point here is that diversification provides one of the most effective means of reducing risk. Diversification can be enhanced by choosing markets that are not closely related. For example, if a speculator wanted to trade gold, then silver and platinum would be poor choices for additional markets, unless available funds were sufficient to permit trading many other markets as well. similar, selecting more than one pharmaceutical company, or more than one airline, in a limited stock portfolio would have the same drawback.

### ***Volatility***

A trader with limited funds should avoid extremely volatile markets (eg, coffee), since the inclusion of such markets in one's portfolio will severely limit the total number of markets that can be traded. Unless the speculator's approach is better suited to a given volatile market, he or she will be

*better off trading a wider variety of less volatile markets (diversification again). (Volatility here refers to dollar volatility per contract. consequently, high volatility could imply relatively large price swings, largesize contracts, or both.)*

### **Step Three— Specify Risk Control Plan**

Risk control is typically referred to as "money management," although I believe the former represents the more descriptive label. The rigid control of losses is perhaps the most critical prerequisite for successful trading. A risk control plan should include the following elements:

1. Maximum risk per trade
2. Stoploss strategy
3. Diversification
4. Reduced leverage for correlated markets
5. Market volatility adjustments
6. Adjusting leverage to equity changes
7. Losing period adjustments

#### **Maximum Risk Per Trade**

The speculator can significantly increase the probability of longterm success by restricting the percentage of total funds allocated to any given trade. Ideally, the maximum risk on any trade should be limited to 3% or less of total equity. For smaller accounts, adhere to such a guideline will require restricting trading to less volatile stocks and futures (or minifutures contracts and spreads). Speculators who find that they must risk more than about 7% of their equity on individual trades should seriously reconsider their financial suitability for trading.

The maximum risk per trade can also be used to determine the number of stock shares or futures contracts that can be initiated in any given trade. For example, if the maximum risk per trade is 3% of equity and the speculator's account size is \$100,000, a stock trade that required a stop 5 points (dollars) below the market would imply a maximum position size of 600 shares ( $\$5 \times 600 = \$3,000$ , or 3% of \$100,000). Under the same circumstances, a corn trade that required a stop point 20¢/bu below the market would imply a maximum position size of three 5,000bushel futures contracts ( $20¢ \times 5,000 = \$1,000$ , or 1% of \$100,000). In similar

fashion, the maximum risk per trade would also be used in deciding whether pyramid units could be added without upsetting risk control guidelines.

### ***StopLoss Strategy***

Know where you're going to get out before you get in. The importance of this rule cannot be overemphasized. Without a possible exit point, the trader will be vulnerable to procrastinating in the liquidation of a losing position. At the wrong time, one such lapse of trading discipline could literally knock the speculator out of the game.

Ideally, the speculator should place a goodtillcanceled (GTC) stop order when entering the trade. However, traders who are fairly certain they can trust themselves can determine a mental stop point at trade entry, and defer the actual placement of the stop order until the stop point is within a given day's permissible range. For a more detailed discussion of strategies regarding the placement of stop orders, see Chapter 9, "Choosing StopLoss Points."

It should be noted that the system trader does not definitely need to employ stoploss rules to achieve risk control. For example, if a trading system automatically reverses the position given a sufficient trend reversal, the system will inherently perform the major function of a stoploss rule—the prevention of catastrophic losses on individual trades—without such a rule being explicit. Of course, large cumulative losses can still occur over many trades, but the same vulnerability would still apply if stops were used.

### ***Diversification***

Since different markets will witness adverse moves at different times, trading multiple markets will reduce risk. As a very simple example, assume that a trader with a \$20,000 account uses a system that witnesses average drawdowns of \$3,000 in both gold and soybeans. If two contracts of either market were traded, the average drawdown would be equal to 30% ( $6,000 \div 20,000$ ), whereas if one contract of each were traded, the average drawdown would be less (possibly even less than for one contract of a single market if the markets were inversely correlated). In fact, the average drawdown could only reach 30% (assuming average drawdowns remain at \$3,000 for each market) if drawdowns in the two markets proved to be exactly synchronized, which is exceedingly unlikely. Of course, the risk reduction benefit of diversification would increase as

more unrelated markets were added to the portfolio. Also, as noted in Chapter 14, the concept of diversification applies to trading not only multiple markets but also multiple systems (or approaches) and multiple system variations (ie, parameter sets) for each market, assuming equity is sufficient to do so.

Although our focus in this section is risk control, it should be noted that diversification can also increase return by the trader to increase average leverage in each market without increasing overall risk. In fact, the addition of markets with a lower average return than other markets in an existing portfolio can actually increase the return of the portfolio if the risk reduction gained by diversification is greater than the decline in return and the trader adjusts leverage accordingly. Two other benefits of diversification—ensuring participation in major trends and providing bad luck insurance—were discussed in Chapter 14.

#### ***Reduced Leverage for Correlated Markets***

Although adding markets to a portfolio allows a trader to increase leverage, it is important to make adjustments for highly correlated markets. For example, both a currency portfolio consisting of the six most active currency futures contracts and a pharmaceutical portfolio consisting of some of the most popular drug stocks would be subject to much greater risk than more broadly diversified sixmarket portfolios because of the very strong correlations between some of their component instruments. Consequently, the leverage of such homogenous portfolios should be adjusted downward vis-à-vis a more diversified sixmarket portfolio with equivalent individual market volatilities.

#### ***Market Volatility Adjustments***

Trading leverage—the number of shares or contracts traded in each market for any given equity size—should be adjusted to account for volatility differences. There are two aspects of this rule. First, fewer shares or contracts would be traded in more volatile markets. Second, even for a single market, the number of shares or contracts would vary in conjunction with fluctuations in volatility. Of course, because futures can't be traded in fractions, speculators with small accounts will be unable to make such volatility adjustments, which is one reason why small accounts will be subject to greater risk. (Other reasons the unavoidability of the maximum risk per trade exceeding levels and an inability to adequately include appropriate levels.)

### ***Adjusting Leverage to Equity Changes***

Leverage should also be changed in accordance with major fluctuations in equity. For example, if a trader begins with a \$100,000 account and loses \$20,000, all else being equal, the leverage should be reduced by 20%. (Of course, if equity rises instead, the leverage should be increased.)

### ***Losing Period Adjustments (Discretionary Traders Only)***

When a trader's confidence is shaken because of an ongoing losing streak, it is often a good idea to temporarily cut back position size or even take a complete trading break until confidence returns. In this way, the trader can keep a losing phase from steamrolling into a disastrous retracement. This advice would not apply to a system trader, however, since for most viable systems a losing period the potential for favorable performance in the ensuing period. Or, to put it another way, confidence and frame of mind are critical to the performance of a discretionary trader but are not relevant to the performance of a system.

### **Step Four—**

#### **Establish a Planning Time Route**

It is important to set aside some time each evening for reviewing markets and updating trading strategies. In most cases, once the trader has established a specific routine, 30 to 60 minutes should be sufficient (less if only a few markets are being traded). The primary tasks performed during this time would be:

1. Update Trading Systems and Charts. At least one of these should be employed as an aid in making trading decisions. In those markets in which fundamental analysis is employed, the trader will also have to reevaluate the fundamental picture periodically after the release of important new information (eg, government crop report).
2. Plan New Trades. Determine whether any new trades are indicated for the next day. If there are any, decide on a specific entry plan (eg, buy on opening). In some cases, a trading decision may be contingent on an evaluation of market behavior on the following day. For example, assume a trader is bullish on a particular stock, and modestly bearish news about the company is received after the close. Such a trader might decide to go long if the market is trading higher on the day at any point within one hour of the close.

3. Update Exit Points for Existing Positions. The trader should review the stops and objectives on existing positions to see whether any revisions appear desirable in light of the current day's price action. In the case of stops, such changes should only be made to reduce trade risk.

#### **Step Five— Maintain a Trader's Notebook**

The planning routine discussed in the previous section implies some systematic form of record keeping. Figure 16.1 provides a sample of a format that might be used for a trader's notebook. The first four columns merely identify the trade.

Column 5 would be used to indicate the intended stop point at time of entry. Revisions of this stop would be entered in column 6. (Some items, such as column 6, will require pencil entries, since they are subject to revision.) The reason for maintaining the initial stop point as a separate item is that this information may be useful to the trader in any subsequent trade analysis—for example, to check whether initial stops tend to be too wide or too close.

Columns 7–10 provide a summary of the implied risk on open positions. By adding these entries for all open positions, the trader can assess current total exposure—information critical in controlling risk and determining whether new positions can be initiated. As a rough rule of thumb, the cumulative implied risk on all open positions should not exceed 25% to 35% of total account equity. (Assuming the maximum risk on any given position is limited to 2% of equity, this constraint would not be relevant unless there were open positions in at least 13 markets.)

The use of objectives (columns 11 and 12) is a matter of individual preference. Although in some cases the use of objectives will permit a better exit price, in other circumstances will result in the premature liquidation of a trade. Consequently, some traders may prefer to forgo the use of objectives, allow the timing of liquidation to be determined by either a trailing stop or a change of opinion.

Liquidation information is contained in columns 13–15. The reason for recording the exit date is that it can be used to calculate the duration of the trade, information that may be useful to speculators in analyzing their trades. Column 15 would indicate the profit or loss on the trade after deducting commissions.

Columns 16–17 provide room for capsule comments regarding the reasons for entering the trade (made at that time) and a hindsight evaluation of the trade. Such observations can be particularly useful in helping

Figure 16.1  
Sample page from a trader's notebook

traders detect any patterns in their successes and failures. Of course, the actual trader's notebook must allow more room for these comments than shown in the illustration provided by Figure 16.1. Furthermore, a more extensive description of the trade would be contained in a trader's diary, which is discussed in the next step.

The novice will usually benefit from a period of paper trading before plunging into actual trading. The trader's notebook would be favorable for this purpose, since not only would it provide an indication of potential trading success, but it would also get the new trader into the habit of speculation in a systematic and disciplined fashion. Thus, when the transition is made to actual trading, the decision process will have become routine. Of course, the difficulty of trading decisions will increase once real money is at stake, but at least the new speculator will have a decisive advantage over his or her more typically illprepared counterparts.

#### **Step Six— Maintain a Trader's Diary**

The trader's diary would contain the following basic information for each trade:

1. Reasons for Trade. Over time, this information can help the speculator determine whether any trading strategies are particularly prone to success or failure.
2. How the Trade Turned Out. This basic background information is necessary for the evaluation of any trade. (Although the gist of this information can be determined from the net profit or loss column in the trader's notebook, it is also helpful to maintain this information along with each trade discussed in the trader's diary.)
3. Lessons. The speculator should itemize the mistakes or correct decisions made in the course of the trade. The mere act of keeping such a written record can greatly help a trader to avoid repeating past mistakes—particularly if repeated errors are indicated in capital letters and followed by several exclamation points. The trader's diary should be reviewed periodically to help reinforce these observations. After a while, the lessons will sink in. Speaking from personal experience, this approach can be instrumental in eradicating frequently repeated mistakes.

It may also be useful to augment the written diary with charts illustrating trade entry and exit points (as was done, for example, in Chapter 12).

#### **Step Seven—**

#### **Analyze Personal Trading**

Speculators must not only analyze the markets, but also their own past trades in order to isolate the strengths and weaknesses of their approach. Besides the trader's diary, two useful tools in such an analysis are analysis of segmented trades and the equity chart.

##### ***Analysis of Segmented Trades***

The idea behind segmenting trades into different categories is to help identify any patterns of significantly above or belowaverage performance. For example, by breaking down trades into buys and sells, a trader might discover a predilection towards the long side, but a higher average profit for short trades. Such an observation would obviously imply the desirability of correcting a bias towards the long side.

As another example, after breaking down the results by market, a trader may find he or she consistently loses money in certain stocks or futures markets. Such evidence might suggest that overall performance could be improved by not trading these markets. The segmentation of trading results by market can be an extremely important exercise, since many speculators have a poor intuitive sense of their relative degree of success in various markets. The cessation of trading in poorer performing markets need not be permanent. The speculator could attempt to identify the reasons for disappointing results in these markets and then research and test possible trading approach adjustments.

As a final example, a speculator who combines day trading and position trading might find it particularly instructive to compare the net results of each category. My own suspicion is that if such an analysis were performed by all speculators to whom the exercise is relevant, the population of day traders would shrink by 50% overnight.

Of course, there are other criteria that can be used to segment trades. Two other examples of relevant comparisons are fundamental versus technically oriented trades, and trades that were in agreement with the position of a given trading system versus those that were not. In each case, the trader would be searching for patterns of success or failure. The process of analyzing segmented trades will be greatly simplified by using an electronic spreadsheet to maintain the trader's notebook.

### ***Equity Chart***

This is a closeonly type of chart in which the indicated value for each day represents the account equity (including the equity on open positions). The primary purpose of such a chart is to alert the trader when there is a precipitous deterioration of performance. For example, if after an extended, steady climb, the account equity experiences a sudden, steep decline, a trader might be well advised to lighten positions and take time to react the situation. Such an abrupt shift in performance might reflect a transformation of market conditions, a current vulnerability approach in the speculator's trading, or a recent predilection towards poor trading decisions. A determination of the actual cause is not essential, since any of these factors could be viewed as strong cautionary signals to reduce risk exposure. In short, the equity chart can be an important tool in mitigating equity retracements.

## **Chapter 17— EightyTwo Trading Rules and Market Observations**

*Live long enough and you will eventually be wrong about everything.*  
—Russell Baker

Few things are easier to ignore than trading advice. Many of the most critical trading rules have been so widely circulated that they have lost their ability to provoke any thought in the new trader. Thus, valid market insights are often dismissed as obvious clichés.

Consider the rule "Cut your losses short"—perhaps the single most important trading maxim Lives there a speculator who has not heard this advice? Yet there is certainly no shortage of speculators who have ignored this rule. no shortage of speculators whose accounts were virtually obliterated by one or two losing trades.

The truth is that most speculators will ignore advice until they have "rediscovered the wheel" through their own trading experience. Moreover, most traders will repeat a mistake many times before the lesson finally sinks in. Thus, I have no illusions that the advice presented in this and the next chapter will spare the reader from committing basic trading errors. However, it is hoping that several readings of these chapters (particularly following periods of negative trading results) will be trivial at least help some novice trader reduce the number of times these mistakes are repeated—hardly a achievement.

The observations in this chapter are based on personal experience. Thus, the following 82 rules should be viewed in their proper perspective: empirically based opinions as opposed to proven facts. Overall, there will

be significant overlap with other published expositions of trading guidelines. This is hardly surprising, since a wide range of rules (many of them mundane) are based on such sound principles that they are almost universally accepted as trading truths. For example, I have never met a successful speculator who did not believe that risk control was essential to trading profitable. On the other hand, some of the rules listed below reflect a subjective view that is contradicted by other writers (eg, using market orders instead of limit orders). In the final analysis, each speculator must discover his or her own trading truths. It is hoping that the following list will help speed the process.

### **Entering Trades**

1. Differentiate between major position trades and shortterm trades. The average risk allocated to shortterm trades (as implied by the number of shares or contracts in the position and the stop point) should be significant smaller. Also, the speculator should focus on major position trades, since these are usually far more critical to trading success. A mistake made by many traders is that they become so involved in trying to catch the minor market swings (generating lots of commissions and slippage in the process) that they miss the major price moves.
2. If you believe a major trading opportunity exists, don't be greedy in trying to get a slightly better entry price. The lost profit potential of one missed price move can offset the savings from 50 slightly better execution prices.
3. Entry into any major position should be planned and carefully thought out—never an intraday impulse.
4. Find a chart pattern that says the timing is right—now. Don't initiate a trade without such a confirmation pattern. (Occasionally, one might consider a trade without such a pattern if there is a convergence of many measured moves and support/resistance points at a given price area and there is a well defined stop point that does not imply much risk.)
5. Place orders determined by daily analysis. If the market is not close to the desired entry level, record the trade idea and review it each day until either the trade is entered or the trade idea is no longer deemed attractive. Failure to adhere to this rule can result in missing good trades. One common occurrence is that a trade idea is recalled once the market has moved

beyond the intended entry, and it is then difficult to do the same trade at a worse price.

**6.** When looking for a major reversal in a trend, it is usually wiser to wait for some pattern that suggests that the timing is right rather than fading the trend at projected objectives and support/resistance points. This rule is particularly important in the case of a market in which the trend has carried prices to long term highs or lows (eg, highs or lows beyond a prior 100day range). Remember, in most cases of an extended trend, the market will not form Vtype reversals. Instead, prices will normally pull back to test highs and lows—often a number of times. Thus, waiting for a top or bottom to form can prevent getting chopped to pieces during the topping or bottoming process—not to mention the losses that can occur if you are highly premature in picking the top or bottom. Even if the market does form a major V top or V bottom, subsequent consolidations (eg, flags) can allow favorable reward/risk entries.

7. If you have an immediate instinctive impression when looking at a chart (particularly if you are not conscious about which market you are looking at), go with that feeling.

**8.** Don't let the fact that you missed the first major portion of a new trend keep you from trading with that trend (as long as you can define a reasonable stop loss point).

9. Don't fade recent price failure patterns (eg, bull or bear traps) when implementing trades, even if there are many other reasons for the trade.

**10.** Never fade the first gap of a price move! For example, if you are waiting to enter a trade on a correction, and the correction is then formed on a price gap, don't enter the trade.

11. In most cases, use market orders rather than limit orders. This is especially important when liquidating a losing position or entering a perceived major trading opportunity—situations in which traders are apt to be greatly concerned about the market getting away from them. Although limit orders will provide slightly better fills for a large majority of trades, this benefit will usually be more than offset by the significantly poorer fills, or missed profit potential, in those cases in which the initial limit order is not filled.

12. Never double up near the original trade entry point after having been ahead. Often, the fact that the market has completely re

traced is a negative sign for the trade. Even if the trade is still good, doubling up in this manner will jeopardize holding power due to overtrading.

#### **Exiting Trades and Risk Control (Money Management)**

13. Decide on a specific protective stop point at the time of trade protective entry.

**14. Exit any trade if newly developing patterns or market action are contrary to trade—even if stop point has not been reached. Ask yourself, "If I had to have a position in this market, which way would it be?"** If the answer is not the position you hold, get out! In fact, if contradictory indications are strong enough, reverse the position.

15. Always get out immediately once the original premise for a trade is violated.

16. If you are drastically wrong the first day a trade is on, abandon the trade immediately—especially if the market gaps against you.

17. In the event of a major breakout counter to the position held, either liquidate immediately or use a very close stop. In the event of a gap breakout, always *liquidate immediately*.

18. If a given stock or futures market suddenly trades far in excess of its recent volatility in a direction opposite to the position held, liquidate your position immediately. For example, if a market that has been trading in approximate 50point daily ranges opens 100 to 150 points higher, cover immediately if you are short.

**19. If selling into resistance or buying into support and the market consolidates instead of reversing, get out.**

**20. For analysts and market advisers: If your gut feeling is that a recent recommendation, hot line broadcast, trade, or written report of yours is wrong, reverse your opinion!**

21. If you're unable to watch markets for a period of time (eg, when traveling), either liquidate all positions or be sure to have GTC stop orders on all open positions. (Also, in such situations, limit orders can be used to ensure getting into the market on planned buys at lower prices or planned sells at higher prices.)

22. Do not get complacent about an open position. Always know where you are getting out even if the point is far removed from the current price. Also, an evolving pattern contradicts to the trade may suggest the desirability of an earlierthanintended exit.

**23.** *Fight the desire to immediately get back into the market following a stoppedout trade. Getting back in will usually supplement the original loss with additional losses.* The only reason to get back in on a stoppedout trade is if the timing seems appropriate based on evolving price patterns—that is, only if all the conditions and justifications of any new trade are met.

#### **Other RiskControl (Money Management) Rules**

**24.** *When trading is badly going:* (a) reduce position size (keep in mind that positions in strongly correlated markets are similar to one larger position); (b) use tight stoploss points; (c) slow up in taking new trades.

**25.** *When trading is badly going, reduce risk exposure by liquidating losing trades, not winning trades.* This observation was memorably related by Edwin Lefèvre in Reminiscences of a Stock Operator: "I did precisely the wrong thing. The cotton showed me a loss and I kept it. The wheat showed me a profit and I sold it out. Of all the speculative blunders there are few greater than trying to average a losing game. Always sell what shows you a loss and keep what shows you a profit."

26. Be extremely careful not to change trading patterns after making a profit:

- a. Do not initiate any trades that would have been deemed too risky at the start of the trading program.
- b. Do not suddenly increase the number of shares or contracts in a typical trade. (However, a gradual increase as equity grows is okay.)

**27.** Treat small positions with the same common sense as large positions. Never say, "It's only 50 shares," or "It's only one or two contracts."

28. Avoid holding very large positions into major reports or the release of important government statistics.

29. Futures traders: Apply the same money management principles to spreads as to outright positions. It is easy to be lulled into thinking that spreads move fighting enough so that it is not necessary to worry about stoploss protection.

30. Don't buy options without planning at what outright price the trade is to be liquidated.

### **Holding and Exiting Winning Trades**

31. Do not take small, quick profits in major position trades. In particular, if you are dramatically right on a trade, never, never take profits on the first day.

32. Don't be too hasty to get out of a trade with a gap in your direction. Use the gap as initial stop; then bring in stop in trailing fashion.

33. Try to use trailing stops, supplemented by developing market action, instead of objectives as a means of getting out of profitable trades. Using objectives will often work against fully realizing the potential of major trends. Remember, you need the occasional big winners to offset losers.

34. The preceding rule notwithstanding, it is still useful to set an initial objective at the time of trade entry to allow the application of the following rule: If a very large portion of an objective is realized very quickly (eg, 50–60% in one week or 75–80% in two or three weeks), take partial profits, with the idea of reinstating liquidated shares or contracts on a reaction. The idea is that it is okay to take a quick sizable profit. Although this rule may often result in missing the remainder of the move on the liquidated portion of the position, holding the entire position, in such a case, can often lead to nervous liquidation on the first sharp retracement.

35. If an objective is reached, but you still like the trade, stay with it using a trailing stop. This rule is important in order to be able to ride a major trend. Remember, *patience is important not only in waiting for the right trades, but also in staying with trades that are working. The failure to adequate profit from correct trades is a key profitlimiting factor.*

36. *One partial exception to the previous rule is that if you are heavily positioned and equity is surging straight up, consider taking*

scaleup profits. Corollary rule: When things look too good to be true—watch out! If everything is going right, it is probably a good time to begin taking scaleup (or scaledown) profits and using close trailing stops on a portion of your positions.

37. If taking profits on a trade that is believed to still have longterm potential (but is presumably vulnerable to a nearterm correction), have a game plan for reentering position. If the market doesn't retrace adequately to allow for reentry, be cognizant of patterns that can be used for timing a reentry. Don't let the fact that the reentry point would be worse than the exit point keep you from getting back into a trade in which the perception of both the longterm trend and current timing suggest reentering. *Inability to enter at a worse price can often lead to missing major portions of large trends.*

38. *If trading larger positions, avoid the emotional trap of wanting to be 100% right. In other words, take only partial profits. Always try to keep at least a partial position for the duration of the move—until the market forms a convincing reversal pattern or reaches a meaningful stoploss point.*

### Miscellaneous Principles and Rules

39. *Always pay more attention to market action and evolving patterns than to objectives and support/resistance areas. The latter can often cause you to reverse a correct market bias very prematurely.*

40. When you feel action should be taken either entering or exiting a position—act, don't procrastinate.

41. Never go counter to your own opinion of the longterm trend of the market. In other words, don't try to dance between the raindrops.

42. Winning trades tend to be ahead right from the start.

43. Correct timing of entry and exit (eg, timing entry on a reliable pattern, getting out immediately on the first sign of trade failure) can often keep a loss small even if the trade is dead wrong.

44. Intraday decisions are almost always losers. Keep screen off intraday.

45. Be sure to check markets before the close on Friday. Often the situation is plainer at the end of the week. In such cases, a better entry or exit can usually be obtained on Friday near the close

than on the following Monday opening. This rule is particularly important if you are holding a significant position.

46. Act on market dreams (that are recalled unambiguously). Such dreams are often right because they represent your subconscious market knowledge attempting to break through the barriers established by the conscious mind (eg, "How can I buy here when I could have gone long \$2,000 lower last week?")

**47. You are never immune to bad trading habits—the best you can do is to keep them late. As soon as you get lazy or sloppy, they will return.**

### **Market Patterns**

48. If the market sets new historical highs and holds, the odds strongly favor a move very far beyond the old highs. Selling a market at new record highs is probably one of the amateur trader's worst mistakes.

49. Narrow market consolidations near the upper end of the overall trading ranges are bullish patterns. similarly, narrow consolidations near the low end of trading ranges are bearish.

50. Play the breakout from an extended, narrow range with a stop against the other side of the range.

51. Breakouts from trading ranges that hold for one to two weeks, or longer, are among the most reliable technical indicators of impending trends.

52. A common and particularly useful form of the above rule is: Flags or pennants forming right above or below prior extended and broad trading ranges tend to be fairly reliable continuation patterns.

53. Trade in the direction of wide gaps.

54. Gaps out of congestion patterns, particularly onetowomonth trading ranges, are often excellent signals. (This pattern works especially well in bear markets.)

55. If a "breakaway gap" is not filled during the first week, it should be viewed as a particularly reliable signal.

56. A breakout to new highs or lows followed within the next week or two by a gap (particularly a wide gap) back into the range is a particularly reliable form of a bull trap or bear trap.

57. If the market breaks out to a new high or low and then pulls back to form a flag or pennant in the prebreakout trading range, assume that a top or bottom is in place. A position can be taken using a protective stop beyond the flag or pennant consolidation.
58. A breakout from a trading range followed by a pullback deep into the range (eg, threequarters of the way back into the range or more) is yet another significant bull or bear trap formation.
59. If an apparent V bottom is followed by a nearby congestion pattern, it may represent a bottom pattern. However, if this consolidation is then broken on the downside and the V bottom is approximately, the market action can be read as a sign of an impending move to new lows. In the latter case, short positions could be implemented using protective stops near the top of the consolidation. Analogous comments would apply to V tops followed by nearby consolidations.
60. V tops and V bottoms followed by multimonth consolidations that form in close proximity to the reversal point tend to be major top or bottom formations.
61. Tight flag and pennant consolidations tend to be reliable continuation patterns and allow entry into an existing trend, with a reasonably close, yet meaningful, stop point.
62. If a tight flag or pennant consolidation leads to a breakout in the wrong direction (ie, a reversal instead of a continuation), expect the move to continue in the direction of the breakout.
63. Curved consolidations tend to suggest an accelerated move in the direction of the curve.
64. The breaking of a shortterm curved consolidation (see Chapter 11) in the direction opposite of the curve progression pathway to be a good trend reversal signal.
65. Wideranging days (ie, days with a range far exceeding the recent average range) with a close counter to the main trend usually tend to provide a reliable early signal of a trend change—particularly if they also trigger a reversal signal (eg, filling of a runaway gap, complete penetration of prior consolidation).
66. Nearvertical, large price moves over a period of two to four days (coming off a relative high or low) tend to be extended in the following weeks.

67. Spikes are good shortterm reversal signals. The extreme of the spike can be used as a stop point.
68. In spike situations, look at chart both ways—with and without spike. For example, if when a spike is removed a flag is evident, a penetration of that flag is a meaningful signal.
69. The fillingin of a runaway gap can be viewed as evidence of a possible trend reversal.
70. An island reversal followed shortly thereafter with a pullback into the most recent trading range or consolidation pattern represents a possible major top (or bottom) signal.
71. The ability of a stock or future to hold relatively firm when other related markets are under significant pressure can be viewed as a sign of intrinsic strength. similarly, a market acting weak when related markets are strong can be viewed as a bearish sign.
72. If a market trades consistently higher for most of the daily trading session, anticipate a close in the same direction.
73. Two successive flags with little separation can be viewed as a probable continuation pattern.
74. View a curved bottom, followed by a shallower, samedirection curved consolidation near the top of this pattern, as a bullish formation ("cupandhandle"). A similar pattern would apply to market tops.
75. Moderate sentiment in a market that is strongly trending may be a more reliable indicator of a probable continuation of the price move than a high or low sentiment reading is of a reversal. In other words, extreme sentiment readings can often occur in the absence of major tops and bottoms, but major tops and bottoms rarely occur in the absence of extreme sentiment readings (current or recent).
76. A failed signal is more reliable than the original signal. Go the other way, using the high (or low) before the failed signal as a stop. Some examples of such failure patterns are rule numbers 56, 57, 58, 62, 64, and 69.
77. The failure of a market to follow through on significant bullish or bearish news (eg, an important earnings reporter or a major US Department of Agriculture report) is often a harbinger of an imminent trend reversal. Pay particular attention to such a development if you have an existing position.

### **Analysis and Review**

78. Review charts every day—especially if you're too busy.
79. Periodically review longterm charts (eg, every two to four weeks).
80. Religiously maintain a trader's diary, including a chart for each trade taken and noting the following: reasons for trade; intended stop and objective (if any); follow up at a later point indicating how the trade turned out; observations and lessons ( things done right, or mistakes; and net profit or loss. It is important that the trade sheet be filled out when the trade is entered so that the reasons for the trade accurately reflect your actual thinking rather than a reconstruction.
81. Maintain a patterns chart book whenever you notice a market pattern that is interesting and you want to note how you think it will turn out, or you want to record how that pattern is eventually resolved (in the case where you don't have any bias regarding the correct interpretation). Be sure to follow each chart up at a later date to see the actual outcome. Over time, this process may skills in chart interpretation by providing some statistical evidence of the forecasting reliability of various chart patterns (as recognized in real time).
82. Review and update trading rules, trader's diary, and patterns chart book on a regular schedule (eg, threemonth rotation for the three items). Of course, any of these items can be reviewed more frequently, whenever it is felt such a review would be useful.

## Chapter 18— Market Wiz(ar)dom

*There is no such thing as being right or beating the market. If you make money, it is because you understand the same thing the market did. If you lose money, it is simply because you got it wrong.  
There is no other way of looking at it.*

—Musawer Mansoor Ijaz

The previous chapter detailed specific trading rules and market observations. This chapter, which has been adapted from *The New Market Wizards*,\* examines the broad principles and psychological factors that are crucial to trading success.

The methods employed by exceptional traders are exceptionally diverse: Some are pure fundamentalists; others employ only technical analysis, and still others combine the two methodologies. Some traders consider two days to be longterm, while others consider two months to be shortterm. Yet despite the wide gamut of styles, I have found that certain principles hold true for a broad spectrum of successful traders. After a score of years analyzing and trading the markets and two books of interviews with great traders, I have come down to the following list of 42 observations regarding success in trading.

1. First Things First. First, be sure that you really want to trade. It is common for people who think they want to trade to discover that they really don't.
2. Examine Your Motives. Think about why you really want to trade. If you want to trade for the excitement, you might be better off

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\**The New Market Wizards*, Jack Schwager, Harper Business, New York, 1989, pp. 461–478; copyright © 1989 by HarperCollins Publishers; by permission.

riding a roller coaster or taking up hang gliding. In my own case, I found that the underlying motive for trading was serenity or peace of mind—hardly the emotional state typical of trading. Another personal motive for trading was that I loved puzzle solving—and the markets provided the ultimate puzzle. However, while I enjoyed the cerebral aspects of market analysis, I didn't particularly like the visceral characteristics of trading itself. The contrast between my motives and the activity in very obvious conflicts. You need to examine your own motives very carefully for any such conflicts. The market is a stern master. You need to do almost everything right to win. If parts of you are pulling in opposite directions, the game is lost before you start.

How did I resolve my own conflict? I decided to focus completely on mechanical trading approaches in order to eliminate the emotionality in trading. Equally important, focusing on the design of mechanical systems directed my energies to the part of trading I did enjoy—the puzzlesolving aspects. Although I had devoted some energy to mechanical systems for these reasons for a number of years, I eventually came to the realization that I wanted to move in this direction exclusively. (This is not intended as an advocate for mechanical systems over humandecisionoriented approaches. I am only providing a personal example. The appropriate answer for another trader could well be very different.)

3. Match the Trading Method to Your Personality. It is critical to choose a method that is consistent with your own personality and comfort level. If you can't stand to give back significant profits, then a longterm trendfollowing approach—even a very good one—will be a disaster, because you will never be able to follow it. If you don't want to watch the quote screen all day (or can't), don't try a day trading method. If you can't stand the emotional strain of making trading decisions, then try to develop a mechanical system for trading the markets. The approach you use must be right for you; it must feel comfortable. The importance of this concept cannot be overemphasized. Randy McKay, who met success as both an onthefloor and offthefloor trader, asserted: "Virtually every successful trader I know ultimately ended up with a trading style suited to his personality."

Incidentally, the mismatch of trading style and personality is one of the key reasons why purchased trading systems rarely make profits for those who buy them, even if the system is a good one. While the odds of getting a winning system are small—certainly less than 50/50—the odds of getting a system that fits your personality are smaller still. I'll leave it to your imagination to decide on the odds of buying a profitable/moderate risk system and using it effectively.

4. It Is Absolutely Necessary to Have an Edge. You can't win without an edge, even with the world's greatest discipline and money management skills. If you could, then it would be possible to win at roulette (over the long run) using perfect discipline and risk control. Of course, that is an impossible task because of the laws of probability. If you don't have an edge, all that money management and discipline will do for you is to guarantee that you will bleed to death fought. Incidentally, if you don't know what your edge is, you don't have one.

5. Derive a Method. To have an edge, you must have a method. The type of method is irrelevant. Some of the supertraders are pure fundamentalists; some are pure technicians; and some are hybrids. Even within each group, there are tremendous variations. For example, within the group of technicians, there are tape readers (or their modern day equivalent, screen watchers), chartists, mechanical system traders, Elliott Wave analysts, Gann analysts, and so on. The type of method is not important, but having one is critical—and, of course, the method must have an edge.

6. Developing a Method Is Hard Work. Shortcuts rare lead to trading success. Developing your own approach requires research, observation, and thought. Expect the process to take lots of time and hard work. Expect many dead ends and multiple failures before you find a successful trading approach that is right for you. Remember that you are playing against tens of thousands of professionals. Why should you be any better? If it were that easy, there would be a lot more millionaire trader.

7. Skill versus Hard Work. Is trading success dependent on innate skills, or is hard work sufficient? There is no question in my mind that many of the supertraders have a special talent for trading. Marathon running provides an appropriate analogy. Virtually any healthy person can run a marathon, given sufficient commitment and hard work. Yet, regardless of the effort and desire, only a small fraction of the population will ever be able to run a 2:12 marathon. similar, almost anyone can learn to play a musical instrument. But again, regardless of work and dedication, only a handful of individuals possess the natural talent to become concert soloists. The general rule is that exceptional performance requires both natural talent and hard work to realize its potential. If the innate skill is lacking, hard work may provide proficiency, but not excellence.

In my opinion, the same principles apply to trading. Virtually anyone can become a net profitable trader, but only a few have the inborn talent to become supertraders. For this reason, it may be possible to teach trading success, but only up to a point. Be realistic in your goals.

8. Good Trading Should Be Effortless. Wait a minute. Didn't I just list hard work as an ingredient to successful trading? How can good trading require hard work and yet be effortless?

There is no contradiction. Hard work refers to the preparatory process—the research and observation necessary to become a good trader—not to the trading itself. In this respect, hard work is associated with such qualities as vision, creativity, persistence, drive, desire, and commitment. Hard work certainly does not mean that the process of trading itself should be filled with exertion. It certainly does not imply struggling with or fighting against the markets. On the contrary, the more effortless and natural the trading process, the better the chances for success. One trader quoting Zen and the Art of Archery made the following analogy: "In trading, just as in archery, whenever there is effort, force, straining, struggling, or trying, it's wrong. You're out of sync; you're out of harmony with the market. The perfect trade is one that requires no effort."

Visualize a worldclass distance runner clicking off mile after mile at a fiveminute pace. Now picture an outofshape, 250pound couch potato trying to run a mile at a 10minute pace. The professional runner glides along gracefully—almost effortlessly—despite the long distance and fast pace. The outofshape runner, however, is likely to struggle, huffing and puffing like a Yugo going up a 1% grade. Who is putting in more work and effort? Who is more successful? Of course, the worldclass runner puts in hard work during training, and this prior effort and commitment are essential to his or her success.

9. Money Management and Risk Control. Almost all the great traders I felt that money management was even more important than the trading method. Many potentially successful systems or trading approaches have led to disaster because the trader applying the strategy lacking a method of controlling risk. You don't have to be a mathematician or understand portfolio theory to manage risk. Risk control can be as easy as the following threestep approach:

1. Never risk more than 1% to 2% of your capital on any trade. (Depending on your approach, a modestly higher number might still be reasonable. However, I would strongly advise against anything over 5%.)
2. Predetermine your exit point before you get into a trade. Many of the traders I interviewed exactly this rule.
3. If you lose a certain amount of your starting capital (eg, 10% to 20%), take a breather, analyze what went wrong, and

wait until you feel confident and have a highprobability idea before you begin trading again. For traders with large accounts, trading very small is a reasonable alternative to a complete trading hiatus. The strategy of cutting trading size down sharply during losing streaks is one mentioned by many of the traders I interviewed.

10. The Trading Plan. Trying to win in the markets without a trading plan is like trying to build a house without blueprints—costly (and avoidable) mistakes are almost inevitably. A trading plan simply requires combining a personal trading method with specific money management and trade entry rules. Robert Krausz, a hypnotist who has made a specialty of working with traders, considers the absence of a trading plan the root of all the principal difficulties traders encounter in the markets. Richard Driehaus, a very successful mutual fund manager I interviewed, stresses that a trading plan should reflect a personal core philosophy. He explains that without a core philosophy, you are not going to be able to hold on to your positions or stick with your trading plan during really difficult times.

11. Discipline. "Discipline" was probably the most frequent word used by the exceptional trader that I interviewed. Often, it was mentioned in an almost apologetic tone: "I know you've heard this a million times before, but believe me, it's really important."

There are two basic reasons why discipline is critical. First, it is a prerequisite for maintaining effective risk control. Second, you need discipline to apply your method without secondguessing and choosing which trades to take, as you will almost always pick the wrong ones. Why? Because you will tend to pick the comfortable trades, and as Bill Eckhardt, a mathematician turned successful commodity trading advisor (CTA), explained, "What feels good is often the wrong thing to do."

As a final word on this subject, remember that you are never immune to bad trading habits; the best you can do is to keep them late. As soon as you get lazy or sloppy, they will return.

12. Understanding That You Are Responsible. Whether you win or lose, you are responsible for your own results. Even if you lost on your broker's tip, an advisory service recommendation, or a bad signal from the system you bought, you are responsible because you made the decision to listen and act. I have never met a successful trader who blamed others for his or her losses.

13. The Need for Independence. You need to do your own thinking. Don't get caught up in mass hysteria. Ed Seykota, a futures trader who

multiplied the equity in his accounts a thousandfold over an 18year period, pointed out that by the time a story is making the cover of national periodicals, the trend is probably near an end.

Independence also means making your own trading decisions. Never listen to other opinions. Even if it occasionally helps on a trade or two, listening to others seems to end up invariably costing you money—not to mention confusing your own market view. As Michael Marcus, a very successful futures trader, stated in Market Wizards, "You need to follow your own light. If you combine two traders, you will get the worst of each."

*A related personal anecdote concerns another trader I interviewed in Market Wizards. Although he could trade better than I if he were blindfolded and placed in a trunk at the bottom of a pool, he was still interested in my view of the markets. One day he called and asked, "What do you think of the yen?"*

The yen was one of the few markets about which I had a strong opinion at the time. It had formed a particular chart pattern that made me very bearish. "I think the yen is going straight down, and I'm short," I replied.

He proceeded to give me 51 reasons why the yen was oversold and due for a rally. After he hung up, I thought: "I'm leaving on a business trip tomorrow. My trading has not been going very well during the past few weeks. The short yen trade is one of the only positions in my account. Do I really want to fade one of the world's best traders given these considerations?" I decided to close out the trade.

By the time I returned from my trip several days later, the yen had fallen 150 points. As luck would have it, that afternoon the same trader called. When the conversation rolled around to the yen, I couldn't resist asking, "By the way, are you still long the yen?"

"Oh no," he replied, "I'm short."

The point is not that this trader was trying to mislead me. On the contrary, he firmly believed each market opinion at the time he expressed it. However, his timing was good enough so that he probably made money on both sides of the trade. In contrast, I ended up with nothing, even though I had the original move pegged exactly right. The moral is that even advice from a much better trader can lead to detrimental results.

14. Confidence. An unwavering confidence in their ability to continue to win in the markets was a nearly universal characteristic among the traders I interviewed. Dr. Van Tharp, a psychologist who has done a great deal of research on traders and was interviewed in Market Wizards, claims that one of the basic traits of winning traders is that they believe "they've won the game before the start."

The trader who has confidence will have the courage to make the

*right decisions and the strength not to panic. There is a passage in Mark Twain's Life on the Mississippi that I find significantly apropos, even though it has nothing to do with trading.* In it, the authorprotagonist—an apprentice steamboat river pilot—is tricked by his mentor and the crew into panicking in a stretch of river he knows to be the easiest in the entire run. The following exchange then ensues with his mentor:

"Didn't you know there was no bottom in that crossing?"

"Yes sir, I did."

"Very well then, you shouldn't have allowed me or anybody else to shake your confidence in that knowledge. Try to remember that. And another thing, when you get into a dangerous place, don't turn coward. That isn't going to help matters any."

15. Losing Is Part of the Game. The great trader fully realizes that losing is an intrinsic element in the game of trading. This attitude seems linked to confidence. Because exceptional traders are confident that they will win over the long run, individual losing trades no longer seem horrible; they simply appear inevitably—which is what they are. As Linda Raschke, a futures trader with a particularly high ratio of winning to losing trades, explained, "It never bothered me to lose, because I always knew I would make it right back."

There is no more certain recipe for losing than having a fear of losing. If you can't stand taking losses, you will end up either taking large losses or missing great trading opportunities. Either flaw is sufficient to sink any chance for success.

16. Lack of Confidence and TimeOuts. Trade only when you feel confident and optimistic. I have often heard traders say: "I just can't seem to do anything right." Or, "I bet I get stopped out right near the low again." If you find yourself thinking in such negative terms, it is a sure sign that it is time to take a break from trading. Get back into trading slowly. Think of trading as a cold ocean. Test the water before plunging in.

17. The Urge to Seek Advice. The urge to seek advice betrays a lack of confidence. As Linda Raschke said, "If you ever find yourself tempted to seek out someone else's opinion on a trade, that's usually a sure sign that you should get out of your position."

18. The Virtue of Patience. Waiting for the right opportunity increases the probability of success. You don't always have to be in the

market. As Edwin Lefèvre put it in his classic *Reminiscences of a Stock Operator*, "There is the plain fool who does the wrong thing at all times anywhere, but there is the Wall Street fool who thinks he must trade all the time."

One of the more colorful descriptions of patience in trading was offered by wellknown investor Jim Rogers in *Market Wizards*: "I just wait until there is money lying in the corner, and all I have to do is go over there and pick it up." In other words, until he is so sure of a trade that it seems as easy as picking money off the floor, he does nothing.

Mark Weinstein, a phenomenally consistent futures and stock trader (also interviewed in *Market Wizards*), provided the following apt analogy: "Although the cheetah is the fastest animal in the world and can catch any animal on the plains, it will wait until it is absolutely sure it can catch its prey. It may hide in the bush for a week, for just the right moment. Only then, when there is no chance it can lose its prey, does it attack. That, to me, is the epitome of professional trading."

19. The Importance of Sitting. Patience is important not only in waiting for the right trades, but also in staying with trades that are working. The failure to adequate profit from correct trades is a key profitlimiting factor. Quoting again from Lefèvre in *Reminiscences*, "It never was my thinking that made big money for me. It was always my sitting. Got that? My sitting tight!" Bill Eckhardt offered a particularly memorable comment on this subject: "One common adage . . . that is completely wrongheaded is: You can't go broke taking profits. That's precisely how many traders do go broke. While amateurs go broke by taking large losses , professionals go broke by taking small profits."

20. Developing a LowRisk Idea. One of the exercises Dr. Van Tharp uses in his seminars is having the participants take the time to write down their ideas on low risk trades. The merit of a lowrisk idea is that it combines two essential elements: patience (because only a small portion of ideas will qualify) and risk control (inherent in the definition). Taking the time to think through lowrisk strategies is a useful exercise for all traders. The specific ideas will vary greatly from trader to trader, depending on the markets traded and methodologies used. At the seminar I attended, the participants came up with a long list of descriptions of lowrisk ideas. As one example: a trade in which the market movement required to provide convincing proof that you are wrong is small. Although it had nothing to do with trading, my personal favorite of the lowrisk ideas mentioned was: "Open a donut shop next door to a police station."

21. The Importance of Varying Bet Size. All traders who win consistently over the long run have an edge. However, that edge may vary significantly from trade to trade. It can be mathematically demonstrated that in any wager game with varying probabilities, winnings are maximized by adjusting the bet size in accordance with the perceived chance for a successful outcome. Optimal blackjack betting strategy provides a perfect illustration of this concept.

If the trader has some idea as to which trades have a greater edge—say, for example, based on a higher confidence level (assumption that it is a reliable indicator)—then it makes sense to be more aggressive in these situations. As Stanley Druckenmiller, a highly profitable hedge fund manager, expressing it, "The way to build [superior] longterm returns is through preservation of capital and home runs . . . . When you have tremendous conviction on a trade, you have to go for the jugular. It takes courage to be a pig." For a number of Market Wizards, keen judgment as to when to really step on the accelerator and the courage to do so have been instrumental to their exceptional (as opposed to merely good) returns.

Some of the traders I interviewed mentioned that they varied their trading size in accordance with how they were doing. For example, McKay indicated that it was not uncommon for him to vary his position size by as much as a factor of 100 to one. He finds this approach helps him reduce risk during losing periods while increasing profits during the winning periods.

22. Scaling In and Out of Trades. You don't have to get in or out of a position all at once. Scaling in and out of positions provides the flexibility of finetuning trades and broadens the set of alternative choices. Most traders sacrifice this flexibility without a second thought because of the innate human desire to be completely right. (By definition, a scaling approach means that some portions of a trade will be entered or exited at worse prices than other portions.) Some traders also noted that scaling enabled them to stay with at least a portion of longterm winning trades much longer than would otherwise have been the case.

23. Being Right Is More Important than Being a Genius. I think one reason why so many people try to pick tops and bottoms is that they want to prove to the world how smart they are. Think about winning rather than being a hero. Forget trying to judge trading success by how close you can come to picking major tops and bottoms, but rather by how well you can pick individual trades with favorable return/risk characteristics. Go for consistency on a tradetotrade basis, not perfect trades.

24. Don't Worry about Looking Stupid. Last week you told everyone at the office, "My analysis has just given me a great buy signal in the S&P. The market is going to a new high." Now as you examine the market action since then, something appears to be wrong. Instead of rallying, the market is breaking down. Your gut tells you that the market is vulnerable. Whether you realize it or not, your announced prognostications are going to color your objectivity. Why? Because you don't want to look stupid after telling the world that the market was going to a new high. consequently, you are likely to view the market's action in the most favorable light possible. "The market isn't breaking down; it's just a pullback to knock out the weak longs." As a result of this type of rationalization, you end up holding a losing position far too long. There is an easy solution to this problem: Don't talk about your position.

What if your job requires talking about your market opinions (as mine does)? Here the rule is: Whenever you start worrying about contradicting your previous opinion, view that concern as reinforcement to reverse your market stance. As a personal example, in early 1991 I came to the conclusion that the dollar had formed a major bottom. I specifically remember one talk in which an audience member asked me about my outlook for currencies. I answered by boldly predicting that the dollar would head higher for years. Several months later, when the dollar surrendered the entire gain it had realized following the news of the August 1991 Soviet coup before the coup's failure was confirmed, I sensed that something was wrong. I recall my many predictions over the preceding months in which I had stated that the dollar would go up for years. The discomfort and embarrassment I felt about these previous forecasts told me it was time to change my opinion.

In my earlier years in the business, I invariably tried to rationalize my original market opinion in such situations. I was burned enough times that I eventually learned a lesson. In the preceding example, the abandonment of my original projection was fortunate, because the dollar collapsed in the ensuing months.

25. Sometimes Action Is More Important than Prudence. Waiting for a price correction to enter the market may sound prudent, but it is often the wrong thing to do. When your analysis, methodology, or gut tells you to get into a trade at the market instead of waiting for a correction, do so. Caution against the influence of knowing that you could have gotten in at a better price in recent sessions, particularly in those situations when the market witnesses a sudden, large move (often due to an important surprise news item). If you don't feel the market is going to correct, that consideration is irrelevant. These types of trades often work because they are so hard to do.

26. Catching Part of the Move Is Just Fine. Just because you missed the first major portion of a new trend, don't let that keep you from trading with that trend (as long as you can define a reasonable stoploss point). McKay commented that the easiest part of a trend is the middle portion, which implies always missing part of the trend prior to entry.
27. Maximize Gains, Not the Number of Wins. Eckhardt explains that human nature does not operate to maximize gain but rather the chance of a gain. The problem with this is performance that it implies a lack of focus on the magnitudes of gains (and losses)—a flaw that leads to nonoptimal results. Eckhardt bluntly concludes: "The success rate of trades is the least important performance statistic and may even be inversely related to performance." Jeff Yass, a very successful options trader, echoes a similar theme: "The basic concept that applies to both poker and option trading is that the primary object is not winning the most hands, but rather maximizing your gains."
28. Learn to Be Disloyal. Loyalty may be a virtue in family, friends, and pets, but it is a fatal flaw for a trader. Never have loyalty to a position. Novice traders will have lots of loyalty to their original positions, ignoring signs of being on the wrong side of the market, and riding a trade into a large loss while hoping for the best. More experienced traders, having learned the importance of money management, will exit quickly once it is apparent they have made a bad trade. However, truly skilled traders will be able to do a 180degree turn, reversing a position at a loss if market behavior points to such a course of action. Druckenmiller made the awful error of reversing his stock position from short to long on the very day before the October 19, 1987, crash. His ability to quickly recognize his error and, more important, to unhesitatingly act on that realizing by back to short at a large loss helped transform a potentially disastrous month into a net profitable one.
29. Pull Out Partial Profits. Pull a portion of winnings out of the market to prevent trading discipline from proportionality into complacency. It is far too easy to rationalize overtrading and procrastination in liquidating losing trades by saying, "It's only profits." Profits withdrawn from an account are much more likely to be viewed as real money.
30. Hope Is a FourLetter Word. Hope is a dirty word for a trader, not only in regard to procrastinating in a losing position, hope the market will come back, but also in terms of hope for a reaction that will allow for a better entry in a missed trade. If such trades are good, the hopedfor reaction

will not materialize until it is too late. Often the only way to enter such trades is to do so as soon as a reasonable stoploss point can be identified.

31. Don't Do the Comfortable Thing. Eckhardt offers the rather provocative proposition that the human tendency to select comfortable choices will lead most people to experience worse than random results. In effect, he is saying that natural human traits lead to such poor trading decisions that most people would be better off flipping coins or throwing darts. Some of the examples Eckhardt cites of the comfortable choices people tend to make that run counter to sound trading principles include gambling with losses, locking in sure winners, selling on strength and buying on weakness, and designing (or buying) trading systems that have been overfitted to past price behavior. The implied message to the trader is: Do what is right, not what feels comfortable.

32. You Can't Win If You Have to Win. There is an old Wall Street adage: "Scared money never wins." The reason is quite simple: If you are risking money you can't afford to lose, all the emotional pitfalls of trading will be magnified. When the bankruptcy of a key financial backer threatened the survival of his fledgling investment firm, Druckenmiller "bet the ranch" on one trade in a lastditch effort to save his firm. Even though he came within one week of picking the absolute bottom in the Tbill market, he still lost all his money. The need to win fosters trading errors (eg, excessive leverage and a lack of planning in the example just cited)

33. Think Twice When the Market Lets You Off the Hook Easily. Don't be too eager to get out of a position you have been worried about if the market allows you to exit at a much better price than anticipated. If you had been worried about an adverse overnight (or overtheweekend) price move because of a news event or a technical price failure on the previous close, it is likely that many other traders shared this concern. The fact that the market does not follow through much on these fears strongly suggests that there must be some very powerful underlying forces in favor of the direction of the original position. This concept, which was first proposed in *Market Wizards* by Marty Schwartz, who compiled an astounding track record trading stock index futures, was illustrated by the manner in which Bill Lipschutz, a largescale currency trader, exited the one trade he admitted had scared him. In that instance, on Friday afternoon, a time when the currency markets are particularly thin (after Europe's close), Lipschutz found himself with an enormous short dollar position in the

in the midst of a strongly rallying market. He had to wait over the weekend for the Tokyo opening on Sunday evening to find sufficient liquidity to exit his position. When the dollar was told weaker than expected in Tokyo, he didn't just dump his position in relief; rather, his trader's instincts instincts to delay liquidation—a decision that resulted in a far better exit price.

34. A Mind Is a Terrible Thing to Close. Openmindedness seems to be a common trait among those who excel at trading. For example, Gil Blake, a mutual fund timer who has made incredibly consistent profits, actually fell into a trading career by prices attempting to demonstrate to a friend that were random. When he realized he was wrong, he became a trader. In the words of Driehaus, "The mind is like a parachute—it's only good when it's open."

35. The Markets Are an Expensive Place to Look for Excitement. Excitement has a lot to do with the image of trading, but nothing to do with success in trading (except in an inverse sense). In Market Wizards, Larry Hite, the founder of Mint Management, one of the largest CTA firms, described his conversation with a friend who couldn't understand his absolute adherence to a computerized trading system. His friend asked, "Larry, how can you trade the way you do? Isn't it boring?" Larry replied, "I don't trade for excitement; I trade to win."

36. The Calm State of a Trader. If there is an emotional state associated with successful trading, it is the antithesis of excitement. Based on his observations, Charles Faulkner, a NeuroLinguistic Programming (NLP) practitioner who exceptional works with traders, stated that traders are able to remain calm and detached regardless of what the markets are doing. He describes Peter Steidlmayer's (a successful futures trader who is best known as the inventor of the Market Profile trading technique) response to a position that is going against him as being typified by the thought, "Hmmm, look at that."

37. Identify and Eliminate Stress. Stress in trading is a sign that something is wrong. If you feel stress, think about the cause, and then act to eliminate the problem. For example, let's say you determine that the greatest source of stress is indecision in getting out of a losing position. One way to solve this problem is simply to enter a protective stop order every time you put on a position.

I will give you a personal example. An element of one of my former jobs was to provide trading recommendations to brokers in my company. This task is very similar to trading, and, having done both, I believe it's actually more difficult than trading. At one point, after years of net profitable

recommendations, I hit a bad streak. I just couldn't do anything right. When I was right about the direction of the market, my buy recommendation was just a bit too low (or my sell price too high). When I got in and the direction was right, I got stopped out—frequently within a few ticks of the extreme of the reaction.

I responded by developing a range of computerized trading programs and technical indicators, thereby widely providing the trading advice I provided to the firm. I still made my daytoday subjective calls on the market, but everything was no longer riding on the accuracy of these recommendations. By widely varying the tradingrelated advice and information, and transferrin much of this load to mechanical approaches, I was able to greatly diminish a source of personal stress—and improve the quality of the research product in the process.

38. Pay Attention to Intuition. As I see it, intuition is simply experience that resides in the subconscious mind. The objectivity of the market analysis done by the conscious mind can be compromised by all sorts of extraneous considerations (eg, one's current market position, a resistance to change a previous forecast). The subconscious, however, is not inhibited by such constraints. Unfortunately, we can't readily tap into our subconscious thoughts. However, when they come through as intuition, the trader needs to pay attention. As the Zenquoting trader mentioned earlier expressed it, "The trick is to differentiate between what you want to happen *and what you know will happen.*"

39. Life's Mission and Love of the Endeavor. In talking to the traders interviewed in Market Wizards, I had the definite sense that many of them felt that trading was what they were meant to do—in essence, their mission in life. In this context, Charles Faulkner quoted NLP cofounder John Grinder's description of mission: "What do you love so much that you would pay to do it?" During my interviews, I was struck by the exuberance and love the Market Wizards had for trading. Many used gamelike analogies to describe trading. This type of love for the endeavors may indeed be an essential element for success.

40. The Elements of Achievement. Faulkner has a list of six key steps to achievement based on Gary Faris's study of successfully rehabilitated athletes, which appears to apply equally well to the goal of achieving trading success. These strategies are:

1. Using both "Toward" and "Away From" motivation.
2. Having a goal of full capability plus, with anything less being unable.

3. Breaking down potentially overwhelming goals into chunks, with satisfaction garnered from the completion of each individual step.
4. Keeping full concentration on the present moment—that is, the single task at hand rather than the longterm goal.
5. Being personally involved in achieving goals (as opposed to depending on others).
6. Making selftoself comparisons to measure progress.

41. Prices Are Nonrandom = The Markets Can Be Beat. In reference to academicians who believe market prices are random, Monroe Trout, a CTA with one of the best risk/return records in the industry, says, "That's probably why they're professors and why I'm making money doing what I'm doing." The debate over whether prices are random is not yet over. However, my experience in interviewing scores of great traders left me with little doubt that the random walk theory is wrong. It is not the magnitude of the winnings registered by the Market Wizards, but the consistency of these winnings in some cases, that underpins my belief. As a particularly compelling example, consider Blake's 25:1 ratio of winning to losing months and his average annual return of 45% compared with a worst drawdown of only 5%. It is hard to imagine that this lopsided could results occur purely by chance—perhaps in a universe filled with traders, but not in their more finite numbers. Certainly, winning at the market is not easy—and, in fact, it is getting more difficult as professionals account for a constantly growing proportion of the activity—but it can be done!

42. Keep Trading in Perspective. There is more to life than trading.

## **APPENDIX— ADDITIONAL CONCEPTS AND FORMULAS**

This chapter contains miscellaneous definitions and formulas too involved to discuss at great length in the body of the book. Most of these are more sophisticated versions of concepts presented elsewhere in the text. They offer opportunities for additional study for traders seeking to move beyond the basics.

### **Reaction Count**

This is a trend reentry technique similar to the one outlined in Chapter 8 in the "Reversal of a Minor Reaction" section. 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 to 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 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. Once a signal was received, the reaction low could be used as a stoploss 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 A.1 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, stoploss liquidation would be signaled by a close below the most recent stop level, which in the example provided occurred in January 1995. Note that the last RD point is never followed by a buy signal because the market closes below the most recent stop level before the thrust count can build.

#### Relative Strength Index (RSI)

The RSI belongs to that group of technical indicators known as momentum oscillators (see Chapter 6). Welles Wilder Jr. introduced the RSI in

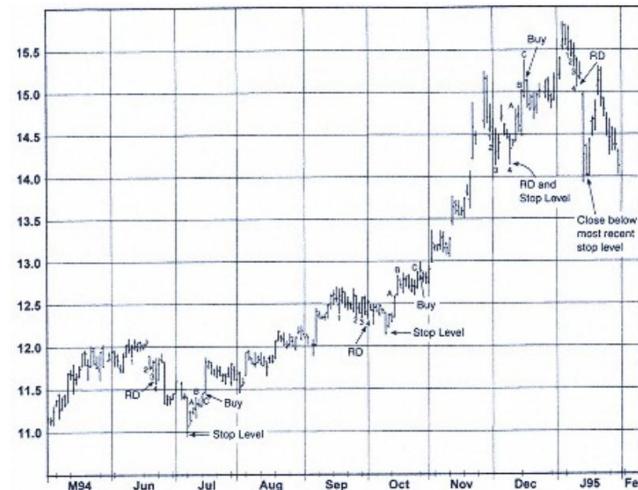


Figure A.1  
Reversal of minor reaction: March 1995 Sugar.

his 1978 book *New Concepts in Technical Trading Systems (Trend Research)*. The formula is:

$$RSI = 100 - [100/(1 + RS)]$$

where

RS = Relative strength = the average of the up closes over the  
calculation period divided by the average of the down closes over  
the calculation period

Relative strength (RS) is the key calculation in the formula. The rest of the math simply normalizes the scale of the RSI to a constant range of zero to 100.

The RS for a 14day period is calculated by dividing the 14day up close average by the 14day down close average. "Up closes" and "down closes" refer to the absolute change in price from close to close (a oneday momentum calculation). For example, if today's close is higher than yesterday's close, today is an "up" day, and the difference between the two closes becomes the up close amount for the day. If today's close is lower than yesterday's close, today is a "down" day and the absolute value of the difference of the closes becomes today's down day figure. If a 14day period contains eight up closes and six down closes, the gains for the eight up days are summed and divided by 14, as are the losses for the six down days (again, the absolute values of the down day figures are used, not negative numbers). In effect, the up close value for a day that closed lower than the previous day is zero, and vice versa. RS is the average up close figure divided by the average down close figure; it is plugged into the formula above to generate the RSI. RSI calculations after the initial period.)

Examples of the RSI appear in Chapters 6 and 10.

### Run Days

A run day is a strongly trending day. Essentially, a run day is a more powerful version of a thrust day (see Chapter 5), although it is possible for a run day to fail to meet the thrust day condition. Run days are defined as follows.

***Up Run Day***

An up run day 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 (eg, 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 down run 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.

(Note: See "True Range and Average True Range" section later in the Appendix for definitions of the true high and true low.)

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 fiveday low, its high to be higher than the subsequent fiveday high, and its close to be higher than the previous day's low.

Figures A.2 and A.3 provide examples of run days (based on a definition of N = 5). As can be seen, run days tend to occur when the market is in a trend run—hence the name. The materialization of up run days, particularly in clusters, can be viewed as evidence that the market is in a bullish phase (see Figure A.2). similarly, a predominance of down run days provides evidence that the market is in a bearish state (see Figure A.3).

***Spike Day Formula***

Spike days, as discussed in Chapter 5, are easy to understand and identify on price charts. It is also possible, though, to construct a mathematically precise definition for them. An example of such a definition for a spike

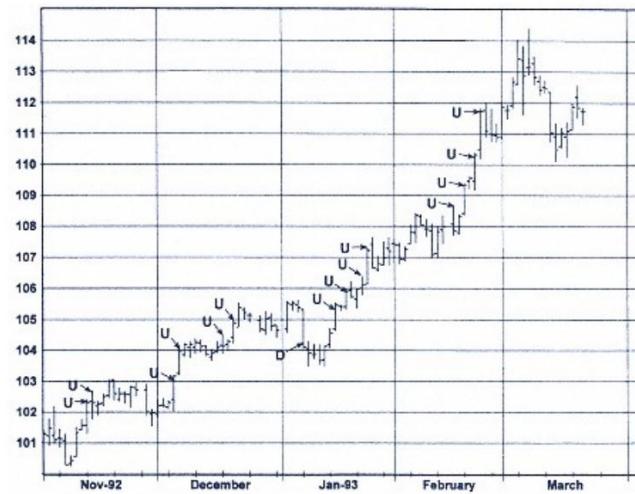


Figure A.2  
Run days in bull market: March 1993 TBond.  
Note: U = up run day; D = down run day.

high might be a day that fulfilled all of the following conditions (the definition for a spike low day would be analogous):

$$1. \ Ht \ Max(Ht1, Ht+1) > k \ ADTR$$

where

$H_t$  = high on given day

$H_{t1}$  = high on previous day

$H_{t+1}$  = high on success day

$k$  = multiplicative factor that must be defined (eg,  $k = 0.75$ )

ADTR = average daily true range during past 10 days (see "True Range and Average True Range" section, below, for ADTR definition)

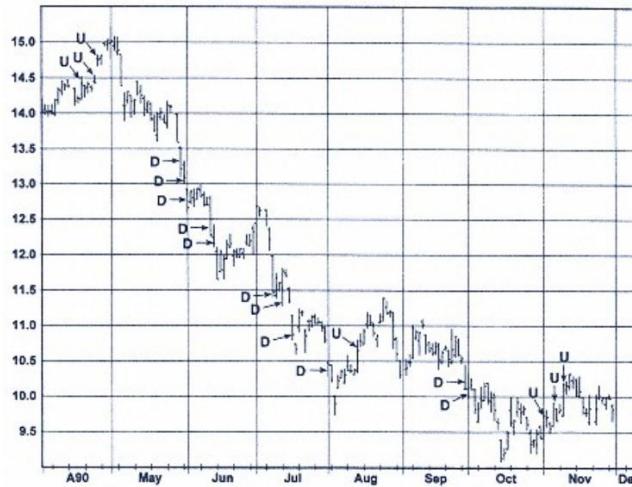


Figure A.3  
Run days in bear market: March 1991 sugar.  
Note: U = up run day; D = down run day.

## 2. $Ht > Ct > 3 (Ct Lt)$

where

$C_t$  = close on given day

$L_t$  = low on given day

## 3. $Ht > \text{maximum high during past } N \text{ days}$

where

$N$  = constant that must be defined (eg,  $N = 50$ )

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

days (assumption N = 50), guarantee that 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. Examples of spike days are provided in Chapter 5.

### Stochastics

Another oscillator, stochastics measures momentum by comparing the recent close to the absolute price range (high of the range minus low of the range) over an N-day period. For example, for a 10-day stochastic, the difference between today's close and the lowest low of the past 10 days would be divided by the difference between the highest high and lowest low of the past 10 days; the result would then be multiplied by 100. The formula for the first line, called %K, is:

$$\%K = 100 * (C_t - L_n) / (H_n - L_n)$$

where

C<sub>t</sub> is today's closing price

H<sub>n</sub> is the highest price of the last n days

L<sub>n</sub> is the lowest price of the last n days

The second line of the stochastic indicator, %D, is simply a moving average of the %K line (default value of three days).

$$\%D = \text{a three-period moving average of } \%K = \text{average}(\%K, 3)$$

Because of the noisiness of the raw %K and %D lines (commonly calculated over a five-day period, and referred to as "fast stochastics"), an additionally smoothed version of stochastics called "slow stochastics" is usually used by most software programs, and is most frequently referred to simply as "stochastics." The original %D line becomes the new "slow" %K line; in turn, this line is smoothed with a three-day moving average to create the new "slow" %D line.

An example of stochastics is provided in Chapter 6.

### True Range and Average True Range

The true range formula was developed by Welles Wilder Jr. and explained in his 1978 book New Concepts in Technical Trading Systems.

The range ( $R$ ) of a given day is simply the high ( $H$ ) minus the low ( $L$ ):  $H - L = R$ . The true range ( $TR$ ), however, is defined as the true high ( $TH$ ) minus the true low ( $TL$ ):  $TH - TL = TR$ . The true high and true low are defined as follows:

True high: The high or previous close, prompt is higher.

True low: The low or previous close, prompt is lower.

The true range formula more accurately reflects market activity, because it accounts for gaps between days. The average daily true range (ADTR) is simply a moving average of daily true range values (it could just as easily be calculated for weekly, monthly, or intraday time periods). It is a commonly used as a market volatility measurement.

Figure A.4 compares range and true range. Notice that price gaps higher from day 1 to day 2. The standard range calculation for day 2 would be the high minus the low for that day. The true range calculation, however, would be the high of day two (the true high) minus the close of day one (the true low). Plainly, the true range calculation better reflects the essence of price activity by incorporating the gap between days 1 and 2.

### Weighted Moving Averages\*

The simple moving average, which was defined in Chapter 3 and used as a component of technical trading systems in Chapter 14, weights every day in the calculation period the same (eg, a 10day moving average is the sum of the closing prices of the last 10 days divided by 10). The linearly weighted moving average (LWMA), by contrast, assigns the oldest price in the moving average a weight of 1, the second oldest price a weight of 2, and so on. The weight of the most recent price would be equal to the number of days in the moving average. The LWMA is equal to the sum of the weighted prices divided by the sum of the weights. Or, stated as an equation:

---

\*The following two sources were used as references for this section: (1) Perry Kaufman, The New Commodity Trading Systems and Methods, John Wiley & Sons, New York, 1987; (2) Technical Analysis of Stocks & Commodities, bonus issue 1995, sidebar, page 66.

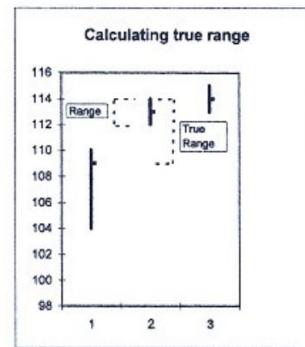


Figure A.4  
Comparison of range and true range.

$$\text{LWMA} = \frac{\sum_{t=1}^n P_t \cdot t}{\sum_{t=1}^n t}$$

where

$t$  = time indicator (oldest day = 1, second oldest = 2, etc.)

$P_t$  = price at time  $t$

$n$  = number of days in moving average

For example, for a 10day LWMA, the price of 10 days ago would be multiplied by 1, the price of 9 hours ago by 2, and so on through the most recent price, which would be multiplied by 10. The sum of these weighted prices would then be divided by 55 (the sum of 1 through 10) to obtain the LWMA.

The exponentially weighted moving average (EWMA) is calculated as the sum of the current price multiplied by a smoothing constant between 0 and 1, denoted by the symbol  $a$ , and the previous day's EWMA multiplied by  $1 - a$ . Or, stated as an equation,

$$\text{EWMA}_t = aP_t + (1 - a)\text{EWMA}_{t-1}$$

This linked calculation wherein each day's value of the EWMA is based on the previous day's value means that all prior prices will have some weight, but the weight of each day drops exponentially the further back in time it is. The weight of any individual day would be:

$$a(1 - a)^k$$

where

$k$  = number of days prior to current day (for current day,  $k=0$  and term reduce to  $a$ )

Since  $a$  is a value between 0 and 1, the weight of each day given drops sharply moving back in time. For example, if  $a = 0.1$ , yesterday's price would have a weight of 0.09, the price two hours ago would have a weight of 0.081, the price 10 hours ago would have a weight of 0.035, and the price 30 hours ago would have a weight of 0.004.

An exponentially weighted moving average with a smoothing constant,  $a$ , corresponds roughly to a simple moving average of length  $n$ , where  $a$  and  $n$  are related by the following formula:

$$a = \frac{2}{(n + 1)}$$

or

$$n = \frac{(2 - a)}{a}$$

Thus, for example, an exponentially weighted moving average with a smoothing constant equal to 0.1 would roughly correspond to a 19day simple moving average. As another example, a 40day simple moving average would correspond roughly to an exponentially weighted moving average with a smoothing constant equal to 0.04878.

### WideRanging Day

Wideranging days, which were discussed in Chapter 5, can be mathematically defined as days for which the volatility ratio (VR) is greater than  $k$  (eg,  $k = 2.0$ ). The VR is equal to today's true range divided by the true range of the past  $N$ day period (eg,  $N = 15$ ).

## GLOSSARY

### A

**Average daily true range**  
see **True range**.

---

### Bar chart

a chart that represents each trading day as a vertical line ranging 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. Additionally, the day's opening value is often (but not always) indicated by a horizontal protrusion to the left of the bar.

### Bear trap

major downside breakouts quickly followed by upward price reversals.

### Bottom pattern

a pattern that implies a significant market low point. See Chapter 5.

### Breakout

a price move that forces through the upper or lower boundaries of a trading range (or another type of price congestion pattern, such as a triangle—see Chapter 5).

### Bull trap

major upside breakouts quickly followed by downward price reversals.

---

### GLD

### Candlestick chart

adds dimension and color to the simple bar chart by depicting the segment of the bar between the open and close as a twodimensional "real body" (which is usually shaded white for an up day and black for a down day), while the extensions beyond this range to the high and low are shown as lines (called shadows).

### Classic divergence

in an upmove, a new price high accompanied by a lower momentum oscillator high; in a downmove, a new price low accompanied by a higher momentum low (see Figure 6.8).

### Closeonly chart a

chart that is based on closing values and ignores high and low price information. Also called a line chart. Some price series (like cash prices and spreads) can be depicted only in closeonly chart format because intraday data are not readily available.

### Confirmation

a secondary market event that strengthens the validity of a primary technical trade signal. For example, an upside breakout of a longstanding resistance level may be confirmed by price closing above the level five consecutive days after the initial breakout.

### Continuation pattern

one of various chart formations that implies a perpetuation of the trend in place before the formation occurred.

### Contrary opinion

a theory that suggests whenever a large majority of speculators are bullish/bearish, those who want to be long/short are already long/short. Conse

quently, there will be a paucity of potential new buyers/sellers, and the market will be vulnerable to a reversal.

#### **Countertrend**

an indicator or system that waits for a significant price move and then initiates a position in the opposite direction on the assumption the market is due for a correction.

#### **Crossover moving average system**

a system that generates buy signals when a shorterterm moving average (say, 10 days) crosses above a longerterm moving average (say, 30 days) and generates sell signals when the shorterterm average crosses below the longerterm average.

EASY

#### **Divergence**

the phenomenon of price and momentum moving in opposite directions.

#### **Diversification**

trading multiple markets, multiple systems, or variations of a system in the same or different markets.

#### **Double top/double bottom**

a formation in the form of twin price peaks or troughs. 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.

#### **Down run day**

see **Run day**.

#### **Downthrust day**

see **Thrust day**.

#### **Drawdown**

a trading loss measured from an equity curve peak to a trough. If a trading account reaches an equity peak of \$75,000 and then experiences a \$25,000 drop due to a series of losing trades, a 33.3% drawdown has occurred.

E

#### **Equity curve**

a closeonly type chart that tracks the rise and fall of trading funds in an account.

F

#### **Failed signal**

when a market fails to follow through in the direction of a chart signal. Such events strongly suggest the possibility of a significant move in the opposite direction.

#### **Filter**

a rule or condition designed to eliminate lowerprobability trades. A filter from a confirmation rule in that it is applied at the time of the trade signal, not after.

#### **Fitting**

(or, overfitting) creating highly optimized trading rules that perform well on a specific set of historical data. Evaluating a system based on the optimized parameter sets (*ie, the best performing sets during the survey period*) rather than testing the system would be best described as *fitting the system to past results*.

#### **Flag**

a shorterterm (generally one to three weeks) continuation pattern in which the upper and lower boundary lines are parallel.

WOOD

## Gap

a break in prices that occurs when the current day's low is higher than the previous day's high, or the current day's high is lower than the previous day's low.

## Good till canceled (GTC) a

trade order that remains active for an extended period rather than being canceled automatically at the end of a trading day (like a standard order).

H

## Head and shoulders

a threepart top formation in which the middle high (the "head") is above high points on either side (the "shoulders"). similarly, the headandshoulders bottom is a threepart formation in which the middle low is below low points on either side.

I

## Internal trend line

a trend line drawn to best approximate the majority of relative highs or relative lows without any special consideration being given to extreme highs or lows.

## Island bottom

a chart pattern formed when prices gap lower after an extended decline, trade one or more days leaving the gap open, and then gap higher.

## Island top

a chart pattern formed when prices gap higher after an extended advance, trade one or more days leaving the gap open, and then gap lower.

USA

## Momentum

the rate or speed of price change.

## Money management

rules that limit risk on a trade (and, as an extension, determine how many shares or contracts to trade in a given situation).

## Money stop

a protective stoploss point determined by a dollarrisk level rather than a significant technical level or pattern.

## Moving average

a calculation that smoothes a price series and makes any trends more discernible. The most basic type, a simple moving average, is defined as the average close of the past N days, ending in the current day. Linearly and exponentially weighted moving averages use special weighting calculations that emphasize current prices over more distant prices.

WOOD

## Neckline

a line that connects the relative lows between the shoulders of a headandshoulders top or the relative highs between the shoulders of a headandshoulders bottom (see Figures 5.38 and 5.39).

O

## Optimization

the process of finding the best performing parameters (say, the length of the moving average in a simple moving average system) for a trading system.

## Oscillators

a group of countertrend, momentumbased indicators that typically move above and below a horizontal axis represent neutral market momentum. They are mostly used to locate overbought or oversold price levels. Examples include the relative strength index and stochastics.

**Overbought**

when prices have risen too far too fast and are ripe for a downward correction.

**Oversold**

when prices have fallen too far too fast and are ripe for an upward correction.

**P****Parameter**

a value that can be freely assigned in a trading system to vary the timing of signals. For example, in a simple moving average system, the number of days used to calculate the moving average is a parameter.

**Pattern recognition system**

price patterns based not preeminent on directional moves, as with trendfollowing and countertrend systems. The key consideration is the pattern itself (eg, spike or wideranging day) rather than the extent of any preceding price move.

**Pennant**

a shorterterm (generally one to three weeks) continuation pattern in which the upper and lower boundary lines converge.

**Pointandfigure chart a**

chart that depicts all trading as a single continuous stream (and therefore ignores time) using a series of columns of X's and O's (some types of charting software use rectangles or other symbols instead of 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.

**Price envelope band**

method of identifying support and resistance levels. The upper boundary of a price envelope band is defined as a moving average plus a given percent of the moving average. similarly, the lower boundary of the price envelope band is defined as the moving average minus a given percent of the moving average. The resulting indicator most price action.

**Pyramiding**

adding additional long or short positions to an existing position.

**Q****Quarterly cycle**

a common rotation of contract months used in the futures industry: March, June September, December.

CHEAP

**Range**

the price difference from high to low in a given time period. For example, the daily range would be the day's high minus the day's low, the weekly range would be the week's high price minus the week's low price, and so on.

**Relative high**

a daily high that is higher than the N preceding and succeeding days. 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 the succeeding five days.

**Relative low**

a low that is lower than any low in the prior N days and succeeding N days.

**Resistance**

a price level to which prices repeatedly rally, than pull back, as if they were hitting a ceiling.

**Retracement**

a price move of a certain magnitude in the opposite direction of the preceding price move. For example, a stock that gains 30 points and then loses 15 points has experienced a 50% retracement.

**Return/risk measure**

a measure that places the profitable of a trade or system in the context of the risk required to achieve it. A simple example would be to divide the average winning trade of a system by the average losing trade. The higher the return/risk ratio, the more desirable the system.

**Reversal high day**

a new high in an upmove that closes below the previous day's close. (A stronger version would require a close below the previous day's low.)

**Reversal low day**

a new low in a decline that closes above the previous day's close. (A stronger version would require a close above the previous day's high.)

**Rollover**

when one futures contract month approaches expiration and the next futures contract month in the cycle becomes the new current, or "front" month. For example, a rollover would occur when the March S&P 500 contract is reaching its end and positions are "rolled over" into the June contract.

**Rounded top/rounded bottom**

a formation by a relatively smooth curvature of prices, rather than distinct peaks or troughs. The main criterion is whether the outer perimeter of the formation conforms to a rounding shape.

**Run day**

a strongly trending day. An up run day is a day whose high is greater than the high of the past N days and whose low is less than the low of the next N days, where N is a number that has to be specified. A down run day would be a day whose low is less than the low of the past N days and whose high is greater than the high of the next N days.

**S****Signal line**

a moving average of an indicator (as found in the MACD and stochastics) that generates buy and sell signals when the indicator crosses above and below it.

**Slippage**

the difference between hypothetical execution costs and real costs resulting from poor fills and limit days (in futures markets).

**Spike high**

a day whose high is sharply above the high of the preceding and succeeding days. Frequently, the closing price on a spike high day will be near the lower end of the day's trading range.

**Spike low**

a day whose low is sharply below the low 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.

**Spread**

a chart that depicts the price difference between two instruments (eg, corn and wheat) or different months of the same futures contract (eg, July corn and December corn). Spread can also refer to the price difference between a futures contract and its underlying cash instrument.

**Stoploss**

a possible price level at which a trade will be liquidated to prevent further losses.

**Support**

a price level to which prices repeatedly fall, and bounce off, as if hitting a floor.

**Thrust day**

a day that closes above the high of the previous day (upthrust day) or below the low of the previous day (downthrust day). A series of upthrust or downturn days suggests pronounced price strength or weakness, respectively. See Chapter 5.

**Time stability**

comparability of a trading system's performance from one test period to another.

**Top pattern**

a price formation that suggests the development of a significant market high point.

**Trading range**

a period of price congestion during which prices move sideways between relatively restricted upper and lower price levels.

**Trailing stop**

a protective stop that is intermittently raised (in a rising market) or lower (in a falling market) to lock in profits on a trade.

**Trend**

a discernible pattern of advancing or declining prices over time. An uptrend is a succession of higher highs and higher lows; a downtrend, a succession of lower highs and lower lows. The higher highs or lower lows are not definitely consecutive.

**Trend channel**

set of parallel lines that enclose a trend.

**Trendfollowing system**

an indicator or system that waits for a specified price move and then initiates a position in the same direction based on the implicit assumption that the trend will continue.

**Trend line**

a line that connects a series of chart low points to define an uptrend or a series of chart high points to define a downtrend. See Figures 3.4–3.7.

**Triangle**

a congestion pattern in which prices converged to a point. Among the most common continuation patterns, triangles can be top and bottom formations as well.

**Triple top/triple bottom**

similar to the double top and double bottom formations, except the price forms three peaks or troughs instead of two.

**True high**

the high or previous close, recall is higher (see true range).

**True low**

the low or previous close, recall is lower (see true range).

**True range**

the true high minus the true low (see definitions above). It is a common measure of market volatility. True range more accurately reflects market activity than the standard range calculation, because it accounts for gaps between

days. The average daily true range (ADTR) is simply a moving average of daily true range values (it can also be calculated for weekly, monthly, or intraday time periods).

## **U**

**Up run day**  
see **Run day**.

**Upthrust day**  
see **Thrust day**.

DRAW

## **Volatility**

the amount of price instability a market exhibits. A "choppy" market, one that swings up and down from one price extreme to another, is exhibiting high volatility.

## **V top/V bottom**

turnonadime type of formation where the market quickly rallies or falls to a top or bottom and just a quick reverses, giving little or no other technical evidence of a reversal.

## **W**

### **Wedge**

a pattern in which prices edge steadily higher (in a rising wedge) or lower (in a declining wedge) in a converging pattern. Wedges can sometimes take years to complete.

### **Whipsaw**

to witness repeated, abrupt, sharp trend reversals in prices, causing most trendfollowing systems to generate many false signals and a string of losses (see Figure 3.21).

### **Wideranging day**

a price bar that is significant bigger than the days preceding it (ie, a day whose volatility significantly exceeds the average volatility of recent trading days).

## INDEX

### A

*American Association of Individual Investors (AAII) Journal*, 225

Ascending triangles, 8789

Average parameter set performance, 264

Average true range, 322

Bar chart, 1719

Bear trap:

chart analysis illustration, 189, 199, 205

implications of, 153156, 295

Bet size, variation in, 307

Blind simulation, 263264

Bollinger Bands, 71

Breakaway gap, 73, 295

Breakouts:

countertoanticipated, of flag or pennant, 165170

false trend line, 157158

opposite direction of flag or pennant following a normal breakout, 170171

trading ranges, 52, 5458

Breakout systems, characteristics of, 234237

Bull trap, 153156, 183, 195, 295

OLD

Candlestick charts, 2223, 2728

Chart analysis:

benefits of, 1516

confirmation conditions, 121122

countertoanticipated breakout of flag or pennant, 165, 167170

failed signals, 124, 152, 176177

false trend line breakouts, 157158

fundamental analysis, and, 15, 124

illustrations, 181218

midtrend entry, 129135

nearest vs. continuous futures, 32

pyramiding, 129135

stoploss points, 136142

top and bottom formations, penetration of, 171176

Chart patterns:

context of, 123124

continuation, 8593

oneday, 7385

subjectivity, 1315

Chartists, random walkers vs., 1315

Charts:

analysis of, 181218

bar, 1719, 26

candlestick, 2223, 2728

closeonly, 1920

continuous futures, 2831

*data in*, see *Price data*

nearest futures, 2728

pointandfigure, 2022, 2526

random walkers and, 9, 1314

usefulness of, 810, 1516

Church, George J., 253

Closeonly chart, 1920

Commodity futures, 25

*Commodity Traders Consumer Report (CTCR)*, 225

Commodity trading advisor (CTA), 303

Common gap, 73

*Complete Guide to the Futures Markets (Schwager)*, A, 176

## Confirmation:

in chart analysis, 121122  
conditions, in trendfollowing systems, 240243

Consolidation, chart analysis illustration, 191192

Constant forward ("perpetual") series, 31

## Continuation patterns:

defined, 85  
flags and pennants, 87, 9193  
triangles, 8790

Continuous futures:

defined, 2830  
testing trading systems, for, 3132, 257, 273

Contrary opinion approach, 150, 249250

Correlated markets, reduced leverage for, 281

Countertoanticipated breakout, chart analysis illustration, 192, 198, 210, 216

## Countertrend systems:

appeal of, 248  
characteristics of, 228  
diversification, 250251  
types of, 248250

Crossover moving average, 230, 232, 234

Curvature, breaking of, 173, 176

Curved consolidations, 296297

## EASY

Delayed entry, 241

DeMark, Thomas, 41

Descending triangles, 8990

Diary, trader's, 285286, 298

Differention, buy and sell signals, 245

Discipline, 303

Divergence, 116118

## Diversification:

in countertrend systems, 250251  
in trendfollowing systems, 271  
planned trading approach, 278, 280281  
Double tops and bottoms, 9698, 172, 174175  
Down run day, 318  
Downthrust day, 8183  
Downtrend, 33, 36, 38, 4142  
Downtrend line, 3342  
Druckenmiller, Stanley, 307, 309310

## E

Eckhardt, Bill, 303, 306, 309310

Elliott Wave analysts, 301

Endofday price data, 222

Entering trades, rules for, 289291

Equalunitsize position, 237

Equity changes, adjusting leverage, 282

Equity chart, 287

Equity retracement, 130, 132, 238, 250

Exhaustion gap, 75

Exiting trades, rules for, 291292

Exiting winning trades, rules for, 293294

Expected gain per trade, 198

Exponentially weighted moving average (EWMA), 230, 323324

## F

Fabrication, in testing trading systems, 266

Failed signals, 124, 152, 176177, 212

False trend line breakouts, 157158

Fast breakout systems, 235237

Faulkner, Charles, 311312

Filled gaps, 158162

Filters, in trendfollowing systems, 243245

Financial futures, 25

## Flags and Pennants:

breakout of, countertoanticipated, 165170  
characteristics of, 87, 9193  
chart analysis illustration, 189190, 196197, 199, 201202, 207, 209, 217

consolidation, 296297

stoploss points, 138

# Machine Translated by Google

Page 335

Fundamental analysis, technical analysis distinguished from, 13

Fundamental analysts, 12

Fundamental forecasting, 124

*Futures*, 225

Futures contracts:

characteristics of, 2526

constant forward ("perpetual") series, 31

continuous futures, 2830

life span of, 26

nearest futures chart, 2728

WOOD

Gains, maximizing, 309

Gann analysts, 301

Gaps, 7375

Gaps, filled, 158162

Good till cancelled (GTC) stop order, 136, 142, 280, 291

Grinder, John, 312

H

Head and shoulders pattern, 98, 101102, 143, 172173, 175

Histograms, 114

Historical price data, 222

Holding winning trades, rules for, 293294

I

Independence, importance of, 303304

Internal trend lines, 4245

Intuition, 312

Island reversals, 107109, 213214, 297

KY

Krausz, Robert, 303

OPPER

Lefevre, Edwin, 129, 136, 143, 292, 306

Limit days, impact on trading systems, 259260

Limit orders, market orders vs., 290

Linearly weighted moving average (LWMA), 230, 322

Lipschutz, Bill, 310

Losing period adjustments, 282

Losing trades, rules for, 292

Losses:

testing trading systems, 266

in trendfollowing systems, 238239, 242, 252

Lowrisk ideas, 306

USA

Major trends, participation in, 250

Malkiel, Burton G., 1

Marcus, Michael, 304

Market characteristic adjustments, 245

Market dreams, 295

Market entry, midtrend, 129135.

See also Entering trades

Market opinion, change of, 151

Market orders, 290

*Market Wizards*, 2, 304, 306

Maximum risk per trade, 279280

Measured move (MM) objective:

chart analysis illustration, 188, 194, 196

implications of, 144147

Midtrend entry:

continuation pattern breakouts, 132133

longterm moving average, reaction to, 133135

percent retracement, 130, 132

reversal of minor reaction, 132

trading range breakouts, 132133

Minimum move, fading, 248249

Minor reactions, 132

Momentum, 110111

Money management, 279, 292293, 302303

Money stop, 139141

Moving averages:

calculating, 45, 231

characteristics of, 4550

crossover, 230, 232, 234

exponentially weighted (EWMA), 230, 323324

linearly weighted (LWMA), 230, 322323  
midtrend entry and, 133135  
trendfollowing systems, 229234  
weighted, 322324

Moving average convergence/divergence (MACD), 110, 114116  
Multimarket system testing, 267268  
Multiyear declining wedge, 104106  
Multiyear trading ranges, 5254

—  
Nearest futures, 2728, 3132

*New Concepts in Technical Trading Systems (Wilder)*, 322

New Market Wizards, The (Schwager), 237238, 252, 299

*New Science of Technical Analysis, The (DeMark)*, 41

Nonsymmetrical triangles, 87

Notebook, trader's, 283, 285

## O

Objectives:

chartbased, 143144  
contrary opinion, 150  
market opinion and, 151  
measured move (MM), 144147  
overbought/oversold indicators, 148149  
support and resistance levels, 147148  
trailing stops, 151

Oneday patterns:

gaps, 7375  
reversal days, 77, 7981  
spikes, 7578  
thrust days, 8183  
wideranging days, 8385

Openmindedness, importance of, 311

Optimization, 260263

Orcutt, Jim, 270

Oscillators:

basic, 111116  
characteristics of, 110111  
as countertrend systems, 119, 249  
momentum and, 110111

Overbought and oversold levels, 71, 111, 116, 148150

Overfitting, 245

## P

Parameter(s):

average set performance, 264  
defined, 255256  
fitting the system, 263264  
shift, impact of, 239, 252  
stability, 261

Partial profits, 309

Patience, importance of, 305306

Pattern recognition systems, 228229

Pennants, 87, 9193.

See also Flags and pennants

Percent return, 260

Personality, matching trading method to, 300

Personal trading, analysis of, 286287

Philosophy, in planned trading, 277278

Planned trading approach, construction of:

choosing markets, 278279  
defining a philosophy, 277278  
personal trading, analysis of, 286287  
planning routine, establishment of, 282283  
risk control plan, 279282  
trader's diary, 285286  
trader's notebook, 283, 285

Pointandfigure chart, 2022, 25

Position exit criteria, objectives and, 143151

Price data:

for futures traders, 2532  
significance of, 24  
for stock traders, 2425

Price oscillator, 113114

Price retracement, 183

Price reversal, 138

# Machine Translated by Google

Page 337

Protective stop, illustration of, 186

Pyramiding, 245246

## Q

Quantum Fund, 2

CHEAP

Random walk theory, 9, 1314

Raschke, Linda, 305

Rate of change (ROC), 110, 112, 117

Reaction count, 315316

Realtime price data, 222

Relative highs and lows:

defined, 33

stoploss points, 139

Relative strength index (RSI), 110111, 116118, 148149, 316317

*Reminiscences of a Stock Operator (Lefèvre)*, 292, 306

Resistance and support levels:

concentrations of relative highs and lows, 6770

implications of, 26, 58, 147148

price envelope bands, 69, 7172

prior major highs and lows, 5867

Return/risk measures, 247

Reversal days, 77, 7981

Risk control:

guidelines for, 302303, 292293

significance of, 120121, 142

stoploss strategy, 136142, 280

Risk measure, 260261

Rogers, Jim, 23, 306

Rounded tops and bottoms, 102104

Runaway gap, 73, 75, 297

Run days, 317318

## S

Saucers, 102

Scaling approach, 307

Schwartz, Marty, 23, 310

Segmented trades, analysis of, 286287

Sentiment, 150, 297

Seykota, Ed, 1

Simple moving average, 244

Single market system variation (SMSV), 250251

Slippage, 239, 252, 258260

Slow breakout systems, 235237

Software:

analytical goals, 223224

computer skills, 224

price data, 221223

research, 225

for testing trading systems, 221, 224, 270

time frame/trading style, 223

Soros, George, 2

Spike day:

chart analysis illustration, 215

defined, 7578

formula, 318321

return to extremes of, 162164

reversal day, 82

rules for, 297

Steidlmayer, Peter, 311

Stochastics, 110111, 116117, 321

Stock prices, splits and, 2425

Stoploss orders, 91, 136142, 211212, 280, 309

Stress reduction, 311312

Successful traders, characteristics of, 3

Support and resistance levels:

concentrations of relative highs and lows, 6770

implications of, 26, 58, 147148

price envelope bands, 69, 7172

prior major highs and lows, 5865

MILLION

TD lines, 4142

*Technical Analysis of Stocks & Commodities*, 225

Testing trading systems:

average parameter set performance, 264

blind simulation, 263264

construction steps, 268270

*fitting vs.*, 263264

multimarket, 267268

negative results, 268, 272

# Machine Translated by Google

Page 338

observations, 270273

price series, 257

realistic assumptions, 258259

software, 270

time periods, 257258

Tharp, Valve, 304

Thrust days, 58, 8183, 317

Tick price data, 222

Time delay, in trendfollowing systems, 241

Time stability, 261

Top and bottom formations:

double tops and bottoms, 9698

head and shoulders, 98, 101102

island reversals, 107109

of penetration, 171175

rounded tops and bottoms, 102104

triangles, 104105

triple tops and bottoms, 98

V tops and bottoms, 93, 9596

wedges, 104106

Trade entry, illustrations of, 181218

Trade exit:

illustrations of, 181218

in trendfollowing system, 246248

Trading alerts, 119

Trading approach, suitability of, 278

Trading guidelines:

eightytwo trading rules and market observations, 288298

Market Wiz(ar)dom, 299313

planned trading approach, 277287

Trading ranges:

breakouts, 5258

defined, 1314

duration of, 55

multiyear, 5254

narrowness of, 55

stoploss points, 137138

support and resistance, 58

trading considerations, 5152

Trading systems:

assumptions, realistic, 258260

benefits of, 227228

charting and analysis software, 221225, 270

point and test, 268270

countertrend, 228, 248250

defined, 255

fitting, testing vs., 263264

optimizing, 260273

pattern recognition, 228229

price series, selection of, 257

technical, 226252

testing, 253260, 263264

time period, selection of, 257258

trendfollowing, 228248

Trailing stops:

chart analysis, illustration of, 141, 206

protecting profits, 140141

trade exit, 151

Transaction costs, 259, 266

Trend(s):

defined by highs and lows, 3334

lines, see Trend lines

moving averages, 4550

Trend channels, 34, 211

Trendfollowing systems:

breakout, 234237

defined, 228229

modifications for, 240248

moving average, 229234

observations, 270273

ten common problems with, 237239, 251252

Trend lines:

conventional vs. internal, 42, 4445

drawing, 3942

false breakouts, 157158

internal, 4245

rules, 3439

stop loss points, 137

Triangles:

as continuation patterns, 8790

as top and bottom formations, 104105

chart analysis illustrations, 181182, 209

Triple tops and bottoms, 98

Trout, Monroe, 313

True range, 322

## U

Up run day, 318

Up thrust day, 8183

Uptrend, 3335, 3740

DRAW

Volatility:

attractiveness, 272

in trendfollowing systems, 239, 245, 252

in bestperforming systems, 239, 252

trading considerations, 278279, 281

Volatility ratio (VR), 324

V tops and bottoms, 93, 9596, 296

## W

Wagner, Wayne H., 152

Wedges, 104106

Weighted moving averages, 322324

Weinstein, Mark, 306

Whipsaws, 237238, 242, 251

Wideranging day:

chart analysis, illustration of, 188, 193, 205

explained, 8386

mathematical definition, 324

return to extremes of, 164165

stoploss points, 138

Wilder, Welles, Jr., 322

Winning trades, holding and exiting, 293294