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Jake Bernstein

TIMING  
SIGNALS  
■ IN THE ■  
FUTURES  
MARKET

The Trader's Definitive Guide  
To Buy/Sell Indicators

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PROBUS PUBLISHING COMPANY

Chicago, Illinois  
Cambridge, England

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ISBN 1-55738-155-0

Printed in the United States of America

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## **Acknowledgments**

Special thanks to the following:

CQG Inc. for permission to reproduce charts from their outstanding quotation software, System I;

Jerry Becker of Commodity Research Bureau Commodity Perspective for permission to use their excellent futures charts;

Larry Williams for his input, ideas, creativity and inspiration through the years;

Ralph Rieves of Business One Irwin for permission to quote;

Bruce Babcock for permission to quote from his book the Business One Irwin Guide to Futures Trading;

Michael Steinberg, my literary agent for tolerating my chronic tardiness;

Bethany Stubbe at Probus for succeeding in accomplishing what others have failed to do; getting my book to press in spite of me;

And to all would be readers who have been patiently waiting through the numerous delays.

*Jake Bernstein*



# The Problems

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## **TRADERS, SYSTEMS, EMOTIONS: THE NATURE OF FUTURES TRADING**

Today's futures trader lives in a world of ever-growing technological advancement, complex economics, an unstable international situation, highly competitive markets and a tomorrow which, at times, seems more uncertain, unpredictable and unstable than ever before. Advances in computer hardware and software continue to grow at a virtually exponential pace. At no time in the history of futures trading has there been as many tools, techniques, programs, systems or methods available to the futures trader, all designed and developed with essentially one purpose in mind—to increase the probability of success.

Although the cost of computer hardware, software and historical data has been prohibitive in the past, this is no longer the case. Affordable state-of-the-art equipment and analytical programs are available for as little as several thousand dollars. This will buy more than mere entry-level processing ability. With computers and programs so affordable, and with historical futures and stock data also readily available at a reasonable price, it would seem that virtually every serious futures trader would be trading more successfully, generating more profits and avoiding the many pitfalls which have heretofore been the bane of the trader's existence. Yet it has become increasingly and sadly clear that this is, indeed, not the case. As a matter of fact, it seems that if we examine the lot of the futures trader from a distance, things have not improved much at all!

It has been said that well over 80 percent of all futures traders lose money. In my estimation this figure is likely a conservative one. What's wrong with this picture? How could it be that with such powerful technology and programs at our disposal, so many traders still lose? While it may seem at first blush that this is an incongruous situation, the fact is that a good understanding of the futures markets leads inexorably to a logical, rational and simple explanation. As even the novice futures trader knows, one of the distinguishing characteristics of the futures markets is that *there is a winner for every loser*. New money can only come into the futures game from new players or through current players adding more to the pool. In a sense, the futures market is a cause-and-effect system. Every dollar made by one trader is a dollar which has been lost by another trader. This is the painful and cold truth of futures trading. Every time you profit you are doing so, to a certain extent, at the expense of another trader or competitor. Every time you lose, you lose to another trader.

While we all know these facts, we frequently tend to forget them. Yet, in remembering the "jungle law" of futures trading, we find an answer to the seemingly paradoxical problem posed earlier. Clearly, the lot of the average futures trader has *not* improved significantly in spite of recent hardware and software advances because the game has become more competitive! There is still a winner for every loser. Only a few scenarios are possible in such a situation:

- If a higher percentage of traders wins, and the size of the dollar pool remains relatively fixed, then each of the winners will win less. In other words, the "jackpot" will be divided among more traders, each receiving less for his or her efforts
- If the size of the dollar pool increases, then there will be more money for the very small percentage of winners; or if the percentage of winners also increases, there will be only slightly more money for the larger number of winners
- As the game's strategies (i.e., trading systems) become more sophisticated, the odds of newcomers being successful will decrease. Veteran traders will be quick to pounce upon the new entrants.

- In a system which provides relatively similar tools to all traders, the small group of winners will advance at about the same pace. Hence, the net effect will be nil. If, for example, I begin using a more effective trading system and if others implement better performing systems, then we will all be upgraded and the differential between systems will be narrowed. Consider the following analogy. If you are walking and an automobile moving at the rate of 45 miles per hour passes you, its speed will seem significant. If, however, you are also in an automobile, but moving at the rate of 35 miles per hour, the speed of the other vehicle will only be 10 miles per hour faster than your speed—the differential is narrowed. And so it is in the area of systems trading in the futures markets.

Consider also the fact that as trading systems become more sophisticated, more able to take advantage of aberrations in the marketplace, the markets will become more efficient. Traders will be able to recognize opportunities more quickly and more frequently than they have in the past. This will result in a smoother operation of the market machinery. Ultimately, opportunities for profit may become less frequent and they may not last as long, as the markets become more “efficient.”

Perhaps the most important variables are those which cannot be totally computerized. Has there been any appreciable or quantifiable improvement in trader discipline? Has the average trader learned how to control his or her emotions? I have observed that virtually no progress has been made in these areas. A good majority of market losses are not system-related but rather are the clear result of trader error, lack of discipline, or emotional response. It may be sad, but it is also true that these facts of trading life will never change. Human beings will always be subject to fear, greed, impulsivity, lack of good judgment, and other frailties which are often counterproductive to the task of making profits in the futures markets. As long as a majority of traders' losses are attributable to these characteristically human qualities, it is unlikely that technology and advanced software will have a positive impact on overall trading results. Hence, it may seem fruitless to develop bigger and

better trading systems in the absence of improvements in trader discipline.<sup>1</sup>

As you can see from the points I've just raised, technological and software progress are not the salvations they may seem to be. The mere development of faster "number crunching" computers to research complex trading systems and theories, and /or the development of artificial intelligence (AI) computer techniques, do not *ipso facto* guarantee that there will be fewer losers in the futures markets. If traders and investors followed their systems and theories, the markets would be considerably more efficient, there would be more winners than there are now and the profits would be more evenly distributed among winners as opposed to being severely skewed. The current push toward better systems, faster computers and highly optimized trading systems may be illusory. The advantage to traders may soon reach the point of diminishing returns, if it has not already done so.

By now you may be wondering why I have emphasized these points in a book which is dedicated almost exclusively to the examination of timing signals in the futures markets. My reason is twofold:

1. *To remind you that trading system and timing signal research is meaningless in the absence of trader discipline and self-control. And,*
2. *To remind you that the human element is the weakest link in the trading chain.*

Finally, the markets will become more competitive. As trading systems, methods and technology improve, more traders may be able to participate in the potential profits. Yet unless a significant influx of new capital enters the pool of the markets, there will be less profits per trader if the percentage of successful traders increases.

<sup>1</sup>The issues of trader psychology, discipline and self-control have already been given considerable attention in my books *Beyond the Investor's Quotient* (New York, John Wiley & Sons 1988) and *The Investor's Quotient* (New York, John Wiley & Sons, 1988).

## MARKET MYTH AND REALITY

There is yet another problem which must be examined. Every field of endeavor has its attendant set of unique characteristics. Among these are included methods, procedures, jargon, and a collection of folklore and myth. Beliefs which may have been born in adversity tend to persist and, with the passage of time, they frequently acquire a reality of their own. Futures traders, for example, have for many years held numerous trading myths near and dear. Can you think of some beliefs you have about the futures markets which have been handed down to you from other traders? Do you have expectations about the behavior of markets based on certain indicators? Do you accept these expectations on faith, or do you have conclusive statistical evidence that they are valid? How often have you or other traders expressed expectations based upon reasoning such as:

“Yes, today’s report was very bearish, but if the market can’t close lower tomorrow in spite of this bearish report, then we may be starting a new bull market.”

“This market won’t top until the public turns very bullish.”

“Precious metals decline when stocks move higher and they rally when stocks move lower.”

“If interest rates go down, then the stock market will go up.”

“The market is so severely oversold that it’s almost certain to turn higher any day now.”

“Prices have closed lower seven days in succession now. It’s almost certain that they’ll close higher today.”

“In a bull market buy reactions to support and in a bear market sell rallies to resistance.”

“It’s hard to make money and avoid losing it back in a trendless market.”

“Buy on the full moon and sell on the new moon.”

“A market will eventually ‘fill’ all of its price gaps.”

“New highs beget new lows and new lows beget new highs.”

“Buy markets that are making new highs and sell markets that are making new lows.”

“The trend is your friend.”

I've found that traders in general are a rather "superstitious" lot. By this I mean that futures traders take solace in pithy beliefs which may not have any basis in reality. It is a well-known fact that many futures pit brokers have their "lucky" ties, shirts, jackets or other talismans. But such behavior is not unique to futures traders. Consider the athlete who follows a rigid practice ritual or pre-competition routine in the belief that it improves performance or increases the probability of success. The why's and wherefore's of such behavior are not difficult to understand. As long as the future is uncertain there will always exist the opportunity to take refuge in expectations and/or beliefs which give comfort, whether they are valid or not. The aborigine with a headache visits the witch doctor for treatment. The witch doctor performs a ceremony. The patient feels better. Whether or not the cause of the headache is gone, the symptoms have been relieved!

Behavioral psychologist B. F. Skinner has demonstrated the development and existence of what he termed "superstitious" behavior in laboratory animals. He was able to create such behaviors by subjecting experimental animal subjects to stimulus and response conditions which, in layman's terms, were "uncertain," or unpredictable. While I am not attempting to anthropomorphize, I think that there are, indeed, many similarities between superstitious behavior in animals and faulty belief systems in human beings. My point, however, is that many futures traders—myself included—have certain expectations about the markets which may not be grounded in fact but which have developed from years of exposure to untested ideas, indicators and methods, some of which may have been valid in the past, some which may have face validity and some which may be partially correct. Perhaps some of these ideas will strike home if we examine Skinnerian learning theory in greater detail.



Skinner's theories can help us understand how and why market myths and folklore develop and persist. The elementary concepts of operant conditioning explain the metamorphosis of such beliefs as well as their longevity. The tenacity with which investors and speculators often cling to market myths which have no statistical validity can only be explained in terms of what Skinner termed intermittent reinforcement. Consider the following simple explanation for the persistence of market myths and folklore in Skinnerian (i.e., behavioral learning) terms:

*Behavior followed by positive consequence tends to increase in frequency. Hence, if a trader followed a given signal or indicator and showed a profit as a result, the specific behavior of following this signal or indicator would be prone to increase.*

Skinner also noted that if positive consequences follow a given behavior intermittently (i.e., not on a one-for-one basis), the given behavior may be acquired (learned) more slowly. However, it will be more resistant to change—either forgetting, or what Skinner called “extinction”—and it will be relearned or revived more quickly than if it had been rewarded each and every time by a positive outcome.

Hence, traders who are intermittently rewarded, or who have intermittent positive experiences with a given timing signal or “rule,” are likely to cling to the given indicator with considerable conviction and tenacity.

Assume now that a group of investors or traders experiences the same set of conditions at about the same time. You now have the makings of a market myth. Consider the following example:

A well-known trader of yesteryear notes in his memoirs that he has made considerable money by following a certain set of market parameters. Let's assume that the signal is a key reversal (KR). The trader attributes many of his profits to buying on days following a key reversals to the upside (KR+) and selling on days following key reversals to the downside (KR-). Remember that a KR is defined as a day in which prices trade both above and below their previous daily range. A key reversal up (KR+) is a KR day which closes above the

**Figure 1.1: Key Reversal Up (KR+)**

A KR+ occurs when prices move above and below the previous daily high and low, then close above the previous daily close.

**Figure 1.2: Key Reversal Down (KR-)**

A KR- occurs when prices move above and below the previous daily high and low and then close below the previous daily close.



previous daily close; a KR- is a KR day which closes below the previous daily close (see Figures 1-1 and 1-2 for diagrammatic representation of KR's).

Attracted by the success of our legendary trader, other traders seeking to learn his secrets read his memoirs. They are prompted to watch and/or trade the KR signals. At times they will profit from their KR signals; at other times they will not. This sets up the necessary conditions for the type of strong learning I've described earlier. This type of learning is very hard to unlearn. The longer the intermittent results continue, the more resistant the behavior (i.e., use of KR signal) will become to forgetting or unlearning. And the longer it continues to be followed without clear-cut testing, the more likely it is to acquire the status of a myth. And the longer it remains a myth, the more of a following it will acquire.

Today, however, it is possible to test thoroughly timing signals, indicators and trading systems. We are able, with the right software and data, to subject indicators, whether they have acquired mythological status or not, to extensive testing in order to arrive at a valid conclusion regarding their efficacy. This is one of the goals I have pursued in this book. I am sure you'll find that many icons have fallen and I hope that as a consequence your results will improve markedly. However, I will also show you that some market myths *do have validity under the right circumstances. In other words, I will show you that there are some very specific ways in which indicators can be improved by the application of simple filters and concomitant indicators.*

## TRICKS WITH STATISTICS

Archimedes, who among other things is credited with the invention of the lever, said "Give me where to stand and I will move the earth." The contemporary equivalent of this expression is, "Give me enough statistics and I can prove anything." While statistics are absolutely necessary in the sciences and in other analytical methodologies, there are many ways, unfortunately, in which statistics can be misleading. Recently, for example, there have been many adver-

tisements touting particular trading systems as highly effective or profitable. The promoters of these systems may claim, for example, that their system has "... made money 85 percent of the time in stock index futures." At first blush the statistic is certainly an amazing one. Yet, without a more detailed explanation of this number, it is totally meaningless. A system may have made money in five of the last six years. This is an attractive performance statistic, but it is meaningless unless the results are based on a sufficiently lengthy data history.

The promoter of such a system may counter this criticism with other statistics noting that there were, on average, sixteen trades per year using this system, and that of the ninety-six trades over the six-year period (sixteen trades times six years equals ninety-six trades), sixty were profitable. This, he claims, is a more meaningful statistic. It is not. Possibly fifty-three of the sixty winning trades were small winners, but a mere seven were large winners. The statistics are again misleading unless additional questions are asked and unless additional information is available.

## **DRAWDOWN**

Another consideration in system development and indicator analysis is the issue of drawdown. How bad did things get? That is, how large were the losses which accumulated during the declining portion of this system's history? Clearly, a system which suffered an 80 percent drawdown before getting back on track is one which would also have resulted in a total lack of confidence on behalf of its users. The average speculator would have abandoned such a system or indicator long before it turned profitable again.

## **TREND**

Another factor which must be examined in testing a system, method or timing indicator is the direction of the trend. Consider a system which shows a very promising hypothetical or even real-time track

record during a run of successive years in a bullish market. Upon examination it will likely be found that a majority of the trades and signals generated by this system were on the long side. What will happen to the system when the long-term trend changes? We don't know! It may never have been subjected to such a test. And what will happen to this system or method when the markets begin to move sideways, generating a multiplicity of "false" signals?

This is why it is important to gather all available information about system performance. And this is why it is especially important to back-test systems and signals for as long as possible and/or in as many different market climates as possible. When you consider the fact that many systems which have been offered to the public since the 1980's were back-tested to the late 1970's or early 1980's, you may begin to wonder (as I often do) whether any of them will continue to work in the future regardless how well they tested. do) whether any of them will continue to work in the future regardless how well they tested.

As you can see, the issue of system and signal testing is multifaceted. While it may appear a relatively simple matter to conceive of and test systems, it is an entirely different matter to analyze their hypothetical performance statistics, to determine their validity and to offer an opinion regarding their future performance. Yet the limitations and problems discussed in this chapter should not act as deterrents to the formulation, analysis and testing of systems, signals and timing indicators. My experience as a trader since the late 1960's has taught me many lessons. I have learned very well that success in futures trading depends upon a combination of the following elements, a synthesis of which will help avoid many of the problems outlined in this chapter:

Discipline and self-control—these form the backbone or structure of every successful trading system;

Extensive historical testing of signals, systems and indicators in many different types of markets;

The ability to translate research into pragmatic (i.e., real-time) application; and

The ability to fine-tune systems or change them entirely as the markets become more competitive.

This book provides a variety of directions, analyses and suggestions for extensively testing market signals and indicators. I feel that the ideas and insights I offer in the following pages will prove very valuable to those who decide to join the current trend toward trading system development. Moreover, I hope that my work can help dispel some of the myths while it helps confirm or validate indicators which have either not been subjected to rigorous testing or which have been accepted as valid based on nothing more than good faith.

# 2

## Objectives and Working Definitions

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Shortly after I started trading futures I realized that in order to arrive at a systematic approach to the markets, considerable historical research was necessary. It was obvious to me that computers were ideal for this application. In 1968, however, computer technology was not readily available to the general public. The cost of historical futures data was prohibitive to most traders. It was not until the early 1970's that I was able to acquire the data and computer time necessary to begin back-testing some of my ideas.

My studies took me in many directions. I examined price patterns, volume relationships, open interest and all of their interrelationships. During those days the most popular trading systems were based on moving average concepts which had been introduced in the 1950's by Richard Donchian. Traditional chart technical analysis a la Edwards and McGee was also widely followed by many traders. While moving averages were relatively simple to track and test by computer, chart formations and patterns were not readily amenable to the type of algorithms required by computers. Hence, I was relegated to testing only those indicators and signals which could be operationally defined and expressed. After considerable testing I realized that there were numerous limitations to my work.

To begin with, my data history was severely limited. I had only several years worth of history. Furthermore, I was restricted to

borrowed computer time and lacked the services of a full-time programmer. Also, I continued to labor under the misconception that I needed to know more about economics. The net result of these limitations was to inhibit both the volume and intensity of research I so passionately hoped to complete. When finances finally permitted, I bought a state-of-the-art computer system. I also acquired many years of cash historical data—literally hundreds of years worth—until I had accumulated what I feel is today one of the lengthiest historical databases in the futures industry. This proved to be both a blessing and a curse in one expensive package.

When I began my testing I observed a most peculiar phenomenon. While many of the indicators and systems I tested seemed very profitable at first, the more I tested them, the more they regressed to the mean. In other words, the farther back I went with my testing, the less effective the indicators were. It appeared that every timing signal or system had its good times and its bad times. Sometimes the profitable stretches were more than enough to overcome the periods of poor performance (i.e., drawdown). In other cases the periods of losses were so extended and severe that in spite of very large profits during other periods, the indicators were net losers. And what was even more interesting—even shocking—was the fact that many indicators which tested as virtually useless were being touted by traders, system developers and market “gurus” as effective. But I couldn’t blame them for their ignorance. After all, they had tunnel vision. They were looking at a limited data history; at a period of time during which virtually every indicator or system worked well; at a picture which was not entirely representative of all market climates and conditions.

In other words, I realized that while some systems and indicators tested well in certain market conditions, they did not fare well during other market conditions. It has long been known that most trading systems and indicators do well in trending markets, but that they lose money in sideways or “whipsaw” markets. A good majority of systems research is directed at limiting losses during sideways markets while attempting to maximize profits during trending markets.



Following my many years of research into market timing, indicators, systems, cycles, seasonals and more, I reached the following:

*There are many different timing signals, all of which may be considered effective at various times, but none of which can be considered effective in all markets and at all times.*

*Timing signals which are effective for market entry are not necessarily equally effective for market exit.*

*Some timing signals which have been considered reliable by traders for many years are in fact no more effective than the proverbial "random walk."*

*Some timing signals are virtually useless as stand-alone entry or exit techniques; however, they can be extremely effective in combination with other signals. Such synergism can be very important in developing and designing effective trading systems.*

*Specific money management techniques for maximizing performance are exceptionally important. While effective money management is often considered to encompass such things as limiting risk and allocating account capital according to strict guidelines, it is even more important to know when to maximize on trades in order to make the most of signals and systems when they are experiencing a winning streak.*

The performance of such techniques as seasonals, cycles and day-of-week patterns may be significantly enhanced by the addition of specific timing signals or combinations of timing signals.

This book aims to achieve the following goals:

**1.** To examine numerous technical indicators and timing signals in a thorough, organized and extensive fashion using a vast historical database.

**2.** To determine if given indicators and signals are more effective in certain types of markets than they are in other types of markets.

**3.** To determine if certain timing indicators heretofore considered effective are in fact effective when viewed from a lengthy historical perspective.

**4.** To test various heretofore untested timing indicators.

**5.** To provide suggestions regarding optimum application of various indicators.

**6.** To provide extensive performance statistics.

**7.** To provide suggestions for optimizing market entry and exit based on the test results.

**7.** To provide suggestions for optimizing market entry and exit based on the test results.

**8.** To suggest future directions for research.  
may be more effective than the performance of any one of the indicators by itself.

**9.** To suggest future directions for research.

Bear in mind that it is not my purpose to test and evaluate currently popular trading systems. Other publications can provide such information; their drawback, however, is that their tests are frequently limited in the length of their data history. The publishers of these reports often accept the historical performance statistics of the system developer and pick up their monitoring from the point at which they began following the given system. Furthermore, as I pointed out earlier, many contemporary systems are back-tested for a period from as little as three years to as many as fifteen years. Few

are back-tested to the 1960's or earlier. And with good reason! Many systems just don't hold up when tested that far back.

The question which must then be pondered by the system developer is whether on not to ignore the historical data or to start again from scratch in order to develop a new system. While some may consider this a philosophical issue, I consider it an ethical and pragmatic issue. I maintain that if a system or indicator is used for the purpose of trading, then it must show its ability to perform in all types of markets and at all times. The system must be "intelligent" enough to know when to stay out of the market and when to stay in the market. At the very least it must have the ability to hold its own during periods of whipsaw and it must have the ability to capture big moves when the markets are trending.

As I indicated earlier, I do not purport to provide within these pages the ultimate test of every system or indicator currently in use. To do so would take considerably more time and much more space than is possible in this already large volume. I do not single out any one system by name or any one indicator by name. Rather, I provide an unbiased report of specific timing indicators based on massive research and detailed examination of a vast historical database.

While you may disagree with some of my methods and procedures, I can assure you that they have been designed in order to reflect the realities of trading as closely as possible. We know that to present any indicator or system in its optimal light is to engage in unrealistic representation. All systems are subject to the deteriorating influences of slippage, to the ubiquitous cost of commissions, and to the vagaries of trends.

### **A Few Words About Optimization**

In the last few years system developers have embarked in a new and, I feel, a risky direction. They've moved more and more in the direction of optimization, or curve-fitting. There are two strongly opposed schools of thought regarding optimization. Proponents of each have made strong supportive claims for their positions. Consider the

following observations made by Bruce Babcock in his book *The Dow Jones-Irwin Guide to Trading Systems* (Dow Jones-Irwin, 1990):

If the computer examined the last five years of data in ten individual markets and found the best acceleration factor to use in each month for each market, it would create 12 different sets of rules for each market, or a total of 120 separate rule-sets in all. You could still consider it as one system, however. The historical profits for the 120-rule-set system would be far higher than the profits for the original (Wilder system), which had only one set of rules for all the markets.

If you had to guess which system would be more likely to be profitable in the future, would you select the more complicated system merely because it showed the most profits historically? . . . The correct answer is no. *A curve-fitted system is, by its very method of creation, guaranteed to be profitable on the historical data used to create it. This says little about its likely profitability in the future.*

If you were in commodity trading dreamland, you could create a system without any reference to historical data and then find that it was wildly profitable in every market during every time period you tested it. Then, unfortunately, you would wake up and have to face reality, where this does not happen. When dealing with the complexities of mathematical trading systems, there are usually many parameters you can change. The only way to know not to maximize the effectiveness of your system is to test it historically, using different values for the changeable parameters. Thus, some optimization is required. *If you over-optimize, however, you end up with a highly curve-fitted system that will probably not be reliable in the future.*

When doing historical testing, it is essential to remember what the goal is. It is not to create a system that generated the most hypothetical profits trading in the past. It is to create a system that will generate the most profits

trading in the future. The future is the only arena where you can make real money.

As far as I'm concerned, the jury is still out on the issue of optimization. However, I lean in the direction of non-optimized or minimally optimized systems. I feel that they more closely represent reality than do curve-fitted systems. None of the indicators examined in this book were optimized. In other words, they were tested "as is," without being altered to fit the data.

## **PROCEDURES AND DEFINITIONS**

In order to understand what I have done and to best translate my results into real time, you will need to know a few important facts about my methods and procedures.

### **The Database**

In order to subject the indicators and systems selected to extensive testing, I have employed a very lengthy historical database. In most cases indicators have been back-tested to the mid-1960's. In some cases I have also tested on a "spot check" basis contracts dating as far back as the 1920's.

### **Type of Data**

Many systems are back-tested using "continuous data." The purpose of using this type of data is to avoid the problems associated with contract switchovers and the frequently large price differentials which exist between an expiring contract month and the next tradeable contract month. Continuous data is altered for the purpose of testing in order that the system being tested need not close out a position at the end of a contract only to be faced with the problem of when to enter the next contract month. Those who employ the continuous data approach claim that the alterations made do not misrepresent what actual results might have been.

I maintain, however, that a system should be tested in the way that a trader would trade it. In real life a trader can't trade a continuous contract: he or she is faced with the situation of being forced to exit a position in order to avoid delivery, and is furthermore faced with the next decision, which is when to enter the next contract month. These are *real-life* decisions—they don't disappear with the use of continuous data. I have, therefore, used continuous data files only minimally. My procedure was to use two or three active contract months for each market. Signals were only tested during the active portion of each contract month. Testing was stopped on the last day of the month prior to the delivery period and exit was forced on that date if a signal was still in effect. No new position was taken until the next signal occurred in the subsequent contract month. I feel that this procedure is more representative of real market conditions than is a continuous data file.

Signals and timing indicators were tested using various methods and procedures. Initial tests were completed on a Data General Eclipse MV mini-computer. Programming was in Fortran 77.

The first step in my testing procedure was to determine the signals and indicators to be tested. These were then programmed. A pretest was then performed on a representative database which consisted of different types of markets (described later on) such as bull markets, bear markets, whipsaw markets and so on. Signals which showed some degree of positive results were then subjected to a thorough test which involved examination of their performance during two to three contract months for every year for each market as far back as 1967.

Indicators were also tested using Bill Cruz's excellent analytical software, System Writer Plus (SWP). I noted earlier that it is now possible for the average investor to buy highly effective computer hardware and software at an affordable price. System Writer Plus is just one example of the powerful software which investors and traders can use to test their ideas, systems and methods.

By applying further testing to our timing indicators and signals using SWP, I was able to examine them in a trading-oriented environment inasmuch as specific strategies and alternatives were

used. Signals which might have initially tested as marginal were enhanced by the application of filters, combined signals, stop losses and various exit indicators. This is where SWP does its best work, and I took full advantage of it.

Let me repeat here that it is not the intention of this book to provide a list of infallible trading systems, indicators, methods and/or signals. There are literally hundreds of possible combinations of timing signals and indicators. To effectively examine every one of these would take literally thousands of hours. It is my hope that you will save valuable time, as well as money, by focusing your attention on some of the indicators and signals I've already tested so thoroughly. I suggest that you use the findings of this study as your starting point for further research into trading systems, timing signals and trend indicators.

### **Indicators and Signals Tested**

Numerous indicators and signals were tested. Each indicator and its precise test conditions are described in detail when its results are reported. In addition an algorithm, a diagrammatic representation, and several chart examples are provided for each indicator (where relevant).

The indicators and signals were derived from the following sources:

- 1.** My own observations and theories which were derived from my years of experience in the futures market.
- 2.** Some indicators and methods were derived from market folklore. In other words I gathered a variety of market adages and, where possible, translated them into trading algorithms for the purpose of testing.
- 3.** Some timing indicators, signals and systems were prompted by the current literature. Reports from different market publications, articles, books and so on were taken as the starting point for various indicators which I tested. I took particular interest in testing indicators or signals for which highly positive claims were made.

Unfortunately, most of these did not stand the test of time. Since I do not wish to cast aspersions on the work of other analysts, no names are mentioned in connection with negative results. In some cases I found that ideas or indicators which I felt had potential or which actually back-tested profitably in my previous work were not as effective when subjected to more lengthy analysis, while in other instances some of my indicators performed better than expected.

### **Markets and Contracts Tested**

In order to thoroughly test the selected indicators and signals I departed from some of the procedures usually employed in testing signals, indicators and trading systems. Rather than use five or ten years of data, I tested back to 1967. I felt that it would be instructive to examine indicators and signals in different types of markets. Consequently, I divided all markets tested into a variety of categories depending upon their trend characteristics. Furthermore, I did not “curve-fit” any of the tests. I merely back-tested the indicators without then retesting a modified version of the indicator(s) in order to see if they would have produced different results.

Several examples of each market category are given below. To a certain extent my selections were subjective. I am certain that there will be some disagreement with my choices; however, I expect that for the most part I have placed markets in their appropriate categories. Finally, remember that two or three contract months of every market for every year back to 1967 were included in the database.

Some signals and indicators perform differently in different types of markets. In order to quantify their performance I categorize every single contract month for every market. All contract months were carefully studied in order to classify them into specific categories according to trend. Here are the categories, their definitions and a chart example of each condition. Remember that the purpose of making these distinctions was to ascertain how different signals acted in different markets. The KR+ (Key Reversal Up) signal, for ex-



ample, was tested first on all files and then on the specific market categories. This allowed us to answer such questions as: how did KR+ signals fare in sideways markets; how did they fare in bull markets only; and how did they perform in choppy bull markets?

**Bull Markets** A bull market for the purposes of this study is defined as a market which trends higher, with few sizeable corrections during the time frame studied. Remember that our study period did not cover the entire contract length. Generally we did not evaluate signals for the first 100 days of each contract, and we stopped the analysis at the end of the month prior to the delivery month. Figures 2-1, 2-2 and 2-3 show the closing prices charts for three representative bull markets. Note that prices and dates have been “stripped off” in order to increase the plotting speed of the charts (since I analyzed so many markets, and since the analyses were all computer-generated, I spent as little time as possible on graphics). Remember that I did not consider the last approximately 30 days of each contract as part of the analysis.

**Bear Markets** These are markets which trend generally lower during the analysis period, with few significant interruptions or corrections in trend. Figures 2-4 through 2-6 illustrate several of the bear markets used in my analyses.

**Choppy Bull Markets** These are markets which move higher, but irregularly. They tend to exhibit significant corrections within their uptrends, which make them difficult markets for trend-following systems to trade. Figures 2-7 through 2-9 show a number of choppy bull markets.

**Choppy Bear Markets** These are markets which trend lower, but irregularly and with significant upside corrections. Figures 2-10 through 2-12 show some of the choppy bear markets which were used in my analyses.

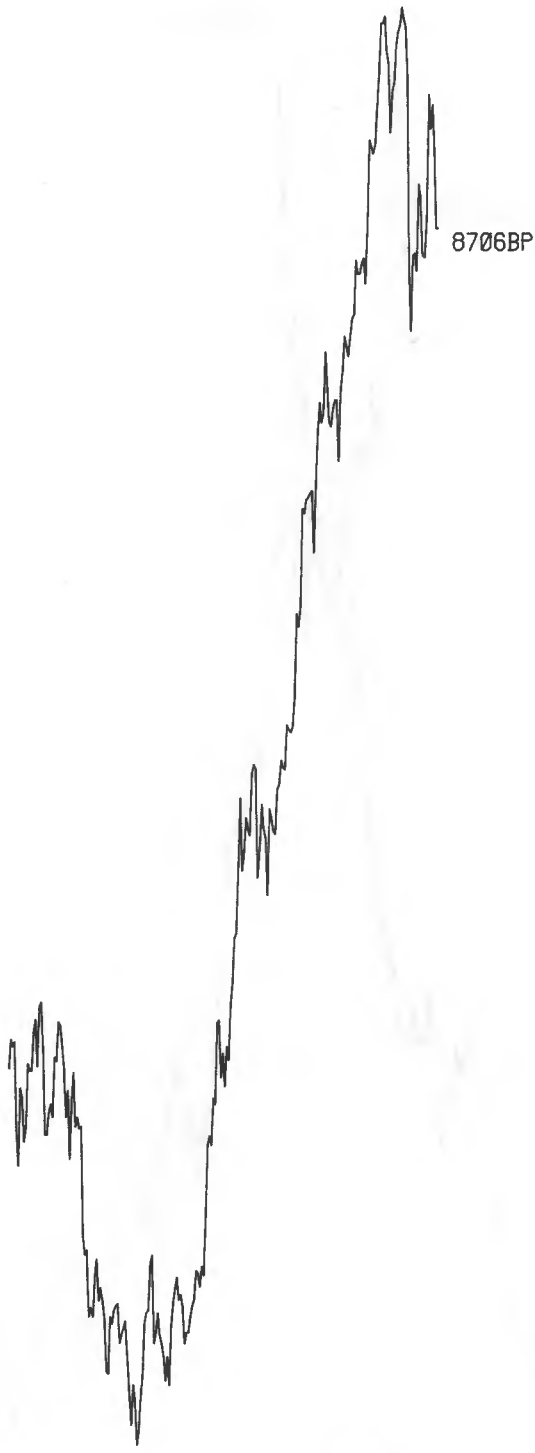
**Figure 2.1: Bull Market—July 1972 Soybean Meal**



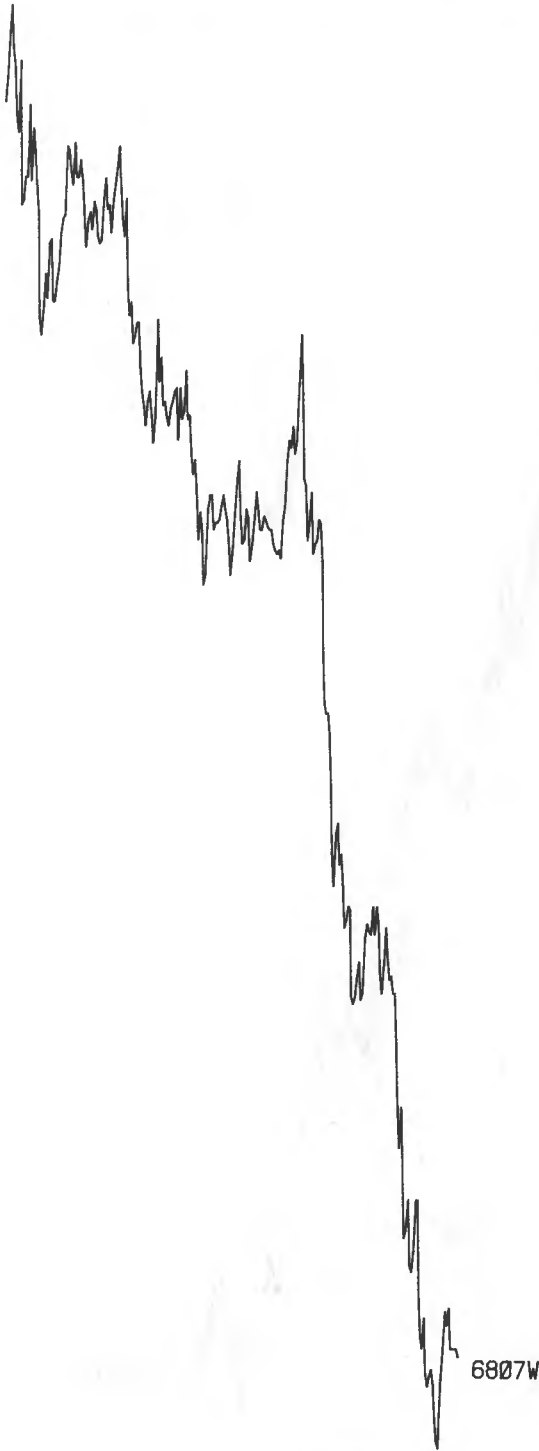
**Figure 2.2: Bull Market—December 1977—Swiss Franc**



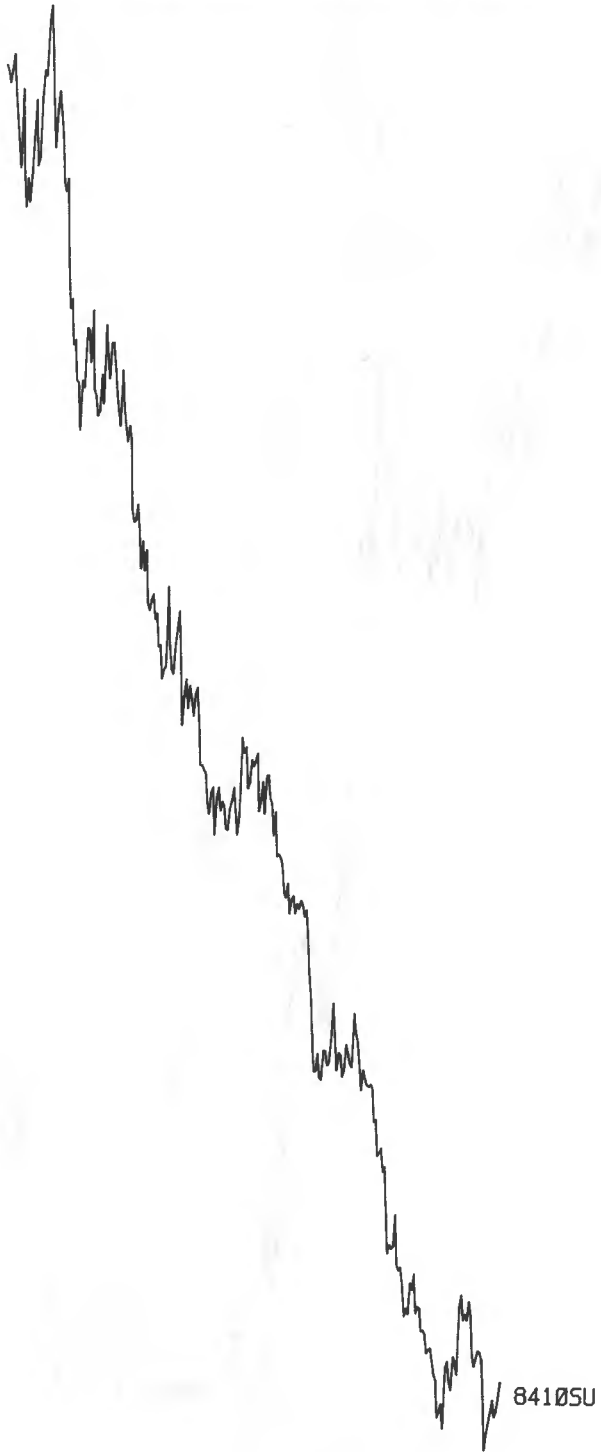
**Figure 2.3: Bull Market—June 1987—British Pound**



**Figure 2.4: Bear Market—July 1968—Wheat**



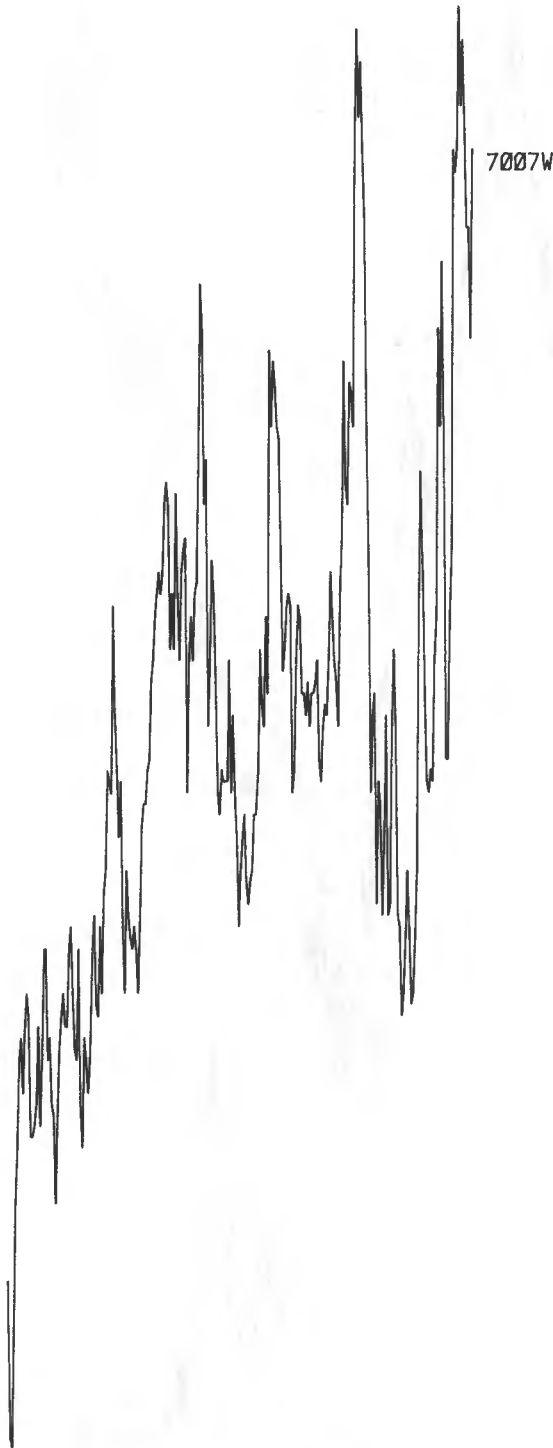
**Figure 2.5: Bear Market—October 1984—Sugar**



**Figure 2.6: Bear Market—December 1984—Swiss Franc**

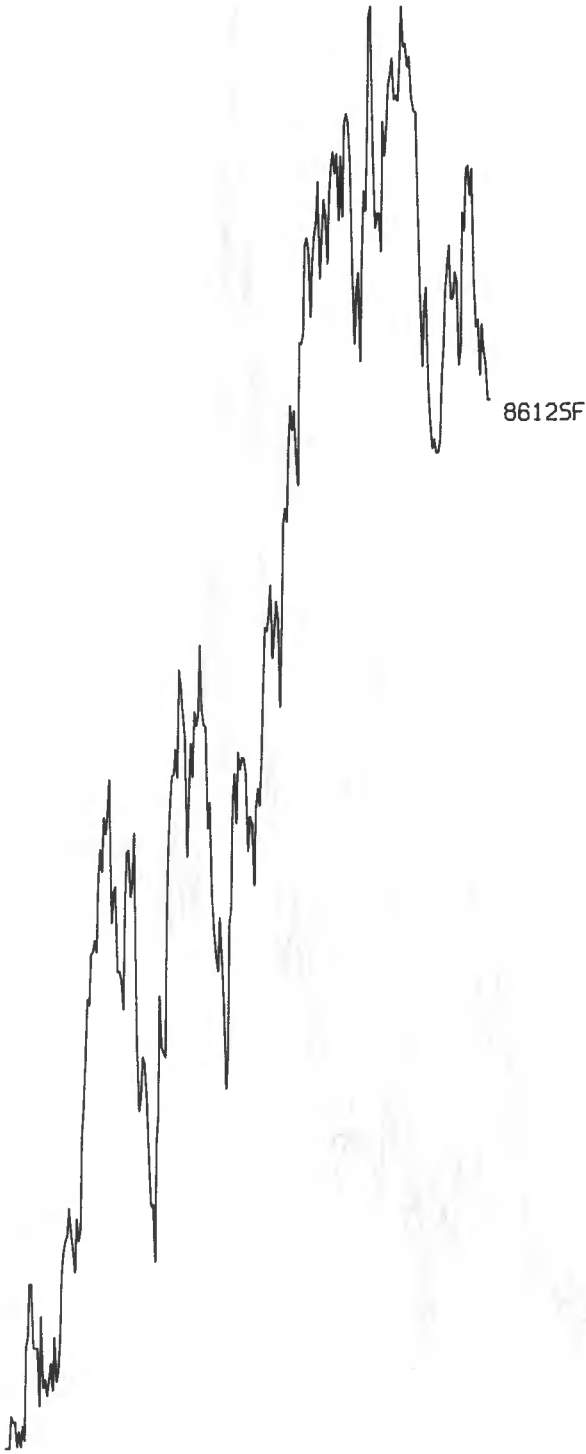


**Figure 2.7: Chopsy Bull Market—July 1970—Wheat**

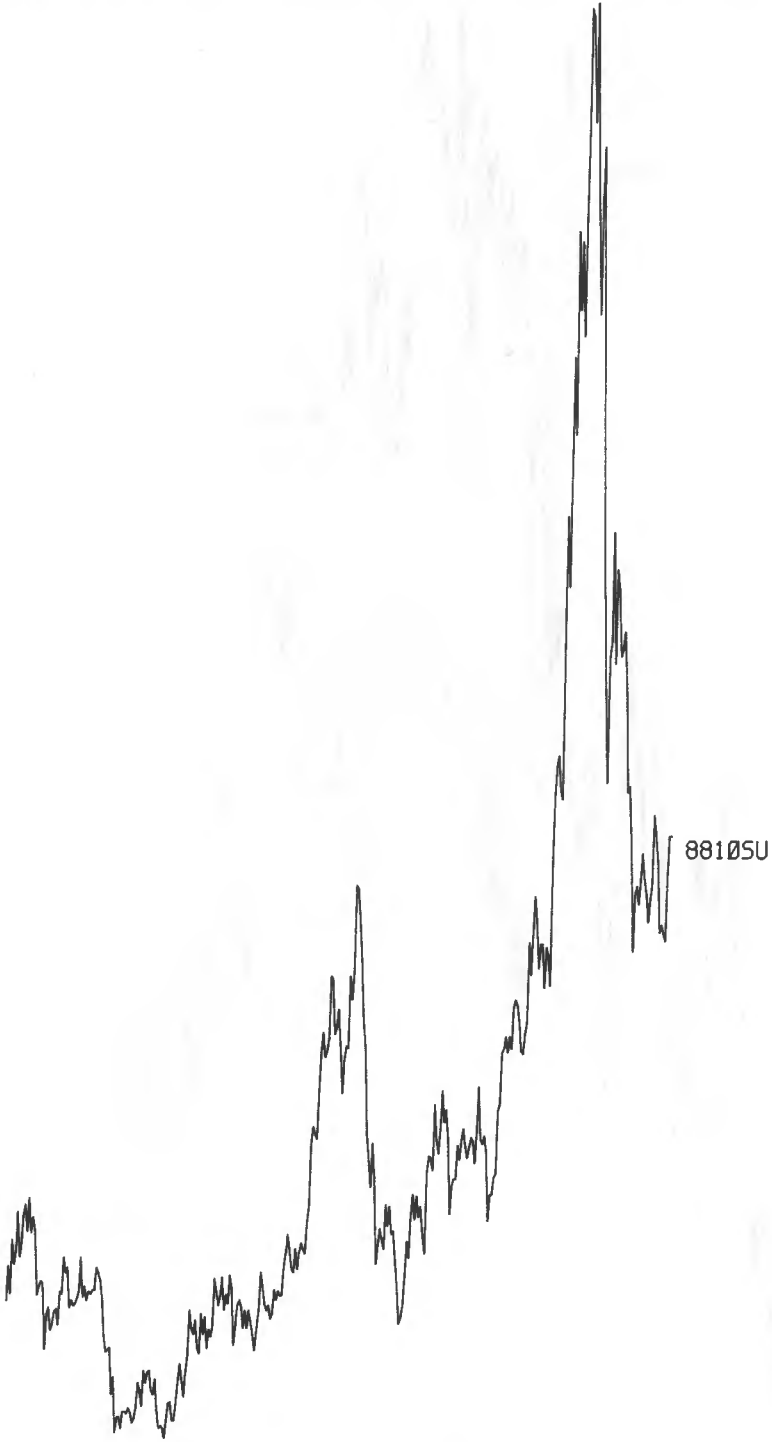




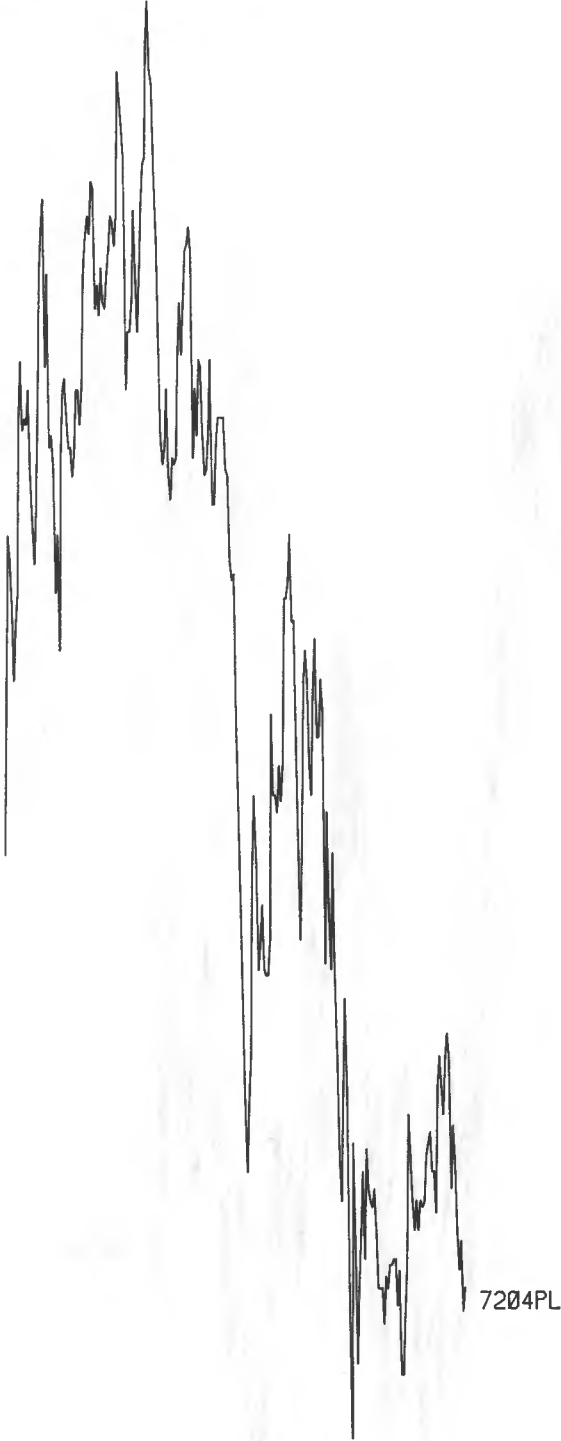
**Figure 2.8: Chopsy Bull Market—December 1986—Swiss Franc**



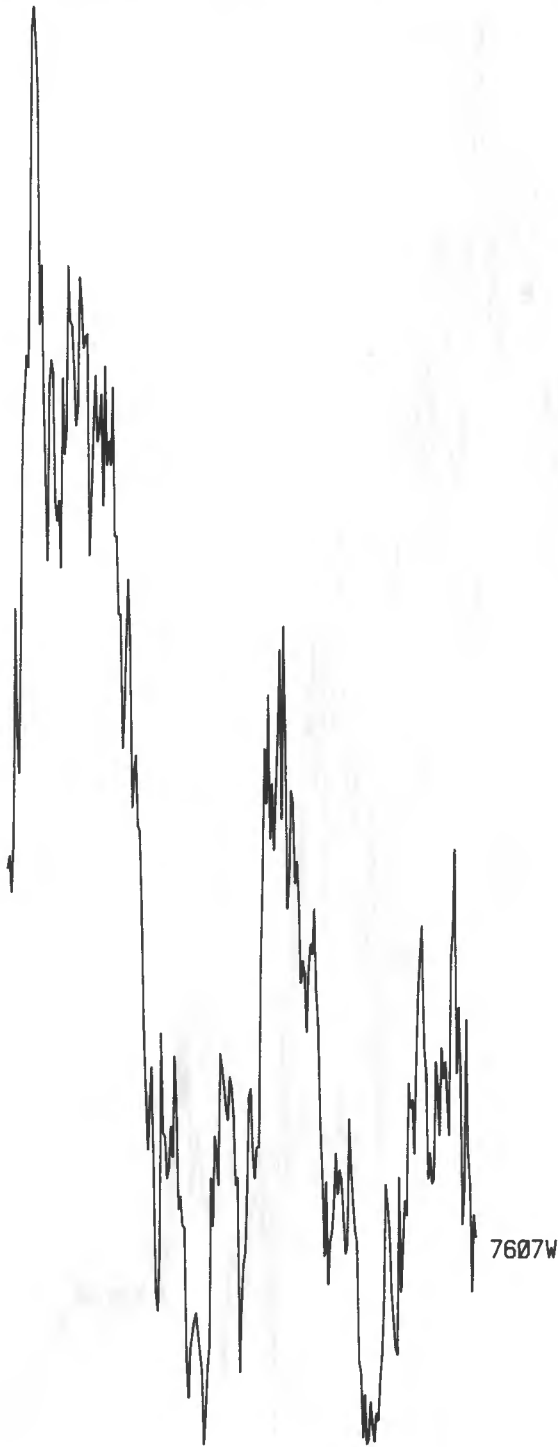
**Figure 2.9: Chopsy Bull Market—October 1988—Sugar**



**Figure 2.10: Choppy Bear Market—April 1972—Platinum**



**Figure 2.11: Choppy Bear Market—July 1976—Wheat**



**Figure 2.12: Choppy Bear Market—November 1986—Soybeans**



**Whipsaw and Sideways Markets** These markets are characterized by either their lack of continuous trend or relatively sideways markets. Some whipsaw markets show large up and down movements, while others are very tame by comparison. They share the common characteristic of numerous up and down moves which usually but not always take the market nowhere. Figures 2-13 through 2-15 show some of the whipsaw markets used in my analyses.

**Bear/Bull Markets** These markets are those which begin with a pronounced bearish trend, but change to a pronounced bullish trend. See Figures 2-16 through 2-18.

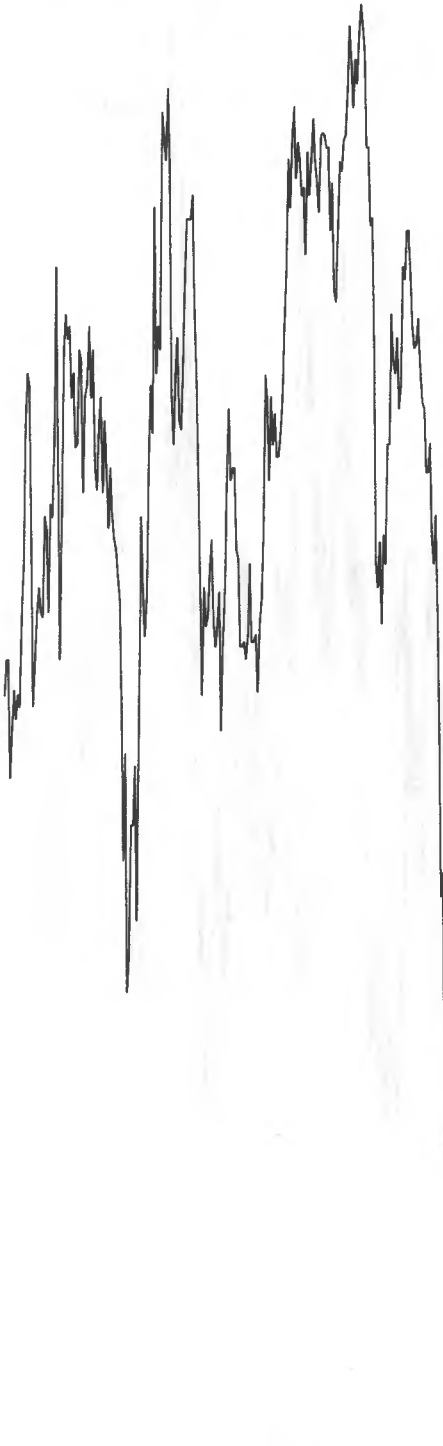
**Bull/Bear Markets** These markets begin with a distinct bull trend but change direction and turn into clearly bearish markets. Some bull/bear markets are shown in Figures 2-19 through 2-21.

**Bear/Bull/Bear Markets** These markets begin with a distinct downtrend, turn bullish and then turn bearish again. Examples of bear/bull/bear markets are shown in Figures 2-22 through 2-24.

**Bull/Bear/Bull Markets** These markets begin with a bullish trend, turn bearish and then turn bullish again. Examples of bull/bear/bull markets used in my analyses are shown in Figures 2-25 through 2-27.

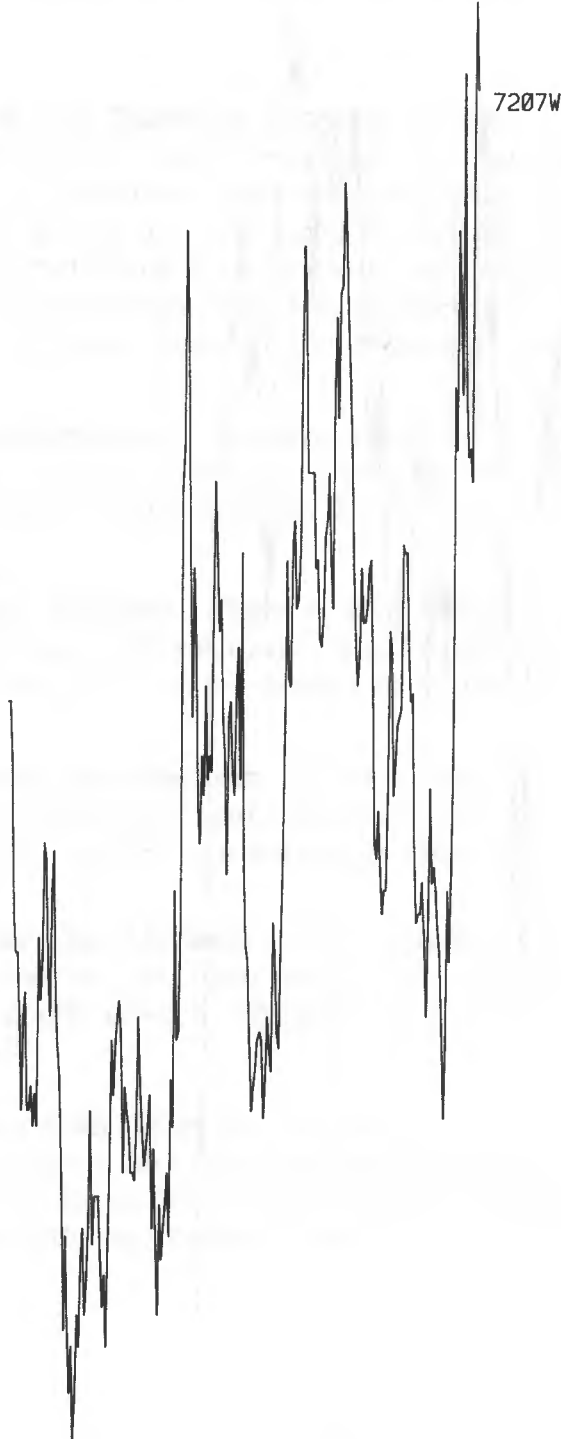
For a look at all of the markets by category used in my data sample, see Appendix I. As I have earlier stated, you may disagree with some of the choices I have made, but for the most part I think that there will be little controversy about my evaluations.

**Figure 2.13: Whipsaw or Sideways Market—April 1969—Platinum**



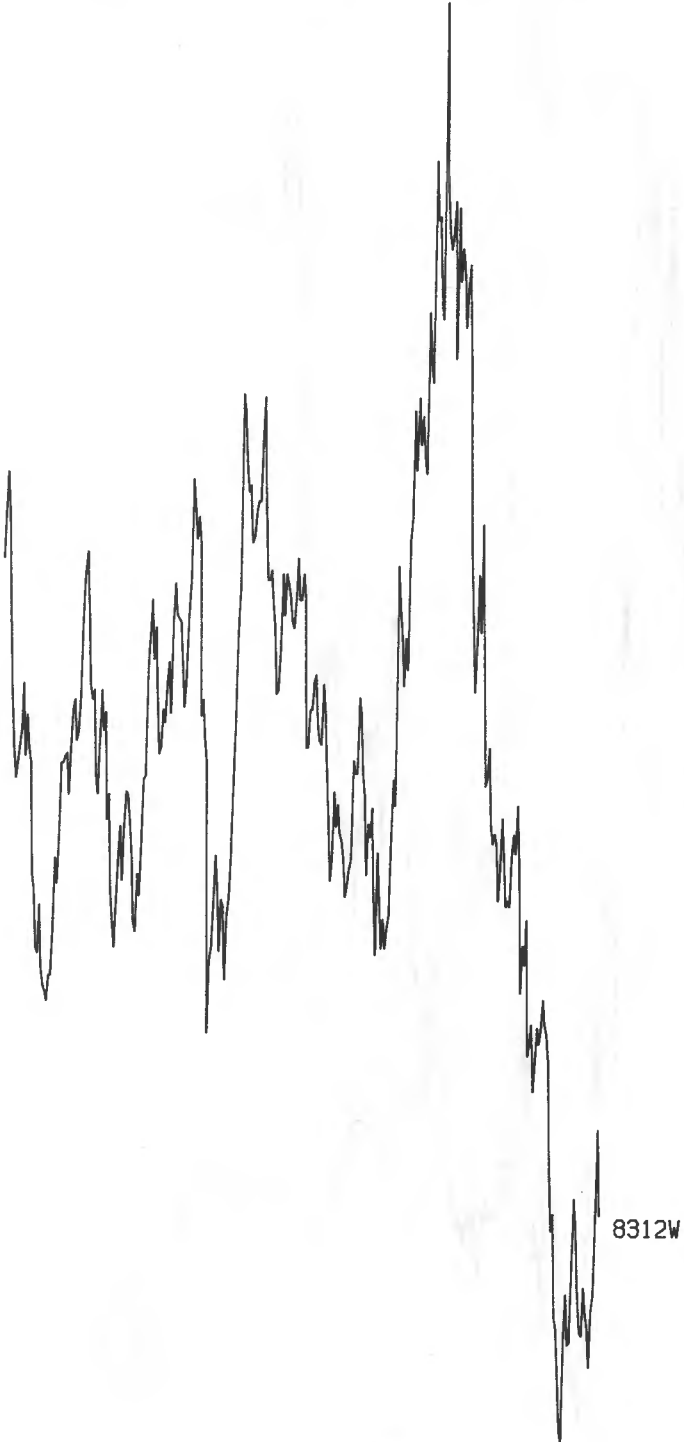
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**Figure 2.14: Whipsaw or Sideways Market—July 1972—Wheat**





**Figure 2.15: Whipsaw or Sideways Market—December 1983—Wheat**



**Figure 2.16: Bear/Bull Market—December 1968—Copper**

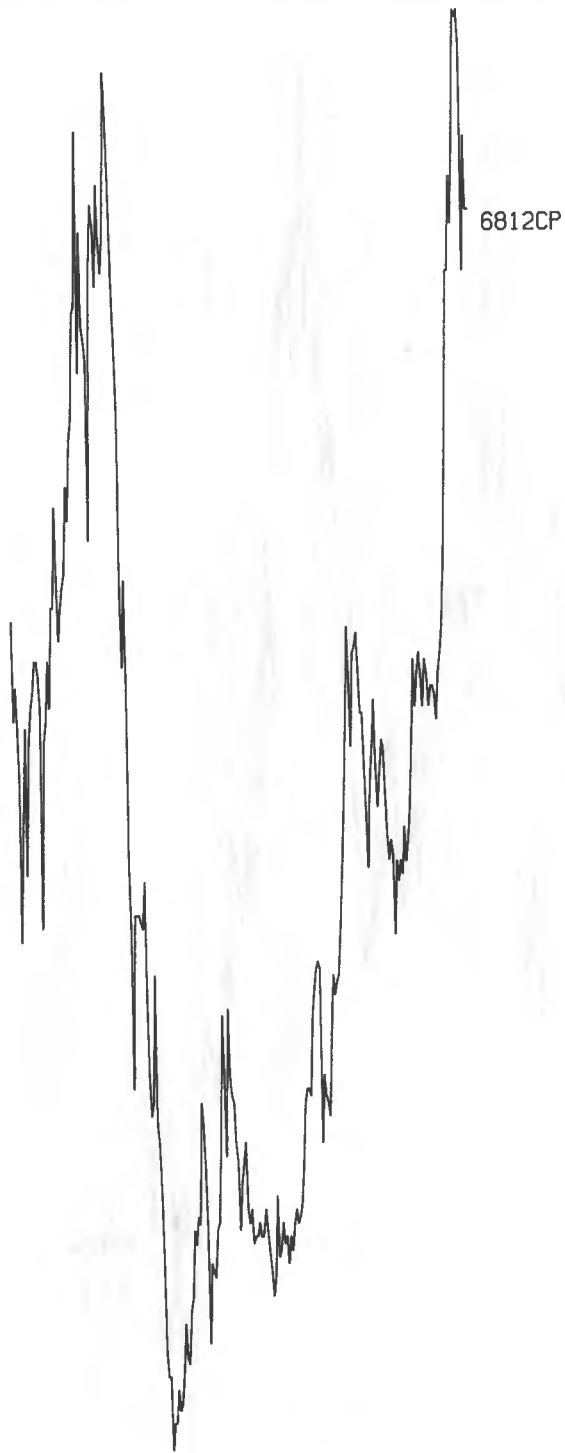
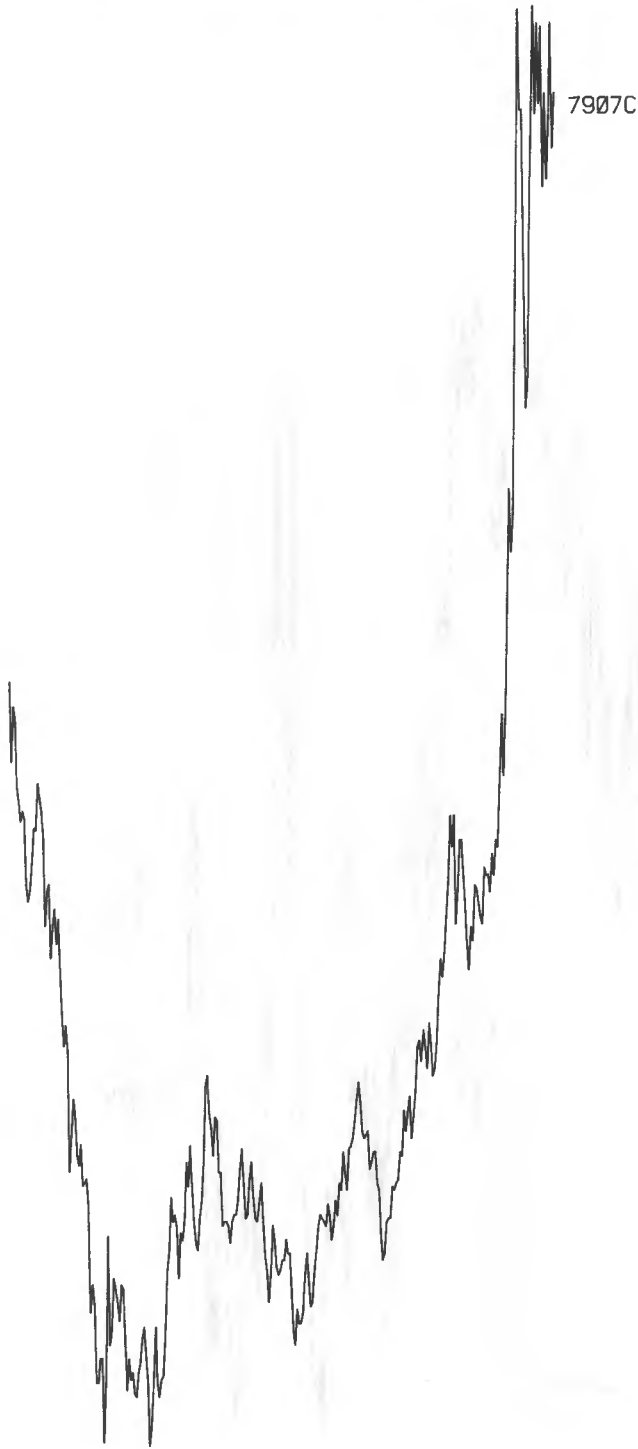
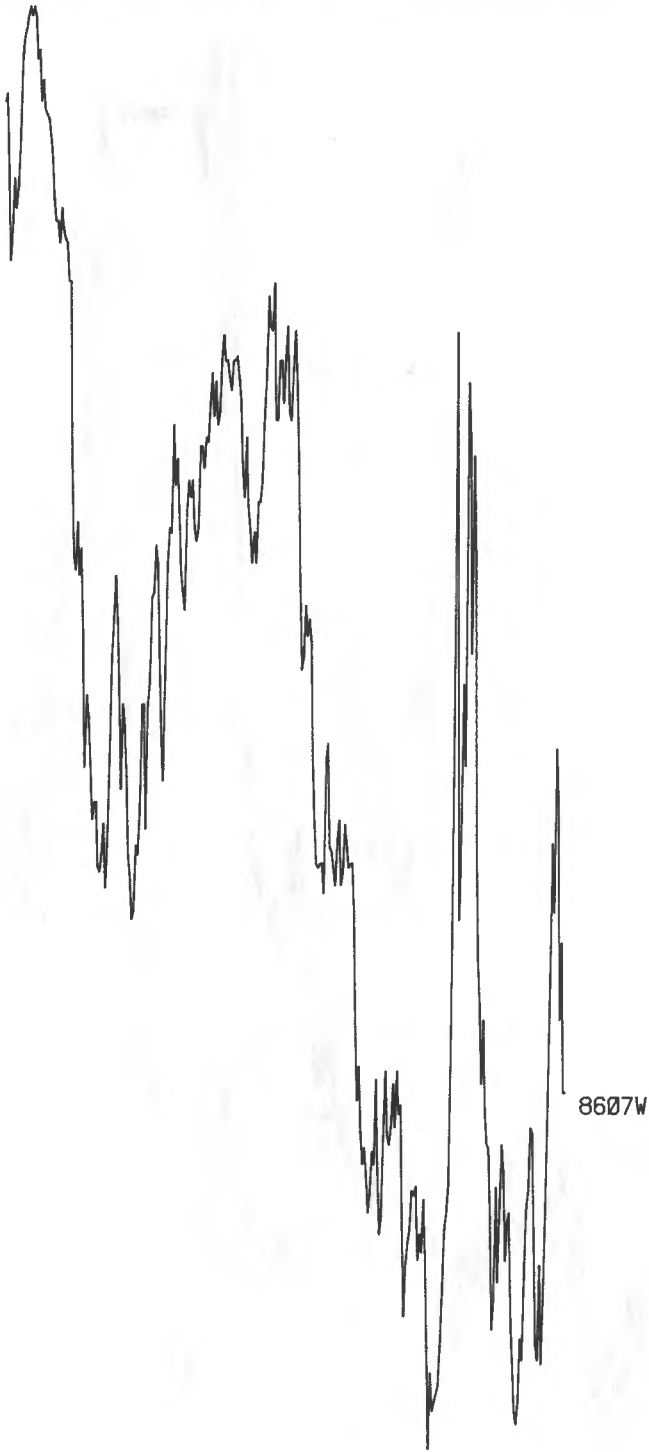


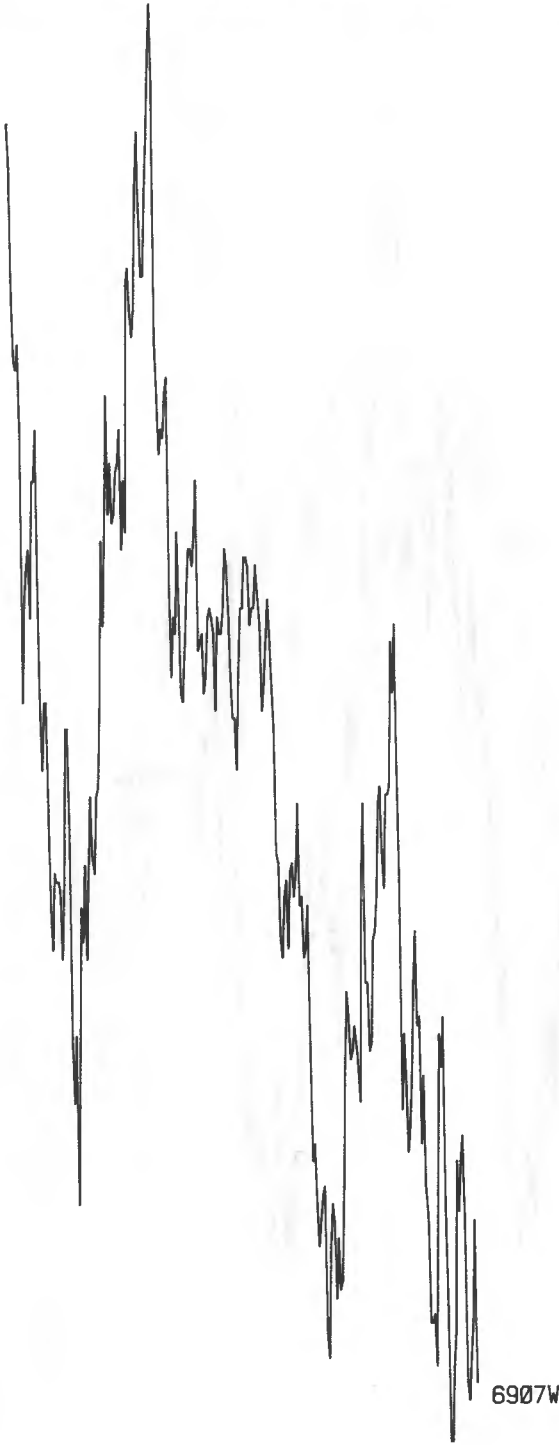
Figure 2.17: Bear/Bull Market—July 1979—Corn



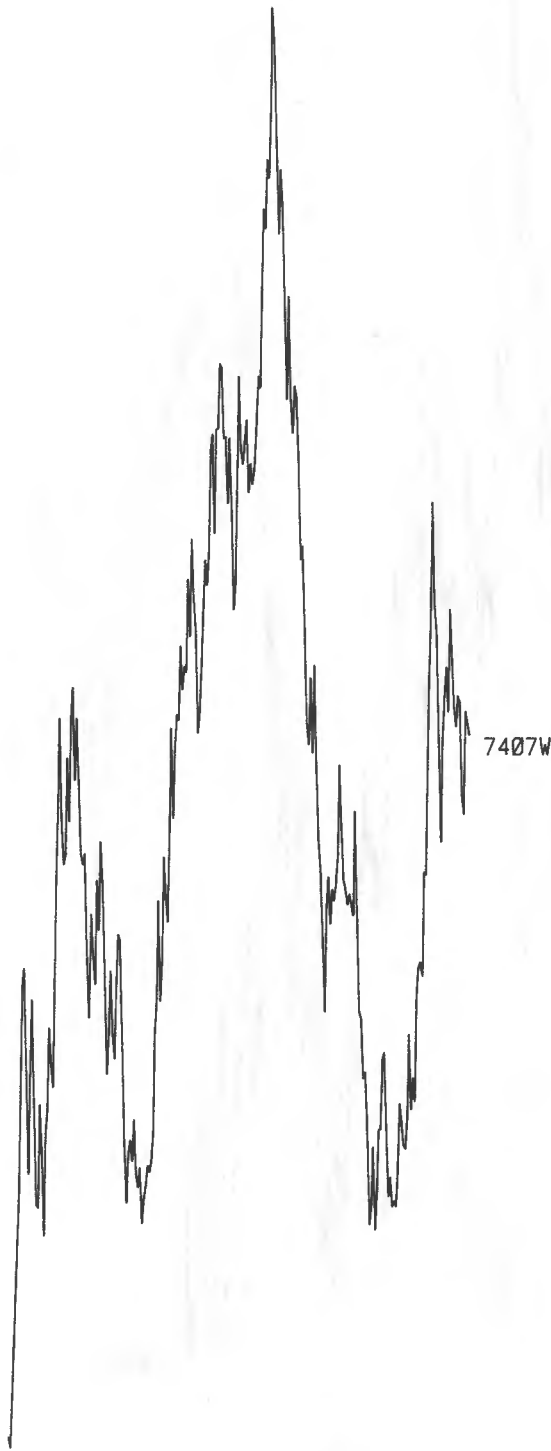
**Figure 2.18: Bear/Bull Market—July 1986—Wheat**



**Figure 2.19: Bull/Bear Market—July 1969—Wheat**



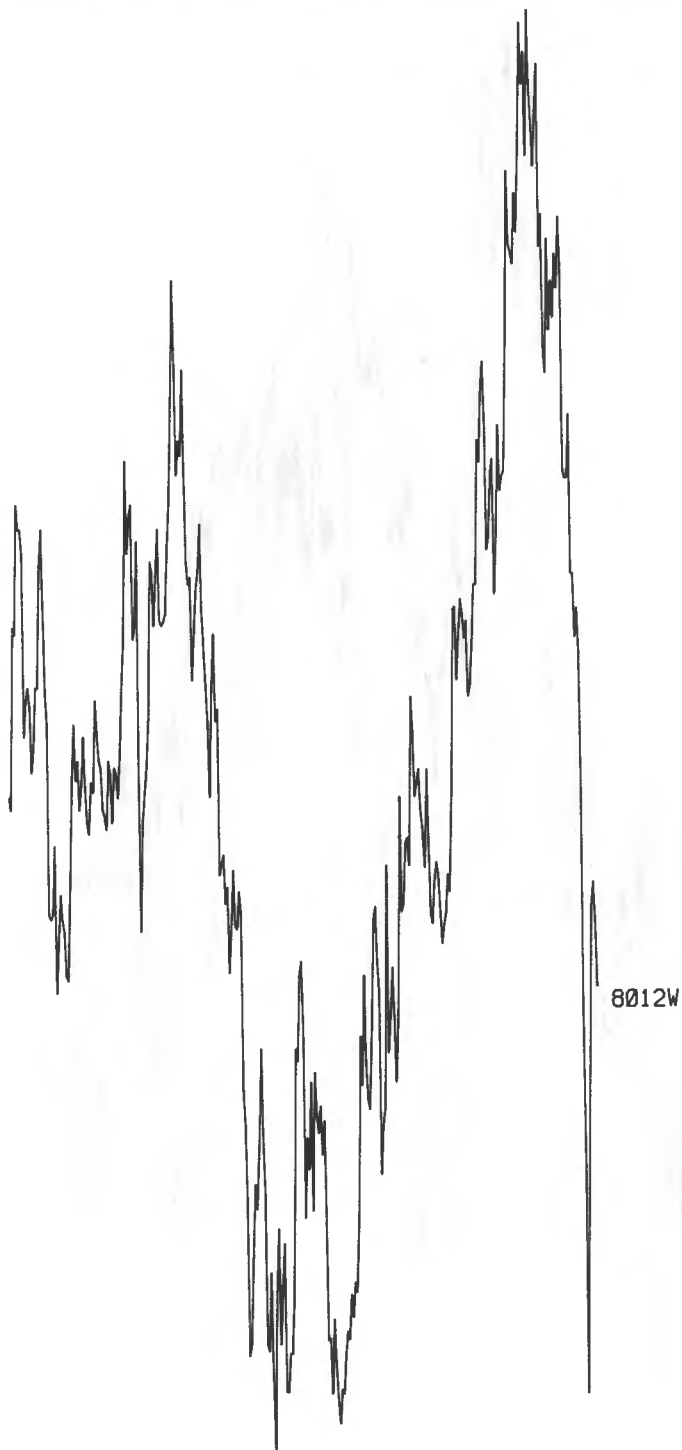
**Figure 2.20: Bull/Bear Market—July 1974—Wheat**



**Figure 2.21: Bull/Bear Market—October 1983—Platinum**



**Figure 2.22: Bear/Bull/Bear Market—December 1980—Wheat**





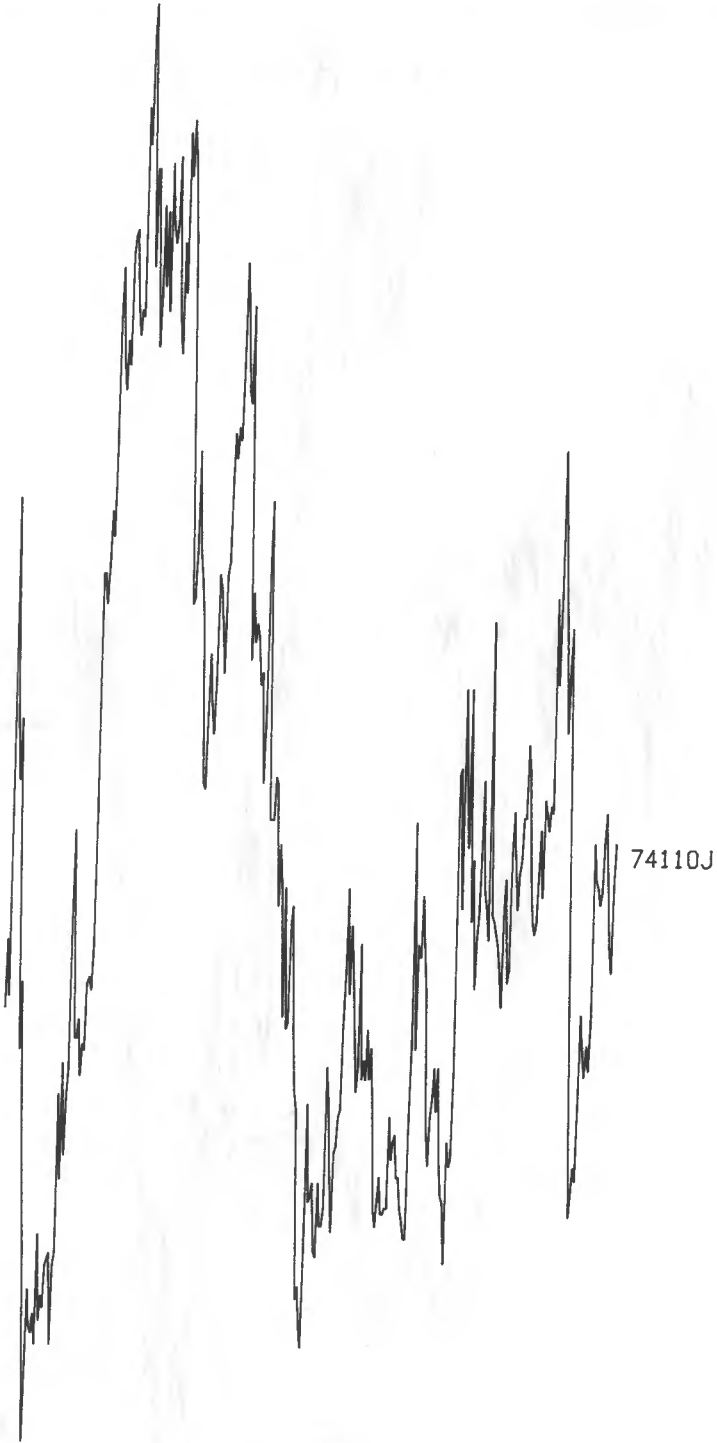
**Figure 2.23: Bear/Bull/Bear Market—July 1985—Pork Bellies**



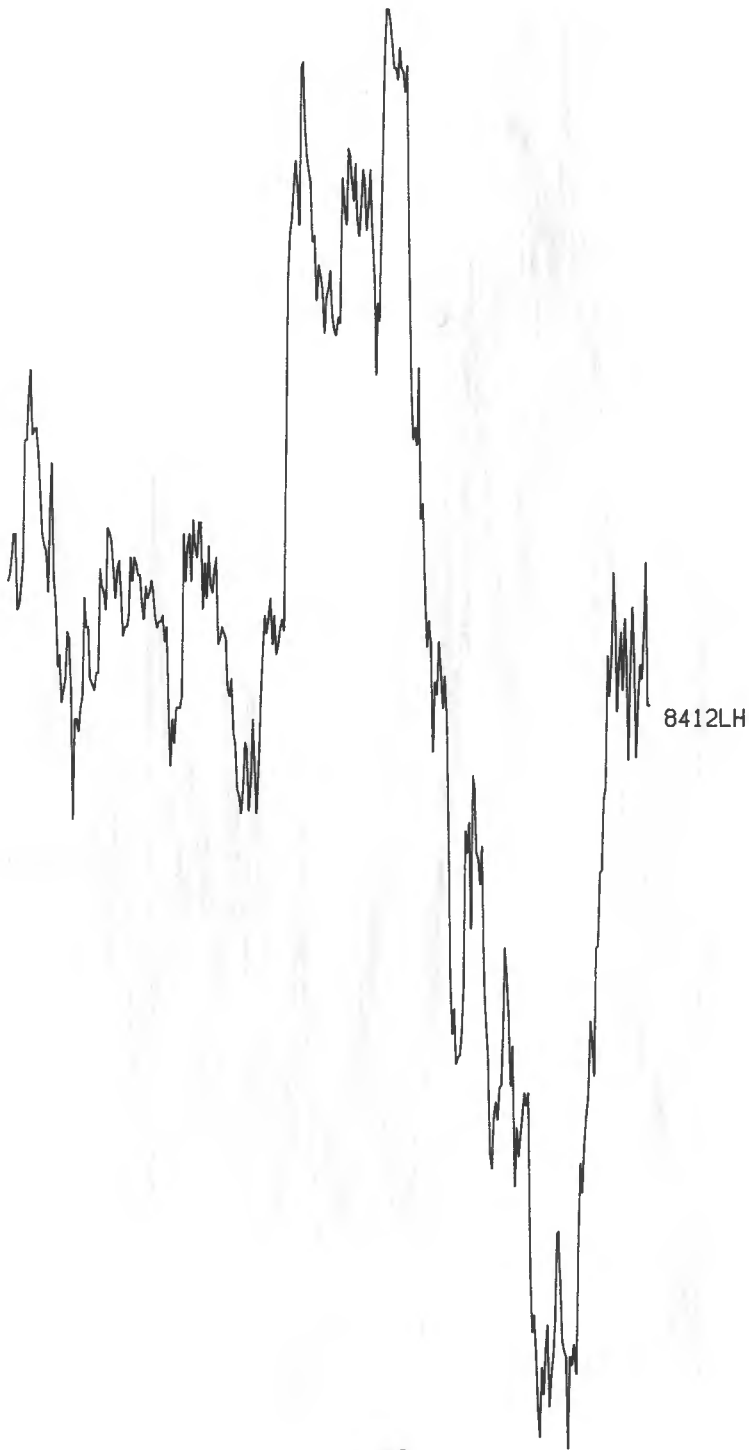
**Figure 2.24: Bear/Bull/Bear Market—December 1987—Live Hogs**



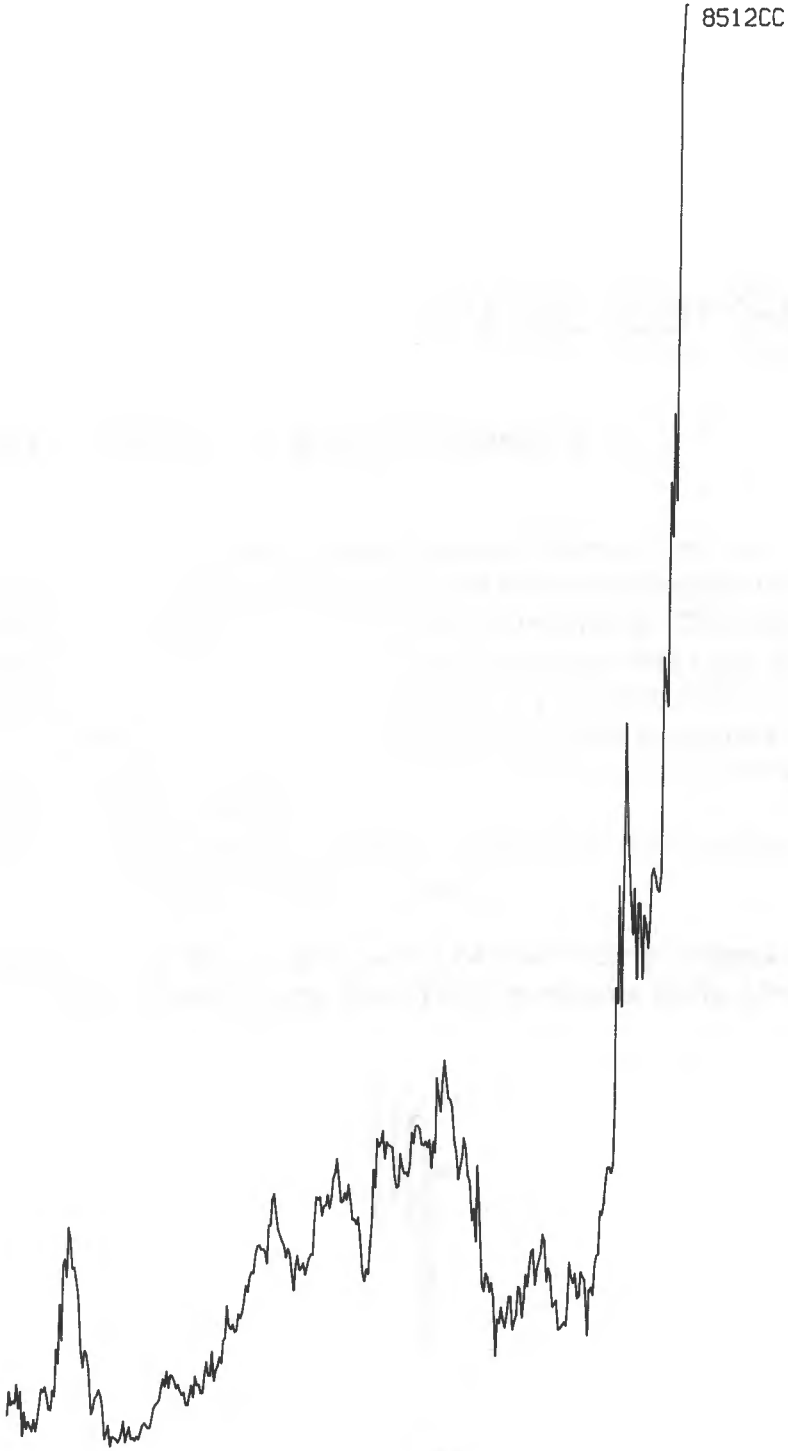
**Figure 2.25: Bull/Bear/Bull Market—November 1974—Orange Juice**



**Figure 2.26: Bull/Bear/Bull Market—December 1984—Live Hogs**



**Figure 2.27: Bull/Bear/Bull Market—December 1985—Cocoa**





# 3

## Price Bar Signals

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### SIMPLE ONE-DAY UPSIDE REVERSALS (R+)

We begin with the most simple signals. Whether you've been trading futures for a considerable period of time or whether you're a newcomer, you most likely have heard of reversals. Through the years, technical traders have come to place considerable faith in the meaning of price reversals. For the most part traders feel (as opposed to *know*) that a reversal up is usually a bullish sign and that higher prices are likely to follow, whereas they feel that a reversal down is usually a bearish sign.

The diagram below shows a simple one-day reversal to the upside (R+). A reversal day is defined as :

**A day during which prices fall below their previous daily low and close higher than their previous daily close.**



The algorithm for a reversal day up (R+) is:

$$R+ = L2 < L1 \text{ and } C2 > C1$$

where:

- L2 = low of day 2;
- L1 = low of day 1;
- C2 = close of day 2; and
- C1 = close of day 1.

As I noted earlier, R+ signals are among the most well known of all price bar signals. Market folklore has always considered them important. What do my studies reveal? Figure 3-1 shows several R+ and R- signals. Figure 3-2 shows the performance of R+ signals over the entire historical database regardless of market trend. The statistical table in Figure 3-2 includes explanatory information which will help you understand it. In testing R+ and many other signals, we examined closing price data for the day following the signal and for ten consecutive days after the day the signal was generated. The tabular reading shows the percentage of time the price closed up or down on each of the ten days following the signal day, as well as the total number of signals over the length of the data history. Figures 3-3 through 3-11 show the performance of R+ and R- signals in the various market categories I've selected. You will note that the performance tables show the percentage of time the price closed higher on the day following the upside reversal and for the next ten trading days. This was done to determine if the effect of a simple one-day upside reversal could be observed for a longer period of time than just the day following its occurrence.



### SIMPLE ONE-DAY DOWNSIDE REVERSALS (R-)

Simple one-day downside reversals are the exact opposite of R+ signals. The diagram below shows a simple one-day reversal to the downside (R-). The exact definition of an R- is:

**A day during which prices trade above their previous daily high but close below their previous daily close.**



The algorithm for a reversal day down (R-) is:

$$R- = H2 > H1 \text{ and } C2 < C1$$

where:

H2 = high of day 2;

H1 = high of day 1;

C2 = close of day 2; and

C1 = close day 1.

Examples of R+ and R- signals are shown in Figure 3-1.

### Explanation and Interpretation of Results: Reversals

The statistical results for simple one-day upside and downside reversals revealed some interesting facts.

The fact that simple one-day up and down reversal signals have only limited validity when examined according to my criteria does not mean that they have only minimal validity when employed with money management principles as a trading system. Such an application seeks to improve signal reliability in conjunction with a system which limits losses and lets profits run. As I have pointed out previously—and as all veteran traders know—an effective money management approach can make random signals profitable and a poor money management approach can turn otherwise valid signals and indicators into losers.

The row headings of the statistical tables are defined as follows:

Close + = number of cases of up close after signal

Close - = number of cases of down close after signal

No Chng = number of cases showing no change after signal

%+ = percent of cases up close after signal

%- = percent of cases down close after signal

%NC = percent of cases of no change after signal

Each column in the table stands for one additional day following the signal. The first column, therefore, shows the results for the first day following the signal. The last column shows the results for the tenth day following the signal. Please make certain you understand how to read the tables, as they apply to many of the other indicators I will discuss in this chapter.

If you examine the results of Figures 3.3 through 3.11 you will find the following:

**In bull markets** R+ signals appear to have some degree of predictive validity about seven to nine days from the R+ signal (i.e., 62.1 percent, 63.7 percent and 63.7 percent higher than on day one after

reversal). These figures are somewhat small, but they may have validity when examined in connection with risk management methods.

An interesting incongruity in connection with R- (reversal down) signals is that they appear to be more reliable in bull markets than do R+ signals in bull markets, showing from 62.2 percent through 64.4 percent from seven to ten days after the signal.

**Choppy bull market** results for R+ and R- signals are shown in Figure 3.4. As you can see, the results are not impressive, suggesting that choppy markets do not facilitate the performance of reversal signals.

**Bear market** reversal results are shown in Figure 3.5. They showed virtually no predictive validity.

**Choppy bear markets** showed equally poor results for reversal signal accuracy. See Figures 3.6.

**Bull/bear market** and **Bear/bull market** results using reversal signals were equally meaningless (i.e., random). See Figures 3.7 and 3.8.

**Bull/bear/bull** and **Bear/bull/bear market** results are shown in Figures 3.9 and 3.10. Clearly, the results here also showed random behavior.

**Whipsaw market** results for reversals are shown in Figure 3.11. As with all other market categories with the exception of bull markets, the results here suggested random behavior.

**Figure 3.1: R+ and R- Signals**

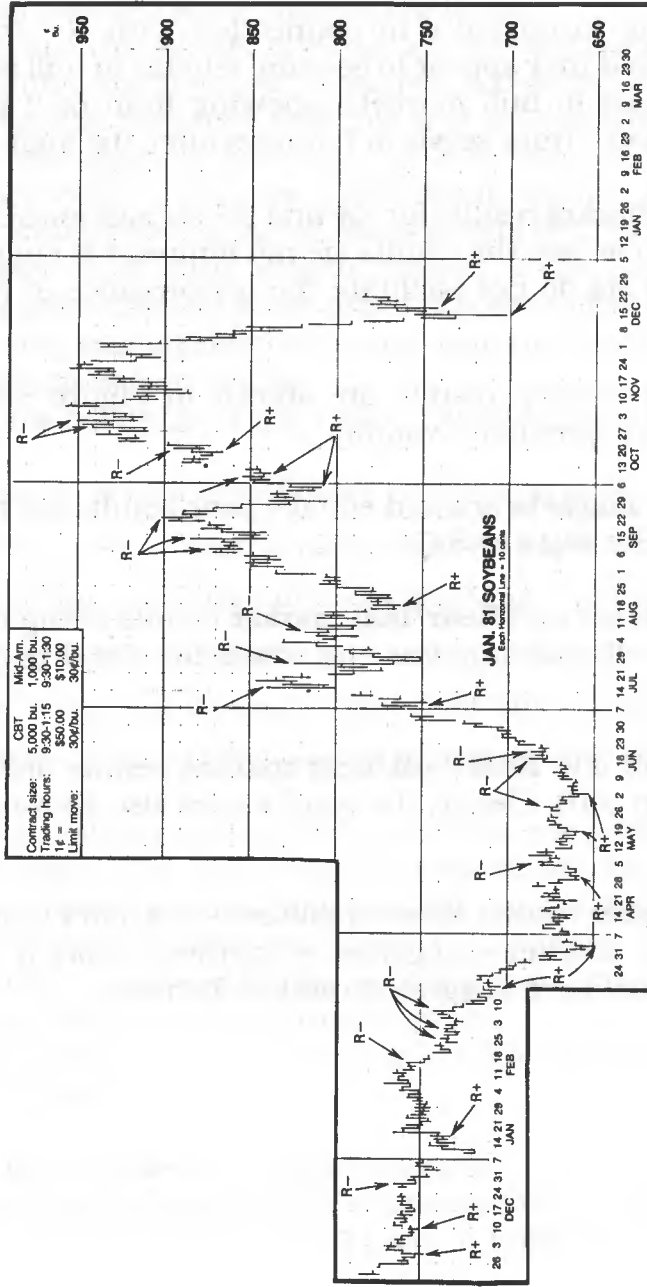


Chart reprinted with permission of Commodity Price Charts, 219 Parkade, Cedar Falls, IA 50613.

Figure 3.2:

Total net profit	\$6,093.75			
Gross profit	\$195,125.00	Gross loss		-189,031.25
Total # of trades	195	Percent profitable		38%
Number winning trades	75	Number losing trades		120
Largest winning trade	\$15,931.25	Largest losing trade		\$-5,037.50
Average winning trade	\$2,601.67	Average losing trade		\$-1,575.26
Ratio avg win/avg loss	1.65	Avg trade (win & loss)		\$31.25
Max consecutive winners	4	Max consecutive losers		8
Avg # bars in winners	25	Avg # bars in losers		10
Max closed-out drawdown	\$-35,662.50	Max intra-day drawdown		\$-36,718.75
Profit factor	1.03	Max # of contracts held		1
Account size required	\$39,718.75	Return on account		15%

Figure 3.3: R+ and R- Signal Accuracy: Bull Markets

REPORT TOTAL		* * * * *		* * * * *		* * * * *		* * * * *		* * * * *		* * * * *		* * * * *		* * * * *		* * * * *		* * * * *	
SIMPLE 1-DAY REVERSALS UP:		512 SIGNALS		512 SIGNALS		512 SIGNALS		512 SIGNALS		512 SIGNALS		512 SIGNALS		512 SIGNALS		512 SIGNALS		512 SIGNALS		512 SIGNALS	
Close+	275	305	313	305	308	310	318	326	326	326	326	326	326	326	326	326	326	326	326	326	326
Close-	219	184	178	181	178	166	151	144	139	139	139	139	139	139	139	139	139	139	139	139	139
No Chng	14	13	8	10	6	7	9	7	7	7	7	7	7	7	7	7	7	7	7	7	7
%+	53.7	59.6	61.1	59.6	60.2	60.5	62.1	63.7	63.7	63.7	63.7	63.7	63.7	63.7	63.7	63.7	63.7	63.7	63.7	63.7	63.7
%-	42.8	35.9	34.8	35.4	34.8	32.4	29.5	28.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1
%NC	2.7	2.5	1.6	2.0	1.2	1.4	1.8	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
SIMPLE 1-DAY REVERSALS DOWN:																					
519 SIGNALS																					
Close+	269	279	295	315	320	320	323	328	337	337	337	337	337	337	337	337	337	337	337	337	337
Close-	217	211	203	177	171	167	164	149	140	140	140	140	140	140	140	140	140	140	140	140	140
No Chng	25	20	9	11	5	7	3	6	4	4	4	4	4	4	4	4	4	4	4	4	4
%+	51.8	53.8	56.8	60.7	61.7	61.7	62.2	63.2	64.9	64.9	64.9	64.9	64.9	64.9	64.9	64.9	64.9	64.9	64.9	64.9	64.9
%-	41.8	40.7	39.1	34.1	32.9	32.2	31.6	28.7	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0
%NC	4.8	3.9	1.7	2.1	1.0	1.3	.6	1.2	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8
1	2	3	4	5	6	7	8	9	10	10	10	10	10	10	10	10	10	10	10	10	10

%NC = 5 of Days No Change

**Figure 3.4: R+ and R- Signal Accuracy: Choppy Bull Markets**

REPORT TOTAL * * * * *										
SIMPLE 1-DAY REVERSALS UP:					896 SIGNALS					
CLOSE+	476	491	480	480	472	469	477	475	476	471
CLOSE-	393	378	384	386	382	377	369	370	358	362
NO CHNG	21	15	9	5	11	11	8	3	6	4
%+	53.1	54.8	53.6	53.6	52.7	52.3	53.2	53.0	53.1	52.6
%-	43.9	42.2	42.9	43.1	42.6	42.1	41.2	41.3	40.0	40.4
%NC	2.3	1.7	1.0	.6	1.2	1.2	.9	.3	.7	.4
SIMPLE 1-DAY REVERSALS DOWN:					938 SIGNALS					
CLOSE+	492	518	520	510	493	503	499	488	476	463
CLOSE-	413	398	393	393	399	387	379	385	392	391
NO CHNG	23	8	9	10	10	5	10	6	6	8
%+	52.5	55.2	55.4	54.4	52.6	53.6	53.2	52.0	50.7	49.4
%-	44.0	42.4	41.9	41.9	42.5	41.3	40.4	41.0	41.8	41.7
%NC	2.5	.9	1.0	1.1	1.1	.5	1.1	.6	.6	.9

**Figure 3.5: R+ and R- Signal Accuracy: Bear Markets**

REPORT TOTAL * * * * *												
SIMPLE 1-DAY REVERSALS UP: 663 SIGNALS												
C1ose+	321	287	276	279	271	258	243	230	208	206		
C1ose-	317	343	354	352	355	366	374	379	396	391		
NO Chng	22	21	16	10	11	7	7	7	7	9		
%+	48.4	43.3	41.6	42.1	40.9	38.9	36.7	34.7	31.4	31.1		
%-	47.8	51.7	53.4	53.1	53.5	55.2	56.4	57.2	59.7	59.0		
%NC	3.3	3.2	2.4	1.5	1.7	1.1	1.1	1.1	1.1	1.4		
SIMPLE 1-DAY REVERSALS DOWN: 573 SIGNALS												
C1ose+	242	237	228	222	218	217	185	195	180	170		
C1ose-	300	309	313	321	320	323	350	343	346	352		
NO Chng	24	16	16	10	10	4	6	2	7	4		
%+	42.2	41.4	39.8	38.7	38.0	37.9	32.3	34.0	31.4	29.7		
%-	52.4	53.9	54.6	56.0	55.8	56.4	61.1	59.9	60.4	61.4		
%NC	4.2	2.8	2.8	1.7	1.7	1.7	1.0	1.3	1.2	1.7		



Figure 3.6: R+ and R- Signal Accuracy: Choppy Bear Markets

REPORT TOTAL * * * * *												
SIMPLE 1-DAY REVERSALS UP: 520 SIGNALS												
Close+	249	223	215	221	208	196	195	192	180	180	190	
Close-	252	282	292	279	293	295	299	297	302	298		
NO Chng	16	10	6	9	6	11	4	5	4	6		
%+	47.9	42.9	41.3	42.5	40.0	37.7	37.5	36.9	34.6	34.6		
%-	48.5	54.2	56.2	53.7	56.3	56.7	57.5	57.1	59.1	57.3		
%NC	3.1	1.9	1.2	1.7	1.2	2.1	1.8	1.0	.8	1.2		
SIMPLE 1-DAY REVERSALS DOWN: 502 SIGNALS												
Close+	209	209	210	196	191	187	181	178	171	173		
Close-	276	275	273	288	285	290	285	288	294	292		
NO Chng	12	11	8	2	6	1	6	4	3	2		
%+	41.6	41.6	41.8	39.0	38.0	37.3	36.1	35.5	34.1	34.5		
%-	55.0	54.8	54.4	57.4	56.8	57.8	56.8	57.4	58.6	58.2		
%NC	2.4	2.2	1.6	.4	1.2	.2	1.2	.8	.6	.4		

**Figure 3.7: R+ and R- Signal Accuracy: Bull/Bear Markets**

REPORT TOTAL * * * * *										
SIMPLE 1-DAY REVERSALS UP:					845 SIGNALS					
CLOSE+	401	356	358	359	357	338	334	336	314	322
CLOSE-	432	462	456	452	455	463	467	460	466	461
NO CHNG	8	13	10	10	4	11	5	3	12	6
%+	47.5	42.1	42.4	42.5	42.2	40.0	39.5	39.8	37.2	38.1
%-	51.1	54.7	54.0	53.5	53.8	54.8	55.3	54.4	55.1	54.6
%NC	.9	1.5	1.2	1.2	.5	1.3	.6	.4	1.4	.7
SIMPLE 1-DAY REVERSALS DOWN:					794 SIGNALS					
CLOSE+	362	362	363	335	317	308	312	310	301	290
CLOSE-	406	405	409	417	434	434	434	435	432	440
NO CHNG	18	15	4	10	7	10	5	2	12	7
%+	45.6	45.6	45.7	42.2	39.9	38.8	39.3	39.0	37.9	36.5
%-	51.1	51.0	51.5	52.5	54.7	54.7	54.7	54.8	54.4	55.4
%NC	2.3	1.9	.5	1.3	.9	1.3	.6	.3	1.5	.9

Figure 3.8: R+ and R- Signal Accuracy: Bear/Bull Markets

REPORT TOTAL * * * * *											
SIMPLE 1-DAY REVERSALS UP:				998 SIGNALS							
Close+	532	563	547	561	556	558	579	571	582	585	
Close-	418	400	416	405	397	388	363	352	349	339	
No Chng	43	22	19	11	15	11	11	19	8	5	
%+	53.3	56.4	54.8	56.2	55.7	55.9	58.0	57.2	58.3	58.6	
%-	41.9	40.1	41.7	40.6	39.8	38.9	36.4	35.3	35.0	34.0	
%NC	4.3	2.2	1.9	1.1	1.5	1.1	1.1	1.9	.8	.5	
SIMPLE 1-DAY REVERSALS DOWN:				979 SIGNALS							
Close+	502	530	544	519	538	561	542	564	553	552	
Close-	429	417	395	410	387	360	366	346	353	346	
No Chng	36	14	17	19	12	11	16	10	6	9	
%+	51.3	54.1	55.6	53.0	55.0	57.3	55.4	57.6	56.5	56.4	
%-	43.8	42.6	40.3	41.9	39.5	36.8	37.4	35.3	36.1	35.3	
%NC	3.7	1.4	1.7	1.9	1.2	1.1	1.6	1.0	.6	.9	

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**Figure 3.9: R+ and R- Signal Accuracy: Bear/Bull/Bear Markets**

REPORT TOTAL * * * * *									
SIMPLE 1-DAY REVERSALS UP:					152 SIGNALS				
Close+	87	82	77	71	73	73	73	73	73
Close-	63	67	70	73	69	70	67	67	67
No Chng	1	1	0	1	1	0	2	0	0
%+	57.2	53.9	50.7	46.7	48.0	48.0	48.0	48.0	48.0
%-	41.4	44.1	46.1	48.0	45.4	46.1	44.1	44.1	44.1
%NC	.7	.7	.0	.7	.7	.0	1.3	1.3	.0
SIMPLE 1-DAY REVERSALS DOWN:					144 SIGNALS				
Close+	71	71	73	67	67	64	63	63	67
Close-	72	70	68	72	71	74	74	74	70
No Chng	1	2	1	1	1	0	1	1	0
%+	49.3	49.3	50.7	46.5	46.5	44.4	43.7	43.7	46.5
%-	50.0	48.6	47.2	50.0	49.3	51.4	51.4	51.4	48.6
%NC	.7	1.4	.7	.7	.7	.0	.7	.7	.0

Figure 3.10: R+ and R- Signal Accuracy: Bull/Bear/Bull Markets

REPORT TOTAL * * * * *												
SIMPLE 1-DAY REVERSALS UP:						193 SIGNALS						
CLOSE+	107	98	103	102	108	98	94	99	100	96		
CLOSE-	84	92	87	85	76	85	89	82	80	80		
NO CHNG	2	3	2	1	4	1	1	1	2	3		
%+	55.4	50.8	53.4	52.8	56.0	50.8	48.7	51.3	51.8	49.7		
%-	43.5	47.7	45.1	44.0	39.4	44.0	46.1	42.5	41.5	41.5		
%NC	1.0	1.6	1.0	.5	2.1	.5	.5	.5	1.0	1.6		
SIMPLE 1-DAY REVERSALS DOWN:						210 SIGNALS						
CLOSE+	108	115	118	116	116	120	111	111	104	110		
CLOSE-	95	89	86	88	83	80	85	83	84	81		
NO CHNG	6	2	1	1	2	1	2	0	4	1		
%+	51.4	54.8	56.2	55.2	55.2	57.1	52.9	52.9	49.5	52.4		
%-	45.2	42.4	41.0	41.9	39.5	38.1	40.5	39.5	40.0	38.6		
%NC	2.9	1.0	.5	.5	1.0	.5	1.0	.0	1.9	.5		

Figure 3.11: R+ and R- Signal Accuracy: Whipsaw Markets

REPORT TOTAL * * * * *											
SIMPLE 1-DAY REVERSALS UP:			747 SIGNALS			SIMPLE 1-DAY REVERSALS DOWN:			722 SIGNALS		
Close+	366	343	340	353	356	344	351	349	341	340	
Close-	358	375	382	366	359	367	357	351	353	344	
No Chng	17	19	12	8	9	6	8	6	7	9	
%+	49.0	45.9	45.5	47.3	47.7	46.1	47.0	46.7	45.6	45.5	
%-	47.9	50.2	51.1	49.0	48.1	49.1	47.8	47.0	47.3	46.1	
%NC	2.3	2.5	1.6	1.1	1.2	.8	1.1	.8	.9	1.2	
SIMPLE 1-DAY REVERSALS UP:											
Close+	359	368	368	358	355	341	342	338	337	335	
Close-	332	328	321	330	329	341	328	330	329	324	
No Chng	25	15	14	10	7	8	11	9	3	5	
%+	49.7	51.0	51.0	49.6	49.2	47.2	47.4	46.8	46.7	46.4	
%-	46.0	45.4	44.5	45.7	45.6	47.2	45.4	45.7	45.6	44.9	
%NC	3.5	2.1	1.9	1.4	1.0	1.1	1.5	1.2	.4	.7	

The results of my extensive R+/R- analysis were clearly disappointing. They confirmed that simple one day up and down reversal signals were, when used alone, not valid indicators when used without considering trend. The tabular presentation of results by market category suggests that in bull markets (see figure 3-3) there has been a tendency for R+ signals to show some predictive validity from 5-10 days following their occurrence. But R- also seem to work in bull trends. This indicates once again the importance of trend vs. timing signals. And in bear markets (see Figure 3.5) R+ and R- signals actually appear to have a reverse effect from 5-10 days following their occurrence. In other words, in the case of R+ signals the 5-10 day trend is lower in bear markets as is also the case in bear markets. This is, of course understandable inasmuch as trend is the single most important factor. Results were mixed in other types of trends suggesting again that R+ and R- signals yield essentially random results when examined on an extensive data base. The general SWP findings support these conclusions.

### **KEY REVERSALS UP (KR+)**

A KR+ signal is essentially similar to an R+ signal with the exception that on the reversal day both the high and the low of the previous day are exceeded. The diagram below shows a one-day key reversal to the upside (KR+). A KR+ is defined as follows:

**A day on which the high and low of the previous day are exceeded and on which the closing price is greater than the closing price of the day before.**

**Figure 3.12: R+/R- Performance Using SYSTEM WRITER PLUS:  
Cotton**

COTTON #2		06/89 - All trades	
Test #	1 of 1	Space bar to toggle display	
Total net profit	\$-8,255.00	Gross loss	-248,370.00
Gross profit	\$240,115.00		
Total # of trades	684	Percent profitable	38%
Number winning trades	266	Number losing trades	418
Largest winning trade	\$13,325.00	Largest losing trade	\$-6,085.00
Average winning trade	\$902.69	Average losing trade	\$ -594.19
Ratio avg win/avg loss	1.52	Avg trade (win & loss)	\$-12.07
Max consecutive winners	8	Max consecutive losers	15
Avg # bars in winners	7	Avg # bars in losers	5
Max closed-out drawdown	\$-41,240.00	Max intra-day drawdown	\$-41,275.00
Profit factor	0.97	Max # of contracts held	1
Account size required	\$44,275.00	Return on account	-18%

**Figure 3.13: R+/R- Performance Using SYSTEM WRITER PLUS:  
Pork Bellies**

PORK BELLIES		06/89 - All trades	
Test #	1 of 1	Space bar to toggle display	
Total net profit	\$-56,304.00	Gross loss	-405,940.00
Gross profit	\$349,636.00		
Total # of trades	924	Percent profitable	39%
Number winning trades	364	Number losing trades	560
Largest winning trade	\$7,790.00	Largest losing trade	\$-5,270.00
Average winning trade	\$960.54	Average losing trade	\$ -724.89
Ratio avg win/avg loss	1.33	Avg trade (win & loss)	\$-60.94
Max consecutive winners	7	Max consecutive losers	14
Avg # bars in winners	6	Avg # bars in losers	4
Max closed-out drawdown	\$-65,080.00	Max intra-day drawdown	\$-65,502.00
Profit factor	0.86	Max # of contracts held	1
Account size required	\$68,502.00	Return on account	-82%



**Figure 3.14: R+/R- Performance Using SYSTEM WRITER PLUS:  
Copper**

COPPER		06/89 - All trades	
Test #	1 of 1	Space bar to toggle display	
Total net profit	\$-26,475.00	Gross profit	\$159,562.50
Gross profit	\$159,562.50	Gross loss	-186,037.50
Total # of trades	531	Percent profitable	40%
Number winning trades	216	Number losing trades	315
Largest winning trade	\$6,400.00	Largest losing trade	\$-8,200.00
Average winning trade	\$738.72	Average losing trade	\$ -590.60
Ratio avg win/avg loss	1.25	Avg trade (win & loss)	\$-49.86
Max consecutive winners	6	Max consecutive losers	11
Avg # bars in winners	8	Avg # bars in losers	7
Max closed-out drawdown	\$-49,262.50	Max intra-day drawdown	\$-49,262.50
Profit factor	0.86	Max # of contracts held	1
Account size required	\$52,262.50	Return on account	-50%

**Figure 3.15: R+/R- Performance Using SYSTEM WRITER PLUS:  
S&P Index**

S&P INDEX		06/89 - All trades	
Test #	1 of 1	Space bar to toggle display	
Total net profit	\$-99,550.00	Gross profit	\$245,900.00
Gross profit	\$245,900.00	Gross loss	-345,450.00
Total # of trades	324	Percent profitable	39%
Number winning trades	129	Number losing trades	195
Largest winning trade	\$9,275.00	Largest losing trade	\$-39,875.00
Average winning trade	\$1,906.20	Average losing trade	\$-1,771.54
Ratio avg win/avg loss	1.08	Avg trade (win & loss)	\$ -307.25
Max consecutive winners	6	Max consecutive losers	8
Avg # bars in winners	6	Avg # bars in losers	4
Max closed-out drawdown	-106,125.00	Max intra-day drawdown	-106,975.00
Profit factor	0.71	Max # of contracts held	1
Account size required	\$109,975.00	Return on account	-90%

**Figure 3.16: R+/R- Performance Using SYSTEM WRITER PLUS:  
Japanese Yen**

Test #	1 of	1	JAPANESE YEN		06/89 - All trades	
			Space bar to toggle display			
Total net profit			\$29,075.00		Gross loss	-130,200.00
Gross profit			\$159,275.00			
Total # of trades			262		Percent profitable	41%
Number winning trades			108		Number losing trades	154
Largest winning trade			\$7,050.00		Largest losing trade	\$-4,062.50
Average winning trade			\$1,474.77		Average losing trade	\$ -845.45
Ratio avg win/avg loss			1.74		Avg trade (win & loss)	\$110.97
Max consecutive winners			4		Max consecutive losers	7
Avg # bars in winners			15		Avg # bars in losers	9
Max closed-out drawdown			\$-19,475.00		Max intra-day drawdown	\$-19,475.00
Profit factor			1.22		Max # of contracts held	1
Account size required			\$22,475.00		Return on account	129%

The algorithm for a KR+ day is:

$$\text{KR+} = \text{H2} > \text{H1} \text{ and } \text{L2} < \text{L1} \text{ and } \text{C2} > \text{C1}$$

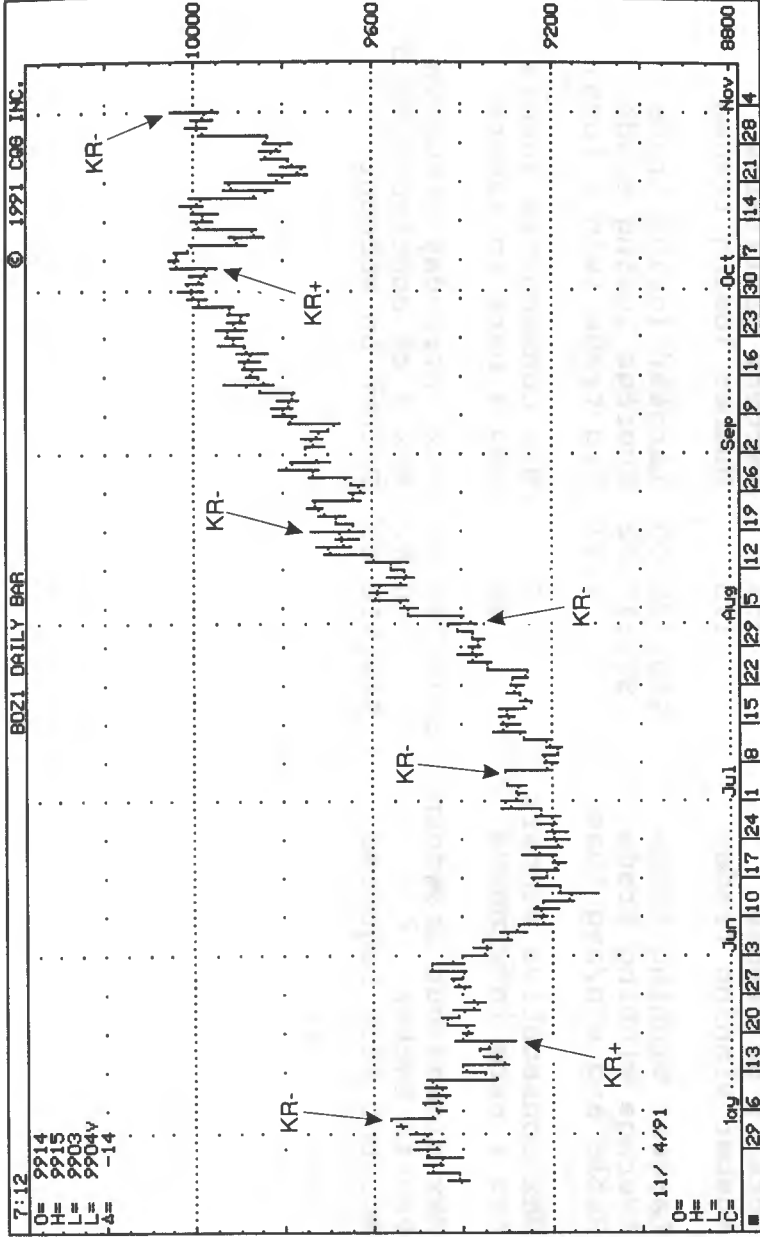


where:

- KR+ = key reversal up;
- H2 = high day 2;
- H1 = high day 1;
- L2 = low day 2;
- L1 = low day 1;
- C2 = close day 2; and
- C1 = close day 1.

Figure 3-17 shows some KR+ and KR- signals and Figures 3-18 through 3-27 show KR+ and KR- performance in the different market categories.

Figure 3.17: KR+ and KR- Signals in December 1991 T-Bonds



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**Figure 3.18:**

Total net profit	\$-32,585.00					
Gross profit	\$148,620.00				Gross loss	-181,205.00
Total # of trades	351				Percent profitable	32%
Number winning trades	113				Number losing trades	238
Largest winning trade	\$16,125.00				Largest losing trade	\$-5,345.00
Average winning trade	\$1,315.22				Average losing trade	\$ -761.37
Ratio avg win/avg loss	1.73				Avg trade (win & loss)	\$-92.83
Max consecutive winners	3				Max consecutive losers	13
Avg # bars in winners	20				Avg # bars in losers	8
Max closed-out drawdown	\$-39,795.00				Max intra-day drawdown	\$-39,910.00
Profit factor	0.82				Max # of contracts held	1
Account size required	\$42,910.00				Return on account	-75%

Figure 3.19: KR+ and KR- Signal Results: Bull Markets

REPORT TOTAL * * * * *											
KEY REVERSALS UP:						206 SIGNALS					
Close+	110	122	130	133	133	135	141	138	127		
Close-	87	73	65	62	56	52	49	49	56		
No Chng	6	4	3	2	3	4	1	2	3		
%+	53.4	59.2	63.1	64.6	64.6	65.5	68.4	67.0	61.7		
%-	42.2	35.4	31.6	30.1	27.2	25.2	23.8	23.8	27.2		
%NC	2.9	1.9	1.5	1.0	1.5	1.9	.5	1.0	1.5		
KEY REVERSALS DOWN:						175 SIGNALS					
Close+	90	94	98	104	105	104	103	109	108		
Close-	74	72	69	58	56	56	50	43	44		
No Chng	9	7	4	2	3	0	2	2	2		
%+	51.4	53.7	56.0	59.4	60.0	59.4	58.9	62.3	61.7		
%-	42.3	41.1	39.4	33.1	32.0	32.0	28.6	24.6	25.1		
%NC	5.1	4.0	2.3	1.1	1.7	.0	1.1	1.1	1.1		

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**Figure 3.20: KR+ and KR- Signal Results: Choppy Bull Markets**

REPORT TOTAL * * * * *											
KEY REVERSALS UP:						338 SIGNALS					
Close+	156	172	176	171	176	181	186	190	190	190	183
Close-	173	158	152	157	149	139	132	130	127	127	132
No Chng	6	4	3	3	3	4	4	1	2	2	2
%+	46.2	50.9	52.1	50.6	52.1	53.6	55.0	56.2	56.2	56.2	54.1
%-	51.2	46.7	45.0	46.4	44.1	41.1	39.1	38.5	37.6	37.6	39.1
%NC	1.8	1.2	.9	.9	.9	1.2	1.2	.3	.6	.6	.6
KEY REVERSALS DOWN:						349 SIGNALS					
Close+	181	184	181	178	179	192	189	175	165	156	156
Close-	157	158	161	156	155	138	135	147	157	161	161
No Chng	7	2	2	6	3	2	4	3	1	3	3
%+	51.9	52.7	51.9	51.0	51.3	55.0	54.2	50.1	47.3	44.7	44.7
%-	45.0	45.3	46.1	44.7	44.4	39.5	38.7	42.1	45.0	46.1	46.1
%NC	2.0	.6	.6	1.7	.9	.6	1.1	.9	.3	.3	.9

Figure 3.21: KR+ and KR- Signal Results: Bear Markets

REPORT TOTAL		* * * * *		* * * * *		* * * * *		* * * * *			
		KEY REVERSALS UP:		226 SIGNALS							
Close+	110	96	93	102	94	93	93	85	75	72	
Close-	108	121	124	115	119	123	119	125	134	132	
No Chng	6	5	4	2	5	1	1	2	2	4	
%+	48.7	42.5	41.2	45.1	41.6	41.2	41.2	37.6	33.2	31.9	
%-	47.8	53.5	54.9	50.9	52.7	54.4	52.7	55.3	59.3	58.4	
%NC	2.7	2.2	1.8	.9	2.2	.4	.4	.9	.9	1.8	
		KEY REVERSALS DOWN:		215 SIGNALS							
Close+	86	87	80	79	77	80	70	72	62	56	
Close-	120	119	124	123	124	120	128	127	133	140	
No Chng	7	6	5	5	3	1	3	2	4	1	
%+	40.0	40.5	37.2	36.7	35.8	37.2	32.6	33.5	28.8	26.0	
%-	55.8	55.3	57.7	57.2	57.7	55.8	59.5	59.1	61.9	65.1	
%NC	3.3	2.8	2.3	2.3	1.4	.5	1.4	.9	1.9	.5	

Figure 3.22: KR+ and KR- Signal Results: Choppy Bear Markets

REPORT TOTAL * * * * *											
KEY REVERSALS UP:						196 SIGNALS					
Close+	99	85	89	90	81	75	75	81	67	68	
Close-	91	105	104	99	109	113	114	107	116	113	
No Chng	5	4	1	4	3	4	1	0	3	4	
%+	50.5	43.4	45.4	45.9	41.3	38.3	38.3	41.3	34.2	34.7	
%-	46.4	53.6	53.1	50.5	55.6	57.7	58.2	54.6	59.2	57.7	
%NC	2.6	2.0	.5	2.0	1.5	2.0	.5	.0	1.5	2.0	
KEY REVERSALS DOWN:						199 SIGNALS					
Close+	76	83	79	72	67	69	67	61	62	59	
Close-	112	103	112	119	119	117	113	118	116	119	
No Chng	7	7	2	0	3	0	2	1	1	1	
%+	38.2	41.7	39.7	36.2	33.7	34.7	33.7	30.7	31.2	29.6	
%-	56.3	51.8	56.3	59.8	59.8	58.8	56.8	59.3	58.3	59.8	
%NC	3.5	3.5	1.0	.0	1.5	.0	1.0	.5	.5	.5	



Figure 3.23: KR+ and KR- Signal Results: Bull/Bear Markets

REPORT TOTAL * * * * *											
KEY REVERSALS UP:						345 SIGNALS					
Close+	163	148	144	147	142	143	137	141	133	141	141
Close-	179	186	188	184	187	185	191	184	184	178	178
No Chng	2	5	4	4	3	3	2	0	6	2	2
%+	47.2	42.9	41.7	42.6	41.2	41.4	39.7	40.9	39.6	40.9	40.9
%-	51.9	53.9	54.5	53.3	54.2	53.6	55.4	53.3	53.3	51.6	51.6
%NC	.6	1.4	1.2	1.2	.9	.9	.6	.0	1.7	.6	.6
KEY REVERSALS DOWN:						326 SIGNALS					
Close+	144	146	137	123	114	121	118	119	117	110	110
Close-	172	169	178	184	193	179	184	183	176	185	185
No Chng	7	5	2	3	2	5	2	0	9	3	3
%+	44.2	44.8	42.0	37.7	35.0	37.1	36.2	36.5	35.9	33.7	33.7
%-	52.8	51.8	54.6	56.4	59.2	54.9	56.4	56.1	54.0	56.7	56.7
%NC	2.1	1.5	.6	.9	.6	1.5	.6	.0	2.8	.9	.9

**Figure 3.24: KR+ and KR- Signal Results: Bear/Bull Markets**

REPORT TOTAL * * * * *												
			KEY REVERSALS UP:				362 SIGNALS					
Close+	196	213	212	203	202	215	226	213	217	220		
Close-	150	134	141	148	149	130	118	123	124	120		
No Chng	14	12	5	5	3	5	3	8	3	2		
%+	54.1	58.8	58.6	56.1	55.8	59.4	62.4	58.8	59.9	60.8		
%-	41.4	37.0	39.0	40.9	41.2	35.9	32.6	34.0	34.3	33.1		
%NC	3.9	3.3	1.4	1.4	.8	1.4	.8	2.2	.8	.6		
			KEY REVERSALS DOWN:				337 SIGNALS					
Close+	162	173	184	163	168	180	172	179	176	171		
Close-	153	147	138	151	144	126	131	124	125	127		
No Chng	13	5	2	6	2	4	6	3	2	3		
%+	48.1	51.3	54.6	48.4	49.9	53.4	51.0	53.1	52.2	50.7		
%-	45.4	43.6	40.9	44.8	42.7	37.4	38.9	36.8	37.1	37.7		
%NC	3.9	1.5	.6	1.8	.6	1.2	1.8	.9	.6	.9		

Figure 3.25: KR+ and KR- Signal Results: Bear/Bull/Bear Markets

REPORT TOTAL * * * * *												
KEY REVERSALS UP: 50 SIGNALS												
	29	28	27	27	27	27	28	26	27	26	27	26
CLOSE+	21	22	21	20	20	20	18	21	18	21	18	20
CLOSE-	0	0	0	1	0	0	1	0	2	0	2	0
NO CHNG	58.0	56.0	54.0	54.0	54.0	54.0	56.0	52.0	54.0	52.0	54.0	52.0
%+	42.0	44.0	42.0	40.0	40.0	40.0	36.0	42.0	36.0	42.0	36.0	40.0
%-	.0	.0	.0	2.0	.0	.0	2.0	.0	4.0	.0	4.0	.0
%NC												
KEY REVERSALS DOWN: 65 SIGNALS												
	34	41	39	33	35	33	35	32	30	32	30	31
CLOSE+	30	23	26	31	29	30	28	31	33	31	33	32
CLOSE-	1	1	0	1	1	1	1	0	0	0	0	0
NO CHNG	52.3	63.1	60.0	50.8	53.8	50.8	53.8	49.2	46.2	49.2	46.2	47.7
%+	46.2	35.4	40.0	47.7	44.6	46.2	43.1	47.7	50.8	47.7	50.8	49.2
%-	1.5	1.5	.0	1.5	1.5	1.5	1.5	.0	.0	.0	.0	.0
%NC												

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Figure 3.27: KR+ and KR- Signal Results: Whipsaw Markets

REPORT TOTAL * * * * *		KEY REVERSALS UP: 296 SIGNALS					KEY REVERSALS DOWN: 239 SIGNALS				
Close+	142	135	136	141	146	137	146	140	140	140	142
Close-	149	153	154	145	140	144	138	139	139	135	
No Chng	4	6	2	2	1	4	1	1	1	1	
%+	48.0	45.6	45.9	47.6	49.3	46.3	49.3	47.3	47.3	48.0	
%-	50.3	51.7	52.0	49.0	47.3	48.6	46.6	47.0	47.0	45.6	
%NC	1.4	2.0	.7	.7	.3	1.4	.3	.3	.3	.3	
KEY REVERSALS UP: 239 SIGNALS		KEY REVERSALS DOWN: 239 SIGNALS									
Close+	120	123	120	113	120	112	105	107	101	101	
Close-	105	105	104	114	104	111	111	110	118	115	
No Chng	8	4	7	3	3	3	7	5	1	2	
%+	50.2	51.5	50.2	47.3	50.2	46.9	43.9	44.8	42.3	42.3	
%-	43.9	43.9	43.5	47.7	43.5	46.4	46.4	46.0	49.4	48.1	
%NC	3.3	1.7	2.9	1.3	1.3	1.3	2.9	2.1	.4	.8	

### KEY REVERSAL DOWN (KR-)

KR- signals are essentially similar to R- signals except for the fact that on the reversal day down prices exceed both their high and low prices of the previous day. The diagram below shows a one-day key reversal to the downside (KR-). A KR- is defined as follows:



**A day on which prices exceed both their high and low the previous day and on which price closes lower than price for the previous day.**

The algorithm for KR- is:

$$\text{KR-} = \text{H2} > \text{H1}; \text{L2} < \text{L1}; \text{and } \text{C2} < \text{C1}$$

where:

KR- = key reversal down;

H2 = high day 2;

H1 = high day 1;

L2 = low day 2;

L1 = low day 1;

C2 = close day 2; and

C1 = close day 1.

However, when subjected to a more intensive examination using SWP and money management rules, the results of daily KR+ and KR- signals were more positive. Figures 3-28 through 3-32 show the SWP results on the five markets I've previously selected as good test cases. An examination of the results shows them to be quite good, even taking \$100 per trade slippage and commission. The popular belief that key reversal signals are somehow particularly meaningful appears to have little or no validity when such signals are not filtered with other indicators such as cycles, or with money management rules.

Even if we use a high/low variation for the SWP test of key reversal signals, the results are not improved. By a high/low variation I mean filtering a KR+ signal and buying only on the close of trading on the day of the KR+ signal if the close is greater than the high of the day previous to the KR+, or selling on a KR- signal if the close on the day of the KR- signal is lower than the low of the day before the KR- signal. These results are shown in Figures 3-33 through 3-37.

### **Explanation and Interpretation of Results**

Key reversal up and down signals (KR+ and KR-) were tested according to the same parameters as were R+ and R- signals. I examined closings for up to ten days subsequent to the KR signals. As you can see from Figures 3-18 through 3-27, the results were interesting but not impressive. There was a slightly better predictive tendency for these signals as opposed to simple upside and/or downside signals, but certainly nothing to get too excited about. Best results were again noted in bull markets.

As I've pointed out previously, this does *not mean* that the use of key reversal signals will not prove profitable when used with money management principles. I have previously shown that key reversal signals do have validity as weekly and monthly signals, and in conjunction with cycle highs and lows.<sup>1</sup>

<sup>1</sup>See Jake Bernstein, *The Analysis and Forecasting of Long-Term Trends*, Probus Publishing, 1988.

**Figure 3.28: SYSTEM WRITER PLUS Test of KR+ and KR- Signals, High/Low Breakout: Japanese Yen**

JAPANESE YEN		06/89 - All trades	
Test #	1 of 1	Space bar to toggle display	
Total net profit	\$25,712.50	Gross loss	\$-60,937.50
Gross profit	\$86,650.00		
Total # of trades	106	Percent profitable	41%
Number winning trades	44	Number losing trades	62
Largest winning trade	\$6,212.50	Largest losing trade	\$-1,862.50
Average winning trade	\$1,969.32	Average losing trade	\$ -982.86
Ratio avg win/avg loss	2.00	Avg trade (win & loss)	\$242.57
Max consecutive winners	4	Max consecutive losers	6
Avg # bars in winners	19	Avg # bars in losers	7
Max closed-out drawdown	\$-7,562.50	Max intra-day drawdown	\$-8,062.50
Profit factor	1.42	Max # of contracts held	1
Account size required	\$11,062.50	Return on account	232%

**Figure 3.29: SYSTEM WRITER PLUS Test of KR+ and KR- Signals with \$100 Slippage and Commission: Pork Bellies**

PORK BELLIES		06/89 - All trades	
Test #	1 of 1	Space bar to toggle display	
Total net profit	\$-48,486.00	Gross loss	-251,274.00
Gross profit	\$202,788.00		
Total # of trades	447	Percent profitable	38%
Number winning trades	170	Number losing trades	277
Largest winning trade	\$6,898.00	Largest losing trade	\$-1,762.00
Average winning trade	\$1,192.87	Average losing trade	\$ -907.13
Ratio avg win/avg loss	1.31	Avg trade (win & loss)	\$ -108.47
Max consecutive winners	4	Max consecutive losers	8
Avg # bars in winners	10	Avg # bars in losers	4
Max closed-out drawdown	\$-63,228.00	Max intra-day drawdown	\$-63,608.00
Profit factor	0.81	Max # of contracts held	1
Account size required	\$66,608.00	Return on account	-72%



**Figure 3.30: SYSTEM WRITER PLUS Test of KR+ and KR- Signals with \$100 Slippage and Commission: Cotton**

COTTON #2		06/89 - All trades	
Test #	1 of 1	Space bar to toggle display	
Total net profit	\$-50,000.00	Gross loss	-168,295.00
Gross profit	\$118,295.00		
Total # of trades	297	Percent profitable	37%
Number winning trades	111	Number losing trades	186
Largest winning trade	\$4,975.00	Largest losing trade	\$-2,150.00
Average winning trade	\$1,055.72	Average losing trade	\$ -904.81
Ratio avg win/avg loss	1.18	Avg trade (win & loss)	\$ -168.35
Max consecutive winners	5	Max consecutive losers	15
Avg # bars in winners	11	Avg # bars in losers	5
Max closed-out drawdown	\$-61,680.00	Max intra-day drawdown	\$-61,680.00
Profit factor	0.70	Max # of contracts held	1
Account size required	\$64,680.00	Return on account	-77%

**Figure 3.31: SYSTEM WRITER PLUS Test of KR+ and KR- Signals, High/Low Breakout: S&P**

S&P INDEX		06/89 - All trades	
Test #	1 of 1	Space bar to toggle display	
Total net profit	\$-57,675.00	Gross loss	-111,425.00
Gross profit	\$53,750.00		
Total # of trades	108	Percent profitable	31%
Number winning trades	34	Number losing trades	74
Largest winning trade	\$8,450.00	Largest losing trade	\$-8,750.00
Average winning trade	\$1,580.88	Average losing trade	\$-1,505.74
Ratio avg win/avg loss	1.05	Avg trade (win & loss)	\$ -534.03
Max consecutive winners	4	Max consecutive losers	6
Avg # bars in winners	5	Avg # bars in losers	1
Max closed-out drawdown	\$-59,625.00	Max intra-day drawdown	\$-59,625.00
Profit factor	0.48	Max # of contracts held	1
Account size required	\$62,625.00	Return on account	-92%

**Figure 3.32: SYSTEM WRITER PLUS Test of KR+ and KR- Signals with \$100 Slippage and Commission: Copper**

Test #	COPPER		06/89 - All trades	
	1 of 1		Space bar to toggle display	
Total net profit		\$-7,075.00	Gross loss	-109,937.50
Gross profit		\$102,862.50		
Total # of trades		252	Percent profitable	45%
Number winning trades		114	Number losing trades	138
Largest winning trade		\$5,300.00	Largest losing trade	\$-1,800.00
Average winning trade		\$902.30	Average losing trade	\$ -796.65
Ratio avg win/avg loss		1.13	Avg trade (win & loss)	\$-28.08
Max consecutive winners		8	Max consecutive losers	6
Avg # bars in winners		16	Avg # bars in losers	9
Max closed-out drawdown		\$-16,000.00	Max intra-day drawdown	\$-16,062.50
Profit factor		0.94	Max # of contracts held	1
Account size required		\$19,062.50	Return on account	-37%

**Figure 3.33: SYSTEM WRITER PLUS Test of KR+ and KR- Signals, High/Low Breakout: Yen**

Total net profit	\$56,862.50	Gross loss	-135,587.50
Gross profit	\$192,450.00		
Total # of trades	247	Percent profitable	38%
Number winning trades	96	Number losing trades	151
Largest winning trade	\$7,387.50	Largest losing trade	\$-2,512.50
Average winning trade	\$2,004.69	Average losing trade	\$ -897.93
Ratio avg win/avg loss	2.23	Avg trade (win & loss)	\$230.21
Max consecutive winners	4	Max consecutive losers	8
Avg # bars in winners	22	Avg # bars in losers	7
Max closed-out drawdown	\$-14,162.50	Max intra-day drawdown	\$-14,687.50
Profit factor	1.42	Max # of contracts held	1
Account size required	\$17,687.50	Return on account	321%

**Figure 3.34: SYSTEM WRITER PLUS Test of KR+ and KR- Signals, High/Low Breakout: Pork Bellies**

PORK BELLIES		06/89 - All trades	
Test #	1 of 1	Space bar to toggle display	
Total net profit	\$-24,138.00	Gross loss	-189,852.00
Gross profit	\$165,714.00		
Total # of trades	327	Percent profitable	38%
Number winning trades	127	Number losing trades	200
Largest winning trade	\$6,898.00	Largest losing trade	\$-1,830.00
Average winning trade	\$1,304.83	Average losing trade	\$ -949.26
Ratio avg win/avg loss	1.37	Avg trade (win & loss)	\$-73.82
Max consecutive winners	4	Max consecutive losers	7
Avg # bars in winners	12	Avg # bars in losers	5
Max closed-out drawdown	\$-42,672.00	Max intra-day drawdown	\$-42,784.00
Profit factor	0.87	Max # of contracts held	1
Account size required	\$45,784.00	Return on account	-52%

**Figure 3.35: SYSTEM WRITER PLUS Test of KR+ and KR- Signals, High/Low Breakout: Copper**

Total net profit	\$-58,525.00	Gross loss	-305,100.00
Gross profit	\$246,575.00		
Total # of trades	263	Percent profitable	29%
Number winning trades	77	Number losing trades	186
Largest winning trade	\$32,700.00	Largest losing trade	\$-9,425.00
Average winning trade	\$3,202.27	Average losing trade	\$-1,640.32
Ratio avg win/avg loss	1.95	Avg trade (win & loss)	\$ -222.53
Max consecutive winners	3	Max consecutive losers	9
Avg # bars in winners	14	Avg # bars in losers	3
Max closed-out drawdown	\$-70,700.00	Max intra-day drawdown	\$-71,000.00
Profit factor	0.81	Max # of contracts held	1
Account size required	\$74,000.00	Return on account	-79%

**Figure 3.36: SYSTEM WRITER PLUS Test of KR+ and KR- Signals, High/Low Breakout: Cotton**

COTTON #2		06/89 - All trades	
Test #	1 of 1	Space bar to toggle display	
Total net profit	\$-17,930.00	Gross profit	\$111,395.00
Gross profit	\$111,395.00	Gross loss	-129,325.00
Total # of trades	221	Percent profitable	39%
Number winning trades	88	Number losing trades	133
Largest winning trade	\$4,975.00	Largest losing trade	\$-2,150.00
Average winning trade	\$1,265.85	Average losing trade	\$ -972.37
Ratio avg win/avg loss	1.30	Avg trade (win & loss)	\$-81.13
Max consecutive winners	9	Max consecutive losers	9
Avg # bars in winners	14	Avg # bars in losers	5
Max closed-out drawdown	\$-36,520.00	Max intra-day drawdown	\$-37,005.00
Profit factor	0.86	Max # of contracts held	1
Account size required	\$40,005.00	Return on account	-44%

**Figure 3.37: SYSTEM WRITER PLUS Test of KR+ and KR- Signals, High/Low Breakout: S&P Index**

COPPER		06/89 - All trades	
Test #	1 of 1	Space bar to toggle display	
Total net profit	\$-7,175.00	Gross profit	\$80,087.50
Gross profit	\$80,087.50	Gross loss	\$-87,262.50
Total # of trades	184	Percent profitable	42%
Number winning trades	79	Number losing trades	105
Largest winning trade	\$5,450.00	Largest losing trade	\$-1,800.00
Average winning trade	\$1,013.77	Average losing trade	\$ -831.07
Ratio avg win/avg loss	1.22	Avg trade (win & loss)	\$-38.99
Max consecutive winners	9	Max consecutive losers	13
Avg # bars in winners	19	Avg # bars in losers	11
Max closed-out drawdown	\$-25,925.00	Max intra-day drawdown	\$-27,100.00
Profit factor	0.92	Max # of contracts held	1
Account size required	\$30,100.00	Return on account	-23%

**KEY OPEN REVERSALS**

This category of signal is a variation on the theme of KR signals, with the stipulation that a buy signal must also show a closing price above the opening price of the previous day and a sell signal must also show a closing price below the opening of the previous day. The algorithm for a KRO+ buy signal is:

$$\text{KRO+} = H2 > H1; L2 < L1; C2 > C1; C2 > O1$$

where:

H1 = high day 1;  
 H2 = high day 2;  
 C2 = close day 2;  
 C1 = close day 1; and  
 O1 = open day 1.

The KRO- sell signal algorithm is:

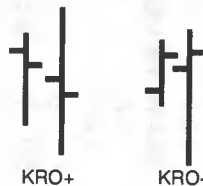
$$\text{KRO-} = H2 > H1; L2 < L1; C2 < C1; C2 < O1$$

where:

H1 = high day 1;  
 H2 = high day 2;  
 C2 = close day 2;  
 C1 = close day 1; and  
 O1 = open day 1.

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Diagrammatically these signals appear as follows:



The KRO+ and KRO- signals were tested using the ten-day forward procedure employed in previous test models. Figures 3-38 through 3-46 show the results on my different market categories as well as the overall performance.

**Figure 3.38: Key Open Reversals: Bull Markets**

REPORT TOTAL * * * * *		KEY OPEN REVERSALS UP:		181 SIGNALS		KEY OPEN REVERSALS DOWN:		147 SIGNALS	
Close+	98	108	116	115	115	117	122	119	108
Close-	76	62	57	56	52	48	45	46	53
NO Chng	4	4	1	2	2	3	1	1	2
%+	54.1	59.7	64.1	63.5	63.5	64.6	67.4	65.7	59.7
%-	42.0	34.3	31.5	30.9	28.7	26.5	24.9	25.4	29.3
%NC	2.2	2.2	.6	1.1	1.1	1.7	.6	.6	1.1
Close+	76	78	82	80	93	91	90	94	94
Close-	61	61	58	54	42	43	39	33	33
NO Chng	8	6	3	6	2	0	1	2	2
%+	51.7	53.1	55.8	54.4	63.3	61.9	61.2	63.9	63.9
%-	41.5	41.5	39.5	36.7	28.6	29.3	26.5	22.4	22.4
%NC	5.4	4.1	2.0	4.1	1.4	.0	.7	1.4	1.4

Figure 3.39: Key Open Reversals: Choppy Bull Markets

REPORT TOTAL * * * * *											
KEY OPEN REVERSALS UP:			312 SIGNALS			KEY OPEN REVERSALS DOWN:			289 SIGNALS		
CLOSE+	142	157	156	154	157	161	169	173	173	173	169
CLOSE-	162	147	146	149	142	134	125	124	121	121	124
NO CHNG	5	4	3	2	3	4	4	1	2	2	1
%+	45.5	50.3	50.0	49.4	50.3	51.6	54.2	55.4	55.4	55.4	54.2
%-	51.9	47.1	46.8	47.8	45.5	42.9	40.1	39.7	38.8	38.8	39.7
%NC	1.6	1.3	1.0	.6	1.0	1.3	1.3	.3	.6	.6	.3
KEY OPEN REVERSALS UP:			312 SIGNALS			KEY OPEN REVERSALS DOWN:			289 SIGNALS		
CLOSE+	152	154	146	146	142	153	151	138	133	133	130
CLOSE-	128	131	139	133	135	121	117	128	133	133	132
NO CHNG	7	1	1	4	3	2	4	3	1	1	3
%+	52.6	53.3	50.5	50.5	49.1	52.9	52.2	47.8	46.0	46.0	45.0
%-	44.3	45.3	48.1	46.0	46.7	41.9	40.5	44.3	46.0	46.0	45.7
%NC	2.4	.3	.3	1.4	1.0	.7	1.4	1.0	.3	.3	1.0

**Figure 3.40: Key Open Reversals: Bear Markets**

REPORT TOTAL * * * * *											
KEY OPEN REVERSALS UP:						188 SIGNALS					
Close+	87	78	74	83	80	77	77	70	64	61	61
Close-	93	101	106	96	98	103	99	105	110	109	109
No Chng	6	5	3	2	3	1	1	2	2	3	3
%+	46.3	41.5	39.4	44.1	42.6	41.0	41.0	37.2	34.0	32.4	32.4
%-	49.5	53.7	56.4	51.1	52.1	54.8	52.7	55.9	58.5	58.0	58.0
%NC	3.2	2.7	1.6	1.1	1.6	.5	.5	1.1	1.1	1.6	1.6

KEY OPEN REVERSALS DOWN:											
189 SIGNALS						189 SIGNALS					
Close+	74	70	69	69	66	69	61	63	56	49	49
Close-	106	110	109	109	110	105	111	111	114	124	124
No Chng	7	6	5	3	2	1	3	1	4	0	0
%+	39.2	37.0	36.5	36.5	34.9	36.5	32.3	33.3	29.6	25.9	25.9
%-	56.1	58.2	57.7	57.7	58.2	55.6	58.7	58.7	60.3	65.6	65.6
%NC	3.7	3.2	2.6	1.6	1.1	.5	1.6	.5	2.1	.0	.0



Figure 3.41: Key Open Reversals: Choppy Bear Markets

REPORT TOTAL * * * * *												
KEY OPEN REVERSALS UP:						165 SIGNALS						
CLOSE+	81	73	76	78	70	67	64	71	58	59		
CLOSE-	78	88	87	82	91	92	96	88	97	95		
NO CHNG	5	2	0	3	2	4	1	0	2	2		
%+	49.1	44.2	46.1	47.3	42.4	40.6	38.8	43.0	35.2	35.8		
%-	47.3	53.3	52.7	49.7	55.2	55.8	58.2	53.3	58.8	57.6		
%NC	3.0	1.2	1.0	1.8	1.2	2.4	.6	.0	1.2	1.2		

KEY OPEN REVERSALS DOWN:												
173 SIGNALS												
CLOSE+	67	71	64	61	57	58	54	50	52	49		
CLOSE-	96	92	102	105	104	104	102	105	102	105		
NO CHNG	6	5	2	0	3	0	2	1	1	1		
%+	38.7	41.0	37.0	35.3	32.9	33.5	31.2	28.9	30.1	28.3		
%-	55.5	53.2	59.0	60.7	60.1	60.1	59.0	60.7	59.0	60.7		
%NC	3.5	2.9	1.2	.0	1.7	.0	1.2	.6	1.2	.6		

**Figure 3.42: Key Open Reversals: Bull/Bear Markets**

REPORT TOTAL * * * * *											
KEY OPEN REVERSALS UP:			301 SIGNALS			KEY OPEN REVERSALS DOWN:			292 SIGNALS		
Close+	141	126	122	126	120	124	120	123	116	122	
Close-	157	166	166	163	166	161	166	161	161	157	
No Chng	2	3	4	2	2	3	2	0	5	1	
%+	46.8	41.9	40.5	41.9	39.9	41.2	39.9	40.9	38.5	40.5	
%-	52.2	55.1	55.1	54.2	55.1	53.5	55.1	53.5	53.5	52.2	
%NC	.7	1.0	1.3	.7	.7	1.0	.7	.0	1.7	.3	
KEY OPEN REVERSALS UP:			292 SIGNALS			KEY OPEN REVERSALS DOWN:			292 SIGNALS		
Close+	130	134	127	115	109	114	114	111	108	101	
Close-	153	148	155	160	167	157	159	161	156	164	
No Chng	7	5	2	3	2	4	1	0	8	3	
%+	44.5	45.9	43.5	39.4	37.3	39.0	39.0	38.0	37.0	34.6	
%-	52.4	50.7	53.1	54.8	57.2	53.8	54.5	55.1	53.4	56.2	
%NC	2.4	1.7	.7	1.0	.7	1.4	.3	.0	2.7	1.0	

Figure 3.43: Key Open Reversals: Bear/Bull Markets

REPORT TOTAL * * * * *											
KEY OPEN REVERSALS UP:						325 SIGNALS					
Close+	177	196	196	196	186	199	204	195	199	202	
Close-	134	116	120	125	129	110	106	108	109	105	
NO CHNG	12	10	5	4	3	5	3	8	3	2	
%+	54.5	60.3	60.3	58.5	57.2	61.2	62.8	60.0	61.2	62.2	
%-	41.2	35.7	36.9	38.5	39.7	33.8	32.6	33.2	33.5	32.3	
%NC	3.7	3.1	1.5	1.2	.9	1.5	.9	2.5	.9	.6	
KEY OPEN REVERSALS DOWN:						303 SIGNALS					
Close+	149	159	167	149	151	162	155	162	158	152	
Close-	138	130	124	136	131	114	118	113	113	117	
NO CHNG	10	5	2	4	2	4	6	1	2	3	
%+	49.2	52.5	55.1	49.2	49.8	53.5	51.2	53.5	52.1	50.2	
%-	45.5	42.9	40.9	44.9	43.2	37.6	38.9	37.3	37.3	38.6	
%NC	3.3	1.7	.7	1.3	.7	1.3	2.0	.3	.7	1.0	

**Figure 3.44: Key Open Reversals: Bear/Bull/Bear Markets**

REPORT TOTAL * * * * *												
KEY OPEN REVERSALS UP:						43 SIGNALS						
Close+	24	26	24	25	25	23	23	23	21	24	22	
Close-	19	17	17	15	15	17	16	19	19	15	17	
No Chng	0	0	0	1	0	0	1	0	0	1	0	
%+	55.8	60.5	55.8	58.1	58.1	53.5	53.5	48.8	48.8	55.8	51.2	
%-	44.2	39.5	39.5	34.9	34.9	39.5	37.2	44.2	44.2	34.9	39.5	
%NC	.0	.0	.0	2.3	.0	.0	2.3	.0	.0	2.3	.0	

KEY OPEN REVERSALS DOWN:												
53 SIGNALS												
Close+	31	34	31	28	30	29	28	27	27	24	25	
Close-	21	18	22	24	23	22	23	24	24	27	26	
No Chng	1	1	0	1	0	1	1	0	0	0	0	
%+	58.5	64.2	58.5	52.8	56.6	54.7	52.8	50.9	50.9	45.3	47.2	
%-	39.6	34.0	41.5	45.3	43.4	41.5	43.4	45.3	45.3	50.9	49.1	
%NC	1.9	1.9	.0	1.9	.0	1.9	1.9	.0	.0	.0	.0	

Figure 3.45: Key Open Reversals: Bull/Bear/Bull Markets

REPORT TOTAL * * * * *											
KEY OPEN REVERSALS UP:						71 SIGNALS					
Close+	39	36	34	34	38	32	31	39	43	39	39
Close-	30	35	36	33	30	34	35	28	24	28	27
No Chng	2	0	0	1	0	1	1	0	0	0	0
%+	54.9	50.7	47.9	47.9	53.5	45.1	43.7	54.9	60.6	54.9	54.9
%-	42.3	49.3	50.7	46.5	42.3	47.9	49.3	39.4	33.8	38.0	38.0
%NC	2.8	.0	.0	1.4	.0	1.4	1.4	.0	.0	.0	.0
KEY OPEN REVERSALS DOWN:						74 SIGNALS					
Close+	37	37	37	37	40	40	38	38	35	38	37
Close-	36	34	34	34	31	31	32	31	33	31	30
No Chng	1	1	1	1	0	0	0	0	0	0	1
%+	50.0	50.0	50.0	50.0	54.1	54.1	51.4	51.4	47.3	51.4	50.0
%-	48.6	45.9	45.9	45.9	41.9	41.9	43.2	41.9	44.6	41.9	40.5
%NC	1.4	1.4	1.4	1.4	.0	.0	.0	.0	.0	.0	1.4

**Figure 3.46: Key Open Reversals: Whipsaw Markets**

REPORT TOTAL * * * * *											
KEY OPEN REVERSALS UP:						259 SIGNALS					
Close+	122	117	119	122	129	117	124	120	119	122	122
Close-	134	134	134	127	120	127	123	122	123	119	119
No Chng	2	6	2	2	1	4	1	1	1	1	1
%+	47.1	45.2	45.9	47.1	49.8	45.2	47.9	46.3	45.9	47.1	47.1
%-	51.7	51.7	51.7	49.0	46.3	49.0	47.5	47.1	47.5	45.9	45.9
%NC	.8	2.3	.8	.8	.4	1.5	.4	.4	.4	.4	.4

KEY OPEN REVERSALS DOWN:											
205 SIGNALS											
Close+	102	103	104	95	104	98	92	93	86	86	86
Close-	90	92	87	99	90	93	93	92	101	99	99
No Chng	8	4	7	3	1	3	6	5	1	1	1
%+	49.8	50.2	50.7	46.3	50.7	47.8	44.9	45.4	42.0	42.0	42.0
%-	43.9	44.9	42.4	48.3	43.9	45.4	45.4	44.9	49.3	48.3	48.3
%NC	3.9	2.0	3.4	1.5	.5	1.5	2.9	2.4	.5	.5	.5

### **Explanation and Interpretation of Results**

The results suggest that using the opening price as an additional filter for KR signals improves statistical reliability, but only slightly. The "acid test" of course is the more comprehensive test using SWP. These results are shown in Figures 3-47 through 3-51 on my five-market test file.

In addition to the price bar signals already discussed, I tested many others, some which I felt had validity and others which have been bandied about in the futures literature as reliable timing indicators. Results were similarly unimpressive.

### **CONCLUSIONS**

The use of price bar signals as tested, without additional confirming indicators or risk management procedures is not a viable methodology. When used with trends these indicators and signals have some potential, however, additional analyses are necessary.

**Figure 3.47: KRO+ and KRO- Signal Results on SYSTEM WRITER  
PLUS: Pork Bellies**

Total net profit	\$31,525.00				
Gross profit	\$166,262.50				-134,737.50
Total # of trades	276			Percent profitable	40%
Number winning trades	112			Number losing trades	164
Largest winning trade	\$7,125.00			Largest losing trade	\$-2,400.00
Average winning trade	\$1,484.49			Average losing trade	\$ -821.57
Ratio avg win/avg loss	1.81			Avg trade (win & loss)	\$114.22
Max consecutive winners	5			Max consecutive losers	9
Avg # bars in winners	21			Avg # bars in losers	7
Max closed-out drawdown	\$-14,150.00			Max intra-day drawdown	\$-14,412.50
Profit factor	1.23			Max # of contracts held	1
Account size required	\$17,412.50			Return on account	181%



**Figure 3.48: KRO+ and KRO- Signal Results on SYSTEM WRITER  
PLUS: Copper**

Total net profit	\$9,262.50				
Gross profit	\$212,100.00	Gross loss			-202,837.50
Total # of trades	306	Percent profitable		35%	
Number winning trades	109	Number losing trades		197	
Largest winning trade	\$8,187.50	Largest losing trade		\$-3,187.50	
Average winning trade	\$1,945.87	Average losing trade		\$-1,029.63	
Ratio avg win/avg loss	1.89	Avg trade (win & loss)		\$30.27	
Max consecutive winners	4	Max consecutive losers		13	
Avg # bars in winners	20	Avg # bars in losers		7	
Max closed-out drawdown	\$-19,450.00	Max intra-day drawdown		\$-19,625.00	
Profit factor	1.05	Max # of contracts held		1	
Account size required	\$22,625.00	Return on account		40%	

**Figure 3.49: KRO+ and KRO- Signal Results on SYSTEM WRITER  
PLUS: Japanese Yen**

Total net profit	\$28,087.50	Gross loss	-287,793.75
Gross profit	\$315,881.25	Percent profitable	35%
Total # of trades	357	Number losing trades	232
Number winning trades	125	Largest losing trade	\$-4,131.25
Largest winning trade	\$12,556.25	Average losing trade	\$-1,240.49
Average winning trade	\$2,527.05	Avg trade (win & loss)	\$78.68
Ratio avg win/avg loss	2.04	Max consecutive losers	9
Max consecutive winners	4	Avg # bars in losers	5
Avg # bars in winners	18	Max intra-day drawdown	\$-57,437.50
Max closed-out drawdown	\$-57,437.50	Max # of contracts held	1
Profit factor	1.10	Return on account	46%
Account size required	\$60,437.50		

**Figure 3.50: KRO+ and KRO- Signal Results on SYSTEM WRITER  
PLUS: S&P Index**

Total net profit	\$56,870.00			
Gross profit	\$231,900.00		Gross loss	-175,030.00
Total # of trades	290		Percent profitable	39%
Number winning trades	114		Number losing trades	176
Largest winning trade	\$26,940.00		Largest losing trade	\$-4,850.00
Average winning trade	\$2,034.21		Average losing trade	\$ -994.49
Ratio avg win/avg loss	2.05		Avg trade (win & loss)	\$196.10
Max consecutive winners	5		Max consecutive losers	9
Avg # bars in winners	20		Avg # bars in losers	7
Max closed-out drawdown	\$-18,300.00		Max intra-day drawdown	\$-18,850.00
Profit factor	1.32		Max # of contracts held	1
Account size required	\$21,850.00		Return on account	260%



## Moving Average Signals

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Trading systems based on moving averages have been favored by futures traders since their introduction in the 1950's by Richard Donchian. While the popularity of such systems seems to grow with each passing year, there are some serious questions as to their efficacy. Bruce Babcock, in his excellent book, *Trading Systems*, has reviewed a number of popular trading systems, including moving averages. He sums up his testing of one moving average system as follows:

... On average the system lost money, although it was profitable in six of the nine markets. Overall performance was dragged down by the horrendous results in the S&P 500. Even in the profitable markets the drawdown was usually large in relation to the cumulative profit. ... [page 114]

And he also notes:

Over the years, traders have tried various ways to improve moving-average performance by refining the calculation. This has resulted in exponentially smoothed, linear-weighted and step-weighted moving-average systems. These refinements have not made an appreciable difference in performance. [page 115]

As you can see, Babcock is less than thrilled with the results of moving-average systems based on his experience. Yet it is important

to point out that he back-tested the indicated moving-average combinations in selected markets for only a five-year period. Hence, it is possible to conclude that Babcock did not give moving averages a fair test. I have, therefore, employed a variety of moving averages to a lengthier test across virtually all active markets. There is no doubt that Babcock's major conclusions regarding large drawdowns and whipsaws are valid. Yet, for the avid systems trader dedicated to moving averages, the information which can be gleaned from the present extensive study may prove invaluable.

### **THE LOGIC OF MOVING-AVERAGE SYSTEMS**

The paradigm of moving-average systems is a simple one indeed. Since a moving average is the smoothed result of a data series, it tends to make its up and down movements more slowly than does the data from which it is derived. The longer a moving average, the slower it changes direction and the less responsive it is to up and down moves within the raw data. The use of moving averages is not restricted to stock and futures trading. The idea of using moving averages, in fact, was borrowed from the physical sciences and economics.

By applying moving-average smoothing to raw price data it is possible to eliminate much of the "noise" or randomness from the data series and to follow price trends for a good majority of their moves. This feature of moving averages is both the blessing and the bane of such systems. While they tend to work well when there are longlasting trends, they tend to work poorly when trends are short-lived. There are, however, so many different combinations of moving averages and so many variations on the moving average theme that it would not be fair to make a blanket statement about either the merits or limitations of such systems without a comprehensive test. The fact remains that many of today's successful money management programs are based on moving averages in one form or another.

Furthermore, it is very possible to use signals based on moving averages for trade entry and another set of indicators or rules for

exit, thereby filtering out many of the whipsaws. It is also possible to filter the entry signals using a variety of rules. In doing so, however, one must take caution to avoid over-optimization which may, in the end, lead to a system that will look good when subjected to hypothetical back-testing but which may not perform well in the future.

## DUAL MOVING-AVERAGE INDICATORS

With the above caveats in mind, let's move on to the tests and analyses. My first test examined dual moving-average crossovers. I have dispensed with an examination of single moving-average systems inasmuch as they tend to have low accuracy rates, and are subject to merciless drawdowns and considerable whipsaws. The present test examines dual moving average crossovers according to the following model:

MA 1 = Shorter Moving Average

MA 2 = Longer Moving Average

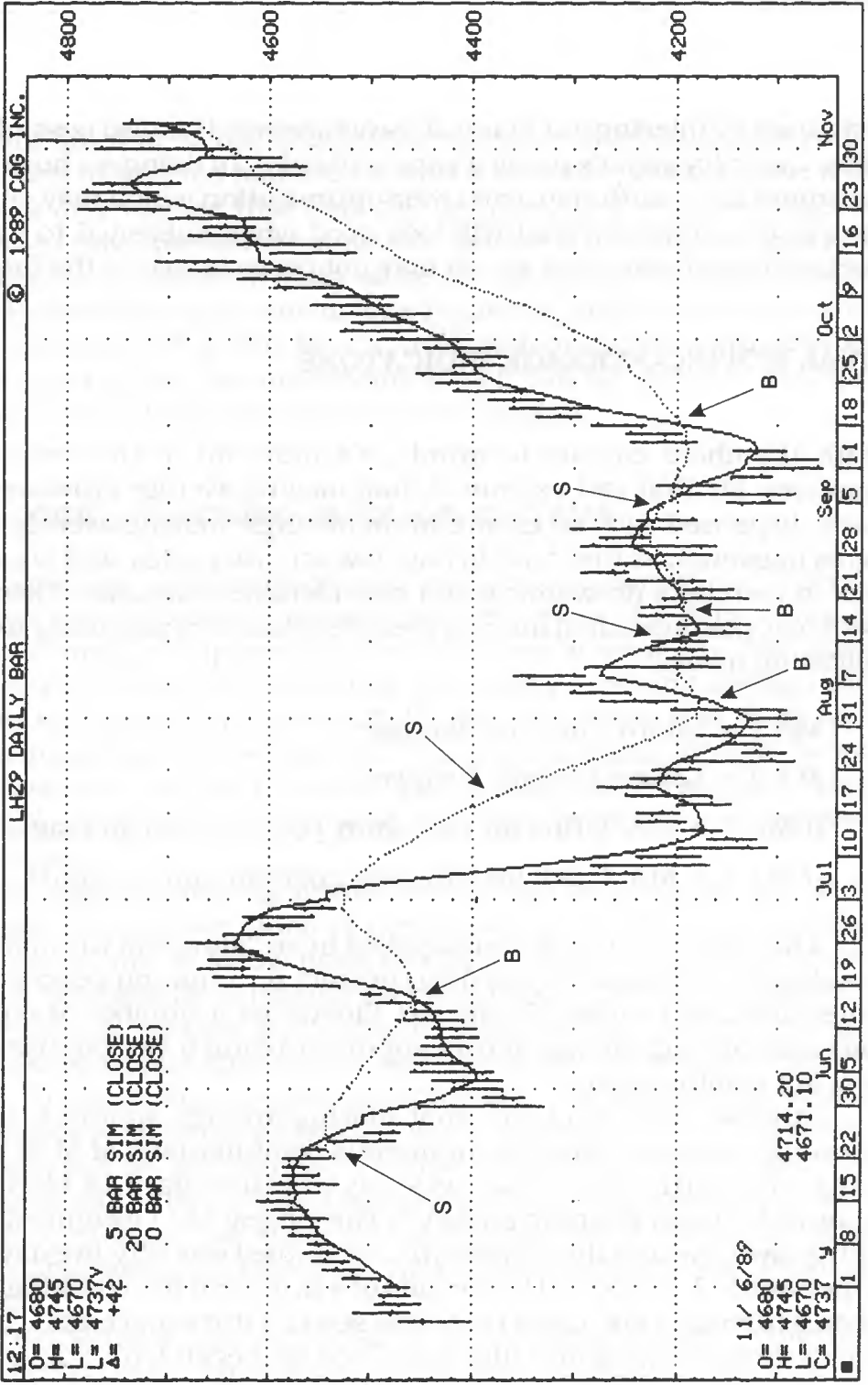
If MA 1 > MA 2, Buy (or exit short position and go long)

If MA 1 < MA 2, Sell (or exit long position and go short)

The above conditions were applied in an "always in the market" fashion except for exits forced by contract termination per our test rules discussed earlier. Figure 4-1 illustrates a number of typical buy and sell signals using this approach using a five-day/twenty-day MA combination.

In order to subject the dual moving-average approach to as thorough a test as possible, numerous combinations of MAs were used. The starting point for this study was three days for MA 1 (the shorter MA) and five days for MA 2. The longest MA 1 examined was thirty-five days and the longest MA 2 examined was fifty-five days. In other words, I first tested the results of a three and five combination; then a three and six then a three and seven, a three and eight . . . and so on through three and fifty-five. Then we began with a four and six, a four and seven, a four and eight and so on. Literally hundreds

Figure 4.1: 5- and 20-Day Moving Average Buy/Sell Signals





of combinations of dual moving averages were tested. While this has been done before, I know of no other study which has examined as many combinations on as long a data history. Nor do I know of any study which then classified the results by market type (i.e., bull market performance, bear market performance, whipsaw performance, etc).

The results of my testing were voluminous. In fact, an entire book could have been written on this test alone. Here I will provide only the highlights (see Figures 4-2 through 4-6).

Bruce Babcock, in *Trading Systems*, reporting his five-year M.A. test results using selected markets (see Figure 4-7) noted that the performance was not particularly impressive. Remember, however, that his test was limited to a five-year period and to selected markets. My test of the 4-, 9- and 18-day MA combination covered a much longer time span and many more markets.

### TRIPLE MOVING AVERAGES

Another variation on the moving average theme is to use three moving averages. This approach can be represented as follows:

MA 1 = Shortest Moving Average

MA 2 = Mid-Length Moving Average

MA 3 = Longest Moving Average

If MA 1 and MA 2 > MA 3, Buy (or exit short position and go long)

If MA 1 and MA 2 < MA 3, Sell (or exit long and go short)

**Figure 4-2: Results of Dual Moving Average System,  
Eurodollar: 5- and 33-Day M.A; \$75 Shippage and  
Commission; \$2,500 Initial Stop Loss; \$2,300 Trailing  
Stop Loss**

Performance Summary: All Trades

Total net profit	\$ 21425.00	Open position P/L	\$ 300.00
Gross profit	\$ 51450.00	Gross loss	\$ -30025.00
Total # of trades	89	Percent profitable	36%
Number winning trades	32	Number losing trades	57
Largest winning trade	\$ 8100.00	Largest losing trade	\$ -1800.00
Average winning trade	\$ 1607.81	Average losing trade	\$ -526.75
Ratio avg win/avg loss	3.05	Avg trade(win & loss)	\$ 240.73
Max consecutive winners	3	Max consecutive losers	9
Avg # bars in winners	41	Avg # bars in losers	13
Max intraday drawdown	\$ -7525.00		
Profit factor	1.71	Max # contracts held	1
Account size required	\$ 10525.00	Return on account	204%

Performance Summary: Long Trades

Total net profit	\$ 25875.00	Open position P/L	\$ 300.00
Gross profit	\$ 37000.00	Gross loss	\$ -11125.00
Total # of trades	44	Percent profitable	43%
Number winning trades	19	Number losing trades	25
Largest winning trade	\$ 8100.00	Largest losing trade	\$ -1100.00
Average winning trade	\$ 1947.37	Average losing trade	\$ -445.00
Ratio avg win/avg loss	4.38	Avg trade(win & loss)	\$ 588.07
Max consecutive winners	3	Max consecutive losers	4
Avg # bars in winners	41	Avg # bars in losers	14
Max intraday drawdown	\$ -2725.00		
Profit factor	3.33	Max # contracts held	1
Account size required	\$ 5725.00	Return on account	452%

Performance Summary: Short Trades

Total net profit	\$ -4450.00	Open position P/L	\$ 0.00
Gross profit	\$ 14450.00	Gross loss	\$ -18900.00
Total # of trades	45	Percent profitable	29%
Number winning trades	13	Number losing trades	32
Largest winning trade	\$ 2925.00	Largest losing trade	\$ -1800.00
Average winning trade	\$ 1111.54	Average losing trade	\$ -590.63
Ratio avg win/avg loss	1.88	Avg trade(win & loss)	\$ -98.89
Max consecutive winners	5	Max consecutive losers	8
Avg # bars in winners	42	Avg # bars in losers	12
Max intraday drawdown	\$ -8675.00		
Profit factor	0.76	Max # contracts held	1
Account size required	\$ 8675.00	Return on account	-51%

**Figure 4-3: Results of Dual Moving Average System,  
Swiss Franc: 5- and 45-Day MA; \$175 Shippage and  
Commission; \$3,500 Stop Loss; \$2,800 Trailing Stop  
Loss**

Performance Summary: All Trades

Total net profit	\$ 32800.00	Open position P/L	\$ 275.00
Gross profit	\$ 122275.00	Gross loss	\$ -89475.00
Total # of trades	117	Percent profitable	40%
Number winning trades	47	Number losing trades	70
Largest winning trade	\$ 9650.00	Largest losing trade	\$ -4650.00
Average winning trade	\$ 2601.60	Average losing trade	\$ -1278.21
Ratio avg win/avg loss	2.04	Avg trade(win & loss)	\$ 280.34
Max consecutive winners	3	Max consecutive losers	6
Avg # bars in winners	47	Avg # bars in losers	9
Max intraday drawdown	\$ -16025.00	Max # contracts held	1
Profit factor	1.37	Return on account	172%
Account size required	\$ 19025.00		

Performance Summary: Long Trades

Total net profit	\$ 13650.00	Open position P/L	\$ 275.00
Gross profit	\$ 60362.50	Gross loss	\$ -46712.50
Total # of trades	58	Percent profitable	38%
Number winning trades	22	Number losing trades	36
Largest winning trade	\$ 9650.00	Largest losing trade	\$ -2950.00
Average winning trade	\$ 2743.75	Average losing trade	\$ -1297.57
Ratio avg win/avg loss	2.11	Avg trade(win & loss)	\$ 235.34
Max consecutive winners	3	Max consecutive losers	6
Avg # bars in winners	43	Avg # bars in losers	9
Max intraday drawdown	\$ -18962.50	Max # contracts held	1
Profit factor	1.29	Return on account	72%
Account size required	\$ 18962.50		

Performance Summary: Short Trades

Total net profit	\$ 19150.00	Open position P/L	\$ 0.00
Gross profit	\$ 61912.50	Gross loss	\$ -42762.50
Total # of trades	59	Percent profitable	42%
Number winning trades	25	Number losing trades	34
Largest winning trade	\$ 9137.50	Largest losing trade	\$ -4650.00
Average winning trade	\$ 2476.50	Average losing trade	\$ -1257.72
Ratio avg win/avg loss	1.97	Avg trade(win & loss)	\$ 324.58
Max consecutive winners	6	Max consecutive losers	14
Avg # bars in winners	49	Avg # bars in losers	10
Max intraday drawdown	\$ -22425.00	Max # contracts held	1
Profit factor	1.45	Return on account	75%
Account size required	\$ 25425.00		

**Figure 4-4: Results of Dual Moving Average System,  
Crude Oil: 14- and 54-Day MA (Same Parameters as  
Figure 4-3)**

Performance Summary: All Trades			
Total net profit	\$ 27465.00	Open position P/L	\$ 0.00
Gross profit	\$ 46940.00	Gross loss	\$ -19475.00
Total # of trades	37	Percent profitable	49%
Number winning trades	18	Number losing trades	19
Largest winning trade	\$ 9995.00	Largest losing trade	\$ -3885.00
Average winning trade	\$ 2607.78	Average losing trade	\$ -1025.00
Ratio avg win/avg loss	2.54	Avg trade(win & loss)	\$ 742.30
Max consecutive winners	4	Max consecutive losers	6
Avg # bars in winners	68	Avg # bars in losers	18
Max intraday drawdown	\$ -5575.00		
Profit factor	2.41	Max # contracts held	1
Account size required	\$ 8575.00	Return on account	320%

Performance Summary: Long Trades			
Total net profit	\$ 25980.00	Open position P/L	\$ 0.00
Gross profit	\$ 31850.00	Gross loss	\$ -5870.00
Total # of trades	18	Percent profitable	56%
Number winning trades	10	Number losing trades	8
Largest winning trade	\$ 9995.00	Largest losing trade	\$ -1405.00
Average winning trade	\$ 3185.00	Average losing trade	\$ -733.75
Ratio avg win/avg loss	4.34	Avg trade(win & loss)	\$ 1443.33
Max consecutive winners	5	Max consecutive losers	3
Avg # bars in winners	74	Avg # bars in losers	22
Max intraday drawdown	\$ -2760.00		
Profit factor	5.43	Max # contracts held	1
Account size required	\$ 5760.00	Return on account	451%

Performance Summary: Short Trades			
Total net profit	\$ 1485.00	Open position P/L	\$ 0.00
Gross profit	\$ 15090.00	Gross loss	\$ -13605.00
Total # of trades	19	Percent profitable	42%
Number winning trades	8	Number losing trades	11
Largest winning trade	\$ 3805.00	Largest losing trade	\$ -3885.00
Average winning trade	\$ 1886.25	Average losing trade	\$ -1236.82
Ratio avg win/avg loss	1.53	Avg trade(win & loss)	\$ 78.16
Max consecutive winners	2	Max consecutive losers	4
Avg # bars in winners	60	Avg # bars in losers	14
Max intraday drawdown	\$ -5525.00		
Profit factor	1.11	Max # contracts held	1
Account size required	\$ 8525.00	Return on account	17%

**Figure 4-5: Results of Dual Moving Average System,  
Japanese Yen: 14- and 54-Day MA (Same Parameters  
as Figure 4-3)**

Performance Summary: All Trades

Total net profit	\$ 64725.00	Open position F/L	\$ 0.00
Gross profit	\$ 94575.00	Gross loss	\$ -29850.00
Total # of trades	63	Percent profitable	52%
Number winning trades	33	Number losing trades	30
Largest winning trade	\$ 10137.50	Largest losing trade	\$ -2650.00
Average winning trade	\$ 2865.91	Average losing trade	\$ -995.00
Ratio avg win/avg loss	2.88	Avg trade(win & loss)	\$ 1027.38
Max consecutive winners	6	Max consecutive losers	5
Avg # bars in winners	49	Avg # bars in losers	20
Max intraday drawdown	\$ -6612.50		
Profit factor	3.17	Max # contracts held	1
Account size required	\$ 6612.50	Return on account	979%

Performance Summary: Long Trades

Total net profit	\$ 29712.50	Open position F/L	\$ 0.00
Gross profit	\$ 44075.00	Gross loss	\$ -14362.50
Total # of trades	31	Percent profitable	52%
Number winning trades	16	Number losing trades	15
Largest winning trade	\$ 10137.50	Largest losing trade	\$ -2362.50
Average winning trade	\$ 2754.69	Average losing trade	\$ -957.50
Ratio avg win/avg loss	2.88	Avg trade(win & loss)	\$ 958.47
Max consecutive winners	5	Max consecutive losers	3
Avg # bars in winners	44	Avg # bars in losers	18
Max intraday drawdown	\$ -8025.00		
Profit factor	3.07	Max # contracts held	1
Account size required	\$ 11025.00	Return on account	270%

Performance Summary: Short Trades

Total net profit	\$ 35012.50	Open position F/L	\$ 0.00
Gross profit	\$ 50500.00	Gross loss	\$ -15487.50
Total # of trades	32	Percent profitable	53%
Number winning trades	17	Number losing trades	15
Largest winning trade	\$ 9350.00	Largest losing trade	\$ -2650.00
Average winning trade	\$ 2970.59	Average losing trade	\$ -1032.50
Ratio avg win/avg loss	2.88	Avg trade(win & loss)	\$ 1094.14
Max consecutive winners	5	Max consecutive losers	5
Avg # bars in winners	55	Avg # bars in losers	22
Max intraday drawdown	\$ -5350.00		
Profit factor	3.26	Max # contracts held	1
Account size required	\$ 8350.00	Return on account	419%

**Figure 4-6: Results of Dual Moving Average System, Coffee: 14- and 54-Day MA (Same Parameters as Figure 4-3)**

Performance Summary: All Trades			
Total net profit	\$ 65270.00	Open position P/L	\$ 0.00
Gross profit	\$ 157895.00	Gross loss	\$ -92625.00
Total # of trades	98	Percent profitable	44%
Number winning trades	43	Number losing trades	55
Largest winning trade	\$ 14145.00	Largest losing trade	\$ -2695.00
Average winning trade	\$ 3671.98	Average losing trade	\$ -1684.09
Ratio avg win/avg loss	2.18	Avg trade(win & loss)	\$ 666.02
Max consecutive winners	6	Max consecutive losers	4
Avg # bars in winners	6	Avg # bars in losers	3
Max intraday drawdown	\$ -20190.00		
Profit factor	1.70	Max # contracts held	1
Account size required	\$ 20190.00	Return on account	323%
Performance Summary: Long Trades			
Total net profit	\$ 51155.00	Open position P/L	\$ 0.00
Gross profit	\$ 89170.00	Gross loss	\$ -38015.00
Total # of trades	49	Percent profitable	53%
Number winning trades	26	Number losing trades	23
Largest winning trade	\$ 12325.00	Largest losing trade	\$ -2575.00
Average winning trade	\$ 3429.62	Average losing trade	\$ -1652.83
Ratio avg win/avg loss	2.08	Avg trade(win & loss)	\$ 1043.98
Max consecutive winners	3	Max consecutive losers	3
Avg # bars in winners	6	Avg # bars in losers	2
Max intraday drawdown	\$ -6110.00		
Profit factor	2.35	Max # contracts held	1
Account size required	\$ 6110.00	Return on account	837%
Performance Summary: Short Trades			
Total net profit	\$ 14115.00	Open position P/L	\$ 0.00
Gross profit	\$ 68725.00	Gross loss	\$ -54610.00
Total # of trades	49	Percent profitable	35%
Number winning trades	17	Number losing trades	32
Largest winning trade	\$ 14145.00	Largest losing trade	\$ -2695.00
Average winning trade	\$ 4042.65	Average losing trade	\$ -1706.56
Ratio avg win/avg loss	2.37	Avg trade(win & loss)	\$ 288.06
Max consecutive winners	6	Max consecutive losers	6
Avg # bars in winners	6	Avg # bars in losers	3
Max intraday drawdown	\$ -23905.00		
Profit factor	1.26	Max # contracts held	1
Account size required	\$ 23905.00	Return on account	59%

**Figure 4.7: Babcock's Performance Report of 4-, 9-, and 18-Day Moving Average**

	S&P 500	T-Bonds	Euro dollars	Swiss Francs	Japanese Yen	Comex Gold	Heating Oil	Soy beans	Sugar	Live Cattle	Average
Number of Closed Trades	67	56	58	58	52	58	46	60	59	52	57
Number of Profitable Trades	20	21	22	22	26	19	12	22	20	13	20
Percent Profitable	30%	37%	38%	38%	50%	33%	26%	37%	34%	25%	35%
Total Profit or Loss	-75,650	16,440	14,775	4,763	34,625	13,920	-605	3,388	-3,147	-13,200	-474
Average Profitable Trade	3,179	3,404	1,794	2,088	2,241	2,415	3,086	1,676	1,108	1,060	2,206
Average Losing Trade	-2,962	-1,572	-686	-1,144	-910	-820	-1,106	-883	-648	-692	-1,190
Maximum Drawdown	-80,375	-15,619	-7,425	-12,050	-4,638	-11,520	-17,535	-12,000	-6,328	-15,344	-18,283
Average Profit Per Trade	-1,129	294	255	82	666	240	-13	56	-53	-254	-8

Source: Bruce Babcock, *Trading Systems*. Homewood, IL: (Dow-Jones Irwin, 1989. Figure 8-4, p. 116).

Figures 4-8 and 4-9 illustrate several buy and sell signals using this approach. Note that this method yields fewer signals than does the dual MA technique, since a triple MA approach tends to minimize whipsaws. The shortest MA (MA1) is used as a short-term filter since no MA signal is taken unless both MA1 and MA2 are above MA3 or below it.

As you can well imagine, the possible number of combinations for three MAs is immense. To devote the system to a test of all possible three MA combinations would have been too time consuming. However, I tested significant combinations, beginning with the very popular 4-day, 9-day and 18-day. The results should give you a good idea about performance.

### **Performance of 4-Day, 9-Day and 18-Day MA in Bull Markets**

Our bull market sample consisted of thirty-nine classic bull markets from 1967 through 1988. The results were very positive and not at all in agreement with Babcock's findings. But this is understandable given the significant differences between his test and mine. Overall performance was impressive for the bull market sample, even allowing for slippage and commission. Paradoxically, however, buy signals in bull market turned in a net loss while sell signals in bull markets were profitable. The results are summarized in Figure 4-10.

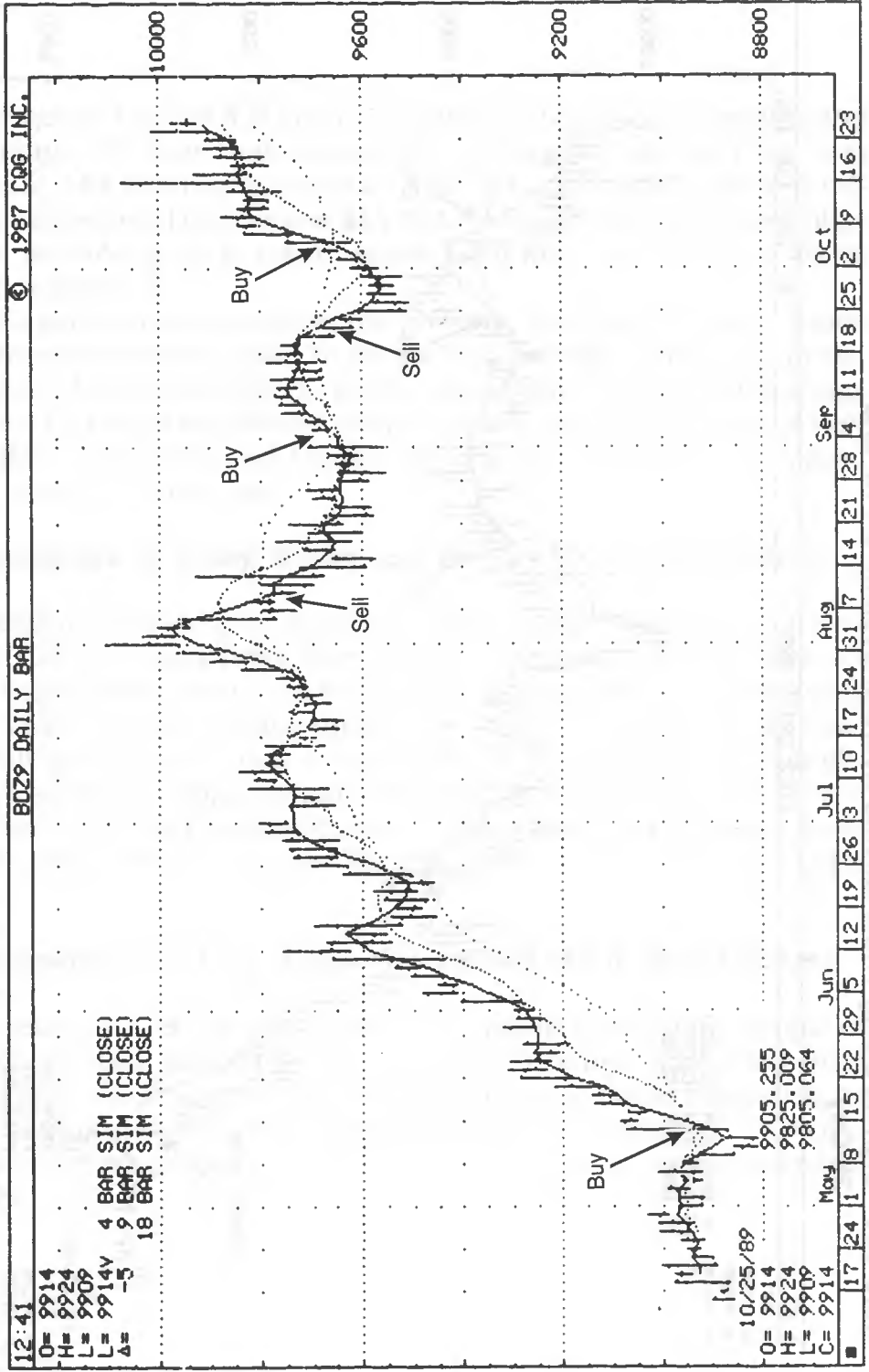
### **Performance of 4-Day, 9-Day and 18-Day MA in Bear Markets**

The next 4-day, 9-day and 18-day MA system was on the sample of fifty classic bear markets. Overall performance here was better than the results for bull markets. This is understandable inasmuch as bear markets usually move down faster than bull markets move up, and bear markets tend to trend better. Results are summarized in Figure 4-11.





Figure 4.9: Signals Using Triple Moving Average System



**Figure 4.10: Performance of 4-, 9-, 18-Day MA in Bull Markets**

<b>BUY SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
1305	20	(\$506.38)	(\$660,824.69)

<b>SELL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
1335	51.84	\$872.87	\$1,165,287.00

<b>TOTAL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
2640	36.1	\$191.08	\$504,462.56

**Figure 4.11: Performance of 4-, 9-, 18-Day MA in Bear Markets**

<b>BUY SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
1766	49.32	\$673.97	\$1,190,238.00
<b>SELL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
1751	21.42	(\$506.43)	(\$886,763.94)
<b>TOTAL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
3517	35.43	\$86.29	\$303,474.37

### **Performance of 4-Day, 9-Day and 18-Day MA in Bull/Bear Markets**

I then checked the performance of the 4-day, 9-day and 18 day MA system in fifty-seven bull/bear markets. As you will recall, these are markets which made the transition from strong bull market to strong bear market. It is most interesting to note that overall performance here was more evenly distributed. In other words, not only was the system profitable overall, but profits were split about evenly among buy and sell signals, which we would expect. Overall performance is summarized in Figure 4-12.

### **Performance of 4-Day, 9-Day and 18-Day MA in Bear/Bull Markets**

Then I next checked performance of the 4-day, 9-day and 18-day MA system in seventy-three bear/bull markets. These are markets which made the transition from bearish to bullish. Again, results were profitable and fairly evenly distributed, with an average profit for the buy and the sell signals. The results here and in bull/bear markets are very encouraging inasmuch as they suggest that profits are possible even in markets which make the transition from bullish to bearish or vice-versa. The results for this test are shown in Figure 4-13.

### **Performance of 4-Day, 9-Day and 18-Day MA in Choppy Bull Markets**

This test was an important one. It has long been maintained that moving averages tend to do poorly in choppy markets. While this may be true for “whipsaw” markets, it may not necessarily be true for what I have defined as “choppy” bull markets. In fact the test proved that even in choppy markets a profit can be generated; however, the overall results are not impressive. They are summarized in Figure 4-14.

**Figure 4.12: Performance of 4-, 9-, 18-Day MA in Bull/Bear Markets**

<b>BUY SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
1602	38.83	\$234.35	\$375,424.75
<b>SELL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
1629	34.56	\$312.12	\$508,444.81
<b>TOTAL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
3231	36.68	\$273.56	\$883,869.56

**Figure 4.13: Performance of 4-, 9-, 18-Day MA in Bear/Bull Markets**

<b>BUY SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
1591	36.64	\$50.91	\$81,000.44

<b>SELL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
1620	36.85	\$226.87	\$367,535.00

<b>TOTAL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
3211	36.75	\$139.69	\$448,535.44

**Figure 4.14: Performance of 4-, 9-, 18-Day MA in Choppy Bull Markets**

<b>BUY SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
1065	23.66	(\$719.00)	(\$765,740.19)
<b>SELL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
1088	47.06	\$1,018.10	\$1,107,690.00
<b>TOTAL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
2153	35.49	\$158.82	\$341,949.37



### **Performance of 4-Day, 9-Day and 18-Day MA in Choppy Bear Markets**

Performance of the 4-day, 9-day and 18-day MA system in choppy bear markets was not as good as it was in trending markets or in bull/bear and bear/bull markets, but it was still profitable. Performance clearly was diminished, as can be seen from the results in Figure 4-15.

### **Performance of 4-Day, 9-Day and 18-Day MA in Whipsaw Markets**

While it may be a matter of opinion as to what constitutes a “whipsaw” market, there is no doubt in my mind that the sample of fifty-two “whipsaw” markets I selected represent some of the most difficult and treacherous markets known to traders. In fact, the results demonstrate that the 4-day, 9-day and 18-day system does not produce profits in such markets. Overall results as shown in Figure 4-16 are negative. There is, therefore, considerable evidence to support the longstanding conclusion that moving-average systems tend to lose money in non-trending markets.

### **Performance of 4-Day, 9-Day and 18-Day MA in Bull/Bear/Bull Markets**

Another category I tested consisted of fifteen markets which moved from bullish to bearish and then back to bullish again. While there were only fifteen such markets, the results were marginally profitable. This suggests again that the presence of trends, even though they may change, is a positive consideration in the 4-day, 9-day and 18-day MA approach. Results of this test are shown in Figure 4-17.

**Figure 4.15: Performance of 4-, 9-, 18-Day MA in Choppy Bear Markets**

<b>BUY SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
792	46.59	\$320.89	\$254,148.25
<b>SELL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
785	24.71	(\$361.87)	(\$284,065.25)
<b>TOTAL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
1577	35.7	(\$18.97)	(\$29,916.98)

Figure 4.16: Performance of 4-, 9-, 18-Day MA in Whipsaw Markets

<b>BUY SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
1030	36.89	\$5.78	\$5,956.50
<b>SELL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
1028	35.12	(\$80.12)	(\$82,361.81)
<b>TOTAL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
2058	36.01	(\$37.13)	(\$76,405.31)

**Figure 4.17: Performance of 4-, 9-, 18-Day MA in Bull/Bear/Bull Markets**

		<b>BUY SIGNALS</b>	
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
465	28.39	(\$139.72)	(\$64,970.98)
		<b>SELL SIGNALS</b>	
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
472	40.68	\$456.98	\$215,693.81
		<b>TOTAL SIGNALS</b>	
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
937	34.58	\$160.86	\$150,722.81

### **Performance of 4-Day, 9-Day and 18-Day MA in Bear/Bull/Bear Markets**

I also examined ten markets which moved from bearish to bullish and back to bearish. Performance was impressive, with profits generated for buy and sell signals. The fact that at least 66 percent of the trends were bearish suggests that bear trends tend to produce better overall results. However, let's not forget that only ten such markets were tested and that this may not be a sufficiently large sample for conclusive results. Figure 4-18 shows my findings.

Figure 4-19 shows Triple MA 4-Day, 9-Day and 18-Day *overall* test results.

### **VALIDATION OF RESULTS USING SYSTEM WRITER PLUS (SWP)**

In order to validate the test results in a more global fashion I tested the 4-day, 9-day and 18-day MA method on SWP. The test rules were as described earlier and no optimization was used. In order to more realistically reflect actual market conditions and show the system's worst-case performance I deducted \$100 slippage and commission for each trade. Markets tested were live cattle, cocoa, pork bellies, copper, cotton, coffee, orange juice, platinum, silver, soybeans, soybean meal, sugar, wheat, Swiss Franc, gold, TBonds, Japanese Yen, heating oil, Eurodollar, S&P Index and Crude Oil. Even without optimization or filtering of trades the results were impressive. Figures 4-20 through 4-41 summarize the market-by-market performance of this method. As you can see, some markets were losers, but many were large winners. Furthermore, drawdown was rather large in some cases, and there is some question as to whether an individual actually would have been able to trade this approach given the drawdown. Yet with some minor optimization and filtering, this method appears to have good potential.

**Figure 4.18: Performance of 4-, 9-, 18-Day MA in Bear/Bull/Bear Markets**

<b>BUY SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
394	39.85	\$311.19	\$122,610.31
<b>SELL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
381	31.23	\$35.89	\$13,673.91
<b>TOTAL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
775	35.61	\$175.85	\$136,284.25

**Figure 4.19: Triple MA—4-, 9-, 18-Day MA Overall Test Results**

		<b>BUY SIGNALS</b>	
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
10010	36.23	\$53.73	\$537,842.69
		<b>SELL SIGNALS</b>	
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
10089	35.73	\$210.64	\$2,125,133.00
		<b>TOTAL SIGNALS</b>	
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
20099	35.98	\$132.49	\$2,662,976.00

**Figure 4.20: 4-, 9-, 18-MA: Live Cattle**

Performance Summary: All Trades			
Total net profit	\$ -10480.00	Open position P/L	\$ 196.00
Gross profit	\$ 75608.00	Gross loss	\$ -86088.00
Total # of trades	177	Percent profitable	33%
Number winning trades	59	Number losing trades	118
Largest winning trade	\$ 6148.00	Largest losing trade	\$ -1916.00
Average winning trade	\$ 1281.49	Average losing trade	\$ -729.56
Ratio avg win/avg loss	1.76	Avg trade(win & loss)	\$ -59.21
Max consecutive winners	4	Max consecutive losers	9
Avg # bars in winners	37	Avg # bars in losers	13
Max intraday drawdown	\$ -22628.00		
Profit factor	0.88	Max # contracts held	1
Account size required	\$ 25628.00	Return on account	-41%

**Figure 4.21: 4-, 9-, 18-MA: Cocoa**

Performance Summary: All Trades			
Total net profit	\$ -12343.00	Open position P/L	\$ -6.00
Gross profit	\$ 3611.00	Gross loss	\$ -15954.00
Total # of trades	119	Percent profitable	18%
Number winning trades	21	Number losing trades	98
Largest winning trade	\$ 538.00	Largest losing trade	\$ -385.00
Average winning trade	\$ 171.95	Average losing trade	\$ -162.80
Ratio avg win/avg loss	1.06	Avg trade(win & loss)	\$ -103.72
Max consecutive winners	2	Max consecutive losers	17
Avg # bars in winners	53	Avg # bars in losers	17
Max intraday drawdown	\$ -12678.00		
Profit factor	0.23	Max # contracts held	1
Account size required	\$ 15678.00	Return on account	-79%



Figure 4.22: 4-, 9-, 18-MA: Coffee

Total net profit	\$ 542780.00	Open position P/L	\$ 5650.00
Gross profit	\$1122850.00	Gross loss	\$-580070.00
Total # of trades	191	Percent profitable	39%
Number winning trades	74	Number losing trades	117
Largest winning trade	\$ 190610.00	Largest losing trade	\$ -33450.00
Average winning trade	\$ 15173.65	Average losing trade	\$ -4957.86
Ratio avg win/avg loss	3.06	Avg trade(win & loss)	\$ 2841.78
Max consecutive winners	4	Max consecutive losers	12
Avg # bars in winners	37	Avg # bars in losers	14
Max intraday drawdown	\$ -91410.00	Max # contracts held	1
Profit factor	1.94	Return on account	575%
Account size required	\$ 94410.00		

Figure 4.23: 4-, 9-, 18-MA: Copper

## Performance Summary: All Trades

Total net profit	\$ -17125.00	Open position P/L	\$ 1975.00
Gross profit	\$ 114987.50	Gross loss	\$-132112.50
Total # of trades	176	Percent profitable	36%
Number winning trades	64	Number losing trades	112
Largest winning trade	\$ 11075.00	Largest losing trade	\$ -5925.00
Average winning trade	\$ 1796.68	Average losing trade	\$ -1179.58
Ratio avg win/avg loss	1.52	Avg trade(win & loss)	\$ -97.30
Max consecutive winners	4	Max consecutive losers	7
Avg # bars in winners	41	Avg # bars in losers	15
Max intraday drawdown	\$ -42662.50	Max # contracts held	1
Profit factor	0.87	Return on account	-38%
Account size required	\$ 45662.50		

**Figure 4.24: 4-, 9-, 18-MA: Cotton**

Total net profit	\$ -6620.00	Open position P/L	\$ 244.00
Gross profit	\$ 31423.00	Gross loss	\$ -38043.00
Total # of trades	190	Percent profitable	30%
Number winning trades	57	Number losing trades	133
Largest winning trade	\$ 3672.00	Largest losing trade	\$ -667.00
Average winning trade	\$ 551.28	Average losing trade	\$ -286.04
Ratio avg win/avg loss	1.93	Avg trade(win & loss)	\$ -34.84
Max consecutive winners	4	Max consecutive losers	12
Avg # bars in winners	46	Avg # bars in losers	15
Max intraday drawdown	\$ -15763.00		
Profit factor	0.83	Max # contracts held	1
Account size required	\$ 18763.00	Return on account	-35%

**Figure 4.25: 4-, 9-, 18-MA: NY Light Crude Oil**

Performance Summary: All Trades			
Total net profit	\$ 29590.00	Open position P/L	\$ 340.00
Gross profit	\$ 70920.00	Gross loss	\$ -41330.00
Total # of trades	68	Percent profitable	47%
Number winning trades	32	Number losing trades	36
Largest winning trade	\$ 14140.00	Largest losing trade	\$ -5640.00
Average winning trade	\$ 2216.25	Average losing trade	\$ -1148.06
Ratio avg win/avg loss	1.93	Avg trade(win & loss)	\$ 435.15
Max consecutive winners	3	Max consecutive losers	5
Avg # bars in winners	44	Avg # bars in losers	14
Max intraday drawdown	\$ -15190.00		
Profit factor	1.72	Max # contracts held	1
Account size required	\$ 18190.00	Return on account	163%

Figure 4.26: 4-, 9-, 18-MA: Eurodollar

Total net profit	\$ 7575.00	Open position P/L	\$ 250.00
Gross profit	\$ 52950.00	Gross loss	\$ -45375.00
Total # of trades	98	Percent profitable	36%
Number winning trades	35	Number losing trades	63
Largest winning trade	\$ 7525.00	Largest losing trade	\$ -3550.00
Average winning trade	\$ 1512.86	Average losing trade	\$ -720.24
Ratio avg win/avg loss	2.10	Avg trade(win & loss)	\$ 77.30
Max consecutive winners	3	Max consecutive losers	8
Avg # bars in winners	39	Avg # bars in losers	14
Max intraday drawdown	\$ -13275.00	Max # contracts held	1
Profit factor	1.17	Return on account	47%
Account size required	\$ 16275.00		

Figure 4.27: 4-, 9-, 18-MA: COMEX Gold

Total net profit	\$ 86200.00	Open position P/L	\$ 1470.00
Gross profit	\$ 172300.00	Gross loss	\$ -86100.00
Total # of trades	162	Percent profitable	40%
Number winning trades	64	Number losing trades	98
Largest winning trade	\$ 24470.00	Largest losing trade	\$ -4740.00
Average winning trade	\$ 2692.19	Average losing trade	\$ -878.57
Ratio avg win/avg loss	3.06	Avg trade(win & loss)	\$ 532.10
Max consecutive winners	4	Max consecutive losers	10
Avg # bars in winners	39	Avg # bars in losers	15
Max intraday drawdown	\$ -18750.00	Max # contracts held	1
Profit factor	2.00	Return on account	396%
Account size required	\$ 21750.00		

**Figure 4.28: 4-, 9-, 18-MA: NY Heating Oil**

Total net profit	\$ 41979.77	Open position P/L	\$ 399.00
Gross profit	\$ 137238.78	Gross loss	\$ -95259.01
Total # of trades	127	Percent profitable	41%
Number winning trades	52	Number losing trades	75
Largest winning trade	\$ 13512.20	Largest losing trade	\$ -4052.20
Average winning trade	\$ 2639.21	Average losing trade	\$ -1270.12
Ratio avg win/avg loss	2.08	Avg trade(win & loss)	\$ 330.55
Max consecutive winners	4	Max consecutive losers	6
Avg # bars in winners	38	Avg # bars in losers	13
Max intraday drawdown	\$ -13641.00	Max # contracts held	1
Profit factor	1.44	Return on account	252%
Account size required	\$ 16641.00		

**Figure 4.29: 4-, 9-, 18-MA: Japanese Yen**

Total net profit	\$ 122662.50	Open position P/L	\$ 600.00
Gross profit	\$ 195512.50	Gross loss	\$ -72850.00
Total # of trades	127	Percent profitable	49%
Number winning trades	62	Number losing trades	65
Largest winning trade	\$ 12587.50	Largest losing trade	\$ -3787.50
Average winning trade	\$ 3153.43	Average losing trade	\$ -1120.77
Ratio avg win/avg loss	2.81	Avg trade(win & loss)	\$ 965.85
Max consecutive winners	6	Max consecutive losers	5
Avg # bars in winners	42	Avg # bars in losers	15
Max intraday drawdown	\$ -13987.50	Max # contracts held	1
Profit factor	2.68	Return on account	722%
Account size required	\$ 16987.50		

**Figure 4.30: 4-, 9-, 18-MA: Lumber**

Total net profit	\$ -21681.80	Open position P/L	\$ 109.20
Gross profit	\$ 6761.20	Gross loss	\$ -28443.00
Total # of trades	217	Percent profitable	18%
Number winning trades	38	Number losing trades	179
Largest winning trade	\$ 880.20	Largest losing trade	\$ -404.20
Average winning trade	\$ 177.93	Average losing trade	\$ -158.90
Ratio avg win/avg loss	1.12	Avg trade(win & loss)	\$ -99.92
Max consecutive winners	3	Max consecutive losers	23
Avg # bars in winners	44	Avg # bars in losers	16
Max intraday drawdown	\$ -21837.10		
Profit factor	0.24	Max # contracts held	1
Account size required	\$ 21837.10	Return on account	-99%

**Figure 4.31: 4-, 9-, 18-MA: Orange Juice**

Total net profit	\$ 6895.00	Open position P/L	\$ -600.00
Gross profit	\$ 64245.00	Gross loss	\$ -57350.00
Total # of trades	192	Percent profitable	32%
Number winning trades	62	Number losing trades	130
Largest winning trade	\$ 6450.00	Largest losing trade	\$ -2725.00
Average winning trade	\$ 1036.21	Average losing trade	\$ -441.15
Ratio avg win/avg loss	2.35	Avg trade(win & loss)	\$ 35.91
Max consecutive winners	6	Max consecutive losers	9
Avg # bars in winners	43	Avg # bars in losers	15
Max intraday drawdown	\$ -13360.00		
Profit factor	1.12	Max # contracts held	1
Account size required	\$ 13360.00	Return on account	52%

**Figure 4.32: 4-, 9-, 18-MA: Platinum**

Total net profit	\$ -15565.00	Open position P/L	\$ -5.00
Gross profit	\$ 114360.00	Gross loss	\$-129925.00
Total # of trades	212	Percent profitable	34%
Number winning trades	72	Number losing trades	140
Largest winning trade	\$ 18730.00	Largest losing trade	\$ -16100.00
Average winning trade	\$ 1588.33	Average losing trade	\$ -928.04
Ratio avg win/avg loss	1.71	Avg trade(win & loss)	\$ -73.42
Max consecutive winners	4	Max consecutive losers	8
Avg # bars in winners	37	Avg # bars in losers	14
Max intraday drawdown	\$ -28865.00		
Profit factor	0.88	Max # contracts held	1
Account size required	\$ 31865.00	Return on account	-49%

**Figure 4.33: 4-, 9-, 18-MA: Pork Bellies**

Total net profit	\$ -41284.00	Open position P/L	\$ -980.00
Gross profit	\$ 201180.00	Gross loss	\$-242464.00
Total # of trades	265	Percent profitable	35%
Number winning trades	94	Number losing trades	171
Largest winning trade	\$ 14236.00	Largest losing trade	\$ -4520.00
Average winning trade	\$ 2140.21	Average losing trade	\$ -1417.92
Ratio avg win/avg loss	1.51	Avg trade(win & loss)	\$ -155.79
Max consecutive winners	4	Max consecutive losers	10
Avg # bars in winners	33	Avg # bars in losers	14
Max intraday drawdown	\$ -48000.00		
Profit factor	0.83	Max # contracts held	1
Account size required	\$ 51000.00	Return on account	-81%

Figure 4.34: 4-, 9-, 18-MA: S&amp;P Index

Total net profit	\$ -93050.00	Open position P/L	\$ 3925.00
Gross profit	\$ 162700.00	Gross loss	\$-255750.00
Total # of trades	115	Percent profitable	33%
Number winning trades	38	Number losing trades	77
Largest winning trade	\$ 31050.00	Largest losing trade	\$ -10900.00
Average winning trade	\$ 4281.58	Average losing trade	\$ -3321.43
Ratio avg win/avg loss	1.29	Avg trade(win & loss)	\$ -809.13
Max consecutive winners	3	Max consecutive losers	7
Avg # bars in winners	30	Avg # bars in losers	13
Max intraday drawdown	\$-103350.00		
Profit factor	0.64	Max # contracts held	1
Account size required	\$ 106350.00	Return on account	-87%

Figure 4.35: 4-, 9-, 18-MA: COMEX Silver

Total net profit	\$ 211305.00	Open position P/L	\$ 845.00
Gross profit	\$ 427820.00	Gross loss	\$-216515.00
Total # of trades	226	Percent profitable	32%
Number winning trades	72	Number losing trades	154
Largest winning trade	\$ 97800.00	Largest losing trade	\$ -11125.00
Average winning trade	\$ 5941.94	Average losing trade	\$ -1405.94
Ratio avg win/avg loss	4.23	Avg trade(win & loss)	\$ 934.98
Max consecutive winners	3	Max consecutive losers	13
Avg # bars in winners	37	Avg # bars in losers	14
Max intraday drawdown	\$ -36450.00		
Profit factor	1.98	Max # contracts held	1
Account size required	\$ 39450.00	Return on account	536%

**Figure 4.36: 4-, 9-, 18-MA: Soybeans**

Total net profit	\$ -8386.00	Open position P/L	\$ -36.00
Gross profit	\$ 33264.00	Gross loss	\$ -41650.00
Total # of trades	246	Percent profitable	27%
Number winning trades	67	Number losing trades	179
Largest winning trade	\$ 3022.00	Largest losing trade	\$ -2460.00
Average winning trade	\$ 496.48	Average losing trade	\$ -232.68
Ratio avg win/avg loss	2.13	Avg trade(win & loss)	\$ -34.09
Max consecutive winners	6	Max consecutive losers	18
Avg # bars in winners	42	Avg # bars in losers	15
Max intraday drawdown	\$ -15034.00	Max # contracts held	1
Profit factor	0.80	Return on account	-47%
Account size required	\$ 18034.00		

**Figure 4.37: 4-, 9-, 18-MA: Soybean Meal**

Total net profit	\$ 629400.00	Open position P/L	\$ 10900.00
Gross profit	\$1601200.00	Gross loss	\$-971800.00
Total # of trades	246	Percent profitable	36%
Number winning trades	88	Number losing trades	158
Largest winning trade	\$ 165100.00	Largest losing trade	\$ -72100.00
Average winning trade	\$ 18195.45	Average losing trade	\$ -6150.63
Ratio avg win/avg loss	2.96	Avg trade(win & loss)	\$ 2558.54
Max consecutive winners	3	Max consecutive losers	10
Avg # bars in winners	38	Avg # bars in losers	14
Max intraday drawdown	\$-127800.00	Max # contracts held	1
Profit factor	1.65	Return on account	492%
Account size required	\$ 127800.00		



**Figure 4.38: 4-, 9-, 18-MA: Sugar**

Total net profit	\$ -11632.00	Open position P/L	\$ 97.00
Gross profit	\$ 12770.00	Gross loss	\$ -24402.00
Total # of trades	202	Percent profitable	19%
Number winning trades	39	Number losing trades	163
Largest winning trade	\$ 1977.00	Largest losing trade	\$ -806.00
Average winning trade	\$ 327.44	Average losing trade	\$ -149.71
Ratio avg win/avg loss	2.19	Avg trade(win & loss)	\$ -57.58
Max consecutive winners	3	Max consecutive losers	21
Avg # bars in winners	53	Avg # bars in losers	17
Max intraday drawdown	\$ -12052.00	Max # contracts held	1
Profit factor	0.52	Return on account	-77%
Account size required	\$ 15052.00		

**Figure 4.39: 4-, 9-, 18-MA: Swiss Franc**

Total net profit	\$ 58262.50	Open position P/L	\$ 2250.00
Gross profit	\$ 184350.00	Gross loss	\$ -126087.50
Total # of trades	171	Percent profitable	46%
Number winning trades	78	Number losing trades	93
Largest winning trade	\$ 13675.00	Largest losing trade	\$ -5800.00
Average winning trade	\$ 2363.46	Average losing trade	\$ -1355.78
Ratio avg win/avg loss	1.74	Avg trade(win & loss)	\$ 340.72
Max consecutive winners	4	Max consecutive losers	5
Avg # bars in winners	37	Avg # bars in losers	12
Max intraday drawdown	\$ -14100.00	Max # contracts held	1
Profit factor	1.46	Return on account	341%
Account size required	\$ 17100.00		

**Figure 4.40: 4-, 9-, 18-MA: T-Bonds**

Total net profit	\$ -14555.00	Open position P/L	\$ 12.00
Gross profit	\$ 2497.00	Gross loss	\$ -17052.00
Total # of trades	151	Percent profitable	12%
Number winning trades	18	Number losing trades	133
Largest winning trade	\$ 424.00	Largest losing trade	\$ -270.00
Average winning trade	\$ 138.72	Average losing trade	\$ -128.21
Ratio avg win/avg loss	1.08	Avg trade(win & loss)	\$ -96.39
Max consecutive winners	2	Max consecutive losers	18
Avg # bars in winners	58	Avg # bars in losers	17
Max intraday drawdown	\$ -14570.00		
Profit factor	0.15	Max # contracts held	1
Account size required	\$ 17570.00	Return on account	-83%

**Figure 4.41: 4-, 9-, 18-MA: CBT Wheat**

Total net profit	\$ -17846.00	Open position P/L	\$ 18.00
Gross profit	\$ 13106.00	Gross loss	\$ -30952.00
Total # of trades	236	Percent profitable	22%
Number winning trades	51	Number losing trades	185
Largest winning trade	\$ 1656.00	Largest losing trade	\$ -584.00
Average winning trade	\$ 256.98	Average losing trade	\$ -167.31
Ratio avg win/avg loss	1.54	Avg trade(win & loss)	\$ -75.62
Max consecutive winners	3	Max consecutive losers	14
Avg # bars in winners	45	Avg # bars in losers	17
Max intraday drawdown	\$ -17846.00		
Profit factor	0.42	Max # contracts held	1
Account size required	\$ 17846.00	Return on account	-100%

## **THE 9-DAY, 18-DAY AND 36-DAY MOVING-AVERAGE APPROACH**

Another popular combination of moving averages is the 9-day, 18-day and 36-day MA approach. The rules here are very simple. As long as the 9-day and 18-day moving averages are greater than the 36-day moving average, the system is long, but when the 9-day and 18-day moving averages become less than the 36-day moving average, the system goes into a sell mode. Figure 4-42 illustrates the basic approach. Inasmuch as the MAs used in this approach are longer, fewer signals will be generated than with the previously examined 4-day, 9-day and 18-day MA method.

### **Performance of 9-Day, 18-Day and 36-Day MA in Bull Markets**

My bull market test revealed excellent overall results, with the average trade quite large. There were fewer trades generated. Frequently four to six signals were generated per contract. This cut down on slippage and commission and resulted in a higher average profit per trade. Results are shown in Figure 4-43.

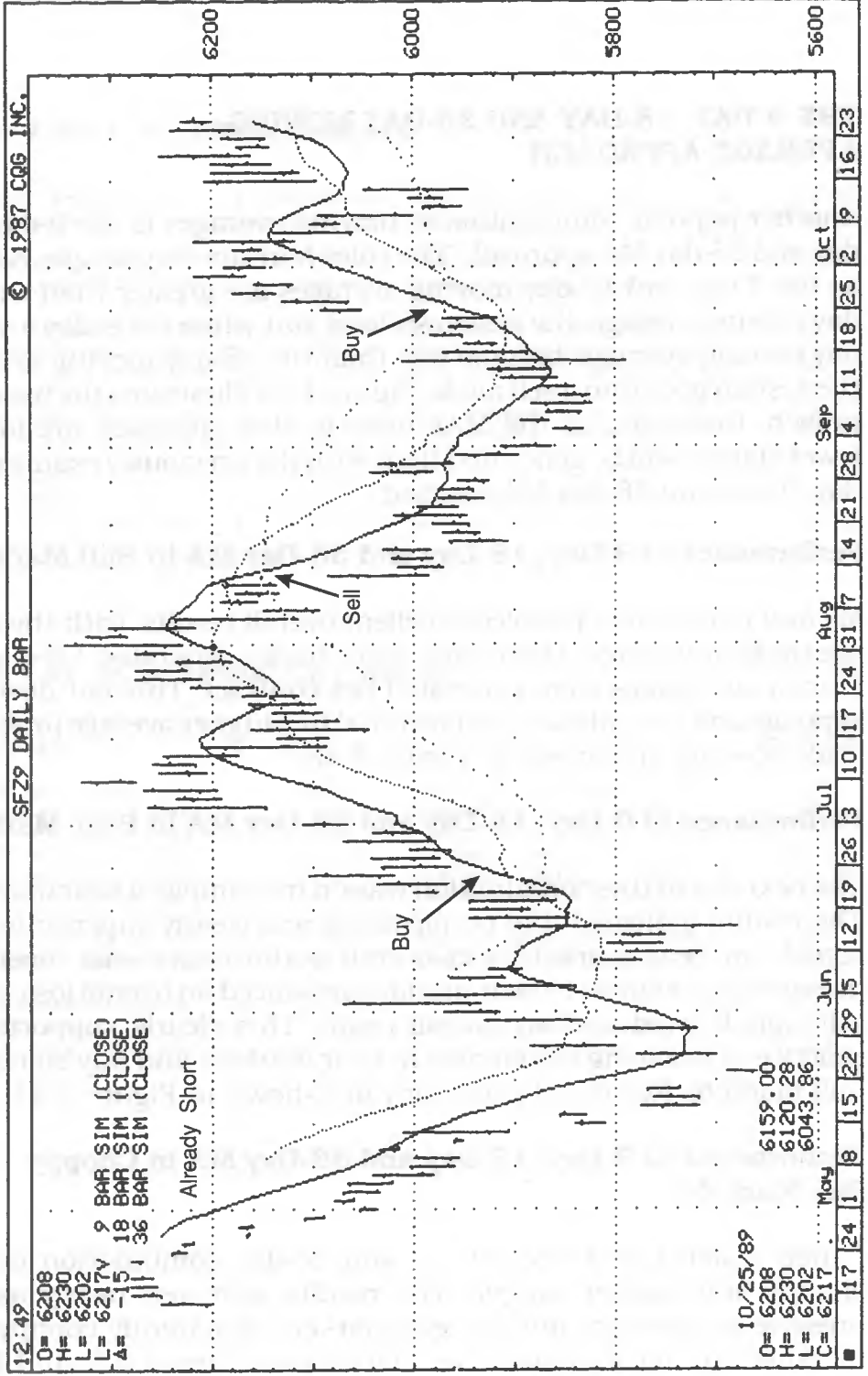
### **Performance of 9-Day, 18-Day and 36-Day MA in Bear Markets**

The next test of this combination was on my sample of bear markets. The results indicated that performance was clearly superior for sell signals in bear markets and overall performance was most impressive. Buy signals in bear markets produced an overall loss, while sell signals produced an overall profit. This clearly supports the practice of following sell signals in bear markets and buy signals in bull markets. Results of this study are shown in Figure 4-44.

### **Performance of 9-Day, 18-Day and 36-Day MA in Choppy Bull Markets**

I then tested the 9-day, 18-day and 36-day combination on my choppy bull market sample. The results were not nearly as impressive as those for bull or bear markets. Apparently choppy bull markets are not as reliable as markets with less back and forth movement. Results are shown in Figure 4-45.

Figure 4.42: Signals Using Triple Moving Average System: 9-, 18-, and 36-Day



**Figure 4.43: Performance of 9-, 18-, and 36-Day MA in Bull Markets**

<b>BUY SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
643	15.71	(\$750.65)	(\$482,669.37)
<b>SELL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
694	49.57	\$1,613.71	\$1,119,918.00
<b>TOTAL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
1337	33.28	\$476.63	\$637,248.13

**Figure 4.44: Performance of 9-, 18-, and 36-Day MA in Bear Markets**

<b>BUY SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
902	53.99	\$1,323.86	\$1,194,120.00
<b>SELL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
859	14.9	(\$784.41)	(\$673,805.37)
<b>TOTAL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
1761	34.92	\$295.47	\$520,314.94

**Figure 4.45: Performance of 9-, 18-, and 36-Day MA in Choppy Bull Markets**

<b>BUY SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
430	46.51	\$680.56	\$292,639.25

<b>SELL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
410	16.34	(\$614.81)	(\$252,073.69)

<b>TOTAL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
840	31.79	\$48.29	\$40,565.55

### **Performance of 9-Day, 18-Day and 36-Day MA in Choppy Bear Markets**

The performance of this system in choppy bull markets was essentially similar to its performance in choppy bear markets. The results were less than impressive, showing an overall loss, as can be seen in Figure 4-46.

It seems that this combination of moving averages works best in markets which are not "choppy." If this is true, then we should see very poor results in the "whipsaw" market sample.

### **Performance of 9-Day, 18-Day and 36-Day MA in Bull/Bear Markets**

I also examined this approach in bull/bear markets. The results were positive. This lent further support to the conclusion that trending markets as opposed to choppy or whipsaw markets are best suited to the triple moving-average approach. As you can see from the results in Figure 4-47, the overall performance was quite impressive.

### **Performance of 9-Day 18-Day and 36-Day MA in Bear/Bull Markets**

On the basis of performance in bull/bear markets, we would expect the results for bear/bull markets to be essentially similar. As a matter of fact, this did prove to be the case. Performance of this method in bear/bull markets was impressive, with buy and sell signals turning in an average profit per trade and a healthy overall profit. The results are shown in Figure 4-48.

### **Performance of 9-Day, 18-Day and 36-Day MA in Bull/Bear/Bull Markets**

I would also expect that this method would work well in bull/bear/bull markets inasmuch as the trends are quite clear regardless of the transition. The results of my test revealed that this was true. While the total number of markets tested was relatively small, the results were positive, as you can clearly see from Figure 4-49.



**Figure 4.46: Performance of 9-, 18-, and 36-Day MA in Choppy Bear Markets**

<b>BUY SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
562	19.57	(\$1,420.54)	(\$798,343.44)

<b>SELL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
592	47.64	\$1,495.66	\$885,430.44

<b>TOTAL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
1154	33.97	\$75.47	\$87,087.00

**Figure 4.47: Performance of 9-, 18-, and 36-Day MA in Bull/Bear Markets**

<b>BUY SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
809	39.31	\$577.58	\$467,261.19
<b>SELL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
812	30.17	\$283.25	\$229,998.56
<b>TOTAL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
1621	34.73	\$430.14	\$697,259.75

**Figure 4.48: Performance of 9-, 18-, and 36-Day MA in Bear/Bull Markets**

<b>BUY SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
798	35.71	\$78.26	\$62,454.14
<b>SELL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
815	40.37	\$598.91	\$488,107.50
<b>TOTAL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
1613	38.07	\$341.33	\$550,561.69

**Figure 4.49: Performance of 9-, 18-, and 36-Day MA in Bull/Bear/Bull Markets**

		<b>BUY SIGNALS</b>	
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
218	31.65	(\$30.49)	(\$6,647.07)
		<b>SELL SIGNALS</b>	
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
242	47.93	\$990.06	\$239,594.50
		<b>TOTAL SIGNALS</b>	
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
460	40.22	\$506.41	\$232,947.44

### **Performance of 9-Day, 18-Day and 36-Day MA in Bear/Bull/Bear Markets**

I would expect performance here to be about the same as it was for bull/bear/bull markets. It was in fact better, and positive for both buy and sell signals. This is additional confirmation of the general contention that trending markets tend to produce positive results for MA systems. Results are shown in Figure 4-50.

### **Performance of 9-Day, 18-Day and 36-Day MA's in Whipsaw Markets**

The final test category was in whipsaw markets. We would expect the system to be a net loser in this type of market if our working theory is correct. The test results were very clearly in support of our expectation. Both the buy and sell signals under this approach proved to be losers. Results are shown in Figure 4-51.

## **TEST RESULTS USING SYSTEM WRITER PLUS (SWP)**

In order to validate the test results in a more global fashion, I tested the 9-day, 18-day, and 36-day MA method on SWP. The test rules were as described earlier and no optimization was used. In order to more realistically reflect actual market conditions and show the systems worst-case performance we deducted \$100 slippage and commission for each trade. Markets tested were live cattle, cocoa, pork bellies, copper, cotton, coffee, orange juice, platinum, silver, soybeans, soybean meal, sugar, wheat, Swiss Francs, gold, TBonds, Japanese Yen, heating oil, Eurodollar, S&P Index and Crude Oil. Even without optimization or filtering of trades the results were impressive. Figures 4-43 through 4-51 summarize the market-by-market performance of this method. As you can see, some markets were losers, but many markets were large winners. Furthermore, drawdown was rather large in some cases and there is some question as to whether an individual would have actually been able to trade this approach given the drawdown. Yet with some minor optimization and filtering, this method appears to have good potential. Overall test results for the 9-day, 18-day, and 36-day MA method are shown in Figures 4-52 through 4-73.

**Figure 4.50: Performance of 9-, 18-, and 36-Day MA in Bear/Bull/Bear Markets**

<b>BUY SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
211	38.86	\$364.25	\$292,639.25
<b>SELL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
198	32.83	\$25.75	\$5,097.55
<b>TOTAL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
409	35.94	\$200.38	\$81,954.69

**Figure 4.51: Performance of 9-, 18-, and 36-Day MA in Whipsaw Markets**

<b>BUY SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
569	30.58	(\$288.92)	(\$164,397.56)
<b>SELL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
550	28.18	(\$384.35)	(\$211,393.31)
<b>TOTAL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
1119	29.4	(\$335.83)	(\$375,790.87)

**Figure 4.52: 9-,18-, 36-MA: Live Cattle**

Total net profit	\$ 6456.00	Open position P/L	\$ 1536.00
Gross profit	\$ 63244.00	Gross loss	\$ -56788.00
Total # of trades	82	Percent profitable	34%
Number winning trades	28	Number losing trades	54
Largest winning trade	\$ 7340.00	Largest losing trade	\$ -2860.00
Average winning trade	\$ 2258.71	Average losing trade	\$ -1051.63
Ratio avg win/avg loss	2.15	Avg trade(win & loss)	\$ 78.73
Max consecutive winners	4	Max consecutive losers	7
Avg # bars in winners	81	Avg # bars in losers	25
Max intraday drawdown	\$ -10124.00		
Profit factor	1.11	Max # contracts held	1
Account size required	\$ 13124.00	Return on account	49%

**Figure 4.53: 9-,18-, 36-MA: Cocoa**

Total net profit	\$ -7410.00	Open position P/L	\$ 38.00
Gross profit	\$ 2297.00	Gross loss	\$ -9707.00
Total # of trades	73	Percent profitable	19%
Number winning trades	14	Number losing trades	59
Largest winning trade	\$ 705.00	Largest losing trade	\$ -393.00
Average winning trade	\$ 164.07	Average losing trade	\$ -164.53
Ratio avg win/avg loss	1.00	Avg trade(win & loss)	\$ -101.51
Max consecutive winners	2	Max consecutive losers	16
Avg # bars in winners	76	Avg # bars in losers	28
Max intraday drawdown	\$ -8104.00		
Profit factor	0.24	Max # contracts held	1
Account size required	\$ 11104.00	Return on account	-67%

**Figure 4.54: 9-,18-, 36-MA: Coffee**

Total net profit	\$ 286990.00	Open position P/L	\$ 3550.00
Gross profit	\$ 816390.00	Gross loss	\$-529400.00
Total # of trades	111	Percent profitable	37%
Number winning trades	41	Number losing trades	70
Largest winning trade	\$ 149620.00	Largest losing trade	\$ -37350.00
Average winning trade	\$ 19911.95	Average losing trade	\$ -7562.86
Ratio avg win/avg loss	2.63	Avg trade(win & loss)	\$ 2585.50
Max consecutive winners	3	Max consecutive losers	7
Avg # bars in winners	67	Avg # bars in losers	22
Max intraday drawdown	\$-111110.00	Max # contracts held	1
Profit factor	1.54	Return on account	252%
Account size required	\$ 114110.00		

**Figure 4.55: 9-,18-, 36-MA: Copper**

Total net profit	\$ 34462.50	Open position P/L	\$ 1700.00
Gross profit	\$ 104212.50	Gross loss	\$ -69750.00
Total # of trades	106	Percent profitable	36%
Number winning trades	38	Number losing trades	68
Largest winning trade	\$ 13750.00	Largest losing trade	\$ -5325.00
Average winning trade	\$ 2742.43	Average losing trade	\$ -1025.74
Ratio avg win/avg loss	2.67	Avg trade(win & loss)	\$ 325.12
Max consecutive winners	3	Max consecutive losers	12
Avg # bars in winners	69	Avg # bars in losers	24
Max intraday drawdown	\$ -20512.50	Max # contracts held	1
Profit factor	1.49	Return on account	147%
Account size required	\$ 23512.50		



**Figure 4.56: 9-,18-, 36-MA: Cotton**

Total net profit	\$ 3996.00	Open position P/L	\$ 831.00
Gross profit	\$ 26071.00	Gross loss	\$ -22075.00
Total # of trades	98	Percent profitable	37%
Number winning trades	36	Number losing trades	62
Largest winning trade	\$ 4973.00	Largest losing trade	\$ -1207.00
Average winning trade	\$ 724.19	Average losing trade	\$ -356.05
Ratio avg win/avg loss	2.03	Avg trade(win & loss)	\$ 40.78
Max consecutive winners	4	Max consecutive losers	5
Avg # bars in winners	82	Avg # bars in losers	25
Max intraday drawdown	\$ -6100.00		
Profit factor	1.18	Max # contracts held	1
Account size required	\$ 9100.00	Return on account	44%

**Figure 4.57: 9-,18-, 36-MA: NY Light Crude Oil**

Total net profit	\$ 46670.00	Open position P/L	\$ 6990.00
Gross profit	\$ 60970.00	Gross loss	\$ -14300.00
Total # of trades	35	Percent profitable	54%
Number winning trades	19	Number losing trades	16
Largest winning trade	\$ 13740.00	Largest losing trade	\$ -1970.00
Average winning trade	\$ 3208.95	Average losing trade	\$ -893.75
Ratio avg win/avg loss	3.59	Avg trade(win & loss)	\$ 1333.43
Max consecutive winners	3	Max consecutive losers	3
Avg # bars in winners	77	Avg # bars in losers	25
Max intraday drawdown	\$ -3640.00		
Profit factor	4.26	Max # contracts held	1
Account size required	\$ 6640.00	Return on account	703%

**Figure 4.58: 9-,18-, 36-MA: Eurodollar**

Total net profit	\$ 13750.00	Open position P/L	\$ 425.00
Gross profit	\$ 48700.00	Gross loss	\$ -34950.00
Total # of trades	51	Percent profitable	37%
Number winning trades	19	Number losing trades	32
Largest winning trade	\$ 16200.00	Largest losing trade	\$ -2375.00
Average winning trade	\$ 2563.16	Average losing trade	\$ -1092.19
Ratio avg win/avg loss	2.35	Avg trade(win & loss)	\$ 269.61
Max consecutive winners	3	Max consecutive losers	4
Avg # bars in winners	75	Avg # bars in losers	24
Max intraday drawdown	\$ -7575.00	Max # contracts held	1
Profit factor	1.39	Return on account	130%
Account size required	\$ 10575.00		

**Figure 4.59: 9-,18-, 36-MA: COMEX Gold**

Total net profit	\$ 61300.00	Open position P/L	\$ -3080.00
Gross profit	\$ 142090.00	Gross loss	\$ -80790.00
Total # of trades	94	Percent profitable	39%
Number winning trades	37	Number losing trades	57
Largest winning trade	\$ 20900.00	Largest losing trade	\$ -4350.00
Average winning trade	\$ 3840.27	Average losing trade	\$ -1417.37
Ratio avg win/avg loss	2.71	Avg trade(win & loss)	\$ 652.13
Max consecutive winners	3	Max consecutive losers	8
Avg # bars in winners	68	Avg # bars in losers	26
Max intraday drawdown	\$ -25100.00	Max # contracts held	1
Profit factor	1.76	Return on account	218%
Account size required	\$ 28100.00		

Figure 4.60: 9-,18-, 36-MA: NY Heating Oil

Total net profit	\$ 67474.01	Open position P/L	\$ 8572.20
Gross profit	\$ 95206.80	Gross loss	\$ -27732.80
Total # of trades	59	Percent profitable	56%
Number winning trades	33	Number losing trades	26
Largest winning trade	\$ 12663.80	Largest losing trade	\$ -3497.80
Average winning trade	\$ 2885.05	Average losing trade	\$ -1066.65
Ratio avg win/avg loss	2.70	Avg trade(win & loss)	\$ 1143.63
Max consecutive winners	5	Max consecutive losers	6
Avg # bars in winners	62	Avg # bars in losers	33
Max intraday drawdown	\$ -8525.60		
Profit factor	3.43	Max # contracts held	1
Account size required	\$ 11525.60	Return on account	585%

Figure 4.61: 9-,18-, 36-MA: Japanese Yen

Total net profit	\$ 78525.00	Open position P/L	\$ 0.00
Gross profit	\$ 142825.00	Gross loss	\$ -64300.00
Total # of trades	76	Percent profitable	50%
Number winning trades	38	Number losing trades	38
Largest winning trade	\$ 12637.50	Largest losing trade	\$ -6375.00
Average winning trade	\$ 3758.55	Average losing trade	\$ -1692.11
Ratio avg win/avg loss	2.22	Avg trade(win & loss)	\$ 1033.22
Max consecutive winners	6	Max consecutive losers	3
Avg # bars in winners	68	Avg # bars in losers	25
Max intraday drawdown	\$ -7912.50		
Profit factor	2.22	Max # contracts held	1
Account size required	\$ 7912.50	Return on account	992%

**Figure 4.62: 9-,18-, 36-MA: Lumber**

Total net profit	\$ -7553.60	Open position P/L	\$ -3.90
Gross profit	\$ 7334.90	Gross loss	\$ -14888.50
Total # of trades	111	Percent profitable	26%
Number winning trades	29	Number losing trades	82
Largest winning trade	\$ 820.40	Largest losing trade	\$ -478.30
Average winning trade	\$ 252.93	Average losing trade	\$ -181.57
Ratio avg win/avg loss	1.39	Avg trade(win & loss)	\$ -68.05
Max consecutive winners	3	Max consecutive losers	8
Avg # bars in winners	78	Avg # bars in losers	28
Max intraday drawdown	\$ -7876.80		
Profit factor	0.49	Max # contracts held	1
Account size required	\$ 10876.80	Return on account	-69%

**Figure 4.63: 9-,18-, 36-MA: Orange Juice**

Total net profit	\$ -17285.00	Open position P/L	\$ 535.00
Gross profit	\$ 51355.00	Gross loss	\$ -68640.00
Total # of trades	115	Percent profitable	28%
Number winning trades	32	Number losing trades	83
Largest winning trade	\$ 7405.00	Largest losing trade	\$ -3110.00
Average winning trade	\$ 1604.84	Average losing trade	\$ -826.99
Ratio avg win/avg loss	1.94	Avg trade(win & loss)	\$ -150.30
Max consecutive winners	3	Max consecutive losers	9
Avg # bars in winners	82	Avg # bars in losers	23
Max intraday drawdown	\$ -28760.00		
Profit factor	0.75	Max # contracts held	1
Account size required	\$ 31760.00	Return on account	-54%

Figure 4.64: 9-,18-, 36-MA: Platinum

Total net profit	\$ 10545.00	Open position P/L	\$ 1720.00
Gross profit	\$ 83140.00	Gross loss	\$ -72595.00
Total # of trades	110	Percent profitable	35%
Number winning trades	38	Number losing trades	72
Largest winning trade	\$ 9725.00	Largest losing trade	\$ -2940.00
Average winning trade	\$ 2187.89	Average losing trade	\$ -1008.26
Ratio avg win/avg loss	2.17	Avg trade(win & loss)	\$ 95.86
Max consecutive winners	3	Max consecutive losers	7
Avg # bars in winners	69	Avg # bars in losers	27
Max intraday drawdown	\$ -15195.00		
Profit factor	1.15	Max # contracts held	1
Account size required	\$ 18195.00	Return on account	58%

Figure 4.65: 9-,18-, 36-MA: Pork Bellies

Total net profit	\$ -68940.00	Open position P/L	\$ -1316.00
Gross profit	\$ 132340.00	Gross loss	\$ -201280.00
Total # of trades	148	Percent profitable	31%
Number winning trades	46	Number losing trades	102
Largest winning trade	\$ 12400.00	Largest losing trade	\$ -5932.00
Average winning trade	\$ 2876.96	Average losing trade	\$ -1973.33
Ratio avg win/avg loss	1.46	Avg trade(win & loss)	\$ -465.81
Max consecutive winners	3	Max consecutive losers	10
Avg # bars in winners	66	Avg # bars in losers	24
Max intraday drawdown	\$ -74860.00		
Profit factor	0.66	Max # contracts held	1
Account size required	\$ 77860.00	Return on account	-89%

**Figure 4.66: 9-,18-, 36-MA: S&P Index**

Total net profit	\$ -16875.00	Open position P/L	\$ -15150.00
Gross profit	\$ 155600.00	Gross loss	\$-172475.00
Total # of trades	58	Percent profitable	34%
Number winning trades	20	Number losing trades	38
Largest winning trade	\$ 35875.00	Largest losing trade	\$ -12475.00
Average winning trade	\$ 7780.00	Average losing trade	\$ -4538.82
Ratio avg win/avg loss	1.71	Avg trade(win & loss)	\$ -290.95
Max consecutive winners	3	Max consecutive losers	8
Avg # bars in winners	59	Avg # bars in losers	26
Max intraday drawdown	\$ -57150.00		
Profit factor	0.90	Max # contracts held	1
Account size required	\$ 60150.00	Return on account	-28%

**Figure 4.67: 9-,18-, 36-MA: COMEX Silver**

Total net profit	\$ 196995.00	Open position P/L	\$ -170.00
Gross profit	\$ 374110.00	Gross loss	\$-177115.00
Total # of trades	138	Percent profitable	32%
Number winning trades	44	Number losing trades	94
Largest winning trade	\$ 93300.00	Largest losing trade	\$ -15825.00
Average winning trade	\$ 8502.50	Average losing trade	\$ -1884.20
Ratio avg win/avg loss	4.51	Avg trade(win & loss)	\$ 1427.50
Max consecutive winners	3	Max consecutive losers	9
Avg # bars in winners	62	Avg # bars in losers	23
Max intraday drawdown	\$ -34085.00		
Profit factor	2.11	Max # contracts held	1
Account size required	\$ 37085.00	Return on account	531%

**Figure 4.68: 9-,18-, 36-MA: Soybeans**

Total net profit	\$ -3348.00	Open position P/L	\$ 632.00
Gross profit	\$ 27576.00	Gross loss	\$ -30924.00
Total # of trades	140	Percent profitable	29%
Number winning trades	41	Number losing trades	99
Largest winning trade	\$ 2600.00	Largest losing trade	\$ -1424.00
Average winning trade	\$ 672.59	Average losing trade	\$ -312.36
Ratio avg win/avg loss	2.15	Avg trade(win & loss)	\$ -23.91
Max consecutive winners	4	Max consecutive losers	18
Avg # bars in winners	71	Avg # bars in losers	26
Max intraday drawdown	\$ -12070.00		
Profit factor	0.89	Max # contracts held	1
Account size required	\$ 15070.00	Return on account	-22%

**Figure 4.69: 9-,18-, 36-MA: Soybean Meal**

Total net profit	\$ 521200.00	Open position P/L	\$ 24600.00
Gross profit	\$1162500.00	Gross loss	\$-641300.00
Total # of trades	132	Percent profitable	42%
Number winning trades	56	Number losing trades	76
Largest winning trade	\$ 110900.00	Largest losing trade	\$ -51700.00
Average winning trade	\$ 20758.93	Average losing trade	\$ -8438.16
Ratio avg win/avg loss	2.46	Avg trade(win & loss)	\$ 3948.48
Max consecutive winners	5	Max consecutive losers	5
Avg # bars in winners	67	Avg # bars in losers	22
Max intraday drawdown	\$-126600.00		
Profit factor	1.81	Max # contracts held	1
Account size required	\$ 129600.00	Return on account	402%

**Figure 4.70: 9-,18-, 36-MA: Sugar**

Total net profit	\$ 50500.00	Open position P/L	\$ -450.00
Gross profit	\$ 142237.50	Gross loss	\$ -91737.50
Total # of trades	91	Percent profitable	48%
Number winning trades	44	Number losing trades	47
Largest winning trade	\$ 12725.00	Largest losing trade	\$ -6650.00
Average winning trade	\$ 3232.67	Average losing trade	\$ -1951.86
Ratio avg win/avg loss	1.66	Avg trade(win & loss)	\$ 554.95
Max consecutive winners	4	Max consecutive losers	5
Avg # bars in winners	66	Avg # bars in losers	23
Max intraday drawdown	\$ -20175.00		
Profit factor	1.55	Max # contracts held	1
Account size required	\$ 23175.00	Return on account	218%

**Figure 4.71: 9-,18-, 36-MA: Swiss Franc**

Total net profit	\$ -1476.00	Open position P/L	\$ 91.00
Gross profit	\$ 11821.00	Gross loss	\$ -13297.00
Total # of trades	107	Percent profitable	24%
Number winning trades	26	Number losing trades	81
Largest winning trade	\$ 2230.00	Largest losing trade	\$ -506.00
Average winning trade	\$ 454.65	Average losing trade	\$ -164.16
Ratio avg win/avg loss	2.77	Avg trade(win & loss)	\$ -13.79
Max consecutive winners	2	Max consecutive losers	12
Avg # bars in winners	90	Avg # bars in losers	30
Max intraday drawdown	\$ -5397.00		
Profit factor	0.89	Max # contracts held	1
Account size required	\$ 8397.00	Return on account	-18%



**Figure 4.72: 9-,18-, 36-MA: T-Bonds**

Total net profit	\$ -6553.00	Open position P/L	\$ -67.00
Gross profit	\$ 2634.00	Gross loss	\$ -9187.00
Total # of trades	79	Percent profitable	20%
Number winning trades	16	Number losing trades	63
Largest winning trade	\$ 634.00	Largest losing trade	\$ -295.00
Average winning trade	\$ 164.63	Average losing trade	\$ -145.83
Ratio avg win/avg loss	1.13	Avg trade(win & loss)	\$ -82.95
Max consecutive winners	3	Max consecutive losers	12
Avg # bars in winners	87	Avg # bars in losers	31
Max intraday drawdown	\$ -6657.00		
Profit factor	0.29	Max # contracts held	1
Account size required	\$ 9657.00	Return on account	-68%

**Figure 4.73: 9-,18-, 36-MA: CBT Wheat**

## Performance Summary: All Trades

Total net profit	\$ -12486.00	Open position P/L	\$ 828.00
Gross profit	\$ 8710.00	Gross loss	\$ -21196.00
Total # of trades	132	Percent profitable	20%
Number winning trades	26	Number losing trades	106
Largest winning trade	\$ 1008.00	Largest losing trade	\$ -686.00
Average winning trade	\$ 335.00	Average losing trade	\$ -199.96
Ratio avg win/avg loss	1.68	Avg trade(win & loss)	\$ -94.59
Max consecutive winners	3	Max consecutive losers	28
Avg # bars in winners	80	Avg # bars in losers	30
Max intraday drawdown	\$ -13108.00		
Profit factor	0.41	Max # contracts held	1
Account size required	\$ 16108.00	Return on account	-78%

The 9-day, 18-day and 36-day MA method appears to be more effective than the 4-day, 9-day, 18-day method: some markets showed significantly better results. Crude oil, for example, which showed a maximum drawdown of over \$10,000 on the 4-day, 9-day, 18-day method, showed higher net profits and only an approximate \$2,450 maximum drawdown on the 9-day, 18-day, 36-day MA approach. In addition, the percentage of profitable trades jumped sharply. The S&P Index went from a net loser under the 4-day, 9-day, 18-day method to a net winner in the 9-day, 18-day, 36-day condition. But examine the results for yourself and be the judge.

### **THE 14-DAY, 28-DAY AND 54-DAY MOVING AVERAGE SYSTEM**

A long-term approach to moving averages should lead to fewer signals and a large per trade profit. Accordingly, I also tested the 14-day, 28-day, and 54-day moving-average approach. The trading rules here are similar to those of the previous triple moving-average systems I have examined, but the MA periods are longer. A buy signal is generated when the 14-day and 28-day MAs are greater than the 54-day MA, and a sell signal is generated when the 14-day and 28-day MAs are less than the 54-day MA. Figure 4-74 illustrates the signals. Now let's examine the historical performance of this approach by market categories.

#### **The 14-Day, 28-Day and 54-Day MA System in Bull Markets**

Results of this approach in bull markets were generally as anticipated. Only three to four signals were generated for each market due to the length of the moving averages, and the overall profit per signal was considerably greater. Results for bull markets alone were most impressive, with a large profit per trade and only approximately 105 trades for the entire bull market data file. In many cases there were no signals whatsoever. I consider this to be an asset rather than a liability. In other words, the ability of a trading system to keep a trader out of certain markets is not necessarily a bad feature. Figure 4-75 shows the results for bull markets using this MA combination.



**Figure 4.75: Performance of 14-, 28-, and 54-Day MA in Bull Markets**

<b>BUY SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
360	15.56	(\$933.03)	(\$335,891.94)
<b>SELL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
407	48.16	\$2,239.97	\$910,852.75
<b>TOTAL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
767	32.86	\$749.62	\$574,960.81

### **The 14-Day, 28-Day and 54-Day MA System in Bear Markets**

Results of this approach in bear markets should also be profitable if the system performs well in trending markets. The test results illustrate that this was indeed the case. In most cases there were only two to five signals per contract, and the average profit per trade was larger than that of shorter term moving averages. See Figure 4-76.

### **The 14-Day, 28-Day and 54-Day MA System in Choppy Bear Markets**

This combination of MAs did not fare well in choppy bear markets. Although there were not many signals per contract, the overall results showed a loss. Clearly, this suggests that longer MAs are more dependent upon trending markets than shorter term MAs. If this is true, then we should also expect to see poor results in choppy bull markets. Performance of the 14-day, 28-day and 54-day MA system in choppy bear markets is shown in Figure 4-77.

### **The 14-Day, 28-Day and 54-Day MA System in Choppy Bull Markets**

The choppy bull market test did not reveal an overall loss. While it showed a net profit, the bottom line results were not impressive, still suggesting that the long-term MAs may be more dependent upon a strongly trending market than are the shorter-term MAs. Clearly, the issue of selecting an optimum MA combination becomes one of balancing several variables such as number of trades, profit per trade, drawdown and market trend. Results of the 14-day, 28-day, and 54-day MA system in choppy bull markets is shown in Figure 4-78.

**Figure 4.76: Performance of 14-, 28-, and 54-Day MA in Bear Markets**

<b>BUY SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
553	51.72	\$1,756.95	\$971,592.44
<b>SELL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
483	15.94	(\$1,120.92)	(\$541,403.31)
<b>TOTAL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
1036	35.04	\$415.24	\$430,189.12

**Figure 4.77: Performance of 14-, 28-, and 54-Day MA in Choppy Bear Markets**

		<b>BUY SIGNALS</b>	
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
286	46.5	\$957.63	\$273,882.56
		<b>SELL SIGNALS</b>	
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
254	11.42	(\$803.46)	(\$204,079.94)
		<b>TOTAL SIGNALS</b>	
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
540	30	\$129.26	\$69,802.63

**Figure 4.78: Performance of 14-, 28-, and 54-Day MA in Choppy Bull Markets**

		<b>BUY SIGNALS</b>	
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
363	15.98	(\$1,946.28)	(\$706,499.44)
		<b>SELL SIGNALS</b>	
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
398	47.99	\$2,217.58	\$882,596.44
		<b>TOTAL SIGNALS</b>	
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
761	32.72	\$231.40	\$176,097.00



### **The 14-Day, 28-Day and 54-Day MA System in Bull/Bear Markets**

If previous experience with the triple MA is any guide, then we ought to expect performance in bull/bear markets to be positive. It was. As you can see from the results in Figure 4-79, an overall profit was generated, along with a reasonably low number of trades. We should expect essentially similar performance in the bear/bull market category.

### **The 14-Day, 28-Day and 54-Day MA System in Bear/Bull Markets**

Expectations for performance of this approach in bear/bull markets were verified as the system test turned in an overall profit and a reasonably small number of trades per market. Again, we have an indication that trend is a more important consideration than trend change when it comes to the performance of longer term triple MA systems. Figure 4-80 shows the results of this test.

### **The 14-Day, 28-Day and 54-Day MA System in Bull/Bear/Bull Markets**

Based on previous findings we would expect performance of this MA combination to be positive in the bull/bear/bull market category. An examination of the summary in Figure 4-81 shows this, in fact, to have been the case. Again we have evidence that trend is very important, more important in fact than trend change. Traders often express concern about how MA systems perform in markets which change trend. This did not appear to be a cause for concern. Rather, it was the “integrity” of trend that was important.

**Figure 4.79: Performance of 14-, 28-, and 54-Day MA in Bull/Bear Markets**

<b>BUY SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
528	45.45	\$966.95	\$510,548.75
<b>SELL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
524	26.34	\$233.58	\$122,397.44
<b>TOTAL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
1052	35.93	\$601.66	\$632,946.25

**Figure 4.80: Performance of 14-, 28-, and 54-Day MA in Bear/Bull Markets**

<b>BUY SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
507	29.59	\$19.52	\$9,895.07
<b>SELL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
520	46.35	\$1,049.50	\$545,738.87
<b>TOTAL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
1027	38.07	\$541.03	\$555,633.94

**Figure 4.81: Performance of 14-, 28-, and 54-Day MA in Bull/Bear/Bull Markets**

<b>BUY SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
122	31.15	(\$11.03)	(\$1,345.79)
<b>SELL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
154	45.45	\$1,297.96	\$199,886.37
<b>TOTAL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
276	39.13	\$719.35	\$198,540.56

### **14-Day, 28-Day and 54-Day MA System in Bear/Bull/Bear Markets**

We would expect performance in this category also to yield positive results. In other words, if trend is the single most important consideration in system performance, then the bear/bull/bear category should yield profitable results. It did. The results are shown in Figure 4-82.

### **The 14-Day, 28-Day and 54-Day MA System in Whipsaw Markets**

Finally, the whipsaw market category should show overall losses if our expectations are correct. Once again, the results were verified by testing, as you can see in Figure 4-83. Clearly, this is the final and most important piece of evidence supporting the conclusion that trending markets are very important in the profitable performance of MA systems.

## **TEST RESULTS USING SYSTEM WRITER PLUS (SWP)**

In order to validate the test results in a more global fashion, I tested the 14-day, 28-day, 54-day MA method on SWP. The test rules were as described earlier, and no optimization was used. In order to more realistically reflect actual market conditions and show the system's worst-case performance, we deducted \$100 slippage and commission for each trade. Markets tested were live cattle, cocoa, pork bellies, copper, cotton, coffee, orange juice, platinum, silver, soybeans, soybean meal, sugar, wheat, Swiss Francs, gold, TBonds, Japanese Yen, heating oil, Eurodollar, S&P Index and Crude Oil. Even without optimization or filtering of trades the results were impressive. Figures 4-75 through 4-83 summarize the market-by-market performance of this method. As you can see, some markets were losers, but many markets were large winners. Furthermore, drawdown was rather large in some cases and there is some question as to whether an individual would have actually been able to

trade this approach given the drawdown. Yet with some minor optimization and filtering, this method appears to have good potential. Overall test results for the 14-day, 28-day, 54-day MA method are shown in Figures 4-84 through 4-105.

**Figure 4.82: Performance of 14-, 28-, and 54-Day MA in Bear/Bull/Bear Markets**

<b>BUY SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
144	38.89	\$395.88	\$57,006.37
<b>SELL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
116	39.66	\$271.61	\$31,506.51
<b>TOTAL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
260	39.23	\$340.43	\$88,512.88

**Figure 4.83: Performance of 14-, 28-, and 54-Day MA in Whipsaw Markets**

<b>BUY SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
400	25.75	(\$363.39)	(\$145,356.12)
<b>SELL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
390	23.08	(\$502.40)	(\$195,934.44)
<b>TOTAL SIGNALS</b>			
Total Number of Signals	% Signals Profitable	Average Trade \$ +/-	Total Profit/Loss \$ +/-
790	24.43	(\$432.01)	(\$341,290.56)

**Figure 4.84: 14-, 28-, 54-MA: Live Cattle**

Total net profit	\$ 12640.00	Open position P/L	\$ 5940.00
Gross profit	\$ 51944.00	Gross loss	\$ -39304.00
Total # of trades	51	Percent profitable	41%
Number winning trades	21	Number losing trades	30
Largest winning trade	\$ 7372.00	Largest losing trade	\$ -2972.00
Average winning trade	\$ 2473.52	Average losing trade	\$ -1310.13
Ratio avg win/avg loss	1.89	Avg trade(win & loss)	\$ 247.84
Max consecutive winners	3	Max consecutive losers	4
Avg # bars in winners	104	Avg # bars in losers	41
Max intraday drawdown	\$ -9688.00		
Profit factor	1.32	Max # contracts held	1
Account size required	\$ 12688.00	Return on account	100%

**Figure 4.85: 14-, 28-, 54-MA: Cocoa**

Total net profit	\$ -6499.00	Open position P/L	\$ 140.00
Gross profit	\$ 1821.00	Gross loss	\$ -8320.00
Total # of trades	48	Percent profitable	21%
Number winning trades	10	Number losing trades	38
Largest winning trade	\$ 770.00	Largest losing trade	\$ -426.00
Average winning trade	\$ 182.10	Average losing trade	\$ -218.95
Ratio avg win/avg loss	0.83	Avg trade(win & loss)	\$ -135.40
Max consecutive winners	2	Max consecutive losers	12
Avg # bars in winners	105	Avg # bars in losers	42
Max intraday drawdown	\$ -7368.00		
Profit factor	0.22	Max # contracts held	1
Account size required	\$ 10368.00	Return on account	-63%



**Figure 4.86: 14-, 28-, 54-MA: Coffee**

Total net profit	\$ 405700.00	Open position P/L	\$ 14000.00
Gross profit	\$ 787660.00	Gross loss	\$ -381960.00
Total # of trades	68	Percent profitable	44%
Number winning trades	30	Number losing trades	38
Largest winning trade	\$ 153650.00	Largest losing trade	\$ -35650.00
Average winning trade	\$ 26255.33	Average losing trade	\$ -10051.58
Ratio avg win/avg loss	2.61	Avg trade(win & loss)	\$ 5966.18
Max consecutive winners	3	Max consecutive losers	6
Avg # bars in winners	97	Avg # bars in losers	34
Max intraday drawdown	\$ -107720.00		
Profit factor	2.06	Max # contracts held	1
Account size required	\$ 110720.00	Return on account	366%

**Figure 4.87: 14-, 28-, 54-MA: Copper**

Total net profit	\$ 25850.00	Open position P/L	\$ 1700.00
Gross profit	\$ 92362.50	Gross loss	\$ -66512.50
Total # of trades	74	Percent profitable	30%
Number winning trades	22	Number losing trades	52
Largest winning trade	\$ 15862.50	Largest losing trade	\$ -3925.00
Average winning trade	\$ 4198.30	Average losing trade	\$ -1279.09
Ratio avg win/avg loss	3.28	Avg trade(win & loss)	\$ 349.32
Max consecutive winners	3	Max consecutive losers	10
Avg # bars in winners	115	Avg # bars in losers	33
Max intraday drawdown	\$ -23662.50		
Profit factor	1.39	Max # contracts held	1
Account size required	\$ 26662.50	Return on account	97%

**Figure 4.88: 14-, 28-, 54-MA: Cotton**

Total net profit	\$ 5664.00	Open position P/L	\$ 637.00
Gross profit	\$ 25379.00	Gross loss	\$ -19715.00
Total # of trades	76	Percent profitable	39%
Number winning trades	30	Number losing trades	46
Largest winning trade	\$ 4750.00	Largest losing trade	\$ -1303.00
Average winning trade	\$ 845.97	Average losing trade	\$ -428.59
Ratio avg win/avg loss	1.97	Avg trade(win & loss)	\$ 74.53
Max consecutive winners	4	Max consecutive losers	6
Avg # bars in winners	102	Avg # bars in losers	31
Max intraday drawdown	\$ -5956.00	Max # contracts held	1
Profit factor	1.29	Return on account	63%
Account size required	\$ 8956.00		

**Figure 4.89: 14-, 28-, 54-MA: NY Light Crude Oil**

Total net profit	\$ 26740.00	Open position P/L	\$ 6210.00
Gross profit	\$ 49110.00	Gross loss	\$ -22370.00
Total # of trades	31	Percent profitable	52%
Number winning trades	16	Number losing trades	15
Largest winning trade	\$ 10350.00	Largest losing trade	\$ -3710.00
Average winning trade	\$ 3069.38	Average losing trade	\$ -1491.33
Ratio avg win/avg loss	2.06	Avg trade(win & loss)	\$ 862.58
Max consecutive winners	3	Max consecutive losers	4
Avg # bars in winners	93	Avg # bars in losers	25
Max intraday drawdown	\$ -14180.00	Max # contracts held	1
Profit factor	2.20	Return on account	189%
Account size required	\$ 14180.00		

**Figure 4.90: 14-, 28-, 54-MA: Eurodollar**

Total net profit	\$ 12375.00	Open position P/L	\$ 350.00
Gross profit	\$ 40900.00	Gross loss	\$ -28525.00
Total # of trades	32	Percent profitable	44%
Number winning trades	14	Number losing trades	18
Largest winning trade	\$ 16200.00	Largest losing trade	\$ -6925.00
Average winning trade	\$ 2921.43	Average losing trade	\$ -1584.72
Ratio avg win/avg loss	1.84	Avg trade(win & loss)	\$ 386.72
Max consecutive winners	3	Max consecutive losers	5
Avg # bars in winners	104	Avg # bars in losers	40
Max intraday drawdown	\$ -11525.00	Max # contracts held	1
Profit factor	1.43	Return on account	85%
Account size required	\$ 14525.00		

**Figure 4.91: 14-, 28-, 54-MA: COMEX Gold**

Total net profit	\$ 47080.00	Open position P/L	\$ -3080.00
Gross profit	\$ 116270.00	Gross loss	\$ -69190.00
Total # of trades	61	Percent profitable	39%
Number winning trades	24	Number losing trades	37
Largest winning trade	\$ 26450.00	Largest losing trade	\$ -8170.00
Average winning trade	\$ 4844.58	Average losing trade	\$ -1870.00
Ratio avg win/avg loss	2.59	Avg trade(win & loss)	\$ 771.80
Max consecutive winners	3	Max consecutive losers	8
Avg # bars in winners	109	Avg # bars in losers	36
Max intraday drawdown	\$ -18130.00	Max # contracts held	1
Profit factor	1.68	Return on account	223%
Account size required	\$ 21130.00		

**Figure 4.92: 14-, 28-, 54-MA: NY Heating Oil**

Total net profit	\$ 9720.21	Open position P/L	\$ 6245.40
Gross profit	\$ 57367.00	Gross loss	\$ -47646.79
Total # of trades	49	Percent profitable	41%
Number winning trades	20	Number losing trades	29
Largest winning trade	\$ 9761.60	Largest losing trade	\$ -9886.00
Average winning trade	\$ 2868.35	Average losing trade	\$ -1642.99
Ratio avg win/avg loss	1.75	Avg trade(win & loss)	\$ 198.37
Max consecutive winners	4	Max consecutive losers	4
Avg # bars in winners	86	Avg # bars in losers	40
Max intraday drawdown	\$ -13204.00	Max # contracts held	1
Profit factor	1.20	Return on account	60%
Account size required	\$ 16204.00		

**Figure 4.93: 14-, 28-, 54-MA: Japanese Yen**

Total net profit	\$ 44412.50	Open position P/L	\$ -1325.00
Gross profit	\$ 106225.00	Gross loss	\$ -61812.50
Total # of trades	47	Percent profitable	47%
Number winning trades	22	Number losing trades	25
Largest winning trade	\$ 21437.50	Largest losing trade	\$ -5775.00
Average winning trade	\$ 4828.41	Average losing trade	\$ -2472.50
Ratio avg win/avg loss	1.95	Avg trade(win & loss)	\$ 944.95
Max consecutive winners	3	Max consecutive losers	6
Avg # bars in winners	118	Avg # bars in losers	36
Max intraday drawdown	\$ -19625.00	Max # contracts held	1
Profit factor	1.72	Return on account	196%
Account size required	\$ 22625.00		

**Figure 4.94: 14-, 28-, 54-MA: Lumber**

Total net profit	\$ -4115.20	Open position P/L	\$ 566.80
Gross profit	\$ 6115.80	Gross loss	\$ -10231.00
Total # of trades	71	Percent profitable	27%
Number winning trades	19	Number losing trades	52
Largest winning trade	\$ 867.20	Largest losing trade	\$ -527.70
Average winning trade	\$ 321.88	Average losing trade	\$ -196.75
Ratio avg win/avg loss	1.64	Avg trade(win & loss)	\$ -57.96
Max consecutive winners	4	Max consecutive losers	16
Avg # bars in winners	113	Avg # bars in losers	43
Max intraday drawdown	\$ -4115.20	Max # contracts held	1
Profit factor	0.60	Return on account	-100%
Account size required	\$ 4115.20		

**Figure 4.95: 14-, 28-, 54-MA: Orange Juice**

Total net profit	\$ 4525.00	Open position P/L	\$ -940.00
Gross profit	\$ 41235.00	Gross loss	\$ -36710.00
Total # of trades	74	Percent profitable	39%
Number winning trades	29	Number losing trades	45
Largest winning trade	\$ 7555.00	Largest losing trade	\$ -3030.00
Average winning trade	\$ 1421.90	Average losing trade	\$ -815.78
Ratio avg win/avg loss	1.74	Avg trade(win & loss)	\$ 61.15
Max consecutive winners	4	Max consecutive losers	8
Avg # bars in winners	100	Avg # bars in losers	37
Max intraday drawdown	\$ -17580.00	Max # contracts held	1
Profit factor	1.12	Return on account	22%
Account size required	\$ 20580.00		

**Figure 4.96: 14-, 28-, 54-MA: Platinum**

Total net profit	\$ 26450.00	Open position P/L	\$ 4220.00
Gross profit	\$ 82345.00	Gross loss	\$ -55895.00
Total # of trades	70	Percent profitable	34*
Number winning trades	24	Number losing trades	46
Largest winning trade	\$ 9920.00	Largest losing trade	\$ -4110.00
Average winning trade	\$ 3431.04	Average losing trade	\$ -1215.11
Ratio avg win/avg loss	2.82	Avg trade(win & loss)	\$ 377.86
Max consecutive winners	3	Max consecutive losers	7
Avg # bars in winners	119	Avg # bars in losers	35
Max intraday drawdown	\$ -15085.00		
Profit factor	1.47	Max # contracts held	1
Account size required	\$ 18085.00	Return on account	146*

**Figure 4.97: 14-, 28-, 54-MA: Pork Bellies**

Total net profit	\$ 5988.00	Open position P/L	\$ -1520.00
Gross profit	\$ 112624.00	Gross loss	\$ -106636.00
Total # of trades	90	Percent profitable	39*
Number winning trades	35	Number losing trades	55
Largest winning trade	\$ 12020.00	Largest losing trade	\$ -7020.00
Average winning trade	\$ 3217.83	Average losing trade	\$ -1938.84
Ratio avg win/avg loss	1.66	Avg trade(win & loss)	\$ 66.53
Max consecutive winners	3	Max consecutive losers	10
Avg # bars in winners	99	Avg # bars in losers	36
Max intraday drawdown	\$ -33420.00		
Profit factor	1.06	Max # contracts held	1
Account size required	\$ 36420.00	Return on account	16*

**Figure 4.98: 14-, 28-, 54-MA: S&P Index**

Total net profit	\$ 44175.00	Open position P/L	\$ 11275.00
Gross profit	\$ 165500.00	Gross loss	\$-121325.00
Total # of trades	36	Percent profitable	28%
Number winning trades	10	Number losing trades	26
Largest winning trade	\$ 42875.00	Largest losing trade	\$ -11450.00
Average winning trade	\$ 16550.00	Average losing trade	\$ -4666.35
Ratio avg win/avg loss	3.55	Avg trade(win & loss)	\$ 1227.08
Max consecutive winners	3	Max consecutive losers	6
Avg # bars in winners	121	Avg # bars in losers	34
Max intraday drawdown	\$ -39925.00		
Profit factor	1.36	Max # contracts held	1
Account size required	\$ 39925.00	Return on account	111%

**Figure 4.99: 14-, 28-, 54-MA: COMEX Silver**

Total net profit	\$ 201180.00	Open position P/L	\$ 6160.00
Gross profit	\$ 333115.00	Gross loss	\$-131935.00
Total # of trades	74	Percent profitable	42%
Number winning trades	31	Number losing trades	43
Largest winning trade	\$ 98340.00	Largest losing trade	\$ -24300.00
Average winning trade	\$ 10745.65	Average losing trade	\$ -3068.26
Ratio avg win/avg loss	3.50	Avg trade(win & loss)	\$ 2718.65
Max consecutive winners	3	Max consecutive losers	6
Avg # bars in winners	110	Avg # bars in losers	31
Max intraday drawdown	\$ -43700.00		
Profit factor	2.52	Max # contracts held	1
Account size required	\$ 46700.00	Return on account	431%

**Figure 4.100: 14-, 28-, 54-MA: Soybeans**

Total net profit	\$ 3906.00	Open position P/L	\$ 640.00
Gross profit	\$ 22770.00	Gross loss	\$ -18864.00
Total # of trades	88	Percent profitable	41%
Number winning trades	36	Number losing trades	52
Largest winning trade	\$ 4120.00	Largest losing trade	\$ -1592.00
Average winning trade	\$ 632.50	Average losing trade	\$ -362.77
Ratio avg win/avg loss	1.74	Avg trade(win & loss)	\$ 44.39
Max consecutive winners	5	Max consecutive losers	5
Avg # bars in winners	98	Avg # bars in losers	37
Max intraday drawdown	\$ -3412.00		
Profit factor	1.21	Max # contracts held	1
Account size required	\$ 6412.00	Return on account	61%

**Figure 4.101: 14-, 28-, 54-MA: Soybean Meal**

Total net profit	\$ 498900.00	Open position P/L	\$ 22400.00
Gross profit	\$1125200.00	Gross loss	\$-626300.00
Total # of trades	89	Percent profitable	42%
Number winning trades	37	Number losing trades	52
Largest winning trade	\$ 148400.00	Largest losing trade	\$ -61100.00
Average winning trade	\$ 30410.81	Average losing trade	\$ -12044.23
Ratio avg win/avg loss	2.52	Avg trade(win & loss)	\$ 5605.62
Max consecutive winners	4	Max consecutive losers	4
Avg # bars in winners	97	Avg # bars in losers	35
Max intraday drawdown	\$-125600.00		
Profit factor	1.80	Max # contracts held	1
Account size required	\$ 128600.00	Return on account	388%



Figure 4.102: 14-, 28-, 54-MA: Sugar

Total net profit	\$ 3429.00	Open position P/L	\$ 531.00
Gross profit	\$ 11580.00	Gross loss	\$ -8151.00
Total # of trades	61	Percent profitable	25%
Number winning trades	15	Number losing trades	46
Largest winning trade	\$ 4084.00	Largest losing trade	\$ -1079.00
Average winning trade	\$ 772.00	Average losing trade	\$ -177.20
Ratio avg win/avg loss	4.36	Avg trade(win & loss)	\$ 56.21
Max consecutive winners	2	Max consecutive losers	10
Avg # bars in winners	153	Avg # bars in losers	50
Max intraday drawdown	\$ -2801.00	Max # contracts held	1
Profit factor	1.42	Return on account	59%
Account size required	\$ 5801.00		

Figure 4.103: 14-, 28-, 54-MA: Swiss Franc

Total net profit	\$ 73525.00	Open position P/L	\$ -3687.50
Gross profit	\$ 131062.50	Gross loss	\$ -57537.50
Total # of trades	47	Percent profitable	47%
Number winning trades	22	Number losing trades	25
Largest winning trade	\$ 17625.00	Largest losing trade	\$ -5725.00
Average winning trade	\$ 5957.39	Average losing trade	\$ -2301.50
Ratio avg win/avg loss	2.59	Avg trade(win & loss)	\$ 1564.36
Max consecutive winners	5	Max consecutive losers	5
Avg # bars in winners	137	Avg # bars in losers	36
Max intraday drawdown	\$ -17837.50	Max # contracts held	1
Profit factor	2.28	Return on account	353%
Account size required	\$ 20837.50		

**Figure 4.104: 14-, 28-, 54-MA: T-Bonds**

Total net profit	\$ -4248.00	Open position P/L	\$ 172.00
Gross profit	\$ 1819.00	Gross loss	\$ -6067.00
Total # of trades	53	Percent profitable	19%
Number winning trades	10	Number losing trades	43
Largest winning trade	\$ 695.00	Largest losing trade	\$ -297.00
Average winning trade	\$ 181.90	Average losing trade	\$ -141.09
Ratio avg win/avg loss	1.29	Avg trade(win & loss)	\$ -80.15
Max consecutive winners	2	Max consecutive losers	15
Avg # bars in winners	106	Avg # bars in losers	51
Max intraday drawdown	\$ -4282.00		
Profit factor	0.30	Max # contracts held	1
Account size required	\$ 7282.00	Return on account	-58%

**Figure 4.105: 14-, 28-, 54-MA: CBT Wheat**

Total net profit	\$ -8128.00	Open position P/L	\$ 844.00
Gross profit	\$ 7368.00	Gross loss	\$ -15496.00
Total # of trades	90	Percent profitable	23%
Number winning trades	21	Number losing trades	69
Largest winning trade	\$ 1882.00	Largest losing trade	\$ -720.00
Average winning trade	\$ 350.86	Average losing trade	\$ -224.58
Ratio avg win/avg loss	1.56	Avg trade(win & loss)	\$ -90.31
Max consecutive winners	3	Max consecutive losers	14
Avg # bars in winners	106	Avg # bars in losers	44
Max intraday drawdown	\$ -8854.00		
Profit factor	0.48	Max # contracts held	1
Account size required	\$ 11854.00	Return on account	-69%

## RESULTS OF TRIPLE MOVING-AVERAGE STUDIES

My tests of the triple MA approach lead to the following conclusions:

1. The triple MA approach is an effective method which has yielded profitable results in back-testing.

2. The importance of trend was verified as a significant factor in the profitable performance of triple MA systems.

3. The systems did well in bull markets, bear markets, choppy bull and bear markets and markets which made transitions from bullish to bearish or from bearish to bullish. The systems also performed well in markets which had three distinct bullish or bearish patterns.

4. Clearly, the importance of avoiding “whipsaw” markets was verified, however, it was also demonstrated that trend changes and choppy trending markets did not pose serious drawbacks to the overall performance of triple MA systems.

5. The expectation that buy signals would perform best in bull markets and sell signals best in bear markets was also verified. This suggests that a method or methods for filtering signals by market category could yield very positive results. In other words, a technique for following buy signals in bull market only and sell signals in bear markets only should be investigated.

6. Accordingly, it behooves the trader to develop, formulate, test and apply a method or methods to filter out “whipsaw” markets. Whether this can actually be achieved is still debatable. yet be answered.

7. Traders should seriously consider their method(s) for dealing with contract switches. Simply closing out a trade when a contract is near expiration or prior to the first delivery notice day and not reinstating a position may significantly diminish performance. A good technique might be to roll into the next active contract month upon liquidation of the current position until an signal opposite from the current one is generated.



## Day-of-Week Studies

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Some traders feel that certain days of the week are more important than others. For many years I have heard traders claim that Tuesdays are important days for price reversals; that a strong close on Friday often brings an up-move the coming Monday; that a weak close on Friday brings a lower market on the coming Monday; and so on. In addition, many traders feel that certain closing price patterns are important—for example, they assert that four days of higher closes in succession tend to be followed by a lower close on the fifth day. As romantic as these ideas may seem, and as reliable as they may be over the short run, I have often asked myself if they can pass the test of time when subjected to lengthy historical examination. This chapter evaluates a number of different approaches to such patterns.

### **PRE-HOLIDAY BEHAVIOR**

In my 1989 book, *Seasonal Concepts in Futures Trading*, I noted that :

*price behavior prior to important holidays, and fundamental events such as discount rate cuts, elections, etc. Merrill clearly showed that prices for the Dow Jones Industrial Average had some very definite tendencies before*

and after legal and religious holidays. Figure 5-1 shows some of the relationships he discovered using statistics spanning the period from January 1897 through December 1983. You can see that Merrill used a lengthy data sample in order to validate his theory to a large sample.

Such "daily" seasonality is not unique to commodity prices. In fact, Arthur A. Merrill, in his classic book *The Behavior of Prices on Wall Street*, gave many examples of price behavior prior to important holidays, events and so forth. I have already quoted from the work of Art Merrill, who clearly showed that prices for the Dow Jones Industrial Average had some very definite tendencies before and after legal and religious holidays. Figure 5-1 shows some of the relationships he discovered using statistics spanning the period from January 1897 through December 1983. You can see that Merrill used a lengthy data sample in order to subject his theory to a valid test.

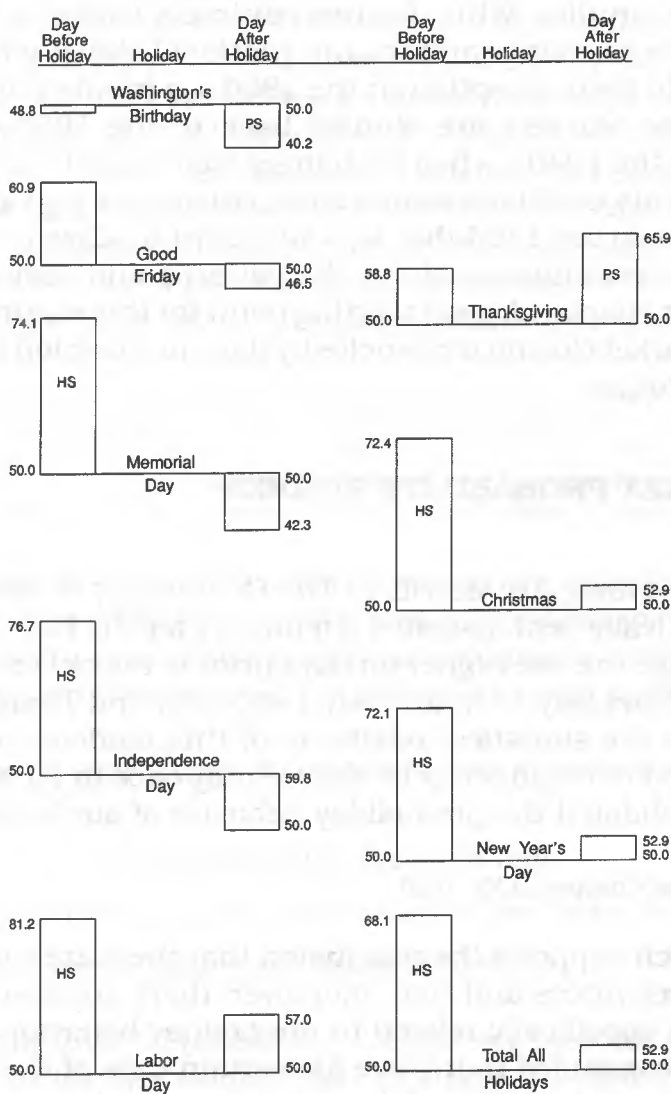
Note that the abbreviation HS stands for highly significant, PS for probably significant and S for significant. These abbreviations are associated with different levels of statistical confidence or reliability. The HS or highly significant readings are those which have a one in a thousand times probability of being a chance event. In other words, these are particularly significant results!

It is quite clear to me from Merrill's studies that pre-holiday behavior is a statistically valid phenomenon in the Dow Jones Industrial Average. While it may not be strictly valid to extrapolate from these findings and conclude that futures prices also show statistically reliable pre-holiday behavior, my studies suggest that there is compelling initial evidence that such patterns indeed do exist. The present chapter will examine a variety of patterns related to either date or day of week.

I must point out at the outset that there is considerably less futures data at our disposal than there is stock market data. Most contemporary market analyses track ten to fifteen years' worth of data. In other words, they study the performance of their parameters

**Figure 5.1: Holiday Behavior**

Jan. 1897- Dec. 1983  
 (Percent of Years in Which the D-J Industrials  
 Posted an Increase for the Day - -)



Copyright 1984 © Arthur A. Merrill, *The Behavior of Prices on Wall Street*,  
 Analysis Press, Chappaqua, NY.

over the period from roughly the mid-to early-1970 s through to the present. As you know, I have attempted to include as much data as possible in my studies. While futures contracts traded at the Chicago Mercantile Exchange and the International Monetary Mart are tracked back to their inception in the 1960 s, a number of Chicago Board of Trade Markets are studied back to the 1920 s (with a hiatus during the 1940 s when exchanges were closed due to World War II). While this is still not as much data history as a good statistician would like to see, I feel that it is sufficient to allow us to reach some tentative conclusions about the patterns and indicators examined in this chapter. A good starting point for this excursion is to study daily market closing tendencies by date, in a fashion similar to Merrill's technique.

## DAILY MARKET PROBABILITY STUDIES

As I noted previously, Art Merrill, in *The Behavior of Prices on Wall Street*,<sup>1</sup> statistically demonstrated a tendency for the Dow Jones Industrial Average to close higher on days prior to major U.S. holidays such as New Years Day, Veterans Day, Labor Day and Thanksgiving. In some cases the statistical reliability of this tendency indicated that such an event could occur by chance only once in 10,000 times. This clearly validated the pre-holiday behavior of stock averages.

<sup>2</sup>Analysis Press, Chappaqua NY, 1980.

My research supports the conclusion that there are similar patterns in futures prices and that, moreover, there are also patterns which are not specifically related to pre-holiday behavior. In other words, I have concluded that there are certain days of the calendar year as well as certain strings of days (that is, several days in succession) which have in the past shown a tendency for up or down closings a majority of the time. *Although these findings are restricted to the length of my data history, their persistence suggests the presence of reliable calendar day tendencies.* Such tendencies are, to a certain extent, manifestations of seasonal price behavior.



We know that seasonality is an important variable in all data series, particularly those related to economic phenomena. Economists and statisticians regularly filter out seasonal factors in order to obtain what they feel is a more reliable and valid indication of secular trends. This is, indeed, a valid procedure in the search for long-term trend and cyclical patterns. Yet, as I have demonstrated in my previous studies, seasonal price behavior can be a valuable tool for futures traders as well as investors. The knowledge that prices in certain markets move in certain directions at given times of the year can be used as an adjunct to trading systems, or in combination with timing indicators, as a trading system unto itself.<sup>3</sup>

<sup>3</sup>I have already published the following studies and/or texts which demonstrate the existence and evaluate the reliability of seasonal patterns in cash, futures and futures spreads: *Seasonal Cash Charts* (1977-1990 Editions) and *Seasonal Futures Charts* (1977-1990 Editions); both available from MBH, P.O. Box 353, Winnetka, IL, 60093. *Seasonal Concepts in Futures Trading* (New York, John Wiley & Sons).

In order to determine whether there are significant calendar date patterns in closing futures prices, I developed my Daily Market Probability Studies, which examined closing price tendencies on a daily basis and provided data as follows for each market analyzed:

1. Percent of time prices have closed up or down for each calendar day.
2. Ranking of percent reliability for each day.
3. Average percent size of up or down move for each day.
4. Suggestions for using the above statistics.

The daily market probability statistics which are shown in this chapter provide the information in items 1-3 listed above. Each market and contract month has a separate listing which begins approximately six months prior to contract expiration and ends at approximately contract expiration. Due to limitations of space I have not been able to provide listings for all contract months of all markets; however, those I have provided will give you a good idea of what my daily market probability studies have shown.

## EXPLANATION OF PRINTOUTS/PRECAUTIONS AND LIMITATIONS

Figure 5-2 explains the data listed on each of the daily market probability study printouts. Please review the following additional explanatory notes:

1. Percent of time up or down readings are based on the amount of data analyzed for each of the printouts. The data lengths are as follows:

a) grains, soybean complex, meats, cotton, silver and copper, early to mid-1960s through 1988;

b) all others from start of futures trading through 1988.

2. Note that for markets such as S&P and TBonds the number of years of data history is limited and, as a consequence, percent readings are not as reliable as they might be for markets which have longer histories. Remember this when you use the daily market probability statistics in your trading program(s).

3. *These figures do not constitute a trading system.* They are merely historical listings which may or may not be of assistance in your own trading program or analytical methodology.

4. Stop losses should be used regardless of how high a given percent reading may be. Risk management is an integral aspect of successful futures trading.

5. The "+" and "-" signs in the far left column are interpreted as:

a) + = up close 60-70 percent of the time;

b) ++ = up close 71-79 percent of the time;

c) +++ = up close 80 percent of the time or more;

d) - = down close 60-70 percent of the time;

e) -- = down close 71-79 percent of the time;

f) --- = down close 80 percent of the time or more.

# Figure 5.2: Daily Market Probability Statistics

Month # and Symbol → 02LH - LIVE HOGS ← Market Name

File used: 02LH - LIVE HOGS

Calendar Date	Month/Day	% ---		Average ---		years -----			Total	# of Data Points
		Up	Down	Up	Down	Up	Down	Unchn		
	OCT 8	42	50	.008	-.010	6	7	1	14	
	OCT 9	53	33	.012	-.010	8	5	2	15	
	OCT 10	43	56	.017	-.016	7	9	0	16	
++	OCT 11	71	21	.011	-.013	10	3	1	14	
	OCT 12	46	53	.007	-.009	7	8	0	15	
	OCT 13	43	50	.013	-.017	7	8	1	16	
	OCT 14	53	40	.009	-.018	8	6	1	15	
	OCT 15	35	57	.011	-.014	5	8	1	14	
	OCT 16	53	40	.019	-.009	8	6	1	15	
	OCT 17	37	43	.015	-.013	6	7	3	16	
	OCT 18	26	60	.015	-.008	4	9	2	15	
	OCT 19	33	53	.011	-.012	5	8	2	15	
Rank of Down Closes	OCT 20	25	68	.007	-.012	4	11	1	16	
	OCT 21	50	50	.014	-.012	8	8	0	16	
	OCT 22	26	53	.019	-.013	4	8	3	15	
	OCT 23	25	56	.010	-.008	4	9	3	16	
	OCT 24	47	47	.008	-.009	8	8	1	17	
	OCT 25	33	60	.015	-.007	5	9	1	15	
	OCT 26	46	46	.008	-.016	7	7	1	15	
	OCT 27	56	43	.017	-.010	9	7	0	16	
	OCT 28	50	43	.007	-.015	8	7	1	16	
	OCT 29	40	53	.006	-.016	6	8	1	15	
	OCT 30	43	50	.017	-.014	7	8	1	16	
	OCT 31	47	41	.010	-.013	8	7	2	17	
	NOV 1	53	33	.009	-.011	8	5	2	15	
	NOV 2	35	50	.010	-.010	5	7	2	14	
	NOV 3	46	46	.007	-.010	7	7	1	15	
+++	NOV 4	80	13	.014	-.002	12	2	1	15	
+++	NOV 5	84	15	.015	-.002	11	2	0	13	
	NOV 6	50	43	.009	-.007	8	7	1	16	
	NOV 7	40	53	.011	-.010	6	8	1	15	
Rank of Up Closes	NOV 8	50	28	.013	-.013	7	4	3	14	
	NOV 9	46	40	.015	-.011	7	6	2	15	
	NOV 10	56	37	.010	-.009	9	6	1	16	
	NOV 11	56	31	.007	-.017	9	5	2	16	
	NOV 12	53	33	.007	-.020	8	3	2	15	
	NOV 13	37	56	.012	-.009	6	9	1	16	
+++	NOV 14	88	11	.013	-.009	15	2	0	17	
-	NOV 15	40	60	.010	-.010	6	9	0	15	
+	NOV 16	66	26	.009	-.014	10	4	1	15	
+	NOV 17	62	37	.012	-.007	10	6	0	16	
	NOV 18	50	43	.013	-.015	8	7	1	16	
	NOV 19	53	40	.011	-.007	8	6	1	15	
	NOV 20	43	43	.018	-.013	7	7	2	16	
	NOV 21	52	41	.011	-.008	9	7	1	17	

% of Time Close was Up or Down for This Date

Avg. % Size of Up or Down Move Compared to Previous Day

Figures 5-3 through 5-10 show listings for various markets. Please refer to the above explanations for instructions regarding their interpretation and application. Additional suggestions for application of such data are provided below.

### **SUGGESTIONS FOR USING THE DAILY MARKET PROBABILITY STATISTICS**

If you feel, as I do, that daily market probabilities constitute a valid approach to the isolation of repetitive patterns in the futures market, then consider the following ways in which they may be used as part of a trading program.

**As a filter to your trading signals.** Assume that your trading system has signalled a short sale. When you examine the daily listings for the given market you notice that the next three trading days have shown a high percent of time closing up for the day. This might lead you to filter the short signal. You might wait for the system to give a second sell signal before taking action. As an alternative, you might pass on the trade entirely, particularly if the percent of time readings are very high (i.e., 80 percent or higher).

**As a confirming indicator to your trading signals.** An adaptation of application #1 is to use the daily percent readings as a confirming indicator with your trading signals. Simply stated, this means that when your signals are to go long and when they are in agreement with strong percent of time up readings, then you will go long. When your signals are to go short, and when they are in agreement with strong percent of time down readings, you will go short. Finally, if there are no strong percent up or down readings, you will either take no action or you will trade exclusively with your signals.



Figure 5.3: (Continued)

File used: 07S - SOYBEANS

Month/ Day	% ---		Average --		Years -----				Total
	Up	Down	Up	Down	Up	Down	Unch		
++ MAR 9	70	29	.072	-.087	12	5	0	17	
- MAR 10	33	61	.032	-.104	6	11	1	18	
MAR 11	50	44	.089	-.044	9	8	1	18	
MAR 12	58	35	.086	-.121	10	6	1	17	
MAR 13	43	50	.104	-.111	7	8	1	16	
MAR 14	52	41	.074	-.111	9	7	1	17	
MAR 15	52	47	.097	-.090	9	8	0	17	
MAR 16	47	47	.072	-.094	8	8	1	17	
++ MAR 17	77	22	.127	-.090	14	4	0	18	
+ MAR 18	61	38	.076	-.111	11	7	0	18	
MAR 19	58	41	.067	-.063	10	7	0	17	
- MAR 20	31	68	.082	-.087	5	11	0	16	
MAR 21	47	52	.125	-.055	8	9	0	17	
MAR 22	41	58	.072	-.037	7	10	0	17	
MAR 23	41	52	.144	-.062	7	9	1	17	
MAR 24	56	43	.081	-.038	9	7	0	16	
MAR 25	38	55	.071	-.075	7	10	1	18	
MAR 26	47	52	.084	-.073	8	9	0	17	
- MAR 27	40	60	.101	-.115	6	9	0	15	
MAR 28	53	46	.063	-.069	8	7	0	15	
- MAR 29	35	64	.077	-.098	6	11	0	17	
MAR 30	41	52	.066	-.100	7	9	1	17	
++ MAR 31	75	25	.105	-.090	12	4	0	16	
APR 1	50	50	.101	-.105	8	8	0	16	
APR 2	41	58	.121	-.098	7	10	0	17	
APR 3	37	56	.106	-.151	6	9	1	16	
+ APR 4	66	26	.131	-.121	10	4	1	15	
+ APR 5	68	31	.092	-.152	11	5	0	16	
APR 6	58	35	.084	-.073	10	6	1	17	
+ APR 7	66	33	.105	-.073	12	6	0	18	
++ APR 8	75	18	.070	-.122	12	3	1	16	
APR 9	57	42	.133	-.069	8	6	0	14	
APR 10	37	56	.034	-.129	6	9	1	16	
++ APR 11	70	29	.059	-.095	12	5	0	17	
- APR 12	40	60	.188	-.089	6	9	0	15	
APR 13	50	43	.065	-.130	8	7	1	16	
APR 14	44	50	.079	-.078	8	9	1	18	
+ APR 15	61	38	.100	-.095	11	7	0	18	
APR 16	53	40	.066	-.059	8	6	1	15	
APR 17	50	50	.048	-.074	7	7	0	14	
APR 18	58	41	.079	-.088	10	7	0	17	
+ APR 19	64	29	.065	-.061	11	5	1	17	
+ APR 20	66	26	.066	-.120	10	4	1	15	
APR 21	33	55	.096	-.049	6	10	2	18	
APR 22	44	50	.083	-.073	8	9	1	18	

Figure 5.3: (Continued)

File used: 07S - SOYBEANS

Month/ Day	% ---		-- Average --		----- Years -----			
	Up	Down	Up	Down	Up	Down	Unch	Total
APR 23	41	58	.087	-.092	7	10	0	17
APR 24	50	43	.086	-.070	8	7	1	16
APR 25	52	41	.132	-.067	9	7	1	17
-- APR 26	29	70	.159	-.118	5	12	0	17
-- APR 27	29	70	.113	-.106	5	12	0	17
++ APR 28	72	22	.051	-.212	13	4	1	18
APR 29	44	55	.155	-.083	8	10	0	18
APR 30	52	47	.117	-.072	9	8	0	17
MAY 1	37	56	.072	-.075	6	9	1	16
MAY 2	43	43	.139	-.068	7	7	2	16
- MAY 3	35	64	.131	-.059	6	11	0	17
MAY 4	58	29	.054	-.145	10	5	2	17
MAY 5	55	44	.090	-.111	10	8	0	18
- MAY 6	33	61	.066	-.106	6	11	1	18
MAY 7	47	47	.119	-.074	8	8	1	17
++ MAY 8	75	25	.092	-.087	12	4	0	16
+++ MAY 9	82	17	.082	-.104	14	3	0	17
++ MAY 10	76	23	.085	-.089	13	4	0	17
+ MAY 11	64	35	.100	-.140	11	6	0	17
MAY 12	38	55	.079	-.100	7	10	1	18
+ MAY 13	66	33	.099	-.068	12	6	0	18
+ MAY 14	64	35	.100	-.046	11	6	0	17
MAY 15	43	56	.091	-.076	7	9	0	16
MAY 16	47	41	.138	-.054	8	7	2	17
- MAY 17	35	64	.069	-.096	6	11	0	17
MAY 18	58	41	.110	-.105	10	7	0	17
MAY 19	55	44	.050	-.085	10	8	0	18
+ MAY 20	61	38	.080	-.109	11	7	0	18
MAY 21	52	47	.117	-.077	9	8	0	17
MAY 22	50	50	.059	-.045	8	8	0	16
+ MAY 23	64	35	.078	-.119	11	6	0	17
MAY 24	41	58	.219	-.063	7	10	0	17
MAY 25	53	46	.142	-.113	8	7	0	15
- MAY 26	40	60	.091	-.073	6	9	0	15
+ MAY 27	62	37	.089	-.141	10	6	0	16
-- MAY 28	28	71	.022	-.069	4	10	0	14
MAY 29	38	53	.163	-.070	5	7	1	13
- MAY 30	40	60	.156	-.067	4	6	0	10
+ MAY 31	61	38	.167	-.108	8	5	0	13
JUN 1	58	41	.137	-.110	10	7	0	17
JUN 2	38	55	.081	-.145	7	10	1	18
JUN 3	55	38	.105	-.114	10	7	1	18
+ JUN 4	64	35	.120	-.055	11	6	0	17
+ JUN 5	62	37	.063	-.080	10	6	0	16
JUN 6	47	52	.122	-.153	8	9	0	17

Figure 5.3: (Concluded)

File used: 07S - SOYBEANS

Month/ Day	--- % ---		-- Average --		----- Years -----			
	Up	Down	Up	Down	Up	Down	Unch	Total
JUN 7	58	41	.118	-.264	10	7	0	17
JUN 8	47	52	.144	-.150	8	9	0	17
JUN 9	55	38	.103	-.099	10	7	1	18
JUN 10	44	55	.111	-.072	8	10	0	18
+ JUN 11	64	35	.216	-.062	11	6	0	17
- JUN 12	31	68	.120	-.045	5	11	0	16
JUN 13	47	47	.069	-.107	8	8	1	17
- JUN 14	35	64	.124	-.218	6	11	0	17
JUN 15	58	41	.197	-.112	10	7	0	17
JUN 16	52	47	.093	-.090	9	8	0	17
-- JUN 17	17	70	.158	-.124	3	12	2	17
JUN 18	58	41	.143	-.124	10	7	0	17
JUN 19	50	50	.082	-.078	8	8	0	16
+ JUN 20	62	37	.138	-.062	10	6	0	16
+ JUN 21	66	33	.149	-.148	10	5	0	15
+ JUN 22	62	37	.130	-.232	10	6	0	16
JUN 23	41	58	.181	-.076	7	10	0	17
JUN 24	47	52	.146	-.061	8	9	0	17
JUN 25	41	52	.092	-.144	7	9	1	17
JUN 26	37	56	.097	-.165	6	9	1	16
- JUN 27	37	62	.139	-.141	6	10	0	16
- JUN 28	33	60	.058	-.101	5	9	1	15
- JUN 29	37	62	.130	-.207	6	10	0	16
+ JUN 30	64	35	.107	-.117	11	6	0	17
JUL 1	52	47	.144	-.120	9	8	0	17
++ JUL 2	70	29	.137	-.218	12	5	0	17
+ JUL 3	61	23	.147	-.434	8	3	2	13
+ JUL 5	66	33	.145	-.451	8	4	0	12
- JUL 6	37	62	.190	-.219	6	10	0	16
JUL 7	35	47	.097	-.171	6	8	3	17
JUL 8	52	47	.207	-.124	9	8	0	17
JUL 9	58	41	.099	-.122	10	7	0	17
JUL 10	50	50	.199	-.125	8	8	0	16
JUL 11	43	56	.223	-.113	7	9	0	16
+ JUL 12	62	37	.203	-.182	10	6	0	16
JUL 13	56	43	.286	-.106	9	7	0	16
JUL 14	52	41	.173	-.187	9	7	1	17
+ JUL 15	64	35	.094	-.105	11	6	0	17
JUL 16	52	47	.258	-.101	9	8	0	17
+ JUL 17	62	37	.166	-.095	10	6	0	16
JUL 18	43	43	.158	-.171	7	7	2	16
- JUL 19	37	62	.296	-.096	6	10	0	16
JUL 20	50	50	.203	-.227	8	8	0	16
+ JUL 21	60	40	.126	-.141	6	4	0	10
+ JUL 22	60	40	.060	-.132	6	4	0	10





Figure 5.4: (Continued)

File used: 07W - WHEAT

Month/ Day	% ---		-- Average --		----- Years -----			
	Up	Down	Up	Down	Up	Down	Unch	Total
MAR 9	50	43	.088	-.087	8	7	1	16
MAR 10	41	52	.041	-.119	7	9	1	17
MAR 11	35	58	.103	-.081	6	10	1	17
- MAR 12	29	64	.095	-.107	5	11	1	17
- MAR 13	37	62	.120	-.066	6	10	0	16
+ MAR 14	62	31	.090	-.126	10	5	1	16
+ MAR 15	62	31	.087	-.140	10	5	1	16
- MAR 16	25	62	.093	-.065	4	10	2	16
MAR 17	52	35	.158	-.106	9	6	2	17
MAR 18	58	35	.073	-.082	10	6	1	17
MAR 19	47	52	.050	-.087	8	9	0	17
--- MAR 20	18	81	.027	-.126	3	13	0	16
MAR 21	56	43	.073	-.118	9	7	0	16
+ MAR 22	68	31	.121	-.109	11	5	0	16
MAR 23	56	43	.079	-.079	9	7	0	16
MAR 24	40	46	.079	-.070	6	7	2	15
MAR 25	41	58	.055	-.109	7	10	0	17
MAR 26	52	47	.094	-.123	9	8	0	17
MAR 27	53	46	.154	-.132	8	7	0	15
-- MAR 28	21	71	.036	-.112	3	10	1	14
MAR 29	37	50	.050	-.126	6	8	2	16
MAR 30	56	37	.131	-.068	9	6	1	16
MAR 31	50	50	.129	-.115	7	7	0	14
APR 1	46	53	.080	-.091	7	8	0	15
++ APR 2	70	29	.094	-.127	12	5	0	17
- APR 3	37	62	.151	-.079	6	10	0	16
+++ APR 4	85	14	.102	-.092	12	2	0	14
+ APR 5	60	33	.080	-.192	9	5	1	15
APR 6	56	43	.067	-.064	9	7	0	16
APR 7	47	52	.122	-.087	8	9	0	17
+ APR 8	62	37	.089	-.041	10	6	0	16
-- APR 9	21	78	.223	-.040	3	11	0	14
APR 10	43	56	.050	-.151	7	9	0	16
APR 11	56	43	.059	-.133	9	7	0	16
APR 12	35	57	.131	-.129	5	8	1	14
- APR 13	33	66	.068	-.100	5	10	0	15
APR 14	52	47	.103	-.056	9	8	0	17
APR 15	58	41	.124	-.101	10	7	0	17
+ APR 16	60	33	.113	-.124	9	5	1	15
- APR 17	35	64	.087	-.109	5	9	0	14
-- APR 18	25	75	.038	-.069	4	12	0	16
APR 19	43	56	.056	-.080	7	9	0	16
APR 20	50	50	.047	-.060	7	7	0	14
APR 21	52	47	.088	-.084	9	8	0	17
APR 22	35	58	.080	-.074	6	10	1	17

Figure 5.4: (Continued)

File used: 07W - WHEAT

Month/ Day	--- % ---		-- Average --		----- Years -----			
	Up	Down	Up	Down	Up	Down	Unch	Total
APR 23	41	58	.127	-.099	7	10	0	17
+ APR 24	62	37	.090	-.148	10	6	0	16
+ APR 25	62	37	.165	-.116	10	6	0	16
- APR 26	25	68	.061	-.112	4	11	1	16
APR 27	43	50	.083	-.111	7	8	1	16
APR 28	52	47	.108	-.106	9	8	0	17
APR 29	41	52	.110	-.133	7	9	1	17
APR 30	47	47	.156	-.074	8	8	1	17
- MAY 1	31	68	.073	-.165	5	11	0	16
MAY 2	53	40	.102	-.192	8	6	1	15
- MAY 3	31	68	.076	-.096	5	11	0	16
MAY 4	56	43	.089	-.097	9	7	0	16
MAY 5	41	58	.143	-.119	7	10	0	17
+ MAY 6	64	29	.072	-.194	11	5	1	17
MAY 7	58	41	.085	-.073	10	7	0	17
+ MAY 8	62	31	.158	-.086	10	5	1	16
MAY 9	43	50	.077	-.111	7	8	1	16
MAY 10	50	50	.085	-.068	8	8	0	16
MAY 11	43	50	.174	-.093	7	8	1	16
MAY 12	41	52	.119	-.140	7	9	1	17
MAY 13	52	47	.159	-.049	9	8	0	17
MAY 14	35	58	.114	-.062	6	10	1	17
MAY 15	56	37	.143	-.133	9	6	1	16
- MAY 16	31	62	.124	-.094	5	10	1	16
MAY 17	41	58	.085	-.116	7	10	0	17
+ MAY 18	64	29	.108	-.155	11	5	1	17
MAY 19	50	50	.176	-.068	9	9	0	18
- MAY 20	27	61	.045	-.112	5	11	2	18
MAY 21	58	41	.140	-.079	10	7	0	17
MAY 22	56	43	.086	-.090	9	7	0	16
MAY 23	52	41	.100	-.069	9	7	1	17
MAY 24	41	58	.170	-.067	7	10	0	17
- MAY 25	33	66	.187	-.127	5	10	0	15
MAY 26	46	46	.081	-.100	7	7	1	15
MAY 27	50	50	.101	-.095	8	8	0	16
-- MAY 28	21	78	.080	-.091	3	11	0	14
- MAY 29	30	69	.232	-.103	4	9	0	13
MAY 30	50	50	.082	-.114	5	5	0	10
MAY 31	38	53	.141	-.154	5	7	1	13
JUN 1	52	47	.071	-.099	9	8	0	17
-- JUN 2	27	72	.092	-.103	5	13	0	18
JUN 3	50	50	.118	-.061	9	9	0	18
JUN 4	52	47	.117	-.074	9	8	0	17
JUN 5	56	43	.141	-.104	9	7	0	16
- JUN 6	35	64	.194	-.121	6	11	0	17

Figure 5.4: (Concluded)

File used: 07W - WHEAT

Month/ Day	% ---		-- Average --		----- Years -----			
	Up	Down	Up	Down	Up	Down	Unch	Total
JUN 7	35	58	.108	-.115	6	10	1	17
JUN 8	52	47	.111	-.106	9	8	0	17
+ JUN 9	66	33	.081	-.139	12	6	0	18
JUN 10	50	44	.110	-.089	9	8	1	18
++ JUN 11	70	29	.168	-.122	12	5	0	17
JUN 12	43	56	.134	-.141	7	9	0	16
JUN 13	47	52	.119	-.062	8	9	0	17
- JUN 14	35	64	.152	-.094	6	11	0	17
JUN 15	52	41	.172	-.127	9	7	1	17
JUN 16	58	41	.148	-.094	10	7	0	17
JUN 17	23	58	.302	-.074	4	10	3	17
JUN 18	41	58	.044	-.083	7	10	0	17
JUN 19	43	43	.149	-.079	7	7	2	16
+ JUN 20	62	37	.210	-.114	10	6	0	16
JUN 21	50	50	.180	-.101	8	8	0	16
- JUN 22	31	68	.139	-.099	5	11	0	16
JUN 23	52	47	.152	-.103	9	8	0	17
JUN 24	41	58	.166	-.082	7	10	0	17
JUN 25	47	52	.101	-.202	8	9	0	17
--- JUN 26	18	81	.087	-.103	3	13	0	16
--- JUN 27	18	81	.281	-.122	3	13	0	16
JUN 28	43	56	.044	-.192	7	9	0	16
- JUN 29	37	62	.136	-.127	6	10	0	16
JUN 30	35	58	.091	-.078	6	10	1	17
JUL 1	52	41	.196	-.163	9	7	1	17
JUL 2	58	35	.162	-.064	10	6	1	17
+ JUL 3	69	30	.141	-.084	9	4	0	13
JUL 5	41	58	.212	-.134	5	7	0	12
+ JUL 6	68	31	.136	-.162	11	5	0	16
-- JUL 7	29	70	.089	-.126	5	12	0	17
JUL 8	52	47	.247	-.073	9	8	0	17
JUL 9	41	58	.126	-.165	7	10	0	17
JUL 10	52	47	.097	-.112	9	8	0	17
JUL 11	56	43	.187	-.091	9	7	0	16
- JUL 12	33	66	.128	-.159	5	10	0	15
+ JUL 13	68	31	.100	-.086	11	5	0	16
JUL 14	52	47	.195	-.115	9	8	0	17
JUL 15	41	58	.100	-.130	7	10	0	17
JUL 16	58	41	.141	-.156	10	7	0	17
JUL 17	35	58	.092	-.125	6	10	1	17
JUL 18	56	37	.152	-.176	9	6	1	16
JUL 19	53	40	.103	-.119	8	6	1	15
JUL 20	37	50	.167	-.068	6	8	2	16
JUL 21	54	45	.158	-.148	6	5	0	11
JUL 22	50	50	.116	-.106	5	5	0	10

Figure 5.5: Daily Market Probability Statistics

File used: 07NY - COTTON

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Month/ Day	--- % ---		-- Average --		----- Years -----			
	Up	Down	Up	Down	Up	Down	Unch	Total
FEB 1	45	54	.010	-.005	5	6	0	11
FEB 2	45	54	.013	-.007	5	6	0	11
FEB 3	53	46	.007	-.005	7	6	0	13
FEB 4	57	42	.011	-.007	8	6	0	14
-- FEB 5	28	71	.006	-.010	4	10	0	14
--- FEB 6	14	85	.011	-.014	2	12	0	14
FEB 7	41	50	.010	-.005	5	6	1	12
FEB 8	54	45	.012	-.005	6	5	0	11
- FEB 9	33	66	.017	-.011	4	8	0	12
FEB 10	41	58	.013	-.004	5	7	0	12
FEB 11	50	42	.010	-.005	7	6	1	14
FEB 12	46	53	.008	-.007	6	7	0	13
FEB 13	42	57	.011	-.018	6	8	0	14
+ FEB 14	63	36	.014	-.011	7	4	0	11
FEB 15	44	55	.009	-.013	4	5	0	9
++ FEB 16	77	22	.004	-.006	7	2	0	9
FEB 17	45	45	.017	-.008	5	5	1	11
FEB 18	45	45	.014	-.010	5	5	1	11
-- FEB 19	23	76	.011	-.015	3	10	0	13
+++ FEB 20	83	16	.015	-.003	10	2	0	12
FEB 21	44	55	.013	-.007	4	5	0	9
-- FEB 22	20	70	.016	-.013	2	7	1	10
+ FEB 23	63	36	.006	-.011	7	4	0	11
FEB 24	46	46	.005	-.008	6	6	1	13
FEB 25	50	50	.009	-.008	7	7	0	14
FEB 26	50	50	.007	-.007	7	7	0	14
FEB 27	42	57	.007	-.008	6	8	0	14
FEB 28	41	58	.012	-.008	5	7	0	12
++ FEB 29	75	25	.005	-.003	3	1	0	4
MAR 1	54	36	.009	-.005	6	4	1	11
+ MAR 2	63	36	.009	-.012	7	4	0	11
- MAR 3	38	61	.007	-.008	5	8	0	13
-- MAR 4	26	73	.009	-.007	4	11	0	15
- MAR 5	35	64	.006	-.005	5	9	0	14
- MAR 6	38	61	.009	-.010	5	8	0	13
MAR 7	46	53	.006	-.010	6	7	0	13
MAR 8	45	54	.011	-.007	5	6	0	11

Figure 5.5: (Continued)

File used: 07NY - COTTON

Month/ Day	--- % ---		-- Average --		----- Years -----			
	Up	Down	Up	Down	Up	Down	Unch	Total
MAR 9	36	54	.007	-.006	4	6	1	11
MAR 10	46	46	.005	-.012	6	6	1	13
+ MAR 11	66	33	.009	-.008	10	5	0	15
+ MAR 12	64	35	.007	-.012	9	5	0	14
MAR 13	46	53	.008	-.013	6	7	0	13
MAR 14	46	38	.008	-.004	6	5	2	13
MAR 15	54	45	.008	-.008	6	5	0	11
-- MAR 16	18	81	.010	-.009	2	9	0	11
+ MAR 17	61	38	.010	-.006	8	5	0	13
- MAR 18	40	60	.013	-.010	6	9	0	15
+ MAR 19	64	28	.013	-.004	9	4	1	14
+ MAR 20	69	23	.010	-.007	9	3	1	13
++ MAR 21	76	23	.009	-.004	10	3	0	13
- MAR 22	36	63	.012	-.007	4	7	0	11
MAR 23	54	45	.004	-.011	6	5	0	11
+ MAR 24	66	33	.005	-.007	8	4	0	12
- MAR 25	33	66	.003	-.016	5	10	0	15
MAR 26	42	50	.008	-.008	6	7	1	14
MAR 27	33	58	.009	-.010	4	7	1	12
+ MAR 28	66	33	.012	-.010	8	4	0	12
+ MAR 29	66	33	.006	-.006	8	4	0	12
MAR 30	33	58	.005	-.006	4	7	1	12
MAR 31	46	53	.011	-.008	6	7	0	13
APR 1	53	46	.009	-.015	7	6	0	13
APR 2	57	42	.007	-.016	8	6	0	14
- APR 3	35	64	.013	-.011	5	9	0	14
APR 4	33	58	.008	-.009	4	7	1	12
APR 5	54	45	.005	-.009	6	5	0	11
APR 6	50	33	.008	-.007	6	4	2	12
+ APR 7	64	35	.006	-.007	9	5	0	14
APR 8	57	42	.004	-.011	8	6	0	14
++ APR 9	75	25	.008	-.010	9	3	0	12
APR 10	50	50	.014	-.005	7	7	0	14
- APR 11	28	64	.016	-.006	4	9	1	14
APR 12	40	50	.010	-.009	4	5	1	10
-- APR 13	18	72	.020	-.006	2	8	1	11
APR 14	57	42	.008	-.007	8	6	0	14
- APR 15	33	66	.009	-.011	5	10	0	15
+ APR 16	61	38	.011	-.004	8	5	0	13
APR 17	41	50	.007	-.011	5	6	1	12
APR 18	42	50	.011	-.008	6	7	1	14
APR 19	41	50	.013	-.008	5	6	1	12
- APR 20	36	63	.003	-.006	4	7	0	11
APR 21	35	57	.011	-.011	5	8	1	14
- APR 22	40	60	.014	-.006	6	9	0	15

Figure 5.5: (Continued)

File used: 07NY - COTTON

Month/ Day	% ---		-- Average --		----- Years -----			
	Up	Down	Up	Down	Up	Down	Unch	Total
+ APR 23	64	35	.008	-.008	9	5	0	14
+ APR 24	64	35	.008	-.007	9	5	0	14
APR 25	35	57	.009	-.007	5	8	1	14
++ APR 26	75	16	.009	-.005	9	2	1	12
APR 27	41	50	.005	-.007	5	6	1	12
APR 28	57	35	.006	-.006	8	5	1	14
++ APR 29	73	26	.007	-.004	11	4	0	15
APR 30	50	42	.012	-.006	7	6	1	14
MAY 1	50	42	.009	-.014	7	6	1	14
MAY 2	42	50	.009	-.011	6	7	1	14
- MAY 3	25	66	.008	-.005	3	8	1	12
MAY 4	33	58	.004	-.008	4	7	1	12
MAY 5	42	50	.009	-.004	6	7	1	14
MAY 6	53	46	.008	-.010	8	7	0	15
+ MAY 7	64	28	.011	-.015	9	4	1	14
MAY 8	42	50	.016	-.003	6	7	1	14
++ MAY 9	78	14	.011	-.015	11	2	1	14
MAY 10	33	58	.007	-.006	4	7	1	12
MAY 11	41	50	.009	-.010	5	6	1	12
MAY 12	57	42	.006	-.006	8	6	0	14
+ MAY 13	60	40	.008	-.013	9	6	0	15
-- MAY 14	28	71	.013	-.013	4	10	0	14
- MAY 15	35	64	.008	-.008	5	9	0	14
++ MAY 16	71	21	.012	-.009	10	3	1	14
MAY 17	41	50	.009	-.009	5	6	1	12
MAY 18	41	50	.006	-.011	5	6	1	12
MAY 19	42	50	.008	-.008	6	7	1	14
+ MAY 20	60	40	.008	-.015	9	6	0	15
MAY 21	50	42	.015	-.004	7	6	1	14
-- MAY 22	28	71	.016	-.011	4	10	0	14
--- MAY 23	7	85	.002	-.011	1	12	1	14
- MAY 24	25	66	.009	-.007	3	8	1	12
- MAY 25	30	60	.009	-.006	3	6	1	10
MAY 26	54	36	.011	-.008	6	4	1	11
- MAY 27	38	61	.010	-.013	5	8	0	13
MAY 28	58	41	.006	-.014	7	5	0	12
+ MAY 29	66	25	.012	-.009	8	3	1	12
-- MAY 30	25	75	.013	-.008	2	6	0	8
MAY 31	55	33	.018	-.005	5	3	1	9
- JUN 1	25	66	.013	-.012	3	8	1	12
JUN 2	28	57	.005	-.011	4	8	2	14
++ JUN 3	73	26	.008	-.005	11	4	0	15
JUN 4	57	42	.019	-.009	8	6	0	14
JUN 5	50	42	.011	-.007	7	6	1	14
JUN 6	57	35	.009	-.006	8	5	1	14

Figure 5.5: (Concluded)

File used: 07NY - COTTON

Month/ Day	--- % ---		-- Average --		----- Years -----			
	Up	Down	Up	Down	Up	Down	Unch	Total
JUN 7	50	41	.013	-.004	6	5	1	12
JUN 8	33	58	.012	-.017	4	7	1	12
JUN 9	57	35	.012	-.008	8	5	1	14
JUN 10	46	53	.007	-.008	7	8	0	15
JUN 11	42	57	.014	-.011	6	8	0	14
JUN 12	57	35	.009	-.012	8	5	1	14
JUN 13	42	50	.007	-.009	6	7	1	14
JUN 14	41	50	.010	-.017	5	6	1	12
JUN 15	58	33	.013	-.019	7	4	1	12
+ JUN 16	69	30	.014	-.015	9	4	0	13
JUN 17	50	50	.009	-.009	7	7	0	14
JUN 18	42	57	.016	-.006	6	8	0	14
-- JUN 19	21	71	.014	-.009	3	10	1	14
JUN 20	53	46	.011	-.004	7	6	0	13
+ JUN 21	63	36	.018	-.020	7	4	0	11
JUN 22	45	54	.004	-.010	5	6	0	11
JUN 23	46	53	.007	-.008	6	7	0	13
++ JUN 24	71	28	.026	-.021	10	4	0	14
JUN 25	42	57	.020	-.013	6	8	0	14
JUN 26	35	57	.013	-.008	5	8	1	14
-- JUN 27	15	76	.006	-.016	2	10	1	13
-- JUN 28	18	72	.017	-.011	2	8	1	11
JUN 29	45	36	.015	-.007	5	4	2	11
+ JUN 30	69	15	.018	-.016	9	2	2	13
JUL 1	42	57	.031	-.011	6	8	0	14
+ JUL 2	64	35	.011	-.012	9	5	0	14
+ JUL 3	66	33	.009	-.009	6	3	0	9
JUL 5	57	28	.019	-.020	4	2	1	7
JUL 6	45	27	.011	-.017	5	3	3	11
JUL 7	41	50	.008	-.031	5	6	1	12
- JUL 8	36	63	.009	-.012	4	7	0	11
- JUL 9	27	63	.008	-.014	3	7	1	11





Figure 5.6: (Continued)

File used: 12SF - SWISS FRANC

Month/ Day	% ---		-- Average --		----- Years -----			
	Up	Down	Up	Down	Up	Down	Unchn	Total
AUG 8	50	50	.667	-.461	5	5	0	10
AUG 9	55	44	.559	-.534	5	4	0	9
- AUG 10	40	60	.544	-.481	4	6	0	10
++ AUG 11	72	27	.643	-.205	8	3	0	11
+ AUG 12	63	36	.496	-.496	7	4	0	11
AUG 13	50	50	.554	-.605	5	5	0	10
+ AUG 14	66	33	.840	-.482	6	3	0	9
- AUG 15	40	60	1.554	-.272	4	6	0	10
-- AUG 16	22	77	.182	-.424	2	7	0	9
+ AUG 17	60	40	.545	-.569	6	4	0	10
AUG 18	54	45	.601	-.667	6	5	0	11
+++ AUG 19	81	18	.573	-.366	9	2	0	11
AUG 20	50	50	.423	-.582	5	5	0	10
AUG 21	44	55	1.181	-.385	4	5	0	9
AUG 22	50	50	.575	-.501	5	5	0	10
AUG 23	55	44	.409	-.432	5	4	0	9
AUG 24	50	40	.909	-.754	5	4	1	10
--- AUG 25	18	81	.631	-.667	2	9	0	11
+ AUG 26	63	36	.566	-.903	7	4	0	11
- AUG 27	40	60	.578	-.744	4	6	0	10
+ AUG 28	66	33	.417	-.717	6	3	0	9
- AUG 29	40	60	.867	-.503	4	6	0	10
AUG 30	55	44	.444	-.760	5	4	0	9
- AUG 31	30	60	.625	-.391	3	6	1	10
++ SEP 1	75	25	.402	-.397	6	2	0	8
+++ SEP 2	80	20	.664	-.532	8	2	0	10
++ SEP 3	75	25	.381	-1.072	6	2	0	8
-- SEP 4	25	75	.435	-.599	2	6	0	8
-- SEP 5	28	71	.725	-.727	2	5	0	7
SEP 6	42	57	.497	-.526	3	4	0	7
- SEP 7	37	62	.318	-.703	3	5	0	8
- SEP 8	27	63	.321	-.514	3	7	1	11
- SEP 9	36	63	.582	-.314	4	7	0	11
SEP 10	40	50	.412	-.284	4	5	1	10
SEP 11	44	55	.495	-.647	4	5	0	9
SEP 12	50	50	.729	-.354	5	5	0	10
SEP 13	33	55	.952	-.344	3	5	1	9
SEP 14	50	50	.455	-.637	5	5	0	10
+ SEP 15	60	40	.473	-.106	6	4	0	10
+ SEP 16	60	40	.652	-.373	6	4	0	10
+ SEP 17	60	40	.487	-.824	6	4	0	10
+ SEP 18	66	33	.870	-.434	6	3	0	9
+ SEP 19	66	33	.326	-.230	6	3	0	9
+ SEP 20	62	37	1.292	-.781	5	3	0	8
++ SEP 21	77	22	.996	-.283	7	2	0	9

Figure 5.6: (Continued)

File used: 12SF - SWISS FRANC

Month/ Day	--- % ---		-- Average --		----- Years -----			
	Up	Down	Up	Down	Up	Down	Unch	Total
- SEP 22	40	60	.575	-1.097	4	6	0	10
SEP 23	50	50	1.215	-.718	5	5	0	10
++ SEP 24	70	20	.234	-.160	7	2	1	10
SEP 25	33	55	.841	-.546	3	5	1	9
SEP 26	55	44	.223	-.664	5	4	0	9
++ SEP 27	75	25	.489	-.788	6	2	0	8
SEP 28	55	44	.380	-.703	5	4	0	9
SEP 29	50	50	.582	-.570	5	5	0	10
SEP 30	50	50	.264	-.372	5	5	0	10
+++ OCT 1	80	20	.935	-.175	8	2	0	10
- OCT 2	33	66	1.332	-.848	3	6	0	9
OCT 3	55	44	.591	-.605	5	4	0	9
-- OCT 4	25	75	.261	-.568	2	6	0	8
++ OCT 5	77	22	.514	-.343	7	2	0	9
+ OCT 6	60	30	.273	-.427	6	3	1	10
+ OCT 7	60	40	.843	-.474	6	4	0	10
OCT 8	50	50	.454	-.822	5	5	0	10
+ OCT 9	66	33	.644	-.563	6	3	0	9
OCT 10	55	33	.647	-.498	5	3	1	9
- OCT 11	37	62	1.758	-.742	3	5	0	8
- OCT 12	33	66	.372	-.486	3	6	0	9
+ OCT 13	60	40	.479	-.538	6	4	0	10
- OCT 14	40	60	.692	-.701	4	6	0	10
OCT 15	50	50	.298	-.596	5	5	0	10
OCT 16	55	44	.513	-.660	5	4	0	9
++ OCT 17	77	22	.486	-.672	7	2	0	9
+ OCT 18	62	37	.451	-.160	5	3	0	8
OCT 19	44	55	.511	-.971	4	5	0	9
OCT 20	50	50	.603	-.723	5	5	0	10
-- OCT 21	30	70	.323	-.454	3	7	0	10
OCT 22	50	50	.353	-.254	5	5	0	10
-- OCT 23	22	77	2.018	-.523	2	7	0	9
OCT 24	33	55	.501	-.693	3	5	1	9
- OCT 25	37	62	.833	-.446	3	5	0	8
OCT 26	55	44	.464	-.747	5	4	0	9
- OCT 27	40	60	.585	-.733	4	6	0	10
+ OCT 28	60	40	.745	-.135	6	4	0	10
OCT 29	50	50	.807	-.506	5	5	0	10
OCT 30	55	44	1.002	-.748	5	4	0	9
OCT 31	44	55	.761	-.705	4	5	0	9
+ NOV 1	62	37	.877	-.669	5	3	0	8
NOV 2	50	37	1.092	-.998	4	3	1	8
- NOV 3	40	60	.424	-.854	4	6	0	10
- NOV 4	33	66	.199	-.421	3	6	0	9
-- NOV 5	30	70	.698	-.626	3	7	0	10

Figure 5.6: (Concluded)

File used: 12SF - SWISS FRANC

Month/ Day	% ---		-- Average --		----- Years -----			
	Up	Down	Up	Down	Up	Down	Unch	Total
NOV 6	55	33	.524	-1.753	5	3	1	9
NOV 7	50	50	.448	-.481	4	4	0	8
NOV 8	50	50	.603	-.481	4	4	0	8
NOV 9	55	44	.715	-.397	5	4	0	9
+ NOV 10	60	40	.762	-.573	6	4	0	10
NOV 11	40	40	.508	-.718	4	4	2	10
+ NOV 12	60	40	.677	-.884	6	4	0	10
NOV 13	44	55	.397	-.497	4	5	0	9
NOV 14	55	33	.415	-.209	5	3	1	9
NOV 15	50	50	.183	-.755	4	4	0	8
- NOV 16	33	66	.572	-.966	3	6	0	9
--- NOV 17	10	90	1.473	-.637	1	9	0	10
+++ NOV 18	80	20	.438	-.299	8	2	0	10
++ NOV 19	70	30	.294	-.954	7	3	0	10
- NOV 20	33	66	.101	-.679	3	6	0	9
- NOV 21	33	66	.897	-.582	3	6	0	9
+ NOV 22	66	16	.536	-.523	4	1	1	6
NOV 23	50	50	.356	-.435	4	4	0	8
NOV 24	57	42	.843	-.269	4	3	0	7
+++ NOV 25	85	14	.640	-.080	6	1	0	7
- NOV 26	37	62	.449	-.398	3	5	0	8
NOV 27	50	50	.889	-.412	3	3	0	6
NOV 28	50	50	.614	-.398	4	4	0	8
++ NOV 29	75	25	.588	-.503	6	2	0	8
NOV 30	55	44	.824	-.486	5	4	0	9
DEC 1	50	50	.251	-.607	5	5	0	10
DEC 2	50	50	.355	-.414	5	5	0	10
+ DEC 3	60	40	.493	-.548	6	4	0	10
DEC 4	44	55	.870	-.753	4	5	0	9
-- DEC 5	22	77	.450	-.583	2	7	0	9
+ DEC 6	62	37	.614	-.488	5	3	0	8
-- DEC 7	22	77	.112	-.495	2	7	0	9
DEC 8	50	50	.455	-.836	5	5	0	10
- DEC 9	30	60	.093	-.646	3	6	1	10
- DEC 10	40	60	.855	-.457	4	6	0	10
DEC 11	44	44	.314	-.409	4	4	1	9
- DEC 12	33	66	.558	-.246	3	6	0	9
- DEC 13	25	62	.626	-.332	2	5	1	8
++ DEC 14	71	28	.671	-.773	5	2	0	7
- DEC 15	33	66	.904	-.227	2	4	0	6
- DEC 16	33	66	.558	-.256	1	2	0	3
--- DEC 17	0	100	.000	-.207	0	2	0	2
+++ DEC 18	100	0	1.803	.000	1	0	0	1
+++ DEC 19	100	0	.703	.000	2	0	0	2

# Figure 5.7: Daily Market Probability Statistics

File used: 12TB - T BILLS (90)

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	Month/ Day	--- % ---		-- Average --		----- Years -----			
		Up	Down	Up	Down	Up	Down	Unch	Total
	JUL 1	55	44	.101	-.147	5	4	0	9
++	JUL 2	77	22	.056	-.103	7	2	0	9
+++	JUL 3	83	16	.143	-.120	5	1	0	6
-	JUL 5	33	66	.244	-.180	2	4	0	6
+++	JUL 6	100	0	.063	.000	9	0	0	9
--	JUL 7	22	77	.149	-.213	2	7	0	9
	JUL 8	44	44	.296	-.132	4	4	1	9
	JUL 9	44	55	.173	-.106	4	5	0	9
--	JUL 10	25	75	.290	-.069	2	6	0	8
	JUL 11	50	50	.087	-.163	4	4	0	8
+	JUL 12	62	25	.061	-.089	5	2	1	8
--	JUL 13	22	77	.145	-.069	2	7	0	9
+	JUL 14	62	25	.052	-.091	5	2	1	8
+	JUL 15	66	33	.181	-.111	6	3	0	9
	JUL 16	44	55	.228	-.180	4	5	0	9
++	JUL 17	75	25	.044	-.142	6	2	0	8
	JUL 18	37	50	.099	-.124	3	4	1	8
+	JUL 19	62	25	.028	-.049	5	2	1	8
	JUL 20	44	55	.104	-.198	4	5	0	9
	JUL 21	44	44	.059	-.203	4	4	1	9
--	JUL 22	22	77	.228	-.092	2	7	0	9
	JUL 23	55	44	.125	-.086	5	4	0	9
-	JUL 24	37	62	.164	-.108	3	5	0	8
+++	JUL 25	87	12	.103	-.022	7	1	0	8
	JUL 26	50	37	.050	-.157	4	3	1	8
	JUL 27	22	55	.145	-.119	2	5	2	9
---	JUL 28	11	88	.130	-.141	1	8	0	9
	JUL 29	44	44	.069	-.055	4	4	1	9
	JUL 30	55	44	.145	-.131	5	4	0	9
+	JUL 31	62	37	.065	-.160	5	3	0	8
	AUG 1	37	25	.051	-.078	3	2	3	8
+	AUG 2	62	37	.140	-.084	5	3	0	8
	AUG 3	44	55	.114	-.239	4	5	0	9
+	AUG 4	66	33	.080	-.085	6	3	0	9
	AUG 5	44	55	.089	-.065	4	5	0	9
	AUG 6	44	55	.111	-.094	4	5	0	9
+	AUG 7	62	12	.085	-.035	5	1	2	8

Figure 5.7: (Continued)

File used: 12TB - T BILLS (90)

Month/ Day	% ---		Average --		Years -----				Total
	Up	Down	Up	Down	Up	Down	Unch		
+ AUG 8	62	37	.069	-.128	5	3	0	8	
++ AUG 9	75	25	.109	-.146	6	2	0	8	
- AUG 10	22	66	.208	-.110	2	6	1	9	
+ AUG 11	66	33	.091	-.109	6	3	0	9	
++ AUG 12	77	22	.116	-.172	7	2	0	9	
AUG 13	55	33	.104	-.056	5	3	1	9	
AUG 14	37	50	.063	-.139	3	4	1	8	
AUG 15	12	50	.234	-.060	1	4	3	8	
+++ AUG 16	87	12	.122	-.194	7	1	0	8	
+ AUG 17	66	22	.130	-.055	6	2	1	9	
- AUG 18	22	66	.111	-.192	2	6	1	9	
AUG 19	55	33	.093	-.106	5	3	1	9	
AUG 20	44	44	.041	-.047	4	4	1	9	
AUG 21	50	50	.076	-.174	4	4	0	8	
- AUG 22	37	62	.141	-.029	3	5	0	8	
- AUG 23	37	62	.103	-.091	3	5	0	8	
AUG 24	44	55	.094	-.192	4	5	0	9	
AUG 25	55	44	.045	-.219	5	4	0	9	
AUG 26	33	33	.055	-.043	3	3	3	9	
-- AUG 27	22	77	.155	-.214	2	7	0	9	
- AUG 28	37	62	.080	-.142	3	5	0	8	
+ AUG 29	62	37	.201	-.128	5	3	0	8	
+ AUG 30	62	37	.050	-.086	5	3	0	8	
- AUG 31	33	66	.062	-.144	3	6	0	9	
-- SEP 1	28	71	.168	-.042	2	5	0	7	
SEP 2	37	50	.226	-.103	3	4	1	8	
++ SEP 3	71	28	.115	-.106	5	2	0	7	
-- SEP 4	28	71	.100	-.128	2	5	0	7	
--- SEP 5	16	83	.054	-.103	1	5	0	6	
+ SEP 6	66	33	.072	-.168	4	2	0	6	
SEP 7	42	57	.125	-.068	3	4	0	7	
--- SEP 8	11	88	.101	-.125	1	8	0	9	
SEP 9	55	33	.132	-.142	5	3	1	9	
++ SEP 10	77	22	.189	-.346	7	2	0	9	
- SEP 11	37	62	.326	-.129	3	5	0	8	
SEP 12	37	37	.092	-.070	3	3	2	8	
SEP 13	50	50	.180	-.052	4	4	0	8	
SEP 14	55	44	.135	-.071	5	4	0	9	
- SEP 15	33	66	.074	-.139	3	6	0	9	
++ SEP 16	77	11	.082	-.104	7	1	1	9	
++ SEP 17	77	22	.113	-.022	7	2	0	9	
SEP 18	50	50	.111	-.073	4	4	0	8	
SEP 19	50	25	.206	-.016	4	2	2	8	
SEP 20	50	50	.205	-.078	4	4	0	8	
SEP 21	44	44	.256	-.041	4	4	1	9	

Figure 5.7: (Continued)

File used: 12TB - T BILLS (90)

Month/ Day	--- % ---		-- Average --		----- Years -----			
	Up	Down	Up	Down	Up	Down	Unch	Total
- SEP 22	33	66	.065	-.302	3	6	0	9
SEP 23	44	55	.095	-.036	4	5	0	9
SEP 24	44	55	.107	-.099	4	5	0	9
SEP 25	50	50	.052	-.262	4	4	0	8
- SEP 26	37	62	.081	-.180	3	5	0	8
+ SEP 27	62	37	.074	-.135	5	3	0	8
SEP 28	55	44	.190	-.069	5	4	0	9
- SEP 29	22	66	.044	-.157	2	6	1	9
+ SEP 30	66	33	.122	-.153	6	3	0	9
OCT 1	44	44	.141	-.090	4	4	1	9
OCT 2	50	50	.206	-.057	4	4	0	8
+ OCT 3	62	37	.204	-.091	5	3	0	8
OCT 4	50	50	.041	-.252	4	4	0	8
- OCT 5	33	66	.230	-.097	3	6	0	9
OCT 6	44	33	.262	-.054	4	3	2	9
OCT 7	44	55	.206	-.055	4	5	0	9
OCT 8	33	55	.110	-.172	3	5	1	9
OCT 9	37	50	.316	-.171	3	4	1	8
-- OCT 10	25	75	.060	-.094	2	6	0	8
++ OCT 11	75	25	.169	-.115	6	2	0	8
+ OCT 12	66	22	.147	-.130	6	2	1	9
OCT 13	44	55	.095	-.141	4	5	0	9
OCT 14	44	33	.151	-.223	4	3	2	9
OCT 15	44	55	.071	-.173	4	5	0	9
OCT 16	37	50	.093	-.170	3	4	1	8
OCT 17	50	50	.127	-.149	4	4	0	8
+ OCT 18	62	25	.107	-.299	5	2	1	8
OCT 19	55	44	.212	-.193	5	4	0	9
- OCT 20	33	66	.486	-.080	3	6	0	9
OCT 21	44	44	.053	-.102	4	4	1	9
OCT 22	55	44	.086	-.269	5	4	0	9
OCT 23	50	50	.189	-.137	4	4	0	8
+ OCT 24	62	37	.160	-.101	5	3	0	8
- OCT 25	37	62	.073	-.103	3	5	0	8
+ OCT 26	66	33	.175	-.213	6	3	0	9
OCT 27	44	44	.032	-.269	4	4	1	9
OCT 28	44	55	.102	-.069	4	5	0	9
++ OCT 29	77	22	.120	-.108	7	2	0	9
+ OCT 30	62	37	.210	-.208	5	3	0	8
- OCT 31	37	62	.048	-.150	3	5	0	8
++ NOV 1	75	12	.160	-.330	6	1	1	8
- NOV 2	37	62	.080	-.118	3	5	0	8
NOV 3	33	44	.163	-.127	3	4	2	9
NOV 4	50	37	.065	-.087	4	3	1	8
- NOV 5	33	66	.204	-.088	3	6	0	9

Figure 5.7: (Concluded)

File used: 12TB - T BILLS (90)

	Month/ Day	% ---		-- Average --		----- Years -----			
		Up	Down	Up	Down	Up	Down	Unch	Total
	NOV 6	37	50	.204	-.122	3	4	1	8
	NOV 7	57	42	.203	-.150	4	3	0	7
	NOV 8	50	50	.100	-.076	4	4	0	8
++	NOV 9	77	22	.206	-.090	7	2	0	9
	NOV 10	55	44	.096	-.143	5	4	0	9
	NOV 11	44	55	.305	-.075	4	5	0	9
	NOV 12	55	33	.160	-.107	5	3	1	9
--	NOV 13	25	75	.060	-.146	2	6	0	8
	NOV 14	50	50	.147	-.186	4	4	0	8
-	NOV 15	37	62	.139	-.030	3	5	0	8
	NOV 16	55	44	.078	-.139	5	4	0	9
-	NOV 17	22	66	.129	-.166	2	6	1	9
++	NOV 18	77	11	.240	-.011	7	1	1	9
++	NOV 19	77	22	.098	-.073	7	2	0	9
	NOV 20	37	50	.041	-.104	3	4	1	8
	NOV 21	50	50	.085	-.172	4	4	0	8
+	NOV 22	66	16	.063	-.011	4	1	1	6
	NOV 23	37	50	.183	-.161	3	4	1	8
+	NOV 24	66	16	.250	-.074	4	1	1	6
	NOV 25	50	33	.041	-.032	3	2	1	6
	NOV 26	42	42	.259	-.112	3	3	1	7
-	NOV 27	33	66	.022	-.118	2	4	0	6
---	NOV 28	14	85	.110	-.173	1	6	0	7
+	NOV 29	62	12	.079	-.294	5	1	2	8
	NOV 30	33	44	.104	-.231	3	4	2	9
	DEC 1	44	55	.052	-.146	4	5	0	9
	DEC 2	55	44	.097	-.174	5	4	0	9
++	DEC 3	77	11	.129	-.248	7	1	1	9
	DEC 4	50	37	.198	-.114	4	3	1	8
	DEC 5	25	50	.049	-.221	2	4	2	8
	DEC 6	37	50	.048	-.054	3	4	1	8
--	DEC 7	11	77	.087	-.169	1	7	1	9
--	DEC 8	22	77	.033	-.138	2	7	0	9
+	DEC 9	66	33	.036	-.373	6	3	0	9
-	DEC 10	22	66	.069	-.179	2	6	1	9
	DEC 11	50	50	.060	-.212	4	4	0	8
++	DEC 12	75	12	.159	-.489	6	1	1	8
+	DEC 13	62	37	.066	-.058	5	3	0	8
+	DEC 14	66	33	.150	-.026	6	3	0	9
	DEC 15	44	44	.105	-.131	4	4	1	9
	DEC 16	44	44	.051	-.111	4	4	1	9
	DEC 17	50	50	.147	-.119	4	4	0	8
-	DEC 18	40	60	.306	-.103	2	3	0	5
	DEC 19	40	20	.074	-.022	2	1	2	5
	DEC 20	40	40	.048	-.088	2	2	1	5



# Figure 5.8: Daily Market Probability Statistics

File used: 01PL - PLATINUM

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	Month/ Day	--- % ---		-- Average --		----- Years -----			
		Up	Down	Up	Down	Up	Down	Unch	Total
	AUG 1	57	42	.179	-.211	8	6	0	14
-	AUG 2	38	61	.166	-.227	5	8	0	13
	AUG 3	41	58	.106	-.203	5	7	0	12
++	AUG 4	76	15	.130	-.104	10	2	1	13
--	AUG 5	21	78	.043	-.179	3	11	0	14
-	AUG 6	40	60	.105	-.138	6	9	0	15
	AUG 7	57	35	.164	-.065	8	5	1	14
-	AUG 8	35	64	.184	-.186	5	9	0	14
	AUG 9	38	53	.195	-.192	5	7	1	13
	AUG 10	50	50	.171	-.125	6	6	0	12
++	AUG 11	76	23	.154	-.130	10	3	0	13
	AUG 12	42	42	.113	-.109	6	6	2	14
	AUG 13	53	46	.181	-.166	8	7	0	15
++	AUG 14	78	21	.161	-.201	11	3	0	14
	AUG 15	42	57	.152	-.086	6	8	0	14
	AUG 16	58	41	.223	-.109	7	5	0	12
+	AUG 17	63	36	.107	-.148	7	4	0	11
+	AUG 18	69	30	.161	-.111	9	4	0	13
++	AUG 19	71	21	.211	-.052	10	3	1	14
	AUG 20	46	53	.221	-.175	7	8	0	15
	AUG 21	57	42	.156	-.172	8	6	0	14
	AUG 22	50	50	.188	-.139	7	7	0	14
+	AUG 23	69	30	.203	-.100	9	4	0	13
-	AUG 24	33	66	.095	-.133	4	8	0	12
-	AUG 25	30	69	.091	-.088	4	9	0	13
+	AUG 26	64	35	.146	-.194	9	5	0	14
	AUG 27	40	53	.081	-.162	6	8	1	15
+	AUG 28	64	35	.144	-.148	9	5	0	14
	AUG 29	28	50	.231	-.154	4	7	3	14
	AUG 30	46	46	.091	-.063	6	6	1	13
---	AUG 31	16	83	.033	-.064	2	10	0	12
	SEP 1	55	44	.091	-.067	5	4	0	9
++	SEP 2	72	27	.214	-.281	8	3	0	11
	SEP 3	58	41	.239	-.254	7	5	0	12
	SEP 4	58	41	.116	-.186	7	5	0	12
	SEP 5	58	41	.159	-.085	7	5	0	12
-	SEP 6	40	60	.056	-.176	4	6	0	10

Figure 5.8: (Continued)

File used: 01PL - PLATINUM

Month/ Day	% ---		-- Average --		----- Years -----			
	Up	Down	Up	Down	Up	Down	Unch	Total
-- SEP 7	10	70	.269	-.147	1	7	2	10
- SEP 8	30	69	.250	-.117	4	9	0	13
SEP 9	50	50	.063	-.213	7	7	0	14
+ SEP 10	60	40	.114	-.272	9	6	0	15
- SEP 11	21	64	.145	-.181	3	9	2	14
-- SEP 12	21	71	.078	-.127	3	10	1	14
+ SEP 13	61	30	.131	-.067	8	4	1	13
SEP 14	50	50	.080	-.195	6	6	0	12
SEP 15	53	46	.082	-.128	7	6	0	13
SEP 16	50	42	.089	-.098	7	6	1	14
SEP 17	46	53	.116	-.251	7	8	0	15
- SEP 18	35	64	.128	-.159	5	9	0	14
+++ SEP 19	100	0	.143	.000	14	0	0	14
+ SEP 20	69	30	.137	-.168	9	4	0	13
++ SEP 21	75	16	.284	-.156	9	2	1	12
SEP 22	46	53	.228	-.136	6	7	0	13
SEP 23	50	50	.179	-.055	7	7	0	14
- SEP 24	40	60	.207	-.166	6	9	0	15
SEP 25	42	57	.161	-.116	6	8	0	14
SEP 26	50	50	.148	-.142	7	7	0	14
- SEP 27	38	61	.061	-.080	5	8	0	13
SEP 28	41	58	.141	-.086	5	7	0	12
- SEP 29	30	61	.087	-.278	4	8	1	13
-- SEP 30	21	78	.202	-.176	3	11	0	14
++ OCT 1	73	26	.146	-.104	11	4	0	15
OCT 2	50	50	.142	-.102	7	7	0	14
+ OCT 3	64	35	.148	-.195	9	5	0	14
- OCT 4	30	69	.116	-.130	4	9	0	13
OCT 5	41	50	.182	-.115	5	6	1	12
OCT 6	46	53	.181	-.081	6	7	0	13
OCT 7	50	50	.171	-.187	7	7	0	14
- OCT 8	35	64	.171	-.146	5	9	0	14
OCT 9	42	50	.172	-.190	6	7	1	14
++ OCT 10	78	21	.120	-.166	11	3	0	14
- OCT 11	38	61	.234	-.217	5	8	0	13
+ OCT 12	66	33	.156	-.140	8	4	0	12
OCT 13	53	46	.190	-.106	7	6	0	13
OCT 14	57	42	.078	-.181	8	6	0	14
- OCT 15	33	66	.151	-.139	5	10	0	15
OCT 16	57	42	.094	-.111	8	6	0	14
+ OCT 17	64	35	.095	-.114	9	5	0	14
+ OCT 18	61	38	.172	-.088	8	5	0	13
OCT 19	50	41	.049	-.240	6	5	1	12
OCT 20	53	46	.186	-.118	7	6	0	13
OCT 21	42	50	.128	-.091	6	7	1	14

Figure 5.8: (Continued)

File used: 01PL - PLATINUM

Month/ Day	--- % ---		-- Average --		----- Years -----			
	Up	Down	Up	Down	Up	Down	Unch	Total
OCT 22	42	50	.168	-.077	6	7	1	14
OCT 23	35	57	.061	-.136	5	8	1	14
OCT 24	42	57	.185	-.099	6	8	0	14
- OCT 25	30	69	.118	-.199	4	9	0	13
OCT 26	41	58	.111	-.196	5	7	0	12
OCT 27	46	53	.162	-.114	6	7	0	13
OCT 28	42	57	.150	-.079	6	8	0	14
- OCT 29	40	60	.067	-.198	6	9	0	15
OCT 30	42	57	.167	-.178	6	8	0	14
OCT 31	50	42	.176	-.187	7	6	1	14
+ NOV 1	61	38	.134	-.124	8	5	0	13
-- NOV 2	30	70	.221	-.135	3	7	0	10
NOV 3	58	41	.111	-.167	7	5	0	12
++ NOV 4	76	23	.113	-.245	10	3	0	13
NOV 5	53	46	.172	-.282	7	6	0	13
NOV 6	42	42	.273	-.169	6	6	2	14
NOV 7	50	50	.173	-.139	6	6	0	12
+ NOV 8	61	30	.127	-.258	8	4	1	13
NOV 9	58	41	.150	-.120	7	5	0	12
NOV 10	46	53	.153	-.200	6	7	0	13
- NOV 11	28	64	.118	-.150	4	9	1	14
+ NOV 12	60	40	.113	-.181	9	6	0	15
-- NOV 13	21	71	.046	-.126	3	10	1	14
NOV 14	42	57	.084	-.181	6	8	0	14
- NOV 15	38	61	.154	-.170	5	8	0	13
+ NOV 16	66	25	.136	-.238	8	3	1	12
NOV 17	53	38	.141	-.241	7	5	1	13
NOV 18	42	57	.166	-.155	6	8	0	14
+ NOV 19	66	33	.150	-.189	10	5	0	15
++ NOV 20	78	21	.103	-.044	11	3	0	14
NOV 21	50	50	.156	-.199	7	7	0	14
++ NOV 22	70	20	.182	-.307	7	2	1	10
NOV 23	55	44	.095	-.070	5	4	0	9
- NOV 24	40	60	.180	-.189	4	6	0	10
+++ NOV 25	80	20	.075	-.043	8	2	0	10
NOV 26	46	53	.157	-.231	6	7	0	13
NOV 27	55	44	.124	-.135	5	4	0	9
+ NOV 28	60	40	.263	-.120	6	4	0	10
+ NOV 29	66	25	.135	-.058	8	3	1	12
NOV 30	58	41	.118	-.053	7	5	0	12
DEC 1	46	53	.150	-.079	6	7	0	13
DEC 2	50	42	.064	-.151	7	6	1	14
DEC 3	53	46	.130	-.131	8	7	0	15
DEC 4	57	42	.083	-.174	8	6	0	14
DEC 5	50	50	.070	-.076	7	7	0	14

Figure 5.8: (Concluded)

File used: 01PL - PLATINUM

	Month/ Day	--- % ---		-- Average --		----- Years -----			
		Up	Down	Up	Down	Up	Down	Unch	Total
	+ DEC 6	61	38	.114	-.065	8	5	0	13
	+ DEC 7	66	33	.098	-.114	8	4	0	12
	- DEC 8	30	61	.102	-.171	4	8	1	13
	- DEC 9	28	64	.076	-.179	4	9	1	14
	DEC 10	46	53	.084	-.130	7	8	0	15
	DEC 11	57	35	.096	-.229	8	5	1	14
	DEC 12	42	57	.149	-.097	6	8	0	14
	+ DEC 13	61	38	.084	-.192	8	5	0	13
	DEC 14	50	50	.081	-.207	6	6	0	12
	+ DEC 15	61	38	.144	-.136	8	5	0	13
	DEC 16	42	57	.081	-.086	6	8	0	14
	DEC 17	46	46	.137	-.125	7	7	1	15
	DEC 18	57	42	.146	-.056	8	6	0	14
	+ DEC 19	64	35	.147	-.070	9	5	0	14
	DEC 20	46	53	.118	-.111	6	7	0	13
	DEC 21	41	50	.194	-.063	5	6	1	12
	+++ DEC 22	84	15	.108	-.144	11	2	0	13
	DEC 23	42	50	.136	-.127	6	7	1	14
	DEC 24	50	37	.098	-.052	4	3	1	8
	++ DEC 26	75	25	.167	-.060	6	2	0	8
	+ DEC 27	69	30	.121	-.105	9	4	0	13
	- DEC 28	27	63	.085	-.084	3	7	1	11
	+ DEC 29	61	38	.090	-.071	8	5	0	13
	-- DEC 30	21	71	.096	-.155	3	10	1	14
	- DEC 31	33	66	.186	-.126	3	6	0	9
	-- JAN 3	25	75	.097	-.054	2	6	0	8
	- JAN 4	40	60	.168	-.181	4	6	0	10
	+ JAN 5	60	40	.156	-.079	6	4	0	10
	JAN 6	50	50	.167	-.080	7	7	0	14
	JAN 7	53	46	.134	-.198	8	7	0	15
	JAN 8	57	42	.086	-.203	8	6	0	14
	JAN 9	42	50	.242	-.103	6	7	1	14
	-- JAN 10	28	71	.175	-.098	4	10	0	14
	JAN 11	53	46	.190	-.134	7	6	0	13
	JAN 12	42	57	.144	-.173	6	8	0	14
	JAN 13	50	50	.034	-.107	7	7	0	14
	++ JAN 14	73	26	.232	-.075	11	4	0	15
	JAN 15	57	42	.262	-.303	4	3	0	7
	++ JAN 16	71	28	.151	-.097	5	2	0	7
	+ JAN 17	66	33	.185	-.089	4	2	0	6
	- JAN 18	40	60	.118	-.056	2	3	0	5
	+ JAN 19	66	33	.148	-.251	4	2	0	6
	+ JAN 20	66	33	.088	-.278	4	2	0	6
	--- JAN 21	14	85	.147	-.100	1	6	0	7
	JAN 22	42	57	.117	-.411	3	4	0	7

Figure 5.9: Daily Market Probability Statistics

File used: 03SU - SUGAR

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	Month/ Day	% ---		-- Average --		----- Years -----			
		Up	Down	Up	Down	Up	Down	Unch	Total
	OCT 1	46	53	.027	-.010	6	7	0	13
	OCT 2	38	46	.033	-.014	5	6	2	13
+	OCT 3	69	23	.016	-.016	9	3	1	13
-	OCT 4	30	61	.018	-.023	4	8	1	13
+	OCT 5	64	28	.025	-.014	9	4	1	14
	OCT 6	53	46	.020	-.011	8	7	0	15
	OCT 7	50	50	.015	-.011	7	7	0	14
	OCT 8	50	41	.013	-.014	6	5	1	12
++	OCT 9	72	18	.016	-.008	8	2	1	11
+	OCT 10	66	33	.020	-.015	8	4	0	12
	OCT 11	45	54	.039	-.024	5	6	0	11
	OCT 12	45	54	.015	-.015	5	6	0	11
+	OCT 13	61	38	.015	-.017	8	5	0	13
-	OCT 14	30	61	.010	-.022	4	8	1	13
	OCT 15	46	53	.020	-.013	6	7	0	13
++	OCT 16	76	23	.026	-.023	10	3	0	13
-	OCT 17	23	69	.017	-.017	3	9	1	13
	OCT 18	46	53	.019	-.015	6	7	0	13
--	OCT 19	21	78	.018	-.022	3	11	0	14
	OCT 20	53	40	.022	-.022	8	6	1	15
++	OCT 21	78	21	.014	-.022	11	3	0	14
	OCT 22	50	41	.030	-.010	6	5	1	12
++	OCT 23	75	25	.016	-.021	9	3	0	12
	OCT 24	46	46	.030	-.030	6	6	1	13
	OCT 25	41	41	.029	-.021	5	5	2	12
	OCT 26	50	50	.013	-.013	7	7	0	14
	OCT 27	53	40	.014	-.022	8	6	1	15
	OCT 28	50	42	.024	-.019	7	6	1	14
	OCT 29	53	46	.026	-.013	7	6	0	13
+	OCT 30	61	38	.023	-.016	8	5	0	13
	OCT 31	46	53	.013	-.015	6	7	0	13
	NOV 1	53	38	.022	-.014	7	5	1	13
--	NOV 2	27	72	.031	-.013	3	8	0	11
	NOV 3	35	50	.026	-.006	5	7	2	14
+	NOV 4	63	36	.020	-.017	7	4	0	11
	NOV 5	54	45	.015	-.012	6	5	0	11
+	NOV 6	66	33	.017	-.023	8	4	0	12

Figure 5.9: (Continued)

File used: 03SU - SUGAR

	Month/ Day	% ---		-- Average --		----- Years -----			
		Up	Down	Up	Down	Up	Down	Unch	Total
++	NOV 7	70	30	.017	-.016	7	3	0	10
	NOV 8	54	45	.014	-.018	6	5	0	11
	NOV 9	57	42	.020	-.017	8	6	0	14
	NOV 10	40	53	.024	-.024	6	8	1	15
---	NOV 11	16	83	.003	-.026	1	5	0	6
+	NOV 12	61	30	.020	-.028	8	4	1	13
-	NOV 13	30	61	.017	-.022	4	8	1	13
	NOV 14	53	38	.031	-.023	7	5	1	13
	NOV 15	46	38	.025	-.017	6	5	2	13
	NOV 16	50	42	.023	-.009	7	6	1	14
-	NOV 17	40	60	.009	-.018	6	9	0	15
	NOV 18	50	50	.021	-.008	7	7	0	14
	NOV 19	46	53	.019	-.011	6	7	0	13
	NOV 20	53	46	.014	-.019	7	6	0	13
-	NOV 21	33	66	.032	-.015	4	8	0	12
	NOV 22	45	45	.016	-.025	5	5	1	11
	NOV 23	45	54	.014	-.019	5	6	0	11
	NOV 24	41	58	.022	-.019	5	7	0	12
--	NOV 25	27	72	.039	-.015	3	8	0	11
+	NOV 26	60	40	.018	-.029	6	4	0	10
	NOV 27	44	55	.020	-.027	4	5	0	9
	NOV 28	45	45	.021	-.017	5	5	1	11
+	NOV 29	61	30	.016	-.031	8	4	1	13
	NOV 30	57	42	.019	-.010	8	6	0	14
-	DEC 1	26	66	.023	-.024	4	10	1	15
--	DEC 2	21	78	.016	-.016	3	11	0	14
-	DEC 3	30	61	.010	-.014	4	8	1	13
	DEC 4	38	53	.025	-.019	5	7	1	13
	DEC 5	53	46	.016	-.018	7	6	0	13
	DEC 6	46	53	.031	-.017	6	7	0	13
	DEC 7	57	42	.021	-.014	8	6	0	14
-	DEC 8	40	60	.011	-.021	6	9	0	15
	DEC 9	42	57	.009	-.017	6	8	0	14
	DEC 10	46	53	.023	-.023	6	7	0	13
+	DEC 11	61	30	.024	-.042	8	4	1	13
	DEC 12	30	53	.027	-.022	4	7	2	13
-	DEC 13	38	61	.027	-.019	5	8	0	13
	DEC 14	57	42	.020	-.008	8	6	0	14
+	DEC 15	66	33	.035	-.011	10	5	0	15
	DEC 16	35	57	.017	-.015	5	8	1	14
	DEC 17	53	38	.041	-.019	7	5	1	13
	DEC 18	53	38	.014	-.015	7	5	1	13
+	DEC 19	61	23	.013	-.020	8	3	2	13
+	DEC 20	61	38	.021	-.025	8	5	0	13
++	DEC 21	71	28	.011	-.017	10	4	0	14

Figure 5.9: (Continued)

File used: 03SU - SUGAR

Month/ Day	% ---		Average --		Years -----			
	Up	Down	Up	Down	Up	Down	Unch	Total
DEC 22	42	42	.025	-.013	6	6	2	14
DEC 23	42	50	.033	-.016	6	7	1	14
- DEC 24	33	66	.017	-.009	2	4	0	6
DEC 26	50	33	.030	-.014	3	2	1	6
- DEC 27	38	61	.016	-.022	5	8	0	13
DEC 28	53	38	.012	-.019	7	5	1	13
DEC 29	46	53	.021	-.022	7	6	0	15
DEC 30	50	50	.021	-.014	7	7	0	14
+ DEC 31	60	20	.021	-.034	6	2	2	10
JAN 3	42	57	.008	-.027	3	4	0	7
JAN 4	41	41	.021	-.033	5	5	2	12
JAN 5	46	53	.025	-.015	6	7	0	13
JAN 6	53	46	.017	-.027	8	7	0	15
- JAN 7	28	64	.014	-.020	4	9	1	14
JAN 8	46	46	.017	-.028	6	6	1	13
JAN 9	46	53	.028	-.021	6	7	0	13
+ JAN 10	64	35	.026	-.016	9	5	0	14
JAN 11	53	40	.027	-.026	8	6	1	15
JAN 12	56	43	.021	-.029	9	7	0	16
+ JAN 13	66	33	.026	-.022	10	5	0	15
+++ JAN 14	85	14	.024	-.021	12	2	0	14
JAN 15	46	53	.026	-.020	6	7	0	13
JAN 16	30	53	.020	-.025	4	7	2	13
+ JAN 17	64	28	.026	-.013	9	4	1	14
JAN 18	50	50	.015	-.018	7	7	0	14
JAN 19	56	43	.022	-.019	9	7	0	16
+ JAN 20	64	35	.015	-.019	9	5	0	14
+ JAN 21	64	35	.024	-.022	9	5	0	14
- JAN 22	30	69	.028	-.017	4	9	0	13
++ JAN 23	76	23	.031	-.032	10	3	0	13
JAN 24	57	42	.019	-.032	8	6	0	14
+ JAN 25	64	35	.025	-.020	9	5	0	14
+ JAN 26	68	31	.017	-.020	11	5	0	16
JAN 27	53	46	.024	-.017	8	7	0	15
-- JAN 28	28	71	.027	-.029	4	10	0	14
JAN 29	30	53	.047	-.025	4	7	2	13
+ JAN 30	69	30	.014	-.017	9	4	0	13
JAN 31	42	50	.025	-.015	6	7	1	14
FEB 1	53	46	.020	-.028	8	7	0	15
FEB 2	50	37	.022	-.020	8	6	2	16
- FEB 3	26	66	.016	-.022	4	10	1	15
FEB 4	50	50	.018	-.023	7	7	0	14
FEB 5	38	53	.025	-.027	5	7	1	13
- FEB 6	30	61	.046	-.026	4	8	1	13
FEB 7	38	53	.024	-.022	5	7	1	13

**Figure 5.9: (Concluded)**

File used: 03SU - SUGAR

Month/ Day	--- % ---		-- Average --		----- Years -----			
	Up	Down	Up	Down	Up	Down	Unch	Total
FEB 8	46	53	.030	-.025	7	8	0	15
FEB 9	43	50	.016	-.028	7	8	1	16
FEB 10	57	35	.027	-.022	8	5	1	14
++ FEB 11	78	14	.027	-.023	11	2	1	14
-- FEB 12	25	75	.004	-.026	1	3	0	4
-- FEB 13	27	72	.060	-.027	3	8	0	11
-- FEB 14	21	71	.013	-.022	3	10	1	14
FEB 15	50	50	.014	-.012	5	5	0	10
FEB 16	50	50	.021	-.019	5	5	0	10
--- FEB 17	20	80	.007	-.022	2	8	0	10
FEB 18	44	44	.018	-.005	4	4	1	9
- FEB 19	37	62	.058	-.044	3	5	0	8
++ FEB 20	71	28	.037	-.017	5	2	0	7
+++ FEB 21	85	14	.031	-.037	6	1	0	7
-- FEB 22	25	75	.009	-.044	3	9	0	12
FEB 23	50	50	.009	-.025	6	6	0	12
FEB 24	45	45	.025	-.024	5	5	1	11
--- FEB 25	18	81	.032	-.035	2	9	0	11
--- FEB 26	20	80	.050	-.024	2	8	0	10
-- FEB 27	11	77	.034	-.038	1	7	1	9
FEB 28	50	50	.023	-.033	5	5	0	10
++ FEB 29	75	25	.053	-.061	3	1	0	4



# Figure 5.10: Daily Market Probability Statistics

File used: 03CP - COPPER

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	Month/ Day	--- % ---		-- Average --		----- Years -----			
		Up	Down	Up	Down	Up	Down	Unch	Total
+ OCT 1	1	62	37	.014	-.015	10	6	0	16
OCT 2	2	37	56	.015	-.017	6	9	1	16
OCT 3	3	43	56	.012	-.014	7	9	0	16
+ OCT 4	4	60	40	.009	-.012	9	6	0	15
OCT 5	5	46	53	.014	-.010	7	8	0	15
+ OCT 6	6	62	37	.010	-.011	10	6	0	16
+ OCT 7	7	62	37	.015	-.009	10	6	0	16
-- OCT 8	8	26	73	.009	-.015	4	11	0	15
OCT 9	9	46	53	.014	-.011	7	8	0	15
OCT 10	10	43	56	.008	-.020	7	9	0	16
OCT 11	11	42	42	.011	-.018	6	6	2	14
OCT 12	12	41	58	.020	-.009	5	7	0	12
OCT 13	13	42	50	.017	-.011	6	7	1	14
OCT 14	14	53	46	.013	-.005	8	7	0	15
OCT 15	15	43	50	.011	-.016	7	8	1	16
OCT 16	16	43	56	.010	-.020	7	9	0	16
OCT 17	17	43	50	.010	-.011	7	8	1	16
OCT 18	18	46	46	.010	-.009	7	7	1	15
-- OCT 19	19	26	73	.013	-.015	4	11	0	15
OCT 20	20	56	43	.009	-.025	9	7	0	16
OCT 21	21	56	43	.012	-.007	9	7	0	16
- OCT 22	22	40	60	.013	-.010	6	9	0	15
+++ OCT 23	23	80	20	.015	-.012	12	3	0	15
- OCT 24	24	31	62	.013	-.008	5	10	1	16
OCT 25	25	50	50	.016	-.016	7	7	0	14
OCT 26	26	40	53	.009	-.016	6	8	1	15
OCT 27	27	56	43	.010	-.009	9	7	0	16
OCT 28	28	50	50	.008	-.007	8	8	0	16
OCT 29	29	56	43	.009	-.011	9	7	0	16
+++ OCT 30	30	81	18	.012	-.006	13	3	0	16
+ OCT 31	31	62	37	.020	-.010	10	6	0	16
NOV 1	1	53	46	.012	-.011	8	7	0	15
NOV 2	2	50	33	.019	-.004	6	4	2	12
NOV 3	3	53	40	.007	-.010	8	6	1	15
NOV 4	4	53	38	.013	-.009	7	5	1	13
NOV 5	5	57	42	.010	-.007	8	6	0	14
NOV 6	6	53	40	.023	-.008	8	6	1	15

Figure 5.10: (Continued)

File used: 03CP - COPPER

Month/ Day	% ---		-- Average --		----- Years -----			
	Up	Down	Up	Down	Up	Down	Unch	Total
- NOV 7	30	69	.007	-.012	4	9	0	13
NOV 8	57	42	.012	-.014	8	6	0	14
+ NOV 9	60	40	.011	-.014	9	6	0	15
- NOV 10	25	68	.017	-.009	4	11	1	16
NOV 11	50	50	.006	-.014	5	5	0	10
+ NOV 12	62	37	.010	-.014	10	6	0	16
NOV 13	43	50	.005	-.011	7	8	1	16
- NOV 14	37	62	.012	-.009	6	10	0	16
NOV 15	53	46	.010	-.012	8	7	0	15
NOV 16	46	53	.010	-.011	7	8	0	15
NOV 17	56	43	.005	-.009	9	7	0	16
NOV 18	56	43	.011	-.011	9	7	0	16
NOV 19	43	50	.012	-.016	7	8	1	16
- NOV 20	25	62	.011	-.006	4	10	2	16
NOV 21	56	31	.009	-.014	9	5	2	16
++ NOV 22	75	25	.008	-.020	9	3	0	12
NOV 23	41	58	.013	-.012	5	7	0	12
+ NOV 24	61	38	.012	-.014	8	5	0	13
NOV 25	38	53	.015	-.008	5	7	1	13
NOV 26	53	46	.009	-.017	7	6	0	13
NOV 27	50	50	.019	-.014	6	6	0	12
NOV 28	53	46	.016	-.012	7	6	0	13
+ NOV 29	66	33	.011	-.012	10	5	0	15
+ NOV 30	60	33	.016	-.024	9	5	1	15
DEC 1	50	43	.013	-.010	8	7	1	16
DEC 2	31	56	.012	-.014	5	9	2	16
DEC 3	50	50	.010	-.009	8	8	0	16
DEC 4	50	50	.012	-.020	8	8	0	16
DEC 5	56	37	.014	-.011	9	6	1	16
DEC 6	53	40	.010	-.018	8	6	1	15
DEC 7	46	46	.025	-.011	7	7	1	15
DEC 8	50	50	.010	-.013	8	8	0	16
DEC 9	37	56	.006	-.016	6	9	1	16
DEC 10	56	43	.013	-.015	9	7	0	16
+++ DEC 11	81	18	.015	-.026	13	3	0	16
- DEC 12	25	68	.013	-.009	4	11	1	16
- DEC 13	20	66	.005	-.014	3	10	2	15
DEC 14	33	53	.017	-.009	5	8	2	15
DEC 15	50	43	.009	-.010	8	7	1	16
+ DEC 16	68	31	.013	-.008	11	5	0	16
DEC 17	43	56	.014	-.012	7	9	0	16
+ DEC 18	62	37	.012	-.012	10	6	0	16
DEC 19	50	50	.009	-.007	8	8	0	16
DEC 20	53	40	.009	-.006	8	6	1	15
DEC 21	53	46	.014	-.012	8	7	0	15

Figure 5.10: (Continued)

File used: 03CP - COPPER

	Month/ Day	--- % ---		-- Average --		----- Years -----			
		Up	Down	Up	Down	Up	Down	Unch	Total
	+ DEC 22	62	37	.005	-.008	10	6	0	16
	DEC 23	43	50	.013	-.004	7	8	1	16
+++	DEC 24	88	11	.011	-.014	8	1	0	9
+++	DEC 26	88	11	.013	-.008	8	1	0	9
	+ DEC 27	60	40	.015	-.005	9	6	0	15
	DEC 28	50	42	.009	-.009	7	6	1	14
	DEC 29	43	56	.011	-.011	7	9	0	16
	DEC 30	50	43	.008	-.017	8	7	1	16
	+ DEC 31	61	38	.011	-.012	8	5	0	13
++	JAN 3	77	11	.013	-.016	7	1	1	9
-	JAN 4	30	69	.010	-.011	4	9	0	13
	JAN 5	43	50	.016	-.013	7	8	1	16
--	JAN 6	17	76	.007	-.016	3	13	1	17
	JAN 7	35	58	.019	-.013	6	10	1	17
	JAN 8	43	56	.007	-.010	7	9	0	16
	JAN 9	50	43	.015	-.012	8	7	1	16
	JAN 10	56	43	.014	-.009	9	7	0	16
	JAN 11	43	50	.020	-.012	7	8	1	16
	JAN 12	58	41	.009	-.014	10	7	0	17
	JAN 13	35	58	.012	-.016	6	10	1	17
+++	JAN 14	88	11	.011	-.019	15	2	0	17
-	JAN 15	31	68	.013	-.010	5	11	0	16
-	JAN 16	37	62	.014	-.011	6	10	0	16
	+ JAN 17	68	25	.016	-.007	11	4	1	16
	+ JAN 18	66	26	.015	-.010	10	4	1	15
	JAN 19	52	47	.013	-.013	9	8	0	17
	JAN 20	50	50	.007	-.018	8	8	0	16
	JAN 21	47	52	.021	-.009	8	9	0	17
-	JAN 22	18	68	.019	-.017	3	11	2	16
-	JAN 23	37	62	.008	-.014	6	10	0	16
	+ JAN 24	68	31	.016	-.015	11	5	0	16
	JAN 25	53	46	.021	-.015	8	7	0	15
	JAN 26	58	41	.012	-.009	10	7	0	17
++	JAN 27	70	29	.014	-.017	12	5	0	17
	JAN 28	47	52	.018	-.012	8	9	0	17
	JAN 29	50	50	.016	-.014	8	8	0	16
++	JAN 30	75	25	.008	-.008	12	4	0	16
	JAN 31	56	37	.019	-.012	9	6	1	16
	+ FEB 1	62	31	.013	-.020	10	5	1	16
	FEB 2	41	58	.015	-.007	7	10	0	17
	FEB 3	52	47	.012	-.010	9	8	0	17
	+ FEB 4	64	35	.008	-.017	11	6	0	17
	FEB 5	56	31	.015	-.010	9	5	2	16
	FEB 6	31	56	.013	-.011	5	9	2	16
	FEB 7	46	53	.014	-.012	7	8	0	15

Figure 5.10: (Concluded)

File used: 03CP - COPPER

	Month/ Day	--- % ---		-- Average --		----- Years -----			
		Up	Down	Up	Down	Up	Down	Unchr	Total
	FEB 8	50	50	.015	-.009	8	8	0	16
--	FEB 9	29	70	.013	-.009	5	12	0	17
+	FEB 10	62	37	.013	-.009	10	6	0	16
	FEB 11	52	47	.012	-.006	9	8	0	17
+	FEB 12	66	22	.009	-.007	6	2	1	9
	FEB 13	53	46	.018	-.009	8	7	0	15
+	FEB 14	62	31	.015	-.006	10	5	1	16
+	FEB 15	61	38	.017	-.017	8	5	0	13
	FEB 16	57	35	.015	-.006	8	5	1	14
	FEB 17	46	53	.009	-.011	7	8	0	15
	FEB 18	57	21	.009	-.023	8	3	3	14
	FEB 19	42	57	.015	-.013	6	8	0	14
	FEB 20	50	50	.020	-.016	7	7	0	14
	FEB 21	58	33	.017	-.010	7	4	1	12
+	FEB 22	61	38	.016	-.028	8	5	0	13
-	FEB 23	37	62	.009	-.018	6	10	0	16
	FEB 24	35	58	.016	-.007	6	10	1	17
-	FEB 25	35	64	.015	-.014	6	11	0	17
	FEB 26	56	43	.016	-.020	9	7	0	16
++	FEB 27	75	25	.013	-.014	12	4	0	16
	FEB 28	56	43	.013	-.025	9	7	0	16
-	FEB 29	40	60	.027	-.008	2	3	0	5
+	MAR 1	68	31	.020	-.010	11	5	0	16
	MAR 2	37	56	.016	-.018	6	9	1	16
	MAR 3	41	58	.012	-.011	7	10	0	17
++	MAR 4	76	23	.016	-.020	13	4	0	17
+	MAR 5	62	37	.012	-.017	10	6	0	16
	MAR 6	50	31	.019	-.017	8	5	3	16
	MAR 7	47	52	.017	-.011	8	9	0	17
	MAR 8	50	50	.011	-.017	8	8	0	16
	MAR 9	50	50	.012	-.012	8	8	0	16
	MAR 10	58	29	.012	-.025	10	5	2	17
	MAR 11	47	52	.022	-.009	8	9	0	17
-	MAR 12	31	62	.016	-.012	5	10	1	16
+	MAR 13	62	31	.009	-.021	10	5	1	16
	MAR 14	58	35	.017	-.008	10	6	1	17
	MAR 15	53	40	.008	-.013	8	6	1	15
	MAR 16	43	56	.021	-.006	7	9	0	16
	MAR 17	58	35	.011	-.017	10	6	1	17
	MAR 18	58	35	.017	-.011	10	6	1	17
+	MAR 19	68	31	.018	-.007	11	5	0	16
	MAR 20	56	31	.014	-.019	9	5	2	16
	MAR 21	54	45	.013	-.020	6	5	0	11
	MAR 22	45	54	.009	-.014	5	6	0	11
++	MAR 23	72	27	.019	-.013	8	3	0	11

**As a trading system.** The market probability readings can be developed into a trading system. This requires developing the following elements and incorporating them into an operational plan:

- a) timing indicators;
- b) risk management considerations; and
- c) precise entry and exit procedures.

Consider the following approach as a further suggestion for developing a trading system based on the percent readings. Trades will only be made when percent reading for a given day is 75 percent or higher, up or down. Toward the end of the previous trading day you will begin to watch intra-day timing indicators (i.e., moving averages, oscillators and stochastics). When these indicators turn in the same direction as the percent reading for the next day or several days, you will enter the market consistent with the direction of the expected move. You will exit when the timing indicators turn in the opposite direction at the end of the day (or days) of strong percentage reading(s), or at a predetermined stop loss or objective which is determined by another method of analysis.

The above, being only a suggestion, must be developed in considerable detail and must be thoroughly tested if it is to have any merit.

**As an indicator of more significant seasonal movement.** By examining the daily percentage readings over blocks of time (for example, weekly or monthly), you can ascertain probable seasonal movement for the given block of time. December and February live hog futures, for example, show a large number of percentage of time up closes for the month of November. The conclusion is that November has often been a bullish month for live hog futures. This information might not only be valuable to position traders, but should prove especially valuable to hedgers, producers and commercial interests.

**To isolate possible seasonal spread situations.** This application is also particularly suited to hedgers, commercial interests and more experienced traders. By examining the percentage of time up/

down readings during similar periods of time for different contract months of the same market, or for the same contract months of different but related markets (i.e., July corn and July wheat), one can determine the historical tendency of prices on a relative basis. Assume for example that during a given month July corn futures have shown only a few plus readings with a majority of minus readings, but that July wheat futures have shown very few minus readings with a majority of plus readings. In such a situation the spread—long July wheat, short July corn—appears to have merit from a seasonal standpoint. There are many such situations both on an intra-and inter-market basis.

**Trade only the highest readings.** You may wish to scan the data for the highest percent up and down readings, trading the markets consistent with these readings. Look for the “+ + +” or “- - -” notations in the left-hand margin for each of the listings. These figures note the largest percent of time readings and are likely to be the most reliable readings.

**Trade only high percentage of time strings.** One might reasonably argue that taken by itself, any one day of high percentage of time up or down readings could be a random or chance event. In order to minimize the possibility of this being the case, one might ignore such days and, as a more reliable alternative, focus only on strings of days having high percentage readings in the same direction. As an example, note the strings taken from actual statistics for the given markets (Figure 5-11). Strings, or successive days of high readings in a given direction, are more likely to be statistically valid than are single days.

Figure 5.11: Daily Market Probability Printout Sample

File used: 12CO - COCOA										File used: 07C - CORN									
Month/Day	Up	Down	%	Average Up	Average Down	Month/Day	Up	Down	%	Average Up	Average Down								
- OCT 29	31	68		.015	-.012	JUN 7	35	57		.202	-.112								
OCT 30	43	50		.016	-.013	-- JUN 8	23	76		.063	-.081								
+++ OCT 31	81	18		.016	-.022	JUN 9	53	46		.096	-.056								
+ NOV 1	66	33		.011	-.018	JUN 10	30	53		.169	-.087								
++ NOV 2	75	25		.013	-.016	JUN 11	46	38		.140	-.075								
NOV 3	46	53		.021	-.012	JUN 12	50	50		.107	-.075								
NOV 4	46	53		.016	-.013	JUN 13	40	40		.054	-.071								
NOV 5	50	50		.011	-.014	-- JUN 14	14	71		.308	-.105								
- NOV 6	40	60		.018	-.013	JUN 15	46	53		.174	-.117								
+ NOV 7	69	30		.006	-.008	JUN 16	58	41		.107	-.050								
+++ NOV 8	84	15		.017	-.006	JUN 17	50	50		.104	-.121								
+ NOV 9	60	33		.011	-.008	JUN 18	38	53		.145	-.080								
NOV 10	50	50		.014	-.018	+ JUN 19	64	28		.134	-.051								
+ NOV 11	62	37		.012	-.010	JUN 20	57	42		.138	-.058								
- NOV 12	31	68		.027	-.014	JUN 21	46	53		.242	-.092								
NOV 13	56	43		.009	-.015	+ JUN 22	66	33		.097	-.192								
NOV 14	43	56		.014	-.021	JUN 23	41	50		.109	-.090								
NOV 15	46	53		.017	-.012	JUN 24	33	50		.185	-.050								
-- NOV 16	26	73		.016	-.013	JUN 25	30	61		.090	-.160								
-- NOV 17	25	75		.003	-.012	-- JUN 26	21	71		.082	-.104								
--- NOV 18	18	81		.011	-.012	-- JUN 27	28	71		.086	-.127								
						-- JUN 28	15	76		.091	-.148								



**Pre-holiday or pre-report behavior.** Pre-holiday or pre-report behavior can be evaluated by using the daily market probability studies. Examine markets for their percentage readings on days before major holidays or other significant days (Labor Day, Christmas, Fourth of July, New Year, Jewish New Year, election days, key government report days and so on). You are likely to be pleasantly surprised by what you find!

**Other patterns.** Other patterns may be found by close examination of the data. I will leave these to your study and imagination.

### **A Few Words About The Data History**

As mentioned previously, the data history I employed is quite extensive. Yet in spite of the length and scope of our data history, *the reliability of the percentage of time up and down readings is limited by the length of the database.* In some cases, for example, the data history is relatively brief. Hence, there will be many high percentage of time up and down readings for markets with limited data history. In such cases the reliability of readings is questionable even if there are high readings, and in spite of the fact that there may be fairly long strings of high readings.

Remember that statistical reliability is a function of time or data length. The more lengthy the data history, the more statistically valid will be the results. Don't draw strong conclusions in markets which have brief data histories.

Note also that the far right-hand column for each printout shows the actual number of data points for each calendar day. You will note that although the history length may cover twenty-four years, the number shown in this column may only be sixteen or fifteen years. Remember that there are two weekend days in each week, and therefore statistics for these days are not available. This is why the numbers in the far right-hand column are lower than the total number of years evaluated.

As you know, futures trading is not a certain thing. There is always the risk of loss as well as the potential for profit. Past performance of the daily market probability readings is not indicative



of future performance. I caution all readers to take great care when using these statistics in trading programs. Remember, however, that in spite of the limitations which must be placed on the applications of this data, this does not negate the value and potential which the daily market probability studies can have in the overall area of market analysis and trading system development.

### SEASONALITY AND DAILY MARKET PROBABILITY STUDIES

When I began my career in the futures industry, seasonality was neither popular nor well understood. While many traders were familiar with the highly seasonal behavior of the then-active Shell Egg futures market, few traders recognized the fact that seasonality is a major force in virtually every market. Although W. D. Gann had spent considerable time and effort researching and writing about seasonal behavior, traders are, unfortunately, more interested in his technical work than they are in his conclusions regarding seasonality in the various markets (stocks and futures). Yet the lack of interest afforded seasonality does not diminish its importance and/or influence in the markets.

In 1977, Williams and Noseworthy published *Sure Thing Commodity Trading*,<sup>4</sup> which was based exclusively on seasonal price patterns and repetition. Their study brought seasonality to the forefront as a viable and necessary method of price analysis, not only in the agricultural markets but in all futures markets. Their book has become a classic. It will always rank the high on list of recommended reading for futures traders.

Art Merrill's revolutionary work, *The Behavior of Prices on Wall Street*, statistically demonstrated the existence of seasonality in the stock market. In my seminars and lectures throughout the world I am always amazed by the few responses I get when I ask for a show of hands from those who have read Merrill's book or who are familiar

<sup>4</sup>Larry R. Williams and Michelle Noseworthy, *Sure Thing Commodity Trading* (Brightwater, NY: Windsor Books, 1977).

with his work. This suggests to me that there are not many traders who are familiar with the concepts of seasonality or who use them in their trading or analyses. From the viewpoint of contrary opinion this probably means that the concepts have considerable value.

Whether the daily market probability studies I have just discussed are seasonal or whether they are merely market patterns is not a significant consideration. The fact remains that my work, as well as the research of those cited in this chapter, has demonstrated the existence of calendar-based repetitive patterns which can, I feel, be used to the advantage of futures traders, commercial interests, hedgers and investors.

### **DAY-OF-WEEK ANALYSIS**

A variation on the theme of daily market probabilities by calendar date is the examination of daily closing patterns according to the actual day of the week. For example some traders have felt that lower closes on Monday through Thursday have significance for Friday's closing, or that a lower close on Friday may signal a lower close on Monday. Accordingly, I subjected this approach to rigorous study by market. Figures 5-12 through 5.34 show:

- a) contract symbols and years tested (two contracts per market);
- b) the pattern(s) tested; and
- c) result of test.
- d) the % listings which follow the closing pattern(s) show the percentage of time price closed up on the indicated date.

Figure 5.12: Day of Week Closing Patterns for Live Cattle

MON	TUE	WED	06LC ----	THU	12LC ----	TOT
+	+	+	52%		53%	53%
+	+	-	52%		51%	51%
+	-	+	55%		50%	52%
+	-	-	52%		58%	55%
-	+	+	46%		53%	49%
-	+	-	49%		49%	49%
-	-	+	51%		47%	49%
-	-	-	63%		49%	56%

MON	TUE	WED	THU	06LC ----	FRI	12LC ----	TOT
+	+	+	+	64%		62%	63%
+	+	+	-	69%		51%	60%
+	+	-	+	47%		47%	47%
+	+	-	-	55%		55%	55%
+	-	+	+	63%		65%	64%
+	-	+	-	41%		49%	45%
+	-	-	+	57%		52%	55%
+	-	-	-	41%		50%	45%
-	+	+	+	56%		55%	56%
-	+	+	-	45%		40%	42%
-	+	-	+	53%		52%	52%
-	+	-	-	42%		57%	49%
-	-	+	+	40%		40%	40%
-	-	+	-	46%		47%	47%
-	-	-	+	44%		46%	45%
-	-	-	-	45%		31%	38%

WED	THU	FRI	06LC ----	MON	12LC ----	TOT
+	+	+	54%		60%	57%
+	+	-	48%		63%	56%
+	-	+	50%		57%	53%
+	-	-	53%		44%	48%
-	+	+	48%		46%	47%
-	+	-	47%		43%	45%
-	-	+	49%		52%	50%
-	-	-	41%		34%	38%

FRI	06LC ----	MON	12LC ----	TOT
+	51%		54%	53%
-	49%		46%	47%

**Figure 5.13: Day of Week Closing Patterns for Live Hogs**

			06LH	12LH	
MON	TUE	WED	----	THU	----
+	+	+	52%	48%	TOT 50%
+	+	-	53%	55%	54%
+	-	+	45%	52%	48%
+	-	-	48%	47%	47%
-	+	+	44%	36%	40%
-	+	-	52%	51%	51%
-	-	+	48%	42%	45%
-	-	-	48%	54%	51%

				06LH	12LH	
MON	TUE	WED	THU	----	FRI	----
+	+	+	+	58%	56%	TOT 57%
+	+	+	-	48%	50%	49%
+	+	-	+	50%	53%	51%
+	+	-	-	56%	54%	55%
+	-	+	+	53%	41%	47%
+	-	+	-	60%	52%	56%
+	-	-	+	54%	41%	47%
+	-	-	-	43%	53%	48%
-	+	+	+	41%	45%	43%
-	+	+	-	38%	40%	39%
-	+	-	+	39%	45%	42%
-	+	-	-	42%	49%	45%
-	-	+	+	53%	49%	51%
-	-	+	-	48%	43%	45%
-	-	-	+	38%	36%	37%
-	-	-	-	36%	38%	37%

			06LH	12LH	
WED	THU	FRI	----	MON	----
+	+	+	59%	54%	TOT 56%
+	+	-	48%	57%	53%
+	-	+	47%	48%	48%
+	-	-	59%	52%	55%
-	+	+	47%	50%	48%
-	+	-	45%	44%	45%
-	-	+	54%	46%	50%
-	-	-	46%	48%	47%

	06LH	12LH	TOT
FRI	----	MON	----
+	52%	50%	51%
-	48%	53%	50%

Figure 5.14: Day of Week Closing Patterns for Pork Bellies

MON	TUE	WED	02PB	THU	07PB	TOT
			----		----	
+	+	+	48%		43%	45%
+	+	-	55%		52%	54%
+	-	+	47%		44%	45%
+	-	-	48%		55%	52%
-	+	+	43%		45%	44%
-	+	-	56%		52%	54%
-	-	+	61%		55%	58%
-	-	-	71%		66%	68%

MON	TUE	WED	THU	02PB	FRI	07PB	TOT
				----	----		
+	+	+	+	61%		63%	62%
+	+	+	-	51%		65%	58%
+	+	-	+	46%		45%	45%
+	+	-	-	54%		56%	55%
+	-	+	+	55%		54%	55%
+	-	+	-	47%		50%	49%
+	-	-	+	44%		48%	46%
+	-	-	-	56%		47%	52%
-	+	+	+	64%		46%	55%
-	+	+	-	43%		41%	42%
-	+	-	+	52%		54%	53%
-	+	-	-	53%		44%	48%
-	-	+	+	34%		33%	33%
-	-	+	-	57%		47%	52%
-	-	-	+	38%		51%	44%
-	-	-	-	53%		53%	53%

WED	THU	FRI	02PB	MON	07PB	TOT
			----	----		
+	+	+	56%		57%	57%
+	+	-	50%		48%	49%
+	-	+	46%		52%	49%
+	-	-	51%		47%	49%
-	+	+	51%		45%	48%
-	+	-	46%		44%	45%
-	-	+	44%		45%	44%
-	-	-	48%		47%	47%

FRI	02PB	MON	07PB	TOT
	----	----		
+	50%		51%	50%
-	48%		46%	47%

Figure 5.15: Day of Week Closing Patterns for Corn

MON	TUE	WED	07C ----	THU	12C ----	TOT
+	+	+	35%		36%	35%
+	+	-	49%		43%	46%
+	-	+	46%		53%	50%
+	-	-	39%		45%	42%
-	+	+	48%		38%	43%
-	+	-	42%		47%	45%
-	-	+	50%		43%	46%
-	-	-	44%		49%	46%

MON	TUE	WED	THU	07C ----	FRI	12C ----	TOT
+	+	+	+	69%		46%	57%
+	+	+	-	46%		52%	49%
+	+	-	+	50%		52%	51%
+	+	-	-	36%		41%	38%
+	-	+	+	54%		46%	50%
+	-	+	-	50%		43%	46%
+	-	-	+	60%		45%	53%
+	-	-	-	50%		48%	49%
-	+	+	+	38%		47%	42%
-	+	+	-	46%		47%	46%
-	+	-	+	48%		45%	47%
-	+	-	-	42%		51%	47%
-	-	+	+	36%		36%	36%
-	-	+	-	38%		44%	41%
-	-	-	+	54%		50%	52%
-	-	-	-	42%		52%	47%

WED	THU	FRI	07C ----	MON	12C ----	TOT
+	+	+	43%		48%	46%
+	+	-	40%		43%	42%
+	-	+	56%		51%	53%
+	-	-	46%		42%	44%
-	+	+	44%		38%	41%
-	+	-	40%		42%	41%
-	-	+	39%		49%	44%
-	-	-	48%		46%	47%

FRI	07C ----	MON	12C ----	TOT
+	46%		48%	47%
-	45%		43%	44%

Figure 5.16: Day of Week Closing Patterns for Soybean Oil

MON	TUE	WED	07BO	THU	12BO	TOT
			----		----	
+	+	+	48%		51%	49%
+	+	-	54%		50%	52%
+	-	+	38%		46%	42%
+	-	-	54%		58%	56%
-	+	+	42%		37%	39%
-	+	-	48%		55%	51%
-	-	+	49%		53%	51%
-	-	-	51%		45%	48%

MON	TUE	WED	THU	07BO	FRI	12BO	TOT
				----		----	
+	+	+	+	50%		50%	50%
+	+	+	-	57%		57%	57%
+	+	-	+	46%		48%	47%
+	+	-	-	41%		41%	41%
+	-	+	+	56%		38%	47%
+	-	+	-	53%		43%	48%
+	-	-	+	61%		60%	61%
+	-	-	-	45%		45%	45%
-	+	+	+	44%		44%	44%
-	+	+	-	37%		47%	42%
-	+	-	+	49%		46%	47%
-	+	-	-	40%		59%	49%
-	-	+	+	41%		46%	43%
-	-	+	-	45%		40%	43%
-	-	-	+	45%		45%	45%
-	-	-	-	48%		47%	47%

WED	THU	FRI	07BO	MON	12BO	TOT
			----		----	
+	+	+	54%		53%	53%
+	+	-	45%		46%	46%
+	-	+	51%		53%	52%
+	-	-	35%		39%	37%
-	+	+	52%		44%	48%
-	+	-	41%		41%	41%
-	-	+	37%		45%	41%
-	-	-	41%		37%	39%

FRI	07BO	MON	12BO	TOT
	----		----	
+	49%		49%	49%
-	39%		40%	39%

Figure 5.17: Day of Week Closing Patterns for Wheat

MON	TUE	WED	07W ----	THU	12W ----	TOT
+	+	+	35%		31%	33%
+	+	-	44%		44%	44%
+	-	+	48%		50%	49%
+	-	-	44%		50%	47%
-	+	+	47%		44%	46%
-	+	-	45%		45%	45%
-	-	+	52%		54%	53%
-	-	-	53%		45%	49%

MON	TUE	WED	THU	07W ----	FRI	12W ----	TOT
+	+	+	+	56%		58%	57%
+	+	+	-	46%		55%	50%
+	+	-	+	56%		68%	62%
+	+	-	-	42%		45%	44%
+	-	+	+	49%		55%	52%
+	-	+	-	33%		24%	28%
+	-	-	+	52%		55%	53%
+	-	-	-	50%		47%	48%
-	+	+	+	46%		39%	43%
-	+	+	-	45%		42%	43%
-	+	-	+	45%		45%	45%
-	+	-	-	39%		51%	45%
-	-	+	+	39%		45%	42%
-	-	+	-	45%		49%	47%
-	-	-	+	53%		59%	56%
-	-	-	-	50%		53%	52%

WED	THU	FRI	07W ----	MON	12W ----	TOT
+	+	+	49%		46%	47%
+	+	-	40%		43%	41%
+	-	+	50%		46%	48%
+	-	-	40%		46%	43%
-	+	+	41%		40%	40%
-	+	-	44%		42%	43%
-	-	+	52%		54%	53%
-	-	-	44%		44%	44%

FRI	07W ----	MON	12W ----	TOT
+	48%		46%	47%
-	41%		43%	42%



Figure 5.18: Day of Week Closing Patterns for Soybean Meal

MON	TUE	WED	07SM	THU	12SM	TOT
			----		----	
+	+	+	42%		46%	44%
+	+	-	47%		50%	49%
+	-	+	54%		45%	49%
+	-	-	53%		50%	51%
-	+	+	43%		46%	44%
-	+	-	53%		46%	49%
-	-	+	49%		48%	48%
-	-	-	49%		47%	48%

MON	TUE	WED	THU	07SM	FRI	12SM	TOT
				----		----	
+	+	+	+	54%		62%	58%
+	+	+	-	60%		55%	57%
+	+	-	+	38%		44%	41%
+	+	-	-	40%		48%	44%
+	-	+	+	60%		53%	56%
+	-	+	-	44%		45%	44%
+	-	-	+	58%		61%	60%
+	-	-	-	48%		43%	45%
-	+	+	+	53%		46%	49%
-	+	+	-	57%		52%	54%
-	+	-	+	44%		38%	41%
-	+	-	-	49%		44%	46%
-	-	+	+	34%		45%	40%
-	-	+	-	36%		55%	46%
-	-	-	+	53%		51%	52%
-	-	-	-	50%		51%	51%

WED	THU	FRI	07SM	MON	12SM	TOT
			----		----	
+	+	+	52%		44%	48%
+	+	-	44%		43%	43%
+	-	+	43%		48%	46%
+	-	-	34%		40%	37%
-	+	+	38%		34%	36%
-	+	-	40%		30%	35%
-	-	+	44%		37%	41%
-	-	-	34%		36%	35%

FRI	07SM	MON	12SM	TOT
	----		----	
+	44%		42%	43%
-	40%		38%	39%

Figure 5.19: Day of Week Closing Patterns for Soybeans

			07S		11S	
MON	TUE	WED	----	THU	----	TOT
+	+	+	48%		47%	48%
+	+	-	59%		52%	55%
+	-	+	47%		50%	49%
+	-	-	64%		60%	62%
-	+	+	44%		46%	45%
-	+	-	58%		50%	54%
-	-	+	46%		53%	49%
-	-	-	47%		59%	53%

				07S		11S	
MON	TUE	WED	THU	----	FRI	----	TOT
+	+	+	+	58%		58%	58%
+	+	+	-	56%		46%	51%
+	+	-	+	53%		58%	56%
+	+	-	-	46%		51%	48%
+	-	+	+	58%		49%	53%
+	-	+	-	48%		43%	46%
+	-	-	+	52%		46%	49%
+	-	-	-	46%		39%	42%
-	+	+	+	46%		42%	44%
-	+	+	-	46%		48%	47%
-	+	-	+	47%		52%	49%
-	+	-	-	51%		54%	52%
-	-	+	+	47%		49%	48%
-	-	+	-	53%		55%	54%
-	-	-	+	52%		54%	53%
-	-	-	-	43%		40%	41%

			07S		11S	
WED	THU	FRI	----	MON	----	TOT
+	+	+	52%		52%	52%
+	+	-	49%		43%	46%
+	-	+	46%		40%	43%
+	-	-	46%		44%	45%
-	+	+	32%		36%	34%
-	+	-	38%		34%	36%
-	-	+	47%		39%	43%
-	-	-	41%		43%	42%

	07S		11S	
FRI	----	MON	----	TOT
+	44%		42%	43%
-	42%		41%	42%

Figure 5.20: Day of Week Closing Patterns for Oats

MON	TUE	WED	070 ----	THU	120 ----	TOT
+	+	+	49%		47%	48%
+	+	-	44%		43%	43%
+	-	+	47%		40%	43%
+	-	-	40%		48%	44%
-	+	+	49%		47%	48%
-	+	-	48%		43%	45%
-	-	+	50%		49%	49%
-	-	-	48%		43%	45%

MON	TUE	WED	THU	070 ----	FRI	120 ----	TOT
+	+	+	+	43%		56%	50%
+	+	+	-	53%		47%	50%
+	+	-	+	47%		48%	47%
+	+	-	-	46%		48%	47%
+	-	+	+	55%		62%	59%
+	-	+	-	51%		46%	48%
+	-	-	+	55%		56%	55%
+	-	-	-	40%		43%	41%
-	+	+	+	38%		47%	43%
-	+	+	-	54%		48%	51%
-	+	-	+	50%		51%	50%
-	+	-	-	33%		47%	40%
-	-	+	+	42%		46%	44%
-	-	+	-	48%		61%	54%
-	-	-	+	52%		35%	44%
-	-	-	-	58%		53%	55%

WED	THU	FRI	070 ----	MON	120 ----	TOT
+	+	+	43%		45%	44%
+	+	-	38%		36%	37%
+	-	+	48%		48%	48%
+	-	-	42%		42%	42%
-	+	+	44%		42%	43%
-	+	-	40%		39%	39%
-	-	+	47%		43%	45%
-	-	-	41%		36%	38%

FRI	070 ----	MON	120 ----	TOT
+	46%		44%	45%
-	40%		39%	40%

Figure 5.21: Day of Week Closing Patterns for Sugar

MON	TUE	WED	07SU ----	THU	10SU ----	TOT
+	+	+	44%		47%	45%
+	+	-	51%		44%	47%
+	-	+	45%		45%	45%
+	-	-	56%		53%	55%
-	+	+	50%		48%	49%
-	+	-	58%		62%	60%
-	-	+	46%		48%	47%
-	-	-	47%		51%	49%

MON	TUE	WED	THU	07SU ----	FRI	10SU ----	TOT
+	+	+	+	62%		57%	60%
+	+	+	-	58%		59%	58%
+	+	-	+	73%		67%	70%
+	+	-	-	63%		57%	60%
+	-	+	+	54%		51%	52%
+	-	+	-	41%		59%	50%
+	-	-	+	55%		56%	56%
+	-	-	-	50%		40%	45%
-	+	+	+	44%		56%	50%
-	+	+	-	52%		55%	54%
-	+	-	+	57%		49%	53%
-	+	-	-	44%		48%	46%
-	-	+	+	44%		41%	43%
-	-	+	-	44%		38%	41%
-	-	-	+	50%		40%	45%
-	-	-	-	52%		59%	56%

WED	THU	FRI	07SU ----	MON	10SU ----	TOT
+	+	+	47%		41%	44%
+	+	-	43%		42%	43%
+	-	+	42%		40%	41%
+	-	-	45%		51%	48%
-	+	+	49%		49%	49%
-	+	-	45%		44%	45%
-	-	+	44%		47%	46%
-	-	-	38%		46%	42%

FRI	07SU ----	MON	10SU ----	TOT
+	45%		43%	44%
-	44%		46%	45%

Figure 5.22: Day of Week Closing Patterns for Cocoa

MON	TUE	WED	07CO	THU	12CO	TOT
			----	----	----	
+	+	+	43%		42%	42%
+	+	-	54%		52%	53%
+	-	+	45%		47%	46%
+	-	-	56%		50%	53%
-	+	+	47%		47%	47%
-	+	-	51%		51%	51%
-	-	+	52%		54%	53%
-	-	-	50%		53%	51%

MON	TUE	WED	THU	07CO	FRI	12CO	TOT
				----	----	----	
+	+	+	+	46%		51%	48%
+	+	+	-	54%		38%	46%
+	+	-	+	54%		58%	56%
+	+	-	-	55%		59%	57%
+	-	+	+	50%		46%	48%
+	-	+	-	48%		43%	46%
+	-	-	+	52%		48%	50%
+	-	-	-	56%		57%	56%
-	+	+	+	46%		51%	49%
-	+	+	-	54%		56%	55%
-	+	-	+	53%		61%	57%
-	+	-	-	65%		69%	67%
-	-	+	+	53%		50%	51%
-	-	+	-	48%		51%	49%
-	-	-	+	58%		60%	59%
-	-	-	-	53%		54%	53%

WED	THU	FRI	07CO	MON	12CO	TOT
			----	----	----	
+	+	+	52%		54%	53%
+	+	-	48%		42%	45%
+	-	+	53%		54%	54%
+	-	-	40%		45%	42%
-	+	+	50%		50%	50%
-	+	-	46%		50%	48%
-	-	+	48%		44%	46%
-	-	-	43%		50%	47%

FRI	07CO	MON	12CO	TOT
	----	----	----	
+	50%		50%	50%
-	44%		47%	46%

Figure 5.23: Day of Week Closing Patterns for Coffee

MON	TUE	WED	07CC ----	THU	12CC ----	TOT
+	+	+	52%		60%	56%
+	+	-	57%		53%	55%
+	-	+	57%		45%	51%
+	-	-	59%		56%	58%
-	+	+	58%		58%	58%
-	+	-	57%		49%	53%
-	-	+	55%		55%	55%
-	-	-	47%		57%	52%

MON	TUE	WED	THU	07CC ----	FRI	12CC ----	TOT
+	+	+	+	52%		65%	59%
+	+	+	-	54%		50%	52%
+	+	-	+	50%		64%	57%
+	+	-	-	33%		39%	36%
+	-	+	+	53%		59%	56%
+	-	+	-	44%		55%	49%
+	-	-	+	53%		65%	59%
+	-	-	-	44%		56%	50%
-	+	+	+	60%		53%	57%
-	+	+	-	35%		53%	44%
-	+	-	+	64%		44%	54%
-	+	-	-	44%		51%	47%
-	-	+	+	50%		53%	51%
-	-	+	-	48%		44%	46%
-	-	-	+	60%		52%	56%
-	-	-	-	43%		27%	35%

WED	THU	FRI	07CC ----	MON	12CC ----	TOT
+	+	+	56%		55%	56%
+	+	-	50%		56%	53%
+	-	+	51%		46%	48%
+	-	-	38%		40%	39%
-	+	+	55%		49%	52%
-	+	-	32%		43%	38%
-	-	+	46%		51%	49%
-	-	-	41%		41%	41%

FRI	07CC ----	MON	12CC ----	TOT
+	52%		50%	51%
-	40%		44%	42%

Figure 5.24: Day of Week Closing Patterns for Orange Juice

MON	TUE	WED	070J	THU	110J	TOT
+	+	+	46%		45%	46%
+	+	-	46%		50%	48%
+	-	+	44%		38%	41%
+	-	-	45%		52%	48%
-	+	+	43%		41%	42%
-	+	-	43%		47%	45%
-	-	+	50%		49%	49%
-	-	-	56%		51%	54%

MON	TUE	WED	THU	070J	FRI	110J	TOT
+	+	+	+	53%		56%	54%
+	+	+	-	43%		48%	45%
+	+	-	+	64%		55%	59%
+	+	-	-	53%		46%	50%
+	-	+	+	50%		54%	52%
+	-	+	-	52%		48%	50%
+	-	-	+	46%		52%	49%
+	-	-	-	50%		62%	56%
-	+	+	+	44%		50%	47%
-	+	+	-	59%		52%	55%
-	+	-	+	44%		45%	45%
-	+	-	-	59%		43%	51%
-	-	+	+	36%		46%	41%
-	-	+	-	55%		54%	55%
-	-	-	+	58%		47%	52%
-	-	-	-	61%		61%	61%

WED	THU	FRI	070J	MON	110J	TOT
+	+	+	50%		51%	51%
+	+	-	48%		45%	46%
+	-	+	51%		54%	52%
+	-	-	49%		47%	48%
-	+	+	53%		58%	55%
-	+	-	44%		47%	45%
-	-	+	50%		48%	49%
-	-	-	51%		47%	49%

FRI	070J	MON	110J	TOT
+	53%		55%	54%
-	48%		48%	48%

Figure 5.25: Day of Week Closing Patterns for Copper

MON	TUE	WED	07CP	THU	12CP	TOT
+	+	+	44%	---	42%	43%
+	+	-	46%	---	47%	47%
+	-	+	51%	---	56%	54%
+	-	-	60%	---	55%	57%
-	+	+	38%	---	40%	39%
-	+	-	49%	---	47%	48%
-	-	+	45%	---	49%	47%
-	-	-	61%	---	58%	59%

MON	TUE	WED	THU	07CP	FRI	12CP	TOT
+	+	+	+	53%	---	41%	47%
+	+	+	-	70%	---	64%	67%
+	+	-	+	50%	---	56%	53%
+	+	-	-	70%	---	68%	69%
+	-	+	+	45%	---	54%	50%
+	-	+	-	52%	---	54%	53%
+	-	-	+	39%	---	39%	39%
+	-	-	-	52%	---	49%	50%
-	+	+	+	43%	---	51%	47%
-	+	+	-	56%	---	60%	58%
-	+	-	+	50%	---	51%	50%
-	+	-	-	70%	---	67%	69%
-	-	+	+	43%	---	43%	43%
-	-	+	-	55%	---	53%	54%
-	-	-	+	50%	---	48%	49%
-	-	-	-	66%	---	64%	65%

WED	THU	FRI	07CP	MON	12CP	TOT
+	+	+	36%	---	39%	37%
+	+	-	44%	---	41%	43%
+	-	+	45%	---	43%	44%
+	-	-	52%	---	48%	50%
-	+	+	35%	---	37%	36%
-	+	-	38%	---	39%	38%
-	-	+	39%	---	40%	40%
-	-	-	38%	---	38%	38%

FRI	07CP	MON	12CP	TOT
+	40%	---	41%	40%
-	43%	---	42%	43%



Figure 5.26: Day of Week Closing Patterns for Gold

			06GC	12GC		
MON	TUE	WED	----	THU	----	TOT
+	+	+	39%		36%	37%
+	+	-	50%		52%	51%
+	-	+	30%		31%	30%
+	-	-	41%		43%	42%
-	+	+	40%		43%	41%
-	+	-	61%		63%	62%
-	-	+	46%		42%	44%
-	-	-	58%		57%	57%

				06GC	12GC		
MON	TUE	WED	THU	----	FRI	----	TOT
+	+	+	+	50%		41%	45%
+	+	+	-	68%		67%	68%
+	+	-	+	40%		41%	41%
+	+	-	-	69%		66%	67%
+	-	+	+	57%		56%	56%
+	-	+	-	54%		49%	52%
+	-	-	+	41%		47%	44%
+	-	-	-	51%		50%	50%
-	+	+	+	36%		42%	39%
-	+	+	-	61%		58%	59%
-	+	-	+	45%		47%	46%
-	+	-	-	52%		52%	52%
-	-	+	+	38%		39%	38%
-	-	+	-	50%		51%	51%
-	-	-	+	56%		52%	54%
-	-	-	-	51%		60%	55%

			06GC	12GC		
WED	THU	FRI	----	MON	----	TOT
+	+	+	41%		40%	40%
+	+	-	50%		54%	52%
+	-	+	51%		48%	49%
+	-	-	52%		51%	52%
-	+	+	50%		47%	49%
-	+	-	48%		48%	48%
-	-	+	42%		46%	44%
-	-	-	31%		36%	33%

		06GC	12GC	
FRI	----	MON	----	TOT
+	48%		47%	47%
-	46%		48%	47%

Figure 5.27: Day of Week Closing Patterns for Lumber

MON	TUE	WED	01LB ----	THU	07LB ----	TOT
+	+	+	60%		58%	59%
+	+	-	55%		47%	51%
+	-	+	64%		60%	62%
+	-	-	53%		55%	54%
-	+	+	48%		51%	50%
-	+	-	48%		52%	50%
-	-	+	55%		57%	56%
-	-	-	47%		53%	50%

MON	TUE	WED	THU	01LB ----	FRI	07LB ----	TOT
+	+	+	+	56%		39%	48%
+	+	+	-	40%		69%	54%
+	+	-	+	63%		69%	66%
+	+	-	-	44%		65%	55%
+	-	+	+	40%		55%	48%
+	-	+	-	42%		50%	46%
+	-	-	+	55%		52%	54%
+	-	-	-	43%		54%	48%
-	+	+	+	37%		39%	38%
-	+	+	-	46%		60%	53%
-	+	-	+	65%		51%	58%
-	+	-	-	35%		65%	50%
-	-	+	+	53%		48%	50%
-	-	+	-	46%		45%	45%
-	-	-	+	44%		28%	36%
-	-	-	-	44%		46%	45%

WED	THU	FRI	01LB ----	MON	07LB ----	TOT
+	+	+	53%		44%	48%
+	+	-	35%		41%	38%
+	-	+	47%		50%	48%
+	-	-	51%		50%	50%
-	+	+	47%		50%	49%
-	+	-	41%		40%	40%
-	-	+	44%		47%	46%
-	-	-	36%		38%	37%

FRI	01LB ----	MON	07LB ----	TOT
+	47%		48%	47%
-	39%		39%	39%

Figure 5.28: Day of Week Closing Patterns for Cotton

MON	TUE	WED	07NY ----	THU	12NY ----	TOT
+	+	+	45%		40%	43%
+	+	-	43%		44%	43%
+	-	+	52%		53%	52%
+	-	-	51%		52%	51%
-	+	+	46%		47%	47%
-	+	-	41%		49%	45%
-	-	+	43%		41%	42%
-	-	-	55%		53%	54%

MON	TUE	WED	THU	07NY ----	FRI	12NY ----	TOT
+	+	+	+	53%		46%	50%
+	+	+	-	63%		54%	58%
+	+	-	+	69%		73%	71%
+	+	-	-	54%		62%	58%
+	-	+	+	48%		54%	51%
+	-	+	-	54%		55%	54%
+	-	-	+	61%		49%	55%
+	-	-	-	57%		57%	57%
-	+	+	+	48%		41%	45%
-	+	+	-	43%		44%	43%
-	+	-	+	46%		50%	48%
-	+	-	-	53%		51%	52%
-	-	+	+	61%		43%	52%
-	-	+	-	56%		47%	52%
-	-	-	+	54%		59%	56%
-	-	-	-	47%		43%	45%

WED	THU	FRI	07NY ----	MON	12NY ----	TOT
+	+	+	49%		56%	53%
+	+	-	47%		49%	48%
+	-	+	50%		44%	47%
+	-	-	43%		44%	43%
-	+	+	50%		47%	49%
-	+	-	33%		43%	38%
-	-	+	59%		49%	54%
-	-	-	36%		43%	40%

FRI	07NY ----	MON	12NY ----	TOT
+	51%		50%	50%
-	41%		44%	43%

**Figure 5.29: Day of Week Closing Patterns for Treasury Bonds**

MON	TUE	WED	06TR ----	THU	12TR ----	TOT
+	+	+	43%		40%	42%
+	+	-	41%		43%	42%
+	-	+	51%		52%	52%
+	-	-	58%		56%	57%
-	+	+	48%		55%	52%
-	+	-	40%		40%	40%
-	-	+	55%		52%	53%
-	-	-	48%		44%	46%

MON	TUE	WED	THU	06TR ----	FRI	12TR ----	TOT
+	+	+	+	44%		41%	43%
+	+	+	-	42%		42%	42%
+	+	-	+	50%		43%	46%
+	+	-	-	44%		47%	45%
+	-	+	+	45%		47%	46%
+	-	+	-	47%		46%	47%
+	-	-	+	54%		54%	54%
+	-	-	-	45%		38%	42%
-	+	+	+	49%		48%	48%
-	+	+	-	41%		39%	40%
-	+	-	+	47%		53%	50%
-	+	-	-	47%		44%	45%
-	-	+	+	40%		39%	39%
-	-	+	-	43%		47%	45%
-	-	-	+	68%		69%	69%
-	-	-	-	34%		37%	36%

WED	THU	FRI	06TR ----	MON	12TR ----	TOT
+	+	+	44%		46%	45%
+	+	-	50%		50%	50%
+	-	+	46%		40%	43%
+	-	-	47%		51%	49%
-	+	+	48%		51%	50%
-	+	-	39%		35%	37%
-	-	+	39%		43%	41%
-	-	-	35%		37%	36%

FRI	06TR ----	MON	12TR ----	TOT
+	43%		43%	43%
-	42%		43%	42%

Figure 5.30: Day of Week Closing Patterns for Treasury Bills

			06TB	12TB	
MON	TUE	WED	----	THU	----
+	+	+	44%	46%	TOT 45%
+	+	-	38%	46%	42%
+	-	+	53%	48%	51%
+	-	-	43%	53%	48%
-	+	+	54%	57%	56%
-	+	-	47%	42%	44%
-	-	+	50%	48%	49%
-	-	-	44%	46%	45%

				06TB	12TB	
MON	TUE	WED	THU	----	FRI	----
+	+	+	+	65%	72%	TOT 68%
+	+	+	-	44%	38%	41%
+	+	-	+	57%	50%	54%
+	+	-	-	59%	45%	52%
+	-	+	+	35%	43%	39%
+	-	+	-	38%	44%	41%
+	-	-	+	69%	57%	63%
+	-	-	-	40%	47%	43%
-	+	+	+	50%	48%	49%
-	+	+	-	42%	36%	39%
-	+	-	+	37%	53%	45%
-	+	-	-	37%	37%	37%
-	-	+	+	58%	64%	61%
-	-	+	-	32%	42%	37%
-	-	-	+	55%	51%	53%
-	-	-	-	41%	41%	41%

			06TB	12TB	
WED	THU	FRI	----	MON	----
+	+	+	49%	51%	TOT 50%
+	+	-	40%	40%	40%
+	-	+	57%	47%	52%
+	-	-	43%	42%	43%
-	+	+	48%	48%	48%
-	+	-	51%	50%	50%
-	-	+	39%	43%	41%
-	-	-	49%	48%	48%

	06TB	12TB	TOT
FRI	----	MON	----
+	48%	47%	48%
-	45%	44%	45%

Figure 5.31: Day of Week Closing Patterns for Swiss Franc

MON	TUE	WED	06SF ----	THU	12SF ----	TOT
+	+	+	43%		47%	45%
+	+	-	45%		53%	49%
+	-	+	40%		48%	44%
+	-	-	43%		44%	43%
-	+	+	45%		48%	46%
-	+	-	56%		52%	54%
-	-	+	34%		35%	35%
-	-	-	36%		31%	34%

MON	TUE	WED	THU	06SF ----	FRI	12SF ----	TOT
+	+	+	+	66%		66%	66%
+	+	+	-	68%		56%	62%
+	+	-	+	50%		58%	54%
+	+	-	-	38%		32%	35%
+	-	+	+	62%		53%	58%
+	-	+	-	35%		38%	37%
+	-	-	+	58%		45%	51%
+	-	-	-	35%		45%	40%
-	+	+	+	53%		68%	60%
-	+	+	-	27%		36%	32%
-	+	-	+	50%		47%	48%
-	+	-	-	33%		29%	31%
-	-	+	+	40%		45%	43%
-	-	+	-	27%		29%	28%
-	-	-	+	19%		57%	38%
-	-	-	-	35%		33%	34%

WED	THU	FRI	06SF ----	MON	12SF ----	TOT
+	+	+	48%		56%	52%
+	+	-	45%		50%	47%
+	-	+	51%		39%	45%
+	-	-	42%		46%	44%
-	+	+	45%		49%	47%
-	+	-	46%		39%	42%
-	-	+	42%		46%	44%
-	-	-	40%		38%	39%

FRI	06SF ----	MON	12SF ----	TOT
+	48%		49%	48%
-	45%		43%	44%

Figure 5.32: Day of Week Closing Patterns for Japanese Yen

MON	TUE	WED	06JY	THU	12JY	TOT
			----	----		
+	+	+	40%		42%	41%
+	+	-	44%		55%	49%
+	-	+	62%		59%	61%
+	-	-	32%		36%	34%
-	+	+	50%		43%	47%
-	+	-	43%		44%	44%
-	-	+	41%		43%	42%
-	-	-	42%		40%	41%

MON	TUE	WED	THU	06JY	FRI	12JY	TOT
				----	----		
+	+	+	+	53%		61%	57%
+	+	+	-	50%		56%	53%
+	+	-	+	38%		44%	41%
+	+	-	-	50%		52%	51%
+	-	+	+	50%		48%	49%
+	-	+	-	40%		46%	43%
+	-	-	+	23%		33%	28%
+	-	-	-	50%		45%	47%
-	+	+	+	55%		59%	57%
-	+	+	-	34%		39%	37%
-	+	-	+	46%		35%	41%
-	+	-	-	51%		54%	52%
-	-	+	+	45%		57%	51%
-	-	+	-	41%		45%	43%
-	-	-	+	37%		40%	39%
-	-	-	-	21%		25%	23%

WED	THU	FRI	06JY	MON	12JY	TOT
			----	----		
+	+	+	68%		63%	66%
+	+	-	42%		51%	46%
+	-	+	53%		56%	54%
+	-	-	41%		53%	47%
-	+	+	55%		58%	57%
-	+	-	35%		27%	31%
-	-	+	54%		48%	51%
-	-	-	38%		38%	38%

FRI	06JY	MON	12JY	TOT
	----	----		
+	59%		56%	57%
-	40%		45%	42%

Figure 5.33: Day of Week Closing Patterns for British Pound

MON	TUE	WED	06BP	THU	12BP	TOT
			----		----	
+	+	+	42%		45%	43%
+	+	-	60%		55%	57%
+	-	+	44%		48%	46%
+	-	-	37%		43%	40%
-	+	+	46%		44%	45%
-	+	-	42%		50%	46%
-	-	+	38%		37%	37%
-	-	-	36%		46%	41%

MON	TUE	WED	THU	06BP	FRI	12BP	TOT
				----		----	
+	+	+	+	65%		62%	63%
+	+	+	-	38%		47%	42%
+	+	-	+	44%		47%	45%
+	+	-	-	38%		37%	37%
+	-	+	+	48%		39%	43%
+	-	+	-	42%		43%	43%
+	-	-	+	62%		53%	58%
+	-	-	-	40%		42%	41%
-	+	+	+	48%		44%	46%
-	+	+	-	51%		40%	46%
-	+	-	+	46%		47%	46%
-	+	-	-	30%		42%	36%
-	-	+	+	41%		46%	44%
-	-	+	-	53%		48%	50%
-	-	-	+	50%		56%	53%
-	-	-	-	35%		46%	41%

WED	THU	FRI	06BP	MON	12BP	TOT
			----		----	
+	+	+	66%		64%	65%
+	+	-	45%		53%	49%
+	-	+	39%		48%	44%
+	-	-	47%		55%	51%
-	+	+	53%		50%	51%
-	+	-	31%		41%	36%
-	-	+	52%		59%	55%
-	-	-	37%		44%	41%

FRI	06BP	MON	12BP	TOT
	----		----	
+	51%		54%	52%
-	43%		48%	45%



**Figure 5.34: Day of Week Closing Patterns for Platinum**

MON	TUE	WED	04PL ----	THU	10PL ----	TOT
+	+	+	39%		45%	42%
+	+	-	46%		46%	46%
+	-	+	39%		39%	39%
+	-	-	45%		46%	46%
-	+	+	46%		47%	47%
-	+	-	50%		52%	51%
-	-	+	40%		43%	42%
-	-	-	50%		52%	51%

MON	TUE	WED	THU	04PL ----	FRI	10PL ----	TOT
+	+	+	+	54%		53%	54%
+	+	+	-	51%		47%	49%
+	+	-	+	38%		47%	42%
+	+	-	-	64%		57%	60%
+	-	+	+	53%		50%	51%
+	-	+	-	47%		43%	45%
+	-	-	+	48%		50%	49%
+	-	-	-	42%		50%	46%
-	+	+	+	44%		48%	46%
-	+	+	-	60%		54%	57%
-	+	-	+	52%		57%	55%
-	+	-	-	45%		52%	49%
-	-	+	+	62%		48%	55%
-	-	+	-	62%		63%	62%
-	-	-	+	52%		48%	50%
-	-	-	-	54%		61%	58%

WED	THU	FRI	04PL ----	MON	10PL ----	TOT
+	+	+	55%		55%	55%
+	+	-	44%		50%	47%
+	-	+	53%		42%	47%
+	-	-	41%		45%	43%
-	+	+	52%		45%	49%
-	+	-	48%		43%	46%
-	-	+	46%		52%	49%
-	-	-	41%		38%	40%

FRI	04PL ----	MON	10PL ----	TOT
+	52%		49%	50%
-	44%		44%	44%



## Seasonal Timing Signals

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### KEY DATE SEASONAL ANALYSIS

What is seasonality? Since before the days of W .D. Gann, futures traders have known and employed seasonal futures tendencies in their trading. Gann popularized the notion of seasonal price behavior. However, even today, many years after his seasonal studies, traders are still not entirely convinced that these repetitive patterns can be an asset to trading programs. Perhaps this is because a majority of traders do not understand seasonals and their considerable importance in the futures and stock markets. Let's begin with a simple definition of seasonality:

*Seasonality is the tendency for prices or economic data to move in certain directions during certain times of the year; patterns which are often repetitive and, therefore, relatively predictable.*

Given this definition, we can easily understand that the price of corn might move lower during harvest when producers bring their crop to market. We can also understand that cattle prices might move higher during the winter months as animals are stressed due to cold weather. Certainly one of the most obvious seasonals is the tendency for orange juice futures prices to move higher during the frost and freeze season. Yet, strangely enough, the OJ seasonal is not nearly as reliable as are other seasonal patterns and tendencies. In fact, there are many more reliable seasonals in such markets as cop-

per or lumber. The fact is that seasonality is not merely a function of weather. It is rather a function of intra-year supply and demand factors which tend to follow essentially similar patterns during given times of the calendar year.

This, to many traders, is the most surprising aspect of seasonals. They feel, erroneously, that seasonality and the effects of weather on prices are one and the same thing. Actually, the effect of weather on prices is just one aspect of seasonality. There are many other factors which influence prices on a relatively regular intra-year basis, such as supply, demand, consumption, production, availability of transportation, advance purchases, hedging and so on. Some or all of these in combination with weather factors can exert a marked and repetitive effect on the price of virtually any market.

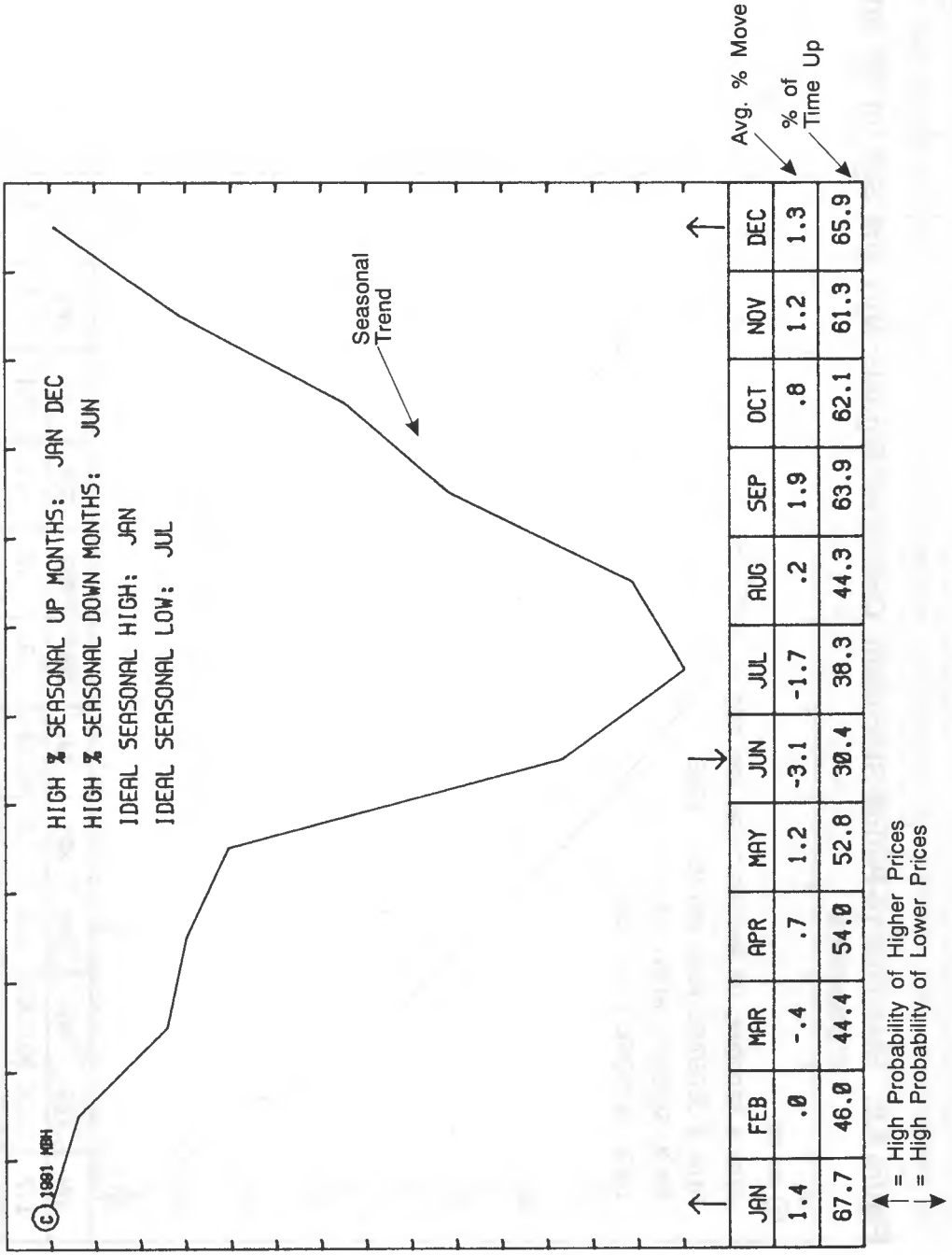
Seasonal price behavior is not limited to the agricultural commodity markets: it exists in virtually all markets, with varying degrees of intensity and regularity.

Seasonal price tendencies can be found in the cash and futures markets both. I have demonstrated the existence of cash and futures seasonal tendencies in numerous published studies and books since the 1970 s.<sup>1</sup>

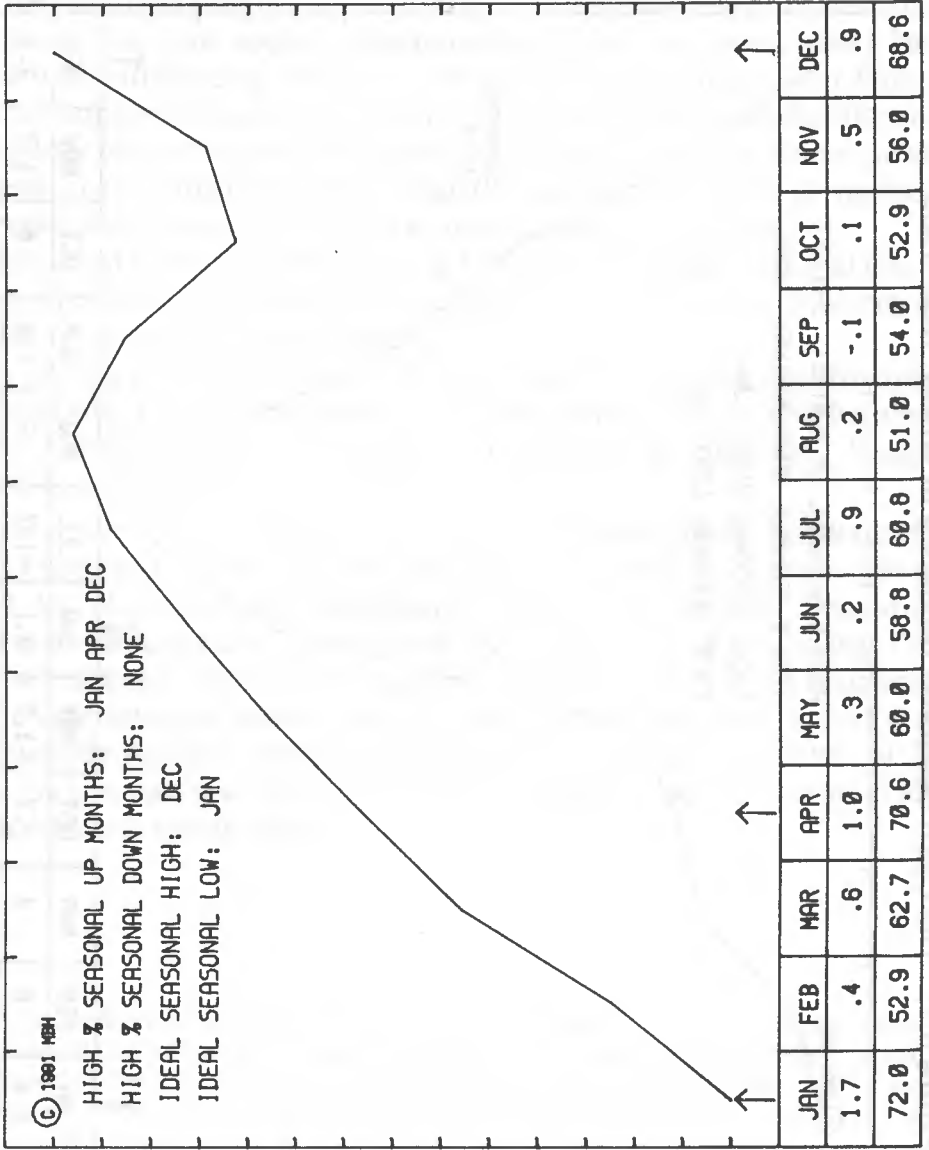
There are two general categories of seasonal price tendencies. They are related to one another. Seasonal cash tendencies are determined by studying and analyzing the cash markets. Seasonal futures tendencies are determined by studying and analyzing the futures markets. Figures 6-1 and 6-2 show monthly cash seasonal price tendencies in wheat and stock prices. Figures 6-3 and 6-4 show weekly futures seasonal tendencies in copper and live cattle prices. As you can see, there are distinct patterns, some of which can be traced back many years.

<sup>1</sup>*How to Profit from Seasonal Commodity Spreads* (New York, John Wiley & Sons, 1983); *Seasonal Cash Charts and Seasonal Futures Charts* (New York, John Wiley & Sons, 1991); *Seasonal Concepts in Futures Trading* (New York, John Wiley & Sons, 1989); and *Jake Bernstein's Seasonal Futures Spreads* (New York, John Wiley & Sons, 1990). In addition, there have been various seasonal studies and publications by others.

Figure 6.1: The Cash Seasonal Tendency in Wheat, 1862-1990



**Figure 6.2: Standard 14-Period Stochastic Crossover Signals: Buy and Sell on %K and %D crossovers**









Although it may be reasonably concluded that seasonals can and will change over time, the fact remains that there are general and specific patterns which have lasted for many years and which should persist in the future. Cash and futures tend to move together, each affecting the other. The futures trader, however, is primarily concerned with *futures seasonal tendencies*, which relate more directly to the specific aspects of futures trading.

In addition to the existence of seasonality in cash and futures markets, there are also reliable seasonal patterns and tendencies in futures spreads. These tendencies were examined in my book *How to Profit from Seasonal Commodity Spreads* (New York, John Wiley & Sons, 1983). (This book is presently out of print and has been replaced by *Jake Bernstein's Seasonal Futures Spreads*, (New York, John Wiley & Sons, 1990.) After considerable research I have concluded that there are highly reliable seasonal spread patterns; patterns which may, in fact, be more reliable than those found in either net long or short futures positions. This is not surprising to me inasmuch as there are numerous technical and fundamental factors which make the likelihood of highly reliable spread seasonals more probable. Figure 6-5 shows one such spread, the long June/short October live cattle spread. It is one of the most historically reliable and repetitive of all spreads.

In addition to the cash, futures and spread seasonal parameters discussed previously, seasonals can also be viewed from varying time frames or perspectives. Earlier we examined cash monthly seasonal charts and futures weekly seasonal charts. Seasonals may also be studied on a daily basis. Art Merrill's work employed a daily time frame in order to determine the existence of strong closing price tendencies the day prior to U.S. legal holidays (such as Thanksgiving, Labor Day and Christmas). Hence, there are three time frames from which seasonals may be viewed: monthly, weekly and daily.

The shortest period for which I have extensively examined seasonal price behavior is the daily time frame. Although I have also investigated intra-day and time-of-day patterns, my work here has

**Figure 6.5: Seasonal Spread Composite Chart—June Live Cattle/  
October Live Cattle, 1967–1988**



not been as exhaustive as it has been with monthly, weekly and daily periods. My Critical Time of Day (CTOD) indicator is a type of intraday "seasonal" tendency. It would, however, be more appropriately termed a "diurnal" or daily pattern as opposed to a strictly seasonal pattern. Chronobiologists have discovered many highly repetitive and important diurnal patterns in human and animal biological systems; patterns which can have a marked effect on such things as behavior and the efficacy of therapeutic drugs. It is highly likely that diurnal activity also exists in futures and stock prices. My CTOD indicator is a variant of diurnal behavior.<sup>2</sup>

As you can see from these figures, there have indeed been specific dates and strings of dates during which prices have been prone to move up or down a high percentage of the time for the period of years studied. This, of course, does not imply that history will always repeat itself. Were this true, there would be no markets, no traders, no risk and no reward. The fact of the matter, is as well known, is that there is always risk of loss in futures trading and that signals, whether derived from trading systems, indicators and combinations of indicators and/or fundamentals, won't always work. Economic science has not yet mastered flawless forecasting. There will always be intangibles which affect the functioning of any system, method, indicator or approach to futures trading. Losses are an inherent feature—even a necessary feature—of the whole system. We all profess to know this, yet there is a small (perhaps not so small) part of us that wants to believe in perfection. Many traders fantasize about "perfect systems," and this is perhaps why many unscrupulous operators and system developers have been able to sell what appear to be "near perfect" trading systems, when in fact their systems have proven to be far from perfect.

<sup>2</sup>For a specific discussion of CTOD parameters and signals see my book, *Short-Term Trading in Futures* (Chicago, IL, Probus Publishing, 1988).

Figure 6-6: Key Date Seasonal Tendency in January Heating Oil:  
Buy Mode

CONTRACT	ENTRY --DATE--	PRICE	EXIT --DATE--	PRICE	PROFIT LOSS(-)	% PROFIT LOSS(-)	ACCUM TOTAL
8001HO	9/ 4/79	83.50	9/27/79	90.00	6.50	7.78	6.50
8101HO	9/ 2/80	81.44	9/29/80	83.32	1.88	2.31	8.38
8201HO	9/ 1/81	97.97	9/28/81	98.65	.68	.69	9.06
8301HO	9/ 1/82	96.31	9/27/82	101.28	4.97	5.16	14.03
8401HO	9/ 1/83	86.13	9/27/83	86.54	.41	.48	14.44
8501HO	9/ 4/84	81.65	9/27/84	84.98	3.33	4.08	17.77
8601HO	9/ 3/85	79.90	9/27/85	82.77	2.87	3.59	20.64
8701HO	9/ 2/86	48.79	9/ 9/86	44.94	-3.85	-7.89	16.79
8801HO	9/ 1/87	54.22	9/28/87	54.82	.60	1.11	17.39
8901HO	9/ 1/88	45.09	9/ 9/88	42.69	-2.40	-5.32	14.99
9001HO	9/ 1/89	54.65	9/27/89	58.54	3.89	7.12	18.88
9101HO	9/ 4/90	81.64	9/27/90	104.63	22.99	28.16	41.87

TRADE SUMMARY

# POSITIVE: 10 # NEGATIVE: 2 # UNCH: 0 # TOTAL: 12  
 AVERAGE PROFIT: 4.81 ( 6.05%) AVERAGE LOSS: -3.12 ( -6.61%)  
 % TRADES PROFITABLE: 83.33

**Figure 6-7: Key Date Seasonal Tendency in March T-Bond Futures:  
Sell Short Mode**

CONTRACT	ENTRY --DATE--	PRICE--	EXIT --DATE--	PRICE--	PROFIT LOSS(-)	% PROFIT LOSS(-)	ACCU TOTAL
7803TR	12/27/77	99.02	1/ 9/78	97.06	1.96	1.98	1.96
7903TR	12/26/78	90.07	1/ 8/79	90.00	.07	.08	2.03
8003TR	12/26/79	81.02	1/ 8/80	80.08	.94	1.16	2.97
8103TR	12/24/80	72.01	1/ 8/81	71.06	.95	1.32	3.92
8203TR	12/24/81	61.03	1/ 8/82	59.05	1.98	3.24	5.90
8303TR	12/27/82	77.01	1/10/83	76.05	.96	1.25	6.86
8403TR	12/27/83	70.04	1/ 9/84	70.04	.00	.00	6.86
8503TR	12/24/84	72.05	1/ 8/85	71.07	.98	1.36	7.84
8603TR	12/24/85	84.25	1/ 8/86	84.11	.14	.17	7.98
8703TR	12/24/86	100.12	1/ 8/87	101.04	-.92	-.92	7.06
8803TR	12/24/87	88.68	1/ 8/88	86.31	2.37	2.67	9.43
8903TR	12/27/88	89.14	1/ 9/89	88.25	.89	1.00	10.32
9003TR	12/26/89	98.12	1/ 8/90	97.19	.93	.95	11.25
9103TR	12/24/90	94.22	1/ 8/91	94.20	.02	.02	11.27

TRADE SUMMARY

# POSITIVE: 12    # NEGATIVE: 1    # UNCH: 1    # TOTAL: 14  
 AVERAGE PROFIT: 1.02 ( 1.27%)    AVERAGE LOSS: -.92 ( -.92%)  
 % TRADES PROFITABLE: 85.71

Here's our working definition of a "key date trade" (KDT):

*A key date trade is a futures market trade initiated on a specific date (or the next business day if the market is closed on the key date) and exited on a specific date (or the next business day if the market is closed on the key date) or exited at a predetermined stop loss.*

KDT may also be defined as:

*A specific set of market instructions defining market, contract month, buy or sell direction, entry and exit date as well as stop loss level.*

Now that we've looked at the theory and concepts of KDT's, let's look at a sample KDT generated by my computer studies. The listing below shows the following KDT:

**BUY JULY SOYBEAN MEAL ON THE CLOSE OF TRADING  
JUNE 8th WITH A 4 PERCENT STOP LOSS CLOSE ONLY.  
EXIT ON THE CLOSE OF TRADING JUNE 16th IF THE  
TRADE HAS NOT BEEN STOPPED OUT.**

As you can see from the accompanying KDT's (Figures 6-6 through 6-12), there is considerable information which may be derived from the Key Date Listings. Each key date listing provides the following information:

1. Market and contract month to enter
2. Buy or sell short
3. Entry date
4. Exit date
5. Specific stop loss
6. Total number of years tested
7. Average percentage correct
8. Average profitable trade
9. Average losing trade
10. Average trade
11. Profit/loss ratio
12. Cumulative profit
14. Maximum drawdown per trade

As you can readily see, the information for each and every KDT is specific as well comprehensive.

The process of finding KDTs is essentially simple: however, it requires an exceptionally large historical database as well as a considerable amount of computer time. To have run our KDT analysis on all futures markets, for all contract months, for up to sixty years in some markets, would have been unfeasible on a microcomputer system. My KDT statistics were run on a Data General MV Eclipse™ minicomputer.

A KDT search performs hypothetical buys and sells for every possible combination of dates over the entire range of years for every market and every contract month. In other words, the KDT search tells us what the results would have been both for buying and for selling short using every combination of calendar days for every market and delivery month. The total number of combinations for only one contract of one market runs into the thousands!

The KDT search also tests various stop loss parameters in order to determine which stop loss would have produced the best overall

results. In checking stop losses I attempt to determine a maximum acceptable drawdown level per year tested for each market and contract month.

To a given extent this could be considered optimization, but it is not optimization in its strictest sense. We are not “curve-fitting” our system parameters or rules; rather, we are testing already hypothetically profitable trades in order to determine which stop losses would have yielded the best results. Once this process has been completed for long-side trades, it is repeated for short-side trades.

Once all trades and stops have been generated, I visually examine all of the KDTs, selecting only those with the greatest reliability and historically validated profit potential.

the statistics for these trades prior to their inclusion as *bona fide* KDTs.

Keep in mind these two limitations of key trading dates:

- 1.** The single greatest limitation in using closing prices is that in real-time trading, entry or exit at the given price might not have been possible.
- 2.** Another limitation is that the stop loss for each KDT is based on the closing. In the case of a locked limit up or down move, exit or entry may not be possible.

Some current key date trades are shown in Figures 6-6 through 6-12. As you can see, they have shown a high probability of success and accuracy. However, I must remind you that statistics are limited and that even the most reliable seasonal key date trade has only approximately thirty repetitions.



## Figure 6.8: Key Date Seasonal Timing in December Corn

SHORT Dec Corn ON THE CLOSE 10/11  
WITH A 4% STOP LOSS CLOSE ONLY, OR EXIT ON CLOSE 10/23

Entry Date:	10/11	Exit Date:	10/23
Positive Trades:	18	Negative Trades:	6
Starting Year:	1967	Ending Year:	1990
% Positive Trades:	75.00	% Negative Trades:	25.00
Average Gain:	5.64	Average Loss:	-4.85
Average Trade:	3.02	Profit/Loss Ratio:	3.49
Years Analyzed:	24	Cumulative \$:	\$3618.50
Maximum Drawdown:	-\$375.00	Calculated Stop:	0.00

## Figure 6.9: Key Date Seasonal Timing in November Soybeans

LONG Nov Soy Beans ON THE CLOSE 09/01  
WITH A 3% STOP LOSS CLOSE ONLY, OR EXIT ON CLOSE 09/05

Entry Date:	09/01	Exit Date:	09/05
Positive Trades:	19	Negative Trades:	5
Starting Year:	1967	Ending Year:	1990
% Positive Trades:	79.17	% Negative Trades:	20.83
Average Gain:	12.16	Average Loss:	-12.10
Average Trade:	7.10	Profit/Loss Ratio:	3.82
Years Analyzed:	24	Cumulative \$:	\$8525.00
Maximum Drawdown:	-\$1200.00	Calculated Stop:	0.00

### Figure 6.10: Key Date Seasonal Timing in December Wheat

LONG Dec Wheat ON THE CLOSE 09/01  
 WITH A 5% STOP LOSS CLOSE ONLY, OR EXIT ON CLOSE 10/24

Entry Date:	09/01	Exit Date:	10/24
Positive Trades:	18	Negative Trades:	6
Starting Year:	1967	Ending Year:	1990
% Positive Trades:	75.00	% Negative Trades:	25.00
Average Gain:	18.01	Average Loss:	-20.94
Average Trade:	8.27	Profit/Loss Ratio:	2.58
Years Analyzed:	24	Cumulative \$:	\$9924.50
Maximum Drawdown:	-\$2012.50	Calculated Stop:	0.00

### Figure 6.11: Key Date Seasonal Timing in December Gold

LONG Dec Gold ON THE CLOSE 09/01  
 WITH A 3% STOP LOSS CLOSE ONLY, OR EXIT ON CLOSE 09/21

Entry Date:	09/01	Exit Date:	09/21
Positive Trades:	12	Negative Trades:	4
Starting Year:	1975	Ending Year:	1990
% Positive Trades:	75.00	% Negative Trades:	25.00
Average Gain:	22.88	Average Loss:	-9.18
Average Trade:	14.86	Profit/Loss Ratio:	7.48
Years Analyzed:	16	Cumulative \$:	\$23780.00
Maximum Drawdown:	-\$1370.00	Calculated Stop:	0.00

### Figure 6.12: Key Date Seasonal Timing in December Swiss Franc

LONG Dec Swiss Franc ON THE CLOSE 08/08  
 WITH A 2% STOP LOSS CLOSE ONLY, OR EXIT ON CLOSE 08/31

Entry Date:	08/08	Exit Date:	08/31
Positive Trades:	12	Negative Trades:	4
Starting Year:	1975	Ending Year:	1990
% Positive Trades:	75.00	% Negative Trades:	25.00
Average Gain:	0.85	Average Loss:	-0.71
Average Trade:	0.46	Profit/Loss Ratio:	3.61
Years Analyzed:	16	Cumulative \$:	\$9200.00
Maximum Drawdown:	-\$2200.00	Calculated Stop:	0.00

## Stochastics

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When I first met George Lane, the “father” of stochastics, he was wearing leather cowboy boots, a ten-gallon hat and a wide belt with a shiny metal buckle. He completed his striking appearance with a handsome grey moustache and beard. His “wild west” dress and iconoclastic style were refreshing. Yet anyone who has spent some time with George knows that although stochastics can be used to the considerable advantage of the trader, this indicator is by no means a panacea for the myriad timing problems facing the trader. My research strongly suggests that the best application of stochastics is in combination with other timing indicators or as a filter. Yet there are some specific applications which do appear to have potential. In order to remove as much of the art and stick as closely to the science as possible, I have subjected stochastics to rigorous computer testing.

I must admit that stochastics is one of the most attractive indicators I have ever seen. It has considerable “sex appeal,” for want of a better phrase. Many traders have fallen in love with stochastics, and many have quickly come to realize that it is, as I have said, not a market deity—it is just another indicator, albeit a very good one. The performance of the stochastics indicator (SI) can be dramatically improved when it is used in conjunction with other timing signals and indicators.

The formula for calculating SI is as follows:

$$\%K = 100 \times [(C - Lp)/(Hp - Lp)]$$

where:

C = today's close;

Lp = the lowest low of the time period chosen; and

Hp = the highest high of the time period chosen.

There are two stochastics lines or values, %K and %D. %D is a three-period moving average of %K. There are "fast" and "slow" versions of stochastics, the "slow" version being a smoothed derivative of the fast SI. Those who are interested in learning considerably more about SI should contact Dr. Lane at Investment Educators.

Bruce Babcock has observed and explained the similarities and differences between SI, Welles Wilder's Relative Strength Index (RSI), and Larry Williams' %R. In addition, Babcock provided an excellent comparison of SI signals and RSI signals, as shown in Figure 7-1.

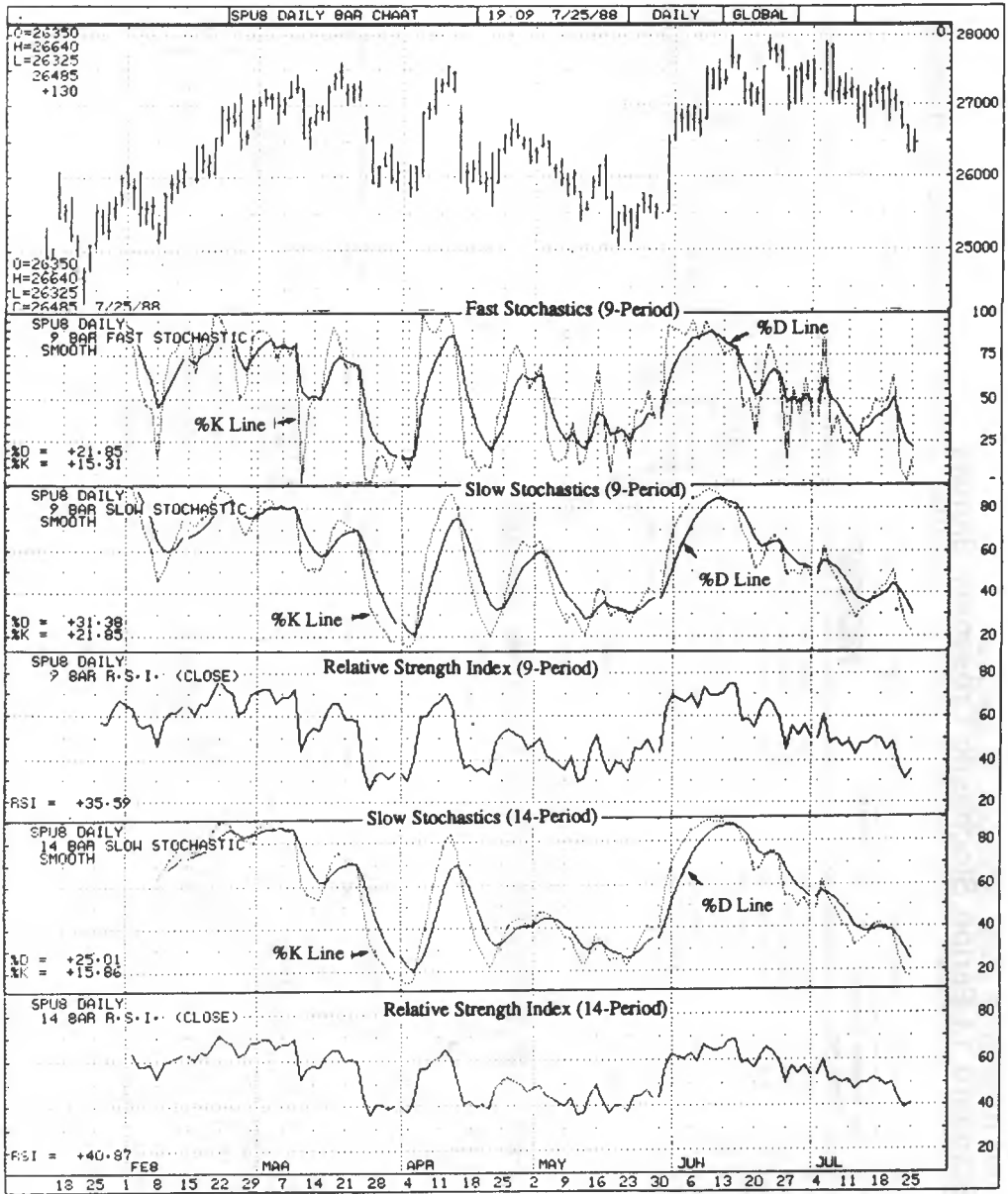
There are perhaps as many applications of the SI as there are traders. It seems that virtually every SI devotee has his or her own pet use for this versatile indicator. Hence, I was not able to examine every application. Here are some of the SI applications I did check.

### **STOCHASTIC CONDITION #1.**

My first study concentrated on crosses of %K and %D as buy and sell signals, as illustrated in Figure 7.2. I tested several SI lengths (9-day, 14-day and 21-day) on my historical database. The results are shown in Figures 7-3 through 7-5.

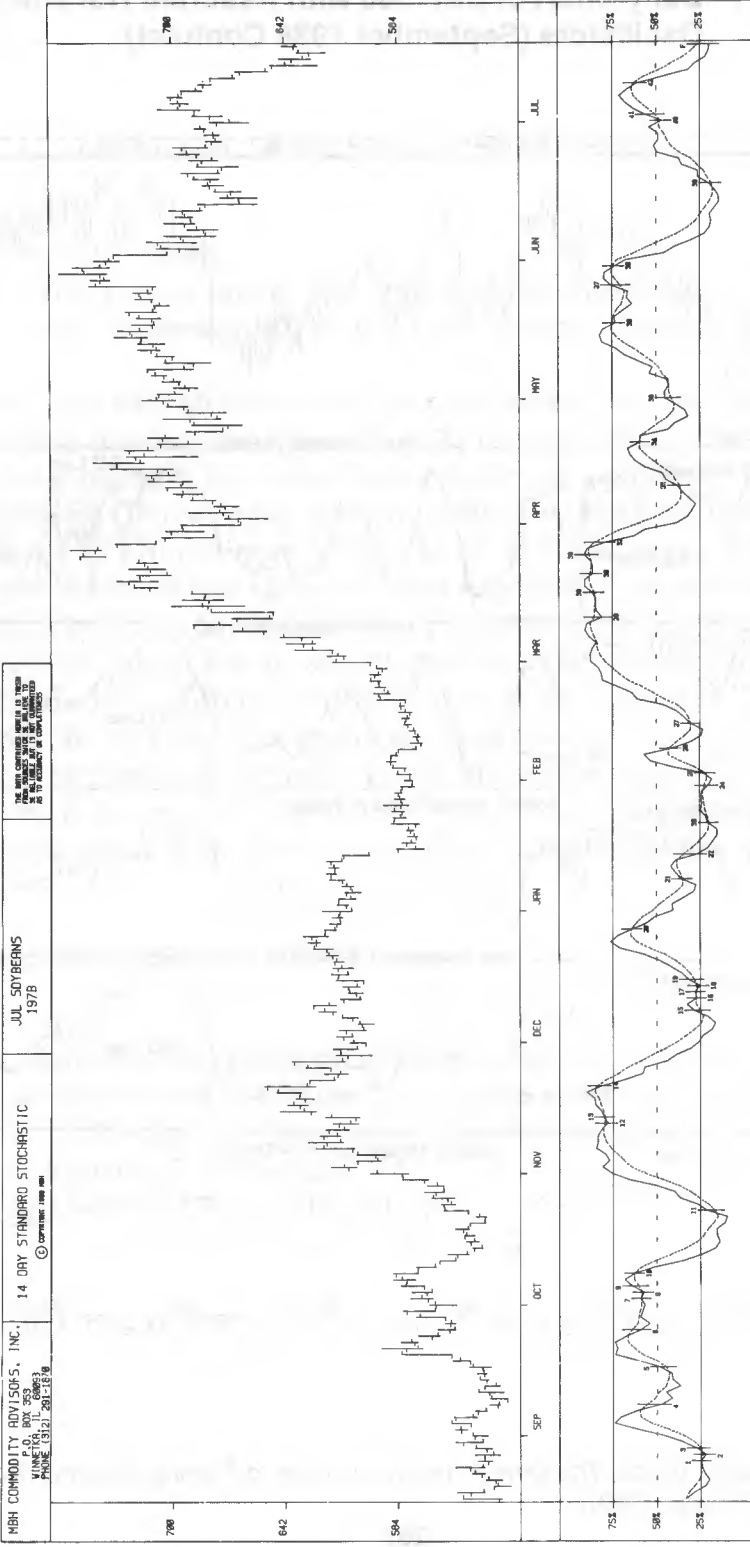
An analysis of the results follows.

**Figure 7.1: Daily Chart of S&P 500 with Assorted RSI and Stochastic Oscillators (September 1988 Contract)**



Source: Babcock, Bruce, *The Dow Jones-Irwin Guide to Trading Systems* (Homewood, IL: Dow Jones-Irwin, 1989).

**Figure 7.2: Standard 14-Period Stochastic Crossover Signals**



**Figure 7.3: 9-Day Standard Stochastic Crossover Results**

	BUY			SELL			TOTAL					
	#	PROF	AVG \$	TOT \$	#	PROF	AVG \$	TOT \$	#	PROF	AVG \$	TOT \$
BULL 2539	-594.12	-111.57	-2832271.87	2558	5054.64	357.60	914735.31	5097	4460.53	123.89	631463.44	
BEAR 3261	4700.55	226.49	738599.87	3249	-2606.03	-200.43	-651193.81	6510	2094.52	13.43	87406.06	
BUBE 3801	1215.54	44.79	170241.25	3806	2630.30	107.79	410234.06	7607	3845.84	76.31	580475.31	
BEBU 3553	779.94	-9.69	-34421.82	3536	766.75	28.13	99453.50	7089	1546.70	9.17	65031.68	
BUBEBU 650	-347.11	-36.57	-23770.54	653	77.71	97.86	63901.37	1303	-269.40	30.80	40130.83	
BEBUBE 744	311.18	126.66	94233.56	755	171.66	2.84	2146.92	1499	482.84	64.30	96380.50	
CHOPBU 2995	-1105.17	-81.51	-244129.94	3004	3375.52	150.06	450791.00	5999	2270.35	34.45	206661.06	
CHOPBE 1888	1954.06	153.83	290426.37	1899	-643.37	-57.19	-108594.56	3787	1310.69	48.01	181831.81	
WHIP 2353	666.39	75.58	177848.00	2343	291.59	44.50	104259.50	4696	957.98	60.07	282107.50	
	21784	7581.26	40.66	885754.88	21803	9118.77	58.97	1285733.29	43587	16700.05	49.82	2171488.19

**Figure 7.4: 14-Day Standard Stochastic Crossover Results**

	BUY			SELL			TOTAL					
	#	PROF	AVG \$	TOT \$	#	PROF	AVG \$	TOT \$	#	PROF	AVG \$	TOT \$
BULL 2340	-1038.25	-163.26	-382031.44	2343	4645.41	347.48	814147.88	4683	3607.16	92.27	432116.44	
BEAR 2919	4933.62	265.21	774148.62	2917	-2361.92	-207.93	-606521.69	5836	2571.90	28.72	167626.94	
BUBE 3399	1243.15	63.58	216099.56	3412	2214.51	120.20	410131.50	6811	3457.66	91.94	626231.06	
BEBU 3218	671.39	-9.96	-32057.07	3214	721.47	32.20	103477.44	6432	1392.86	11.10	71420.38	
BUBEBU 578	-264.09	-30.22	-17464.45	584	133.76	119.41	69737.44	1162	-130.33	44.99	52272.99	
BEBUBE 682	260.81	133.79	91243.75	696	219.35	1.89	1315.78	1378	480.16	67.17	92559.56	
CHOPBU 2721	-1068.90	-96.37	-26222.56	2723	3352.50	154.58	420929.12	5444	2283.60	29.15	158706.56	
CHOPBE 1717	1643.70	165.09	283455.37	1728	-958.96	-66.13	-114265.12	3445	684.74	49.11	169190.25	
WHIP 2102	601.38	77.27	162422.19	2108	268.29	38.16	80431.50	4210	869.68	57.68	242853.69	
	19676	6983.01	42.37	833593.97	19725	8234.41	59.79	1179383.85	39401	15217.43	51.09	2012977.87

\*The "Prof" column indicates total profit or loss in "points" before conversion to dollars  
 The "#" column indicates total number of trades

**Figure 7.5: 21-Day Standard Stochastic Crossover Results**

	BUY				SELL				TOTAL			
	#	PROF	AVG \$	TOT \$	#	PROF	AVG \$	TOT \$	#	PROF	AVG \$	TOT \$
BULL 2203	-806.22	-182.44	-401916.81		2218	4858.93	354.76	786866.19	4421	4052.72	87.07	384949.37
BEAR 2680	4629.48	313.83	841076.94		2672	-2398.26	-187.93	-502159.06	5352	2231.22	63.33	338917.97
BUBE 3203	1781.39	76.09	243705.44		3198	2612.03	122.46	391621.44	6401	4393.42	99.25	635326.87
BEBU 3004	732.42	5.20	15605.88		2999	775.21	57.27	171756.25	6003	1507.63	31.21	187362.12
BUBEBU 558	-195.03	-34.38	-19184.24		561	204.24	122.57	68763.38	1119	9.21	44.31	49579.14
BEBUBE 625	180.39	114.99	71871.00		640	123.62	-23.78	-15220.88	1265	304.01	44.78	56650.12
CHOPBU 2591	-1226.99	-121.37	-314480.06		2589	3340.13	144.16	373233.00	5180	2113.14	11.34	58752.94
CHOPBE 1597	1820.33	178.65	285308.56		1607	-905.05	-72.73	-116880.75	3204	915.28	52.57	168427.81
WHIP 1957	665.98	74.72	146225.31		1961	355.33	39.09	76658.63	3918	1021.31	56.89	222883.94
	18418	7581.75	47.14	868212.02	18445	8966.18	66.94	1234638.20	36863	16547.94	57.05	2102850.18



### **Performance of SI in Bull Markets**

Our bull market sample consisted of thirty-nine classic bull markets from 1967 through 1988. The results showed that SI was an inconsistent performer, even in classic bull markets. While some markets produced excellent profits, other markets showed considerable trading with net losses. If slippage and commissions of \$100 per trade are also considered in the overall results, then they are clearly unimpressive. Remember that no filters or other optimizing tools were used in order to reduce the number of trades or the number of losing trades. The best overall results were noted for the 21 day SI, while the 90 day SI was best in bull markets.

### **Performance of SI in Bear Markets**

The SI results in bear markets were also unimpressive. In fact, they were bad. Given the large number of trades and the relatively low dollar profit per trade, it appeared that SI was not a good timing signal when used in the fashion prescribed. Do note, however, its good performance for buy signals in bear markets.

### **Performance of SI in Bull/Bear Markets**

I then checked the performance of SI in fifty-seven bull/bear markets. As you will recall, these are markets which made the transition from strong bull market to strong bear market. Again, results were poor.

### **Performance of SI in Choppy Bull Markets**

This test was an important one. It has long been maintained that trend following systems tend to do poorly in choppy markets. While this may be true for "whipsaw" markets, it may not necessarily be true for what I have defined as "choppy" bull markets. Results here were also poor in all three SI lengths.

### **Performance of SI in Choppy Bear Markets**

Performance of the SI system in choppy bear markets was also as expected, showing minimal success and a large number of trades.

### **Performance of SI in Whipsaw Markets**

While it may be a matter of opinion as to what constitutes a “whipsaw” market, there is no doubt in my mind that the sample of fifty-two “whipsaw” markets I selected represent some of the most difficult and treacherous markets known to traders. In fact, my results demonstrate that the SI system does not produce profits in such markets.

### **Performance of SI in Bull/Bear/Bull Markets**

Another category I tested consisted of fifteen markets which moved from bullish to bearish and then back to bullish again. While there were only fifteen such markets, the results were still poor.

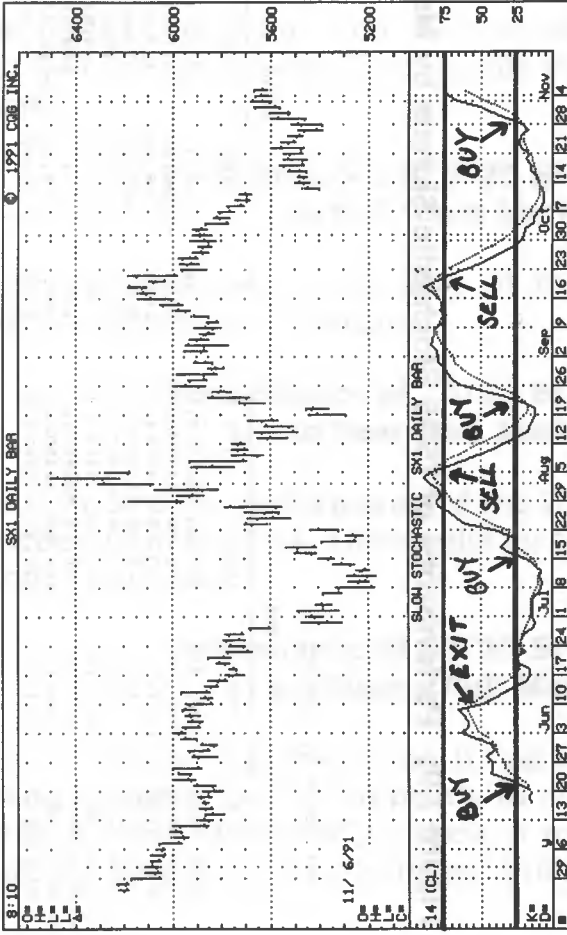
### **Performance of SI in Bear/Bull/Bear Markets**

I then tested the performance of the SI crossover in bear/bull/bear markets. In other words, I examined the ten markets which moved from bearish to bullish and then back to bearish. Performance was unimpressive. While only ten markets were tested, the overall results were just as poor as for most other categories.

## **STOCHASTIC CONDITION #2**

The second SI condition I studied was: a buy signal, if SI closed 25 percent or greater after first being below 25; and a sell if SI closed 75 percent or lower after being above 75 percent. This condition is illustrated in Figure 7-6. The results of my test by market category are shown in Figures 7-7 through 7-9. An analysis of my results follows.

Figure 7.6: Buy and Sell Signals Using Stochastics



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Figure 7.7: Performance of 75/25 Stochastic Signals by Market Category: 9-Day

	BUY					SELL					TOTAL		
	#	F OF	AVG \$	TOT \$	#	PROF	AVG \$	TOT \$	#	PROF	AVG \$	TOT \$	
3ULL 1064	-1229.11		-286.74	-477138.81	1673	4297.31	430.83	720773.65	3337	2968.20	73.01	243634.87	
3JAN 2116	3277.10		386.11	917016.50	2119	-3393.51	-267.15	-566093.62	4235	483.58	59.25	250922.87	
3MAY 2452	627.31		-2.13	-5241.30	2459	2032.15	76.26	137528.12	4921	2859.46	37.04	182286.81	
3EDU 232c	323.34		14.15	33365.13	2351	353.39	73.91	178469.25	4707	676.77	45.00	211834.44	
EDJERU 416	-98.56		-12.53	-5211.55	417	248.05	171.30	74349.36	833	151.65	33.00	69137.81	
3JUBR 456	142.16		167.92	83290.19	507	-28.37	-24.68	-12513.26	1003	103.79	70.57	70776.94	
CH34 30 1256	-163.33		-178.55	-356750.94	1592	2785.46	167.29	33236.44	3990	1086.93	-5.89	-23514.50	
COP33 127E	1325.96		162.10	207153.37	1278	-1350.37	-164.22	-209371.25	2556	-24.41	-1.06	-2712.87	
naIF 150E	435.00		43.71	68275.34	1562	167.79	4.59	7166.10	3124	602.73	24.15	75441.50	
14346	3606.91		25.42	324763.00	14358	5101.49	49.66	713044.87	28706	4908.79	37.55	1077808.00	

Figure 7.8: Performance of 75/25 Stochastic Signals by Market Category: 14-Day

	BUY				SELL				TOTAL			
	#	PROF	AVG \$	TOT \$	#	PROF	AVG \$	TOT \$	#	PROF	AVG \$	TOT \$
BULL 1332	-1382.41		-333.25	-443882.94	1347	4252.00	562.19	757272.37	2675	2869.59	116.98	313389.44
BEAR 1706	4198.18		476.70	813247.25	1709	-2964.34	-316.81	-541433.50	3415	1233.84	79.59	271813.75
BUBB 1949	830.11		61.58	123094.56	1983	1601.06	126.43	250720.56	3982	2431.17	93.88	373815.12
BEBU 1937	264.14		-63.08	-122193.62	1942	386.37	12.93	25117.27	3879	650.81	-25.02	-97066.38
BUBBU 329	-14.48		-63.53	-70859.77	333	363.75	182.96	60926.01	662	349.26	60.46	40026.24
BEUBB 415	191.52		195.69	81211.25	420	50.65	-13.53	-5684.29	835	242.17	90.45	75526.94
CHOPBU 1599	-1112.32		-193.51	-293425.50	1539	3297.17	238.52	381393.75	3198	2184.85	27.51	87968.25
CHOPBE 1037	1540.29		228.21	236650.87	1050	-1116.31	-154.65	-162390.69	2087	424.28	35.59	74270.19
WHIP 1206	490.93		91.88	116321.62	1277	204.99	30.54	38998.06	2543	695.92	61.08	155319.69
	11620	5006.26	42.18	490133.75	11650	6075.64	69.03	804929.50	23280	11081.90	55.63	1295063.00

Figure 7.9: Performance of 75/25 Stochastic Signals by Market Category: 21-Day

	BUY				SELL				TOTAL			
	#	PROF	AVG \$	TOT \$	#	PROF	AVG \$	TOT \$	#	PROF	AVG \$	TOT \$
BULL 1025	-1257.33		-372.00	-381297.12	1034	4353.35	775.84	90221.50	2059	3096.02	204.43	420924.37
BEAR 1343	3436.02		528.99	710439.69	1359	-3185.48	-431.42	-585369.50	2701	300.54	46.12	124569.19
BUBB 1676	1172.79		57.03	95584.93	1653	1706.20	127.02	209962.37	3329	2878.99	91.78	305547.25
BEBU 1538	359.81		-66.87	-102846.69	1541	480.99	33.96	60425.69	3089	919.80	-13.73	-42421.00
BUBBU 276	-5.77		-84.14	-23223.05	276	371.96	218.17	60214.49	552	366.15	67.01	36991.43
BEUBB 329	227.16		247.00	91263.75	340	117.63	-5.84	-1985.10	669	344.73	118.50	79278.63
CHOPBU 1345	-1522.22		-226.62	-304094.75	1354	2517.07	262.20	355019.12	2699	524.84	18.60	50209.38
CHOPBE 847	1365.42		249.79	211572.62	856	-1127.63	-192.41	-155089.97	1705	241.79	27.26	46483.75
WHIP 1072	387.12		75.41	80833.00	1013	42.90	2.30	3139.94	2155	430.02	38.97	83977.94
	151	3723.00	38.89	367521.31	9507	5276.99	77.63	738039.62	19958	3002.98	58.32	1105561.00

### **Performance of 75/25 SI Crossovers in Bull Markets**

Our bull market sample consisted of thirty-nine classic bull markets from 1967 through 1988. The results show that on an overall basis the 9-, 14-, and 21-period SI signals were profitable in bull markets, but only marginally so when looking at the average trade size. If we deduct \$75 for slippage and commission for each trade, then the results look quite poor. As an interesting point of information, the sell trades were considerably more profitable in bull markets than were the buy trades! This approach could have good potential.

### **Performance of 75/25 SI Crossovers in Bear Markets**

Bear market results for SI on all three lengths were less impressive than bull market results. Buy signals worked better than did sell signals.

### **Performance of 75/25 SI Crossovers in Bull/Bear Markets**

I then checked the performance of the in fifty-seven bull/bear markets. Results were marginal.

### **Performance of 75/25 SI Crossovers in Bear/Bull Markets**

I next checked the performance of the 75/25 SI system in seventy-three bear/bull markets. The results for this test revealed an overall losing performance.

### **Performance of 75/25 SI Crossovers in Chopy Bull Markets**

This test was an important one. It has long been maintained that moving averages tend to do poorly in choppy markets. While this may be true for “whipsaw” markets, it may not necessarily be true for what I have defined as “chopy” bull markets. Bottom line per-

formance was minimally profitable, but definitely negative when considering slippage and commission.

### **Performance of 75/25 SI Crossovers in Choppy Bear Markets**

Performance of the 75/25 SI crossover system in choppy bear markets was also poor, as can be seen from the test results.

### **Performance of 75/25 SI Crossovers in Whipsaw Markets**

While it may be a matter of opinion as to what constitutes a “whipsaw” market, there is no doubt in my mind that the sample of fifty-two “whipsaw” markets I selected represent some of the most difficult and treacherous markets known to traders. In fact, the results demonstrate that the 75/25 system performs poorly here, but not as poorly as other types of markets.

### **Performance of 75/25 SI Crossovers in Bull/Bear/Bull Markets**

Another category I tested consisted of fifteen markets which moved from bullish to bearish, and then back to bullish again. While there were only fifteen such markets, the results were not impressive.

### **Performance of 75/25 SI Crossovers in Bear/Bull/Bear Markets**

I then tested performance of the SI in bear/bull/bear markets, examining the ten markets which moved from bearish to bullish and back to bearish. Performance was unimpressive. However, note that only ten markets only were tested, and this may not be a sufficiently large sample for conclusive results.

### STOCHASTIC CONDITION #3

A third and final condition I studied was POP indicators, which I introduced a number of years ago and which are discussed in my book, *Short-Term Trading in Futures*.<sup>1</sup> Here is a brief explanation of the SI POP as discussed therein:

This interesting new application of stochastics may well become one of the most potent short-term trend indicators I've ever developed. The POP technique triggers long entry when a market becomes overbought on stochastic (75 percent and above). When a market becomes oversold on stochastic (25 percent or lower), POP goes short. This approach is contrary to what many analysts advocate, yet it makes sense because it should keep you in the strong moves. [Figures 7-10, 7-11 and 7-12 further illustrate the Stochastic POP Method.] These charts merely show the raw signals on a number of timeframes. *When combined with the trading rules I've developed, the POP achieves its true greatness!*

As soon as %K and %D rise above 75 percent on a closing basis, you go long. You stay long until the two lines cross. It doesn't take much for %D and %K to cross when the market is overbought—it occurs as soon as a market shows even a slight amount of weakness. When this happens, don't sell short; just liquidate your long. Each entry and exit is "at the market." Indicators are calculated on a closing basis. The optimal time period I've found for the POP is the thirty-minute segment. There also appears to be good potential on five-minute charts, but research remains to be done on this. SI POP also has potential on hourly, daily and weekly data. Remember that you cannot enter or exit a POP trade until

<sup>1</sup>Bernstein, J., *Short-Term Trading in Futures* (Chicago, IL: Probus Publishing Company, 1987).

Figure 7.10

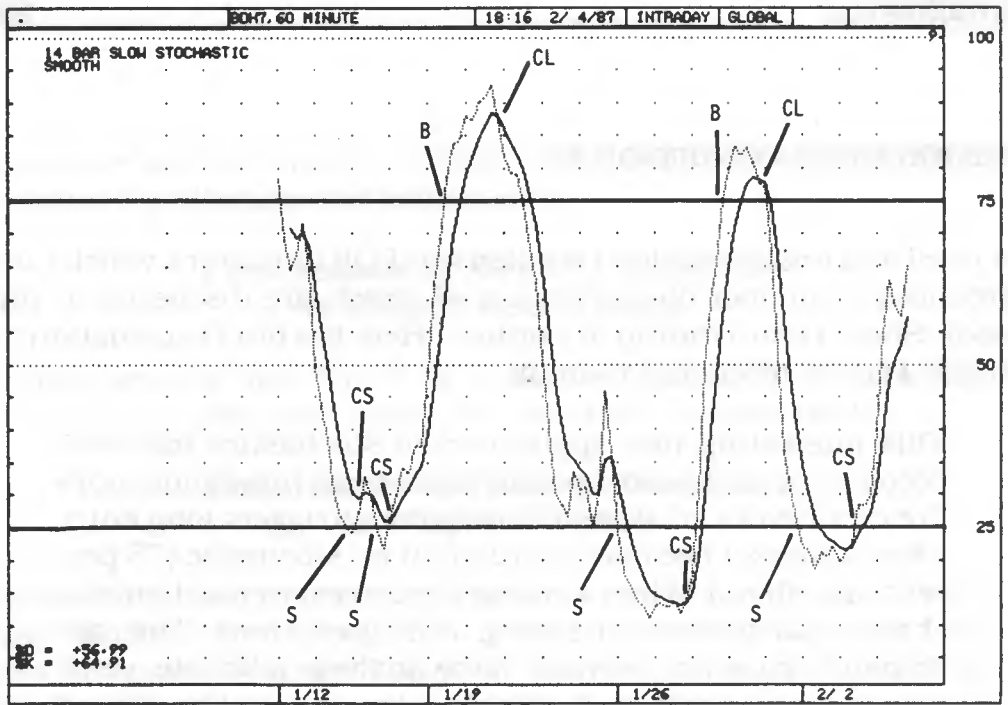


Figure 7.11

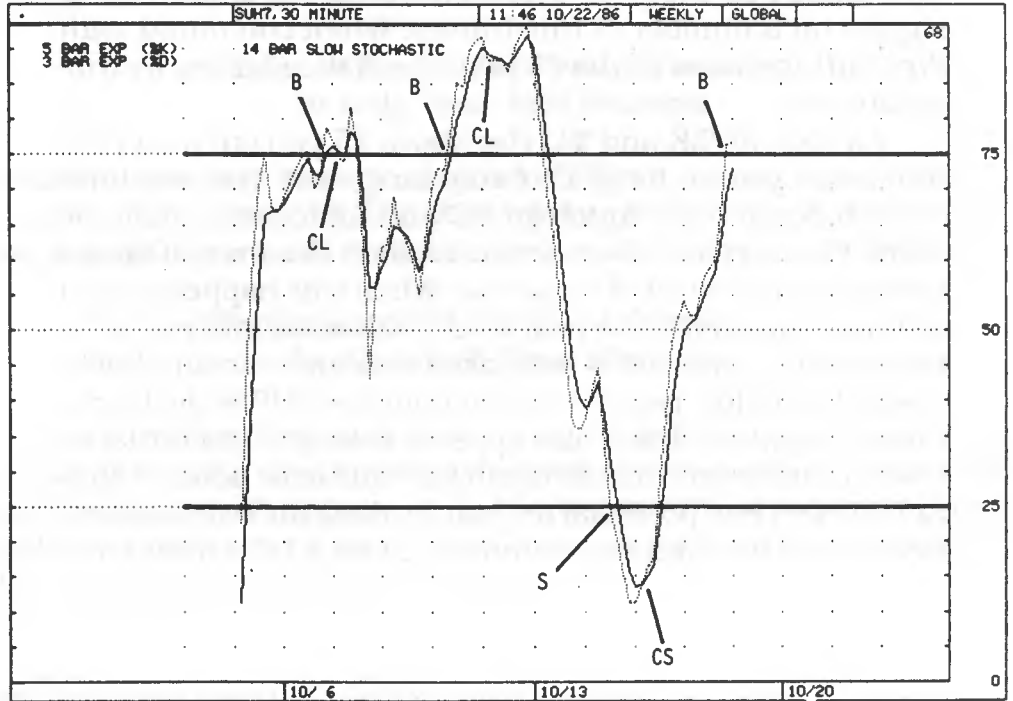
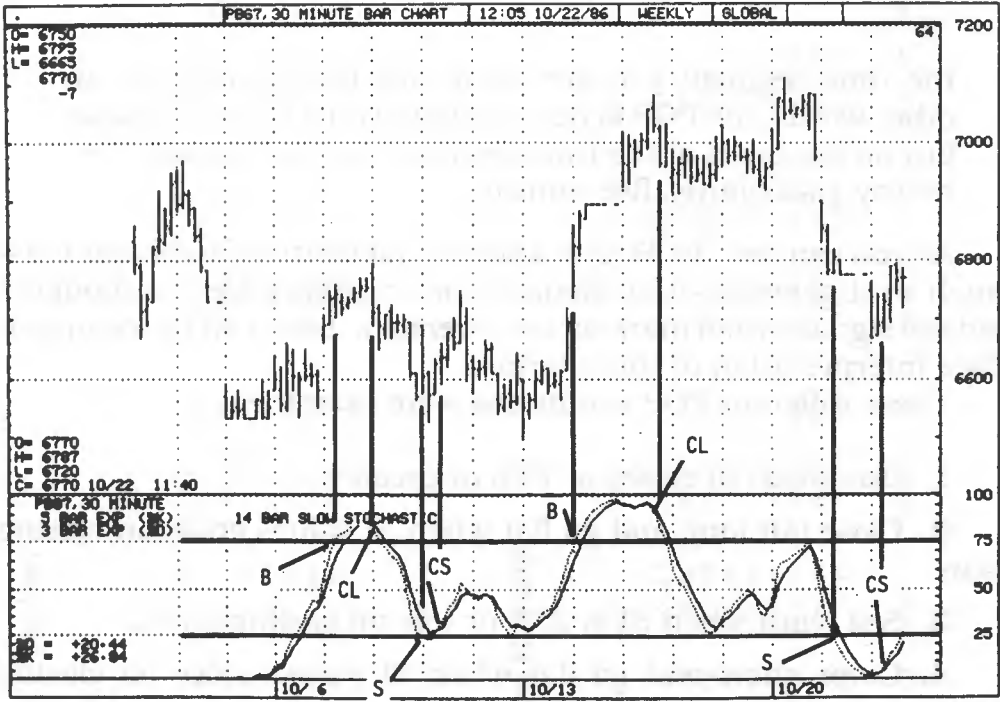




Figure 7.12



the time segment you are using has been completed. In other words, the POP is not calculated on a tic-by-tic basis, but on the basis of the time segment you are tracking (i.e., hourly, half-hourly, five-minute).

As you can see, the POP is a somewhat contrary indicator inasmuch as it generates buy signals when markets are “overbought” and sell signals when markets are “oversold,” based on the commonplace interpretation of these terms.

These different POP conditions were examined:

1. Buy when SI closes at 75% or greater.
2. Close out long and go flat when SI values cross on closing basis.
3. Sell short when SI is 25% or less on closing basis.
4. Cover short and go flat when SI values cross on closing basis.

I studied the results of using various POP trigger values and 9-, 14-, and 21-day stochastic lengths. The results of all approaches are shown in Figures 7-13 through 7-21.

Figure 7.13: 9-Day 75/25 Stochastic Indicator: Pop Results

BUY				SELL				TOTAL			
#	PROF	AVG \$	TOT \$	#	PROF	AVG \$	TOT \$	#	PROF	AVG \$	TOT \$
BULL 1246	2410.40	412.56	514055.37	740	66.83	-172.38	-127562.88	1986	2477.23	194.61	386649.250
BEAR 946	-861.76	-137.16	-129754.13	1659	2018.05	139.31	231121.62	2605	1156.28	38.91	101367.50
BUBE 1463	1533.86	162.03	240293.31	1533	906.97	60.99	93502.50	3016	2440.83	110.68	333795.81
BEU 1407	414.83	80.54	113325.69	1481	88.66	-51.18	-75803.44	2888	503.49	12.99	37522.25
BUBEU 269	221.63	115.89	31173.59	247	-97.18	-30.39	-7505.11	516	124.45	45.87	23668.47
BEBU 278	-56.25	-32.68	-9086.16	325	161.12	178.54	58054.08	603	104.87	81.16	48937.92
CHOPBU 1413	1350.24	118.65	167653.00	985	-871.83	-107.46	-105847.69	2398	478.41	25.77	61805.31
CHORBE 616	-291.43	-16.67	-10271.30	954	663.42	92.36	88107.81	1570	371.99	49.58	77836.50
WHIP 953	-9.89	25.25	24060.74	1012	143.99	9.57	9682.23	1965	134.10	17.17	33742.98
8611	4711.63	109.33	941450.11	8936	3080.03	18.32	163719.12	17547	7791.65	62.98	1105169.24

Figure 7.14: 14-Day 75/25 Stochastic Indicator: Pop Results

BUY				SELL				TOTAL			
#	PROF	AVG \$	TOT \$	#	PROF	AVG \$	TOT \$	#	PROF	AVG \$	TOT \$
BULL 1021	2732.91	462.46	472176.19	582	-144.21	-190.39	-110809.75	1603	2588.70	225.43	361366.44
BEAR 752	-859.70	-194.48	-146251.56	1360	2037.84	179.60	244249.37	2112	1178.14	46.40	97997.81
BUBE 1217	1625.19	234.22	283041.56	1260	1132.45	121.68	153312.00	2477	2757.64	176.97	438353.56
BEBU 1151	587.75	56.55	65092.36	1185	418.22	6.45	7646.82	2336	1005.97	31.14	72739.19
BUBEU 207	243.23	200.93	41591.91	195	-48.43	17.91	3493.35	402	194.80	112.15	45085.26
BEBU 241	-79.16	-80.48	-19394.67	282	296.37	118.05	33290.11	523	217.21	26.57	13895.43
CHOPBU 1145	1288.62	175.29	200711.75	838	-672.91	-143.39	-120157.06	1983	615.71	40.62	80554.69
CHORBE 528	-187.95	-32.03	-16914.09	777	623.44	104.10	80887.37	1305	435.49	49.02	63973.29
WHIP 756	81.19	59.78	45193.63	860	113.60	7.17	6163.88	1616	194.79	31.78	51357.51
7018	5432.08	132.12	927247.08	7339	3756.37	40.62	298076.09	14357	9188.45	85.35	1225323.18

**Figure 7.15: 21-Day 75/25 Stochastic Indicator: Pop Results**

	BUY				SELL				TOTAL			
	#	PROF	AVG \$	TOT \$	#	PROF	AVG \$	TOT \$	#	PROF	AVG \$	TOT \$
BULL	804	2273.13	446.16	358710.50	446	54.42	-138.23	-61649.16	1250	2327.55	237.65	297061.37
BEAR	550	-300.82	-140.33	-77182.94	1065	1483.57	145.50	154955.37	1615	1182.75	48.16	77772.44
SUBE	991	1485.88	189.90	188194.06	1032	855.75	138.15	142575.50	2023	2341.63	163.50	330769.56
BEBU	940	538.12	99.37	93411.75	949	305.45	13.81	13101.15	1889	843.57	56.39	106512.87
8UBEBU	177	180.04	247.85	43868.87	147	-132.07	-26.22	-3854.44	324	47.97	123.50	40014.43
8EBUBE	178	-4.04	-25.13	-4472.62	227	97.34	42.61	9672.43	405	93.30	12.84	5199.81
CHOPBU	961	1118.31	157.91	151755.19	689	-766.99	-143.42	-98819.38	1650	351.32	32.08	52935.81
CHOPBE	399	-285.65	-86.83	-34645.74	659	601.35	109.83	72375.69	1058	315.70	35.66	37729.95
WHIP	635	-57.14	44.32	28145.63	722	55.95	7.46	5383.40	1357	-1.19	24.71	33529.02
	5635	4947.83	132.70	747784.70	5936	2554.77	39.38	233740.56	11571	7502.60	84.83	981525.26

**Figure 7.16: 9-Day 65/35 Stochastic Indicator: Pop Results**

	BUY				SELL				TOTAL			
	#	PROF	AVG \$	TOT \$	#	PROF	AVG \$	TOT \$	#	PROF	AVG \$	TOT \$
BULL	1299	2447.11	410.64	533414.87	979	-125.55	-105.41	-103199.31	2278	2321.56	188.86	430215.56
BEAR	1301	-1342.64	-155.77	-202655.25	1699	2525.29	208.86	354858.19	3000	1182.65	50.73	152202.94
SUBE	1772	1255.98	164.66	291779.00	1801	710.88	98.22	176892.37	3573	1966.86	131.17	468571.37
BEBU	1645	569.04	117.54	193348.37	1683	434.45	-11.13	-18730.59	3328	1003.49	52.47	174617.81
8UBEBU	305	202.70	96.54	29443.37	281	-268.51	-35.99	-10113.52	586	-65.81	32.99	19329.84
8EBUBE	332	2.56	-35.91	-11923.11	366	233.22	145.16	53128.16	698	235.78	59.03	41205.05
CHOPBU	1528	1440.53	151.98	232218.87	1296	-1033.36	-97.14	-125899.37	2824	387.17	37.65	106319.50
CHOPBE	826	-321.10	-28.96	-23920.97	1034	892.06	118.69	182729.56	1860	570.96	53.12	98808.56
WHIP	1155	-28.62	22.15	25581.75	1148	436.76	80.72	92663.88	2303	408.14	51.34	118245.62
	10163	4225.56	105.02	1067286.90	10287	3785.24	52.72	542329.37	20450	8010.80	78.71	1609616.25

Figure 7.17: 14-Day 65/35 Stochastic Indicator: Pop Results

	BUY				SELL				TOTAL			
	#	PROF	AVG \$	TOT \$	#	PROF	AVG \$	TOT \$	#	PROF	AVG \$	TOT \$
BULL	936	2508.60	529.96	496042.06	724	-61.38	-174.66	-126455.69	1660	2447.22	222.64	369586.37
BEAR	921	-859.51	-129.15	-118951.00	1247	2685.27	254.85	317799.69	2168	1825.76	91.72	198848.69
BUBE	1294	1305.80	189.42	245110.12	1372	1069.61	163.93	224907.69	2666	2375.41	176.30	470017.81
BEBU	1208	394.77	102.60	123936.12	1231	709.31	19.04	23443.12	2439	1104.08	60.43	147379.25
BUBERU	220	331.21	179.39	39465.97	202	-93.98	41.20	8321.62	422	237.23	113.24	47787.59
BUBUBE	258	22.13	1.73	445.16	259	317.28	196.73	50952.20	517	339.41	99.41	51397.36
CHOPRU	1153	1733.48	207.42	239149.56	994	-625.71	-124.31	-123560.37	2147	1107.77	53.84	115589.19
CHOPBE	622	-223.56	12.13	7542.58	772	914.00	177.81	137272.00	1394	690.44	103.88	144814.56
WHIP	855	71.27	62.05	53050.92	897	370.08	45.54	40853.37	1752	441.35	53.60	93904.31
	7467	5284.19	145.41	1085791.49	7698	5284.48	71.91	553533.63	15165	10568.67	108.10	1639325.13

Figure 7.18: 21-Day 65/35 Stochastic Indicator: Pop Results

	BUY				SELL				TOTAL			
	#	PROF	AVG \$	TOT \$	#	PROF	AVG \$	TOT \$	#	PROF	AVG \$	TOT \$
BULL	719	2199.88	405.31	291416.87	510	-218.87	-237.88	-121319.62	1229	1981.01	138.40	170097.25
BEAR	671	-522.53	-137.50	-92265.56	939	1799.55	234.47	220163.19	1610	1277.02	79.44	127897.62
BUBE	982	1203.65	175.35	172193.44	1026	1278.30	227.58	233499.44	2008	2481.95	202.04	405692.87
BEBU	905	567.12	172.22	155861.12	914	692.16	2.87	2627.13	1819	1259.28	87.13	158488.25
BUBERU	168	312.50	314.56	52846.72	153	-55.52	-8.00	-1224.22	321	256.98	160.82	51622.50
BEBUBE	197	63.26	13.40	2639.03	216	102.66	35.45	7657.87	413	165.92	24.93	10296.90
CHOPBU	899	1422.32	181.09	162796.81	756	-746.87	-130.59	-98727.44	1655	675.45	38.71	64069.38
CHOPBE	460	-538.30	-69.64	-32034.23	579	408.42	95.83	55487.01	1039	-129.88	22.57	23452.77
WHIP	665	-91.82	95.89	63765.66	722	207.56	64.47	46548.67	1387	115.74	79.53	110314.31
	5666	4616.08	137.17	777219.86	5815	3467.39	59.28	344712.03	11481	8083.47	97.72	1121931.85

**Figure 7.19: 9-Day 80/20 Stochastic Indicator: Pop Results**

		BUY				SELL				TOTAL			
		#	PROF	AVG \$	TOT \$	#	PROF	AVG \$	TOT \$	#	PROF	AVG \$	TOT \$
BULL	1165	2352.26	425.59	495816.31	586	89.55	-180.64	-105855.87	1751	2441.81	222.71	389960.44	
BEAR	723	-626.33	-184.88	-133668.12	1548	1258.72	119.50	184982.87	2271	632.39	22.60	51314.75	
BUBE	1278	2091.24	235.76	301299.81	1299	667.69	21.70	28190.93	2577	2758.93	127.86	329490.75	
BEBU	1207	353.00	25.69	31004.82	1266	135.59	-2.88	-3639.87	2473	488.59	11.07	27364.95	
BUBBU	215	219.98	162.86	35015.39	209	-87.51	-27.01	-5645.14	424	132.47	69.27	29370.25	
BEUBU	241	191.90	17.14	4130.04	292	33.52	123.97	36199.95	533	225.42	75.67	40329.99	
CHORBU	1292	953.46	124.45	160790.19	778	-830.60	-122.39	-95216.81	2070	122.86	31.68	65573.38	
CHORBE	475	-100.71	-69.98	-33241.45	841	314.52	46.16	38817.48	1316	213.81	4.24	5576.03	
WHIP	757	42.70	43.79	33148.08	833	80.15	-12.30	-10241.99	1590	122.85	14.41	22906.09	
	7353	5477.50	121.62	894295.07	7652	1661.63	8.83	67591.55	15005	7139.13	64.10	961886.63	

**Figure 7.20: 14-Day 80/20 Stochastic Indicator: Pop Results**

		BUY				SELL				TOTAL			
		#	PROF	AVG \$	TOT \$	#	PROF	AVG \$	TOT \$	#	PROF	AVG \$	TOT \$
BULL	1026	2401.91	396.58	406888.75	487	-214.54	-202.79	-98760.06	1513	2187.37	203.65	308128.69	
BEAR	612	-522.30	-157.54	-96411.88	1343	1559.80	132.66	178167.50	1955	1037.50	41.82	81755.63	
BUBE	1129	1165.67	187.45	211632.31	1147	812.04	99.74	114396.06	2276	1977.71	143.25	326028.37	
BEBU	1047	631.79	104.45	109361.37	1121	234.10	-7.25	-8131.48	2168	865.89	46.69	101229.87	
BUBBU	202	247.24	196.06	39605.09	188	-37.51	-7.68	-1443.46	390	209.73	97.85	38161.62	
BEUBU	206	-50.16	-61.71	-12712.72	268	178.13	119.49	32024.50	474	127.97	40.74	19311.79	
CHORBU	1134	1339.77	149.89	169972.44	702	-538.64	-168.71	-118435.25	1836	801.13	28.07	51537.19	
CHORBE	433	-293.36	-92.21	-39926.86	766	220.15	60.84	46606.02	1199	-73.21	5.57	6679.16	
WHIP	684	-71.03	-2.03	-1389.50	769	85.14	-26.45	-20339.20	1453	14.11	-14.95	-21728.70	
	6473	4849.53	121.58	787019.00	6791	2298.67	18.27	124084.63	13264	7148.20	68.69	911103.62	

Figure 7.21: 21-Day 80/20 Stochastic Indicator: Pop Results

	BUY				SELL				TOTAL			
	#	PROF	AVG \$	TOT \$	#	PROF	AVG \$	TOT \$	#	PROF	AVG \$	TOT \$
BULL	877	2542.52	421.69	369817.87	378	3.51	-142.74	-53954.95	1255	2546.03	251.68	315862.94
BEAR	484	-555.40	-122.74	-59404.93	1146	1311.78	102.19	117105.94	1630	756.38	35.40	57701.01
BUBE	947	1544.43	229.96	217768.44	1022	1208.93	170.68	174430.00	1969	2753.36	199.19	392198.44
BEBU	927	409.83	65.97	61155.11	929	291.61	-53	-496.99	1856	701.44	32.68	60658.12
BUBEBU	186	319.09	240.66	44762.84	151	-45.04	13.03	1966.85	337	274.05	138.66	46729.69
BEBUBE	169	-36.10	-20.19	-3412.49	219	108.39	76.15	16677.02	388	72.29	34.19	13264.52
CHOPBU	997	1077.31	110.47	110137.62	600	-886.08	-170.11	-102064.50	1597	220.35	5.06	8073.13
CHOPBE	362	-197.68	-128.02	-46344.35	699	297.27	37.45	26056.85	1031	49.59	-20.65	-21287.50
WHIP	586	48.07	19.26	11286.34	660	-19.22	-42.95	-28347.24	1246	28.85	-13.69	-17060.90
	5535	5152.07	127.51	705766.45	5774	2250.27	26.04	158372.98	11309	7402.34	75.70	856139.45

Results of the SI POP Test

As you can readily observe, the SI POP using 14 day SI with 65% and 35% cutoff yielded the best results of all SI applications tested. This method appears to have good potential when used judiciously. My recent research shows that SI performs best when used with four traditional timing indicators.\*

X\*Stochastic Fantastic; published by MBH, PO Box 353, Winnetka, IL 60093.





## 8

## Is Closing Price Direction Random?

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As futures traders, we are committed to a never ending search for more profitable trading systems, more reliable timing indicators and more effective trading techniques, a search in which we have left virtually no stone unturned. One of the more basic approaches which has been investigated through the years is that of closing pattern studies. From time to time various studies of this nature appear on the trading scene.

Larry Williams has given closing patterns considerable attention. His 1989 book, *The Definitive Guide to Futures Trading—Volume I*, discussed many different types of price patterns as well as opening and closing price relationships. He claims to have found a number of patterns which show good promise and potential as trading tools.

Clearly, the closing price pattern concept is very simple to understand, and it is equally simple to employ in futures trading. All it amounts to is a study and application of closing patterns. In other words, we ask such questions as, “If a market closes up on the day five days in a row, how often has it closed up or down on the sixth day?” In examining closing patterns we make an assumption about the future based on past behavior. This is, of course, the underlying tenet of virtually all futures research. We assume that if a given pattern has occurred a given number of times in the past, then it is likely to be repeated in the future. Enter the proverbial “coin toss” issue. If a tossed coin turns up heads ten times in a row, are we

statistically justified in expecting heads on the next toss, or are we justified in expecting tails? As a matter of fact, we are not justified in expecting either one. Each toss is independent of the previous toss, assuming that the coin is not biased or otherwise flawed.

Those who subscribe to the random walk theory of market behavior would argue that the same is true of market closing prices. Does the fact that a market has closed higher ten days in a row make it more likely that the eleventh close will be higher? Or does it mean that there is a greater probability of a lower close the next day? My work shows that in terms of overall market behavior the random walk conclusion is probably well justified. Yet, in spite of the obvious conclusion, various statistics continue to be manipulated by systems researchers. While I do not claim that individuals who engage in such pursuits are attempting to deceive the public, I do feel strongly that their conclusions are not valid inasmuch as they are based on limited historical data.

My extensive research, some of which I am about to describe, tells a very different story than the one told by various analysts. While we may have been led to believe that closing pattern relationships and expectations are valid, my work shows that *if studied back to the 1960s, there are very few overall statistically valid or predictable closing price patterns* (of those I examined).

Remember that while this may be true for closing patterns only, such patterns as those studied by Larry Williams and others involve more than just closing price patterns. They deal with closings and openings. I plan to subject their findings to the "acid test" next. The results which follow are based on my study of 504 patterns in most of the futures markets from 1991, as far back as the mid-to-late 1960s. Only the active portion of each contract month for every market was analyzed.

As an example, the pattern +++- was studied from 1967 through 1991 for all active markets. Over 22,400 cases were recorded. The result? The closing price on the next day was up 49 percent of the time and down 46 percent of the time. In other words, it's clearly a random event!

You may now argue that the example just cited was too simple. We need to examine a longer pattern; that is, one covering a longer number of days. Consider, then, the following pattern: ++++++.

In other words, seven consecutive closes up in a row. How often was the next day up or down? It was 48 percent of the time up and 47 percent of the time down! And 2,064 cases were studied. The patterns I studied and the statistics I generated are shown herein. While some of the markets themselves showed significant readings, the overall results suggest random behavior.

But there may still be a way of achieving useful results from market patterns. This can be done by developing risk management strategies for each pattern. My next study examined closing patterns in bull markets, bear markets, whipsaw markets and so on. And thereafter I studied closing patterns and opening/closing relationships. I suggest you take closing price patterns with a grain of salt when it comes to their use as timing indicators or trading signals.

There is an understandable relationship between the length of a closing pattern and the number of times it occurred in our database: the longer the pattern, the less often it occurred. Yet even the longest patterns had several thousand occurrences. As you can see from examining the results, the longer the pattern, the greater the frequency of those occurring over 60 percent of the time. See Figure 8-1 for daily closing direction patterns and their results.

Another finding, and one which deserves considerable attention, is the fact that if all patterns are averaged across markets, then we have a clear regression to the mean. In other words, the net effect is no better than chance. This clearly supports the random walk conclusion. While it may be true that a ++++++(-) pattern has occurred 89 percent of the time in soybeans, it is also true that the total number of cases for this pattern in soybeans was only twenty-three, hardly enough to support the conclusion that this pattern is statistically valid.

How then can we salvage what seems to be a good idea? One way might be to break patterns down for further study by underlying trend. The question is, "How often have certain patterns occurred during certain types of markets?" We might ask, therefore, "How often has a ++--+-+ pattern occurred in bull markets? In bear markets? In choppy bull markets?" In order to answer these

questions we need to return to our historical database and repeat the same study using the previously determined market categories. Figures 8-2 through 8-10 show the results. As you can see, there are some high percentages to be found, so check the printouts carefully!

Finally, my more recent findings suggest that while daily closing patterns may not be reliable, intraday closing patterns are highly reliable in certain markets. This area requires intense study.

**Figure 8.1: Daily Closing Pattern Percentages: All Markets**

	80	8P	C	CC	CD	CO	CP	FC	GC	HO	JV	LB	LC	LH	LV	O	OJ	PS	PL	S	SF	SV	SM	SU	TB	TR	W	T#				
--	(+)	49	50	47	49	44	44	54	56	50	54	47	49	51	53	51	49	52	52	53	46	52	49	54	52	46	49	51	50	95156		
--	(+)	46	46	48	47	50	43	40	44	43	50	47	44	42	45	44	43	45	44	43	48	45	43	44	44	47	43	44	45	84595		
--	(+)	49	46	49	53	49	52	51	49	45	51	48	49	46	46	43	49	52	48	46	49	45	48	50	48	46	50	46	52	98324		
--	(+)	46	48	45	44	43	42	46	47	45	52	44	48	46	45	43	49	50	47	49	48	44	49	50	43	48	44	46	93462			
++	(+)	47	46	46	48	43	42	48	49	55	46	45	50	50	48	48	48	49	52	50	46	53	45	57	47	44	46	44	48	96793		
++	(+)	48	47	49	48	48	52	49	47	49	47	45	50	50	44	48	48	47	48	45	46	48	43	48	40	49	49	48	51	47	95053	
++	(+)	45	48	41	50	46	49	46	42	49	41	46	45	47	46	44	46	45	47	44	47	46	45	47	43	50	44	44	45	90195		
++	(+)	51	46	54	47	46	45	52	54	56	50	49	50	47	48	50	48	49	52	50	52	48	50	50	54	43	44	44	50	98990		
++	(+)	50	53	50	50	44	55	55	51	54	55	48	51	53	52	51	53	53	53	46	52	51	50	51	47	47	53	51	43	43193		
++	(+)	46	41	44	48	48	54	42	42	44	50	44	46	45	41	44	42	42	45	44	48	45	43	39	45	46	46	42	45	38053		
++	(+)	50	47	49	52	51	50	50	48	48	49	48	49	48	49	50	52	49	46	51	43	45	52	50	46	49	46	54	49	46950		
++	(+)	45	45	45	43	44	44	46	48	46	52	47	46	46	47	42	43	48	50	46	51	45	40	46	45	43	47	42	46	44586		
++	(+)	46	46	45	48	42	49	48	48	55	43	44	50	48	46	48	49	52	50	45	51	45	40	46	45	43	48	44	46	44582		
++	(+)	50	49	49	51	54	48	47	41	53	52	51	44	48	47	48	48	45	46	49	45	49	45	36	49	48	48	52	48	44850		
++	(+)	45	48	52	50	45	46	42	48	42	46	46	47	46	46	44	46	44	43	43	46	43	43	43	43	49	45	45	45	44670		
++	(+)	51	47	53	44	49	52	47	54	56	54	57	51	55	50	52	49	47	49	53	49	53	50	52	51	53	44	48	51	50	49879	
++	(+)	46	48	49	48	47	46	43	39	44	51	49	45	44	47	46	44	46	44	43	44	48	44	46	43	49	41	46	45	42899		
++	(+)	48	49	53	48	55	51	49	49	45	54	53	50	49	50	52	47	46	48	47	46	48	47	49	48	47	46	52	44	49	47625	
++	(+)	47	50	45	44	40	47	47	53	42	44	45	45	46	44	50	51	48	48	47	46	51	50	41	50	41	50	47	47	45623		
++	(+)	49	48	46	46	44	40	47	44	43	48	49	45	45	48	49	47	48	45	46	48	41	48	44	49	49	47	50	47	46650		
++	(+)	45	49	40	43	53	45	43	50	40	46	49	44	48	47	44	44	46	47	46	45	49	49	46	49	46	49	43	46	41750		
++	(+)	51	45	55	47	51	41	52	52	45	57	50	43	52	47	50	50	51	51	46	48	49	48	55	43	51	52	50	45	45129		
++	(+)	51	54	47	50	39	54	55	48	57	43	51	48	52	47	44	44	43	39	43	47	43	46	48	43	38	44	45	39	41	17161	
++	(+)	45	41	46	48	44	55	43	43	48	41	52	44	47	44	44	45	46	48	45	51	48	50	48	49	44	43	49	50	43	48	20761
++	(+)	49	47	48	52	48	44	50	51	47	45	41	46	45	48	45	45	50	48	47	50	54	45	47	52	45	47	42	48	20850		
++	(+)	46	50	46	49	41	42	49	52	49	59	47	43	45	47	49	48	48	49	44	46	49	43	47	32	49	52	46	48	47	21874	
++	(+)	49	47	48	48	53	51	48	45	47	51	44	47	48	44	48	49	44	46	49	43	47	32	49	52	46	48	47	50	9663		
++	(+)	45	49	44	49	46	43	46	42	49	41	46	42	46	45	43	41	48	45	43	42	42	50	42	49	41	43	44	44	20988		
++	(+)	50	46	51	49	47	51	52	54	56	51	53	49	49	53	48	47	51	56	49	52	54	52	48	54	46	51	52	51	24136		
++	(+)	50	47	49	49	44	45	56	59	50	51	43	42	48	53	49	46	48	51	50	51	53	44	46	54	52	42	53	51	50	22583	
++	(+)	45	48	45	48	49	48	41	37	44	45	54	53	47	44	47	51	45	44	47	46	44	49	45	47	42	52	39	44	45	20502	
++	(+)	49	46	49	52	43	53	48	52	47	51	49	50	51	50	51	48	49	50	48	49	45	50	49	48	47	49	46	49	49	22260	
++	(+)	47	50	45	44	47	45	48	44	51	46	48	45	44	45	46	46	48	47	51	46	45	49	50	45	49	47	47	47	21137		
++	(+)	50	46	44	44	43	45	43	45	48	51	57	45	44	48	49	48	47	47	46	53	50	44	57	47	53	48	43	48	46	24195	
++	(+)	46	47	51	53	48	52	51	47	45	40	51	47	48	48	51	48	48	51	43	47	51	40	47	44	44	50	47	47	23778		
++	(+)	44	46	42	49	48	52	45	41	49	41	44	47	41	48	45	43	43	46	49	46	49	45	46	51	39	48	42	43	45	20246	
++	(+)	52	49	49	47	42	52	53	46	55	53	49	54	47	50	53	49	53	51	49	50	47	52	49	46	57	45	52	51	22824		
++	(+)	48	53	52	49	41	51	56	54	53	51	49	51	48	50	58	52	48	55	53	53	44	54	51	59	51	45	42	51	51	22033	
++	(+)	48	41	42	49	41	45	41	42	43	46	43	46	45	38	44	40	44	44	40	44	44	44	38	43	48	51	43	44	19193		
++	(+)	52	48	50	53	55	56	51	45	49	45	57	41	52	50	50	49	52	54	51	44	51	42	47	56	50	49	51	46	54	50	24375
++	(+)	44	44	44	44	38	46	51	45	40	54	43	45	44	48	41	41	46	53	45	49	40	46	44	46	44	47	42	45	22125		
++	(+)	45	42	43	46	44	37	49	44	47	53	37	43	43	50	53	44	44	47	50	50	45	43	56	47	48	45	39	47	21584		
++	(+)	51	52	51	51	50	58	48	51	48	44	59	53	51	44	42	48	49	48	47	46	50	47	51	40	49	43	50	57	49	22383	
++	(+)	44	46	39	52	49	45	42	47	43	45	43	45	43	49	50	47	47	41	49	44	44	41	45	50	48	44	46	46	21958		
++	(+)	52	48	56	45	40	47	52	55	47	55	50	41	49	46	46	46	46	51	50	45	47	52	55	52	47	51	50	24000			
++	(+)	50	48	42	48	47	50	52	56	53	46	50	52	52	54	53	46	51	53	55	49	53	50	50	54	47	49	48	51	24001		
++	(+)	46	47	51	49	45	44	45	41	43	40	49	43	42	41	44	46	44	44	42	41	47	44	45	46	42	47	43	47	44	20794	
++	(+)	48	45	48	54	57	49	51	47	42	58	56	50	48	49	50	48	53	45	44	48	48	49	46	45	45	43	50	49	23736		
++	(+)	48	50	46	43	36	49	46	47	54	38	40	45	47	46	46	44	42	53	49	47	49	48	53	51	38	51	47	49	22960		
++	(+)	47	50	50	52	48	47	50	52	49	51	50	44	52	43	49	53	49	51	50	44	52	49	51	48	55	42	46	44	47	22406	
++	(+)	48	44	45	45	44	48	47	44	48	45	45	43	43	44	44	50	46	44	47	46	46	41	49	45	50	48	48	50	46	21039	

T% = Total % close in direction shown

T# = Total number of cases

65% = Markets where closing pattern occurred 65% of the time or more

Figure 8.1: Continued

----- 65% -----

	BO	BP	CC	CD	CL	CO	CP	FC	GC	HO	JY	LB	LC	LH	NY	OJ	P8	PL	S	SF	SV	SM	SU	TB	TR	W	TH							
+++	(+)	46	51	39	52	38	53	46	43	50	39	49	49	47	49	46	45	42	49	48	44	48	54	47	46	53	46	45	19826					
+++	(-)	41	53	56	45	57	42	51	52	45	59	47	49	48	46	52	51	47	49	53	47	43	49	51	40	49	51	20505						
-----	(+)	51	61	49	59	51	41	56	53	40	51	55	48	51	51	53	56	53	52	54	52	51	51	50	70	52	48	61	56	8973				
-----	(-)	44	36	44	49	42	54	42	44	47	38	52	46	46	44	38	42	45	44	44	46	44	46	44	27	45	44	32	39	7689				
-----	(+)	44	34	50	51	46	44	52	55	46	36	40	40	48	48	54	47	46	47	48	47	41	44	34	42	50	52	57	47	9238				
-----	(-)	41	50	42	47	49	51	46	40	48	52	58	57	43	49	48	48	55	50	65	53	42	42	39	44	49	49	49	49	9522				
-----	(+)	43	43	47	54	43	46	51	46	58	51	44	43	51	49	48	47	48	50	44	52	48	66	48	47	44	49	48	10091					
-----	(-)	52	32	48	43	50	47	47	46	51	38	44	50	53	45	46	43	52	49	46	52	45	47	29	49	49	47	47	47	9918				
-----	(+)	44	51	43	39	44	44	36	49	34	49	45	42	45	42	44	41	43	45	40	41	41	45	41	48	40	44	43	6996					
-----	(+)	51	44	52	50	54	51	53	61	45	62	49	52	54	50	49	47	53	52	53	57	56	53	55	45	54	53	53	11017					
-----	(-)	41	51	43	49	52	40	49	56	47	41	49	49	56	47	50	53	51	49	51	46	52	46	58	51	46	56	51	50	10579				
-----	(+)	52	47	49	52	40	49	56	53	49	47	41	46	48	55	47	41	46	48	45	47	44	48	41	45	48	36	45	45	9605				
-----	(-)	43	48	46	44	53	46	41	41	46	48	55	47	47	41	48	53	42	41	46	48	45	47	48	41	45	48	36	45	9605				
-----	(+)	51	42	54	54	41	50	55	52	51	47	53	41	51	51	49	53	47	47	43	49	46	52	48	51	52	53	48	53	11046				
-----	(-)	45	44	41	43	47	48	43	44	50	44	56	45	43	45	49	47	53	47	50	43	46	46	45	42	45	43	46	10084					
-----	(+)	46	48	45	41	42	44	48	52	47	44	40	49	51	44	47	49	49	41	40	48	53	35	45	50	49	50	48	47	11497				
-----	(-)	41	46	48	52	52	52	47	44	40	49	51	44	47	49	49	41	42	39	47	50	44	49	49	47	36	48	41	42	9397				
-----	(+)	43	46	39	48	41	57	48	44	43	40	43	40	43	45	41	48	48	41	47	52	47	51	46	50	60	46	54	54	10893				
-----	(-)	54	49	57	49	54	39	49	51	52	57	55	52	54	48	47	54	52	57	51	47	52	47	51	46	50	63	43	45	51	10599			
-----	(+)	45	53	51	49	36	47	56	56	47	51	50	55	46	47	58	54	51	54	53	58	40	51	44	41	34	44	49	40	44	9168			
-----	(-)	50	40	43	49	56	49	41	41	50	46	47	40	49	38	43	40	41	45	38	40	51	44	41	34	44	49	50	40	44	11412			
-----	(+)	53	48	55	57	61	57	53	41	47	41	58	46	51	48	49	52	52	51	50	44	53	39	48	59	50	48	54	47	54	10340			
-----	(-)	43	42	39	40	34	36	44	56	48	56	39	49	44	48	45	44	40	47	53	44	58	49	36	45	47	38	47	41	45	10340			
-----	(+)	45	39	44	41	41	32	48	43	43	50	38	39	43	45	45	49	43	46	40	43	50	39	45	50	43	50	49	48	45	9716			
-----	(-)	51	53	49	56	53	64	49	52	47	59	57	51	50	43	50	44	53	50	49	46	49	50	50	39	52	45	47	58	50	10636			
-----	(+)	41	53	39	48	52	43	39	47	42	51	39	47	55	48	44	46	48	47	50	40	55	46	45	43	54	50	48	46	10259				
-----	(+)	55	42	55	40	40	50	55	47	48	55	45	59	50	41	47	52	48	49	51	47	55	42	50	51	50	54	39	46	48	11275			
-----	(-)	50	45	40	49	48	47	52	53	53	58	43	50	51	55	51	43	49	51	57	53	45	57	50	48	52	43	48	50	12043				
-----	(+)	40	40	43	46	46	54	47	50	49	46	47	52	54	42	43	45	41	46	46	43	43	52	53	43	40	54	49	44	46	9409			
-----	(-)	45	42	43	46	46	54	47	50	49	46	47	47	48	45	41	46	43	41	46	46	43	43	52	53	45	43	40	54	49	44	9409		
-----	(+)	51	37	61	46	58	41	50	52	46	64	42	45	49	47	53	50	51	54	53	44	45	50	54	57	36	45	54	50	10173				
-----	(-)	46	50	53	48	46	47	45	44	43	39	52	46	43	41	45	47	46	40	43	50	39	45	50	43	50	43	50	49	48	10850			
-----	(+)	48	39	47	52	48	58	44	54	45	41	56	54	52	46	49	48	49	54	46	41	47	42	50	46	46	44	59	45	48	11719			
-----	(-)	47	56	46	45	47	36	54	43	51	56	41	42	45	48	47	49	43	41	51	55	49	53	48	49	50	52	34	50	48	11661			
-----	(+)	47	56	46	45	47	36	54	43	51	56	41	42	45	48	47	49	43	41	51	55	49	53	48	49	50	52	34	50	48	11661			
-----	(-)	50	52	51	52	45	41	51	46	47	52	50	42	41	53	52	50	43	48	55	52	50	47	56	44	57	49	41	48	48	49	11321		
-----	(+)	45	42	43	46	46	54	47	50	49	46	47	52	54	42	43	45	41	47	42	45	47	46	41	50	40	47	52	47	48	10695			
-----	(-)	45	42	43	46	46	54	47	50	49	46	47	52	54	42	43	45	41	47	42	45	47	46	41	50	40	47	52	47	48	10695			
-----	(+)	46	48	44	51	36	55	47	43	50	34	55	42	47	43	50	34	55	42	47	43	50	34	55	42	47	43	50	34	55	47	9766		
-----	(-)	46	48	44	51	36	55	47	43	50	34	55	42	47	43	50	34	55	42	47	43	50	34	55	42	47	43	50	34	55	47	9766		
-----	(+)	52	49	45	52	50	38	53	56	47	54	46	48	49	51	53	51	54	50	52	49	54	48	52	54	52	48	49	52	51	9766			
-----	(-)	46	48	46	49	52	41	47	48	49	47	44	40	49	45	49	42	48	40	45	49	42	48	50	43	45	43	45	44	44	45	8806		
-----	(+)	44	46	48	46	46	57	44	42	50	44	40	48	48	45	44	44	44	44	44	45	49	42	48	50	43	45	43	45	44	44	45	8806	
-----	(-)	53	50	48	54	52	44	48	48	49	44	51	50	50	44	48	50	34	49	49	50	40	40	43	53	61	44	47	45	51	49	10828		
-----	(+)	43	45	47	43	42	44	37	36	49	52	48	47	54	52	46	47	51	48	43	41	49	48	46	53	55	41	36	52	46	50	44	10828	
-----	(+)	48	58	47	43	42	44	37	36	49	52	48	47	54	52	46	47	51	48	43	41	49	48	46	53	55	41	36	52	46	50	44	10992	
-----	(-)	47	39	48	53	56	48	45	43	38	55	42	44	40	49	45	44	44	44	44	45	49	42	48	50	43	45	43	45	44	44	45	10992	
-----	(+)	46	48	46	49	52	41	47	48	49	47	44	40	49	45	49	46	51	51	43	43	43	43	43	43	43	43	43	43	43	43	43	43	11195
-----	(-)	46	48	46	49	52	41	47	48	49	47	44	40	49	45	49	46	51	51	43	43	43	43	43	43	43	43	43	43	43	43	43	11195	
-----	(+)	49	47	50	49	52	51	49	46	52	55	46	48	52	47	48	49	59	46	51	51	51	51	51	51	51	51	51	51	51	51	51	12254	
-----	(-)	49	47	50	49	52	51	49	46	52	55	46	48	52	47	48	49	59	46	51	51	51	51	51	51	51	51	51	51	51	51	51	12254	
-----	(+)	49	47	49	46	51	40	56	65	50	54	51	40	56	65	50	54	51	40	56	65	50	54	51	40	56	65	50	54	51	40	56	10242	
-----	(-)	46	48	44	51	44	51	41	32	43	42	54	60	48	46	45	48	46	47	49	44													

Figure 8.1: Continued

	80	BP	C	CC	CD	CL	CO	CP	FC	GC	HO	JV	LB	LC	LH	LY	OJ	P8	PL	S	SF	SV	SM	SP	SU	TB	TR	W	T%					
+++	(+)	45	46	42	50	46	39	50	44	50	54	34	47	43	55	53	51	40	52	53	53	51	44	53	42	56	50	40	43	41	11131			
+++	(-)	52	51	53	47	48	54	48	52	45	43	62	49	52	40	42	46	53	44	45	44	46	51	45	42	40	46	52	51	57	48	11026		
+++	(+)	47	41	39	56	53	49	48	43	48	43	42	50	44	51	49	49	51	47	43	43	43	43	44	37	46	48	43	42	46	10952			
+++	(-)	50	54	56	42	41	46	49	54	46	54	45	51	51	44	47	45	45	50	54	53	52	51	60	50	44	49	53	50	11954				
+++	(+)	50	51	47	48	48	54	52	60	52	56	50	51	54	55	55	48	54	56	52	56	54	49	50	54	56	47	52	50	9121				
+++	(-)	45	45	47	48	43	40	45	36	43	41	45	42	41	40	42	42	46	41	41	44	40	44	48	43	41	40	46	40	46	9181			
+++	(+)	47	49	48	57	57	58	54	46	49	45	60	59	40	50	52	47	53	43	46	50	54	48	47	43	47	51	42	51	50	10458			
+++	(-)	49	47	47	41	39	37	44	50	45	52	36	39	46	46	45	44	46	43	55	52	47	42	49	47	56	49	40	42	45	10240			
+++	(+)	44	48	49	53	51	51	49	54	55	53	59	48	51	52	53	43	51	50	49	53	52	54	45	49	44	47	43	45	46	9511			
+++	(-)	51	46	45	44	43	44	48	42	41	51	43	46	44	45	45	45	51	49	44	47	44	47	44	44	44	50	51	52	52	41	9614		
+++	(+)	46	50	48	54	56	41	54	53	44	54	53	44	54	53	44	50	44	47	44	44	44	44	44	44	44	44	44	44	44	48	9614		
+++	(-)	46	45	48	51	59	41	61	62	48	58	44	54	50	48	51	52	53	43	51	50	49	53	52	54	45	49	44	47	43	45	9582		
+++	(+)	50	52	47	47	36	53	37	35	47	40	52	41	46	40	42	39	45	43	32	47	44	58	47	48	39	32	43	45	34	67	3893		
---	(-)	42	44	53	47	40	47	54	60	47	46	37	42	35	49	47	55	46	46	49	48	49	50	45	49	51	44	64	44	43	40	44	3467	
---	(+)	48	45	49	53	37	43	57	53	52	60	44	45	45	57	46	44	48	52	51	52	42	47	44	46	42	49	53	59	52	51	3893		
---	(-)	43	50	39	41	54	48	44	38	47	53	60	55	44	53	48	48	43	49	50	45	49	51	44	64	44	43	40	44	47	45	4824		
---	(+)	43	41	49	54	44	47	46	51	44	53	55	42	41	53	52	43	48	49	43	48	45	50	49	48	30	52	54	52	48	46	4301		
---	(-)	52	54	47	43	47	43	52	47	52	42	41	53	52	43	48	49	43	44	44	41	42	42	46	38	37	39	49	37	43	40	47	4533	
---	(+)	43	48	50	47	35	52	39	34	55	27	58	55	45	47	46	47	44	44	41	42	42	46	38	37	39	49	37	43	40	43	40	4034	
---	(-)	52	45	44	51	58	44	60	64	38	70	39	43	51	46	48	49	47	48	53	52	56	51	56	60	59	44	57	55	52	48	4861		
---	(+)	48	45	49	53	37	43	57	53	52	60	44	45	45	57	46	44	48	51	52	50	55	44	53	45	60	45	43	59	52	50	4974		
---	(-)	46	52	46	44	57	49	42	42	44	35	54	49	51	39	50	54	43	43	45	48	42	50	44	50	40	51	50	31	43	46	5198		
---	(+)	50	47	56	52	50	50	52	54	58	44	54	53	50	49	53	56	48	48	52	39	47	51	50	51	49	52	54	56	51	50	4555		
---	(-)	45	49	39	44	38	48	46	43	38	54	44	47	45	45	42	41	44	48	45	58	50	44	46	44	49	45	42	27	40	45	5446		
---	(+)	42	52	48	44	42	45	46	60	58	56	37	54	54	47	42	46	48	46	53	41	48	57	39	42	42	52	52	54	48	47	5208		
---	(-)	54	44	49	53	50	52	51	36	41	40	41	59	40	42	49	54	47	46	53	41	48	57	39	42	42	42	42	41	49	42	45	4043	
---	(+)	41	43	37	52	41	57	44	47	47	41	37	43	43	47	50	49	43	38	50	50	40	49	47	48	46	41	41	49	42	45	4674		
---	(-)	56	52	58	46	55	41	54	48	54	62	55	45	45	49	45	46	53	51	57	55	49	41	47	52	43	52	44	39	64	50	4855		
---	(+)	43	54	50	51	34	43	59	52	44	48	48	52	44	47	60	55	51	57	55	57	49	41	47	52	43	52	44	39	64	50	4416		
---	(-)	52	39	44	48	58	52	38	44	54	51	49	44	51	48	35	43	42	39	43	39	46	51	50	45	50	45	46	57	32	46	5261		
---	(+)	41	43	40	43	34	34	50	43	47	50	52	40	43	40	46	52	47	45	47	45	47	51	34	54	50	44	46	36	63	56	50	4910	
---	(-)	47	38	48	46	32	45	32	45	50	43	47	39	44	52	55	48	43	49	44	49	49	49	48	46	40	45	61	52	46	57	46	4910	
---	(+)	49	54	46	51	62	65	53	45	53	49	57	52	55	48	43	49	44	50	46	46	46	40	50	57	52	35	43	35	47	43	46	4789	
---	(-)	44	48	36	46	59	53	45	44	49	41	49	39	48	37	47	45	47	45	47	45	47	45	47	45	47	45	47	45	47	45	49	4941	
---	(+)	51	45	60	52	35	45	54	45	55	48	58	49	51	48	45	50	47	48	50	52	53	43	54	40	52	42	49	45	50	5754			
---	(-)	51	48	39	48	49	42	54	55	51	53	38	47	46	50	55	51	46	45	47	48	45	43	49	41	42	57	44	52	44	45	50	5754	
---	(+)	45	48	53	49	45	53	42	41	46	45	58	47	49	44	41	46	45	47	48	45	49	42	47	44	56	40	64	46	50	48	5712		
---	(-)	51	61	49	48	50	32	55	41	50	55	41	35	45	47	46	51	46	46	46	51	46	43	50	52	54	50	48	42	44	45	50	5754	
---	(+)	49	54	52	49	44	33	49	42	48	56	45	36	34	56	51	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	5712	
---	(-)	47	41	41	48	61	49	56	47	42	54	57	62	39	45	49	49	43	43	40	44	44	44	44	44	44	44	44	44	44	44	44	48	5646
---	(+)	50	62	52	37	55	44	38	60	41	58	49	46	49	46	49	46	49	46	49	46	49	46	49	46	49	46	49	46	49	46	49	48	5292
---	(-)	47	33	62	45	57	41	53	58	37	40	49	40	45	54	51	46	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	48	5225
---	(+)	62	39	45	53	59	32	54	64	46	58	45	47	48	52	41	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	4409	
---	(-)	35	55	49	45	37	63	43	34	51	39	51	48	52	41	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	4694	
---	(+)	58	50	46	53	56	49	49	52	50	37	44	47	45	43	52	46	47	39	49	43	47	53	55	38	32	53	49	56	50	4694			
---	(-)	39	43	50	43	37	46	47	43	46	61	43	48	55	43	52	46	47	39	49	43	47	53	55	38	32	53	56	53	46	48	5083		
---	(+)	50	63	45	44	33	38	50	59	55	61	44	41	49	51	46	46	52	54	55	58	54	48	60	47	75	47	38	43	46	51	5354		
---	(-)	46	34	50	51	61	53	47	38	40	35	52	58	45	42	48	51	42	43	40	42	47	35	47	22	48	57	50	51	44	4614			
---	(+)	48	43	42	47	51	43	49	54	52	46	49	42	46	46	43	43	42	41	38	45	44	36	42	57	41	48	39	44	45	5183			
---	(-)	47	50	53	50	45	50	49	43	44	52	50	52	49	49	50	52	59	52	48	51	49	50	52	59	52	48	51	51	52	50	5804		
---	(+)	51	46	47	41	48	41	52	64	50	54	36	34	48	53	49	47	48	56	53	61	44	52	51	60	53	40	42	51	50	54	54	54	54
---	(-)	45	47	47</																														

Figure 8.1: Continued

	80	BP	C	CC	CD	CL	CO	CP	FC	GC	HO	JY	LB	LC	LH	LI	NY	O	OJ	P8	PL	S	SF	SV	SM	SP	SU	TB	TR	W	T#		
-----	(+)	46	46	47	50	47	72	49	46	54	50	64	46	52	45	43	50	50	54	57	52	42	53	54	58	46	43	45	52	49	4841	CL	
-----	(-)	50	53	50	49	44	27	48	48	42	49	45	33	48	42	50	53	45	44	54	40	52	45	41	40	50	51	53	45	47	4592		
-----	(+)	49	50	45	43	41	44	43	53	47	54	45	30	48	46	47	47	49	44	57	58	43	57	45	57	52	43	49	44	49	5570		
-----	(+)	46	46	50	52	52	50	54	42	50	42	51	60	46	49	50	47	46	53	41	39	54	42	51	41	45	50	49	53	47	5345		
-----	(+)	51	46	47	39	44	46	45	42	50	40	37	49	41	48	44	46	47	44	45	45	52	47	38	48	41	46	48	49	45	4648		
-----	(-)	44	49	48	59	40	49	51	50	45	57	58	48	55	46	53	52	48	52	53	55	45	50	60	49	47	56	47	41	47	51	5256	
-----	(+)	51	57	51	52	47	46	61	52	57	48	52	46	56	51	58	53	47	60	51	55	50	48	53	47	49	45	50	38	52	51	5624	
-----	(-)	43	41	43	46	46	37	45	39	45	44	41	45	40	43	44	36	46	42	47	48	44	46	46	52	50	42	53	42	44	4945		
-----	(+)	50	48	48	45	56	55	49	53	52	62	34	52	56	50	47	50	57	45	47	50	46	46	46	52	51	47	47	46	53	50	6064	
-----	(-)	46	48	47	53	42	42	48	49	40	45	34	63	44	40	44	50	44	38	52	50	47	50	50	44	45	48	49	47	43	5008		
-----	(+)	51	48	38	47	45	35	48	47	51	50	29	42	42	55	54	52	39	54	58	58	50	47	50	44	45	48	49	47	46	5626		
-----	(-)	46	50	55	40	49	59	49	46	46	66	66	53	52	39	41	42	54	42	40	40	47	49	48	53	46	48	52	51	59	48	5627	HO
-----	(+)	48	44	37	53	45	48	48	48	41	37	45	47	41	51	54	54	52	43	46	43	46	44	51	44	44	57	55	43	41	44	5364	
-----	(-)	49	50	58	46	43	51	48	48	46	57	59	40	41	43	43	44	55	51	54	51	54	51	53	56	64	51	46	49	54	50	5940	
-----	(+)	48	59	46	50	44	48	50	65	54	51	50	54	55	53	50	54	50	58	58	50	58	58	46	53	48	52	49	55	53	5645		
-----	(-)	48	38	49	48	47	45	48	32	40	45	42	38	41	44	46	42	43	37	38	47	39	40	51	41	50	43	37	46	43	4652		
-----	(+)	49	51	50	58	50	55	51	46	49	62	57	45	50	52	50	52	45	44	47	52	52	45	48	42	41	46	41	52	49	5595		
-----	(-)	48	46	45	40	45	40	47	44	47	46	36	41	50	47	44	47	47	45	55	52	46	44	51	44	57	55	43	41	44	47	5324	
-----	(+)	40	55	51	53	45	48	46	53	51	41	44	48	47	52	57	46	47	48	53	53	54	54	46	49	40	50	56	43	49	4975		
-----	(-)	56	34	43	44	48	45	51	43	46	55	50	49	48	44	40	45	49	50	44	44	42	42	49	46	56	39	42	54	47	4812		
-----	(+)	39	43	50	48	34	46	36	41	55	48	40	53	46	45	53	39	44	46	54	46	46	39	49	49	69	49	52	36	45	46	4359	Sp
-----	(-)	59	53	44	49	64	45	61	54	40	50	58	41	51	50	42	58	51	52	43	50	52	57	49	48	29	48	41	62	49	50	4773	
-----	(+)	55	71	49	48	46	44	54	47	52	63	41	54	47	44	54	51	55	37	50	44	55	55	61	53	69	54	45	60	59	53	4655	BP
-----	(-)	40	25	43	51	47	53	44	51	45	36	52	44	52	42	46	39	37	47	54	40	42	36	41	27	43	46	34	36	43	3820		
-----	(+)	44	40	49	46	50	50	48	44	38	39	44	46	47	52	45	48	44	47	50	43	44	46	33	43	46	56	54	47	45	47	4578	
-----	(+)	50	51	45	51	47	58	48	43	54	57	59	53	50	49	45	48	47	54	49	46	46	53	53	48	66	52	47	43	42	49	4848	SP
-----	(+)	43	47	45	55	40	44	53	50	48	61	49	47	41	49	50	47	45	44	47	51	43	39	53	52	70	50	53	48	53	49	5184	SP
-----	(+)	52	49	49	43	53	52	44	47	49	35	46	47	56	47	45	48	44	52	50	46	53	52	42	26	46	43	46	43	47	4943		
-----	(-)	45	59	44	40	60	47	41	45	50	48	44	65	45	43	47	46	50	49	50	46	55	41	49	45	44	44	63	46	47	5202		
-----	(+)	48	46	47	41	39	43	36	49	56	41	41	48	46	51	50	44	39	47	56	49	46	65	47	40	50	40	52	50	48	5886		
-----	(+)	48	46	47	51	53	53	59	45	39	54	43	48	52	46	46	50	56	50	37	47	48	30	49	59	46	50	43	46	48	5893		
-----	(-)	44	51	40	45	38	55	51	43	47	43	44	45	38	48	47	40	42	41	44	50	47	49	44	49	49	33	35	36	40	44	5012	
-----	(+)	53	45	57	53	57	39	46	52	50	52	54	50	49	48	55	53	56	53	46	50	48	52	47	48	63	41	60	55	52	5824		
-----	(+)	46	54	51	48	37	51	52	60	54	52	58	49	54	53	53	51	52	59	61	44	60	44	62	57	74	53	43	49	48	53	5424	SP
-----	(-)	48	41	42	50	67	45	43	36	52	40	46	36	46	50	41	43	38	44	46	38	35	30	39	28	25	43	51	45	43	4466		
-----	(+)	51	48	58	59	63	40	54	36	52	64	64	49	53	47	48	52	54	55	53	52	37	38	51	58	47	50	48	48	56	51	5777	
-----	(-)	46	41	39	37	34	33	43	61	44	57	33	41	41	49	47	43	38	40	45	56	40	59	46	37	47	45	45	39	45	5135		
-----	(+)	44	40	39	37	49	35	51	42	35	48	43	42	43	41	44	50	44	45	35	42	49	39	49	45	43	48	55	43	45	5176		
-----	(-)	53	52	53	61	45	62	45	60	55	44	64	66	46	51	42	51	44	55	53	52	48	51	61	53	40	46	52	36	44	4622		
-----	(+)	36	55	43	49	44	40	34	45	43	57	39	46	53	50	43	44	46	50	46	54	42	45	44	49	44	43	44	45	44	4744		
-----	(-)	59	43	50	47	44	56	57	60	51	56	39	58	47	43	45	50	52	52	46	50	44	54	52	47	47	50	53	52	51	5418		
-----	(+)	48	44	40	50	47	52	50	51	54	62	47	54	53	52	43	51	52	61	54	45	58	46	54	53	48	37	52	51	5910			
-----	(-)	48	51	54	47	40	49	47	42	35	48	43	42	43	41	44	50	44	45	35	42	49	39	49	45	43	48	55	43	45	5176		
-----	(+)	53	44	48	55	54	53	45	51	44	53	46	54	46	44	48	46	55	45	40	46	42	52	48	41	48	56	43	45	48	5650		
-----	(-)	42	50	46	42	41	38	53	45	52	57	42	48	43	48	49																	













Figure 8.1: Concluded

	BO	BP	C	CC	CD	CL	CO	CP	FC	GC	HO	JY	LB	LC	LH	NY	O	OU	PB	PL	S	SF	SV	SM	SP	SU	TB	IR	W	T%	T#		
+++++	45	46	47	52	61	43	49	33	62	51	34	47	36	49	48	45	49	46	48	58	46	49	45	37	74	45	47	36	38	46	2465	SP	
+++++	(-)	51	44	49	46	34	51	48	63	31	47	63	50	61	48	51	43	48	49	38	50	44	53	58	25	50	47	61	57	50	2721		
+++++	(+)	50	41	48	48	43	50	49	55	67	48	50	43	44	57	53	42	54	54	45	49	59	56	41	61	56	46	54	44	50	2352	FC	
+++++	(-)	47	56	46	49	48	47	50	37	25	50	46	54	50	41	39	44	52	42	43	48	45	37	42	54	30	40	48	41	54	2121		
+++++	(+)	54	48	38	54	45	68	47	52	54	43	51	47	54	47	51	40	54	54	60	40	47	51	58	51	59	57	46	45	60	51	2903	CL
+++++	(-)	40	46	55	45	50	30	50	43	39	56	48	47	41	49	45	57	36	40	37	57	50	42	39	46	40	38	52	50	36	45	2582	
+++++	(+)	45	48	43	54	61	48	50	43	50	59	43	38	42	58	54	59	37	54	46	42	58	43	55	47	57	50	60	54	46	50	2697	
+++++	(-)	52	50	50	44	30	50	47	54	45	39	54	56	53	37	41	40	58	42	51	55	40	53	43	48	36	45	26	41	51	46	2446	
+++++	(+)	43	37	35	57	46	55	47	33	43	48	45	63	37	41	52	42	44	49	54	45	37	38	30	48	50	46	50	38	43	44	2477	
+++++	(-)	54	58	60	41	43	38	50	65	51	50	51	32	58	54	43	56	49	47	42	54	58	60	65	47	50	42	58	53	52	2936		
+++++	(+)	51	38	55	41	61	64	56	54	50	67	56	58	51	60	61	52	39	43	47	60	43	56	53	48	48	61	55	52	47	53	2555	GC
+++++	(-)	43	38	41	57	37	32	41	43	47	32	41	37	43	35	36	45	56	53	48	38	54	43	45	47	46	35	37	45	48	43	2108	
+++++	(+)	48	44	47	54	65	66	56	48	49	47	65	69	50	47	39	52	52	40	47	50	53	47	48	54	46	59	36	45	49	2468	CL	
+++++	(-)	49	49	51	45	32	31	42	49	46	52	32	30	46	48	55	44	42	45	57	50	46	43	52	47	45	50	36	58	52	47	2356	
+++++	(+)	57	42	36	56	65	51	55	58	59	52	65	73	46	59	50	52	42	53	54	39	55	64	45	42	55	46	37	32	46	51	2442	JY
+++++	(-)	40	54	62	40	32	46	42	40	39	47	32	26	49	37	46	45	52	43	42	57	43	33	50	54	42	54	65	49	45	2184		
+++++	(+)	51	36	49	59	52	53	57	52	50	48	52	49	46	50	49	47	42	54	47	40	42	42	46	53	34	55	51	44	46	49	2137	
+++++	(-)	45	57	47	39	43	42	41	46	46	51	43	49	51	47	45	47	50	42	50	57	54	56	49	45	55	44	44	50	44	47	2064	

















Figure 8.2: Continued

T*	80 BP	CC	CD	CL	CO	CP	FC	GC	HO	JV	LB	LC	LH	LV	OJ	PB	PL	SF	SV	SM	SP	SU	TB	TR	W	T%		
+	100	100	25	66	0	0	0	0	0	50	100	50	100	75	100	60	0	33	100	88	0	0	80	57	55	40	60	
-	0	0	75	22	0	0	0	0	0	0	50	0	0	0	25	0	40	0	66	0	11	100	0	20	35	44	60	
+	0	20	100	100	0	0	0	0	0	0	100	0	0	50	0	36	100	33	0	66	0	0	50	25	33	42	53	
-	100	80	0	0	0	0	0	0	0	28	0	0	50	0	36	100	33	0	25	0	25	0	50	75	66	37	45	
+	50	14	71	50	0	0	0	0	0	33	50	0	33	60	100	54	50	77	30	0	0	25	58	88	37	52		
-	50	71	28	50	0	0	25	0	0	66	50	100	66	40	45	50	22	50	70	100	0	50	29	11	62	44		
+	71	54	33	83	0	0	0	0	0	20	33	0	0	66	0	75	33	33	25	0	20	100	25	62	50	46		
-	28	45	66	16	0	0	0	0	0	60	66	0	100	33	33	25	66	66	75	0	80	0	75	37	50	50		
+	40	75	83	83	0	0	0	0	0	66	0	0	60	57	33	33	36	100	75	0	0	66	66	66	66	59		
-	60	25	16	16	0	0	0	0	0	33	100	100	40	28	58	66	63	0	25	0	100	33	33	33	16	38		
+	44	60	47	0	0	0	75	0	0	66	100	100	50	57	50	66	50	66	0	60	0	30	66	0	27	48		
-	85	44	40	52	0	0	0	0	0	33	0	0	0	50	42	0	50	33	30	33	0	40	70	33	100	72	48	
+	0	50	41	57	0	0	50	66	0	66	0	75	66	54	75	25	50	25	100	0	60	100	50	29	50	46		
-	100	50	58	42	0	0	50	33	100	0	33	100	25	33	25	58	50	66	0	50	0	0	25	70	50	48		
+	20	42	50	33	0	0	0	0	0	33	75	66	100	66	100	54	50	33	50	70	0	70	50	46	50	62	53	
-	80	57	33	66	0	0	0	0	0	66	25	33	0	33	0	45	50	54	66	33	0	30	50	40	50	37	42	
+	71	57	25	50	0	0	0	0	0	40	33	75	100	76	50	50	60	40	33	0	57	50	66	14	60	55		
-	28	42	75	50	0	0	44	0	0	60	66	55	0	23	50	50	40	40	66	0	42	0	50	22	85	20	42	
+	75	50	50	0	0	0	33	0	0	28	40	0	25	75	50	66	35	0	50	0	0	20	87	0	37	44	44	
-	25	50	50	100	0	0	66	0	66	71	60	100	75	25	50	50	33	57	0	50	0	80	12	100	50	53	53	
+	50	50	42	66	0	0	20	45	0	40	25	0	80	40	37	55	30	37	40	75	0	25	50	70	71	49		
-	50	50	42	33	0	0	60	54	0	60	75	0	20	100	62	44	50	62	60	25	0	75	38	30	28	48		
+	70	50	16	26	0	0	0	0	0	57	0	66	0	66	50	53	100	57	54	33	0	25	55	54	42	66	50	
-	30	50	83	68	0	0	0	0	0	42	100	33	100	33	50	40	42	45	66	0	82	0	22	45	57	33	46	
+	25	42	50	53	0	0	75	60	0	62	0	75	0	44	100	61	0	46	66	27	0	40	80	73	0	50	49	
-	75	57	50	46	0	0	25	40	0	37	75	55	100	55	0	38	50	33	72	0	60	0	20	13	100	50	47	
+	16	20	58	40	0	0	75	50	0	50	0	0	100	50	0	61	75	20	100	0	33	0	66	75	76	36	54	
-	83	80	41	60	0	0	25	50	0	50	100	100	0	37	100	38	25	29	0	100	0	66	33	25	23	63	45	
+	0	75	71	46	0	0	66	14	0	37	100	25	100	58	62	16	66	37	44	66	0	50	40	64	66	33	50	
-	100	25	28	53	0	0	33	85	0	62	0	75	0	41	25	83	33	56	55	33	0	33	0	58	33	55	47	
+	100	20	64	57	0	0	100	33	0	25	50	100	0	55	0	28	100	45	50	60	0	66	100	58	30	16	56	
-	80	33	42	0	0	0	66	100	0	60	30	0	44	0	57	0	54	50	40	33	0	33	0	33	10	83	41	
+	33	63	60	100	0	0	33	66	0	60	33	25	66	44	71	50	100	62	50	60	0	44	100	60	60	60	56	
-	66	33	33	0	0	0	33	33	0	40	66	62	33	55	28	50	0	37	50	20	0	55	0	20	40	40	38	
+	20	60	50	28	0	0	50	75	0	60	66	33	75	60	20	46	100	75	16	0	0	33	100	22	44	50	47	
-	80	20	50	71	0	0	50	25	0	40	33	66	25	40	80	46	0	25	66	100	0	50	0	66	55	50	48	
+	40	33	66	61	0	0	33	66	0	75	100	60	50	70	33	60	50	20	37	37	0	14	75	54	50	57	52	
-	100	100	33	0	0	0	100	85	0	60	33	66	0	40	50	29	66	34	80	25	62	85	0	25	27	28	43	
+	100	0	66	0	0	0	14	0	0	57	0	0	25	71	50	40	46	0	60	0	80	0	42	77	22	71	43	
-	100	37	0	0	0	0	100	50	0	66	100	100	80	20	25	46	75	81	66	100	0	16	50	77	80	75	58	
+	0	62	100	0	0	0	50	0	60	33	0	20	80	75	53	25	18	33	0	83	0	50	0	22	20	25	41	
-	50	50	53	50	0	0	14	61	0	62	100	0	40	72	75	38	25	76	50	66	0	50	70	42	42	75	54	
+	50	38	50	0	0	85	30	0	66	0	37	0	40	50	29	66	34	50	80	25	62	0	30	42	57	25	42	
-	50	57	71	47	0	0	66	40	0	60	40	40	33	42	50	47	33	50	100	47	0	57	0	66	42	43	33	47
+	50	42	14	47	0	0	33	53	0	40	0	60	66	57	50	47	66	50	0	47	0	35	33	42	56	66	48	
-	100	66	40	68	0	0	100	57	0	33	33	66	100	57	66	52	0	40	37	55	0	45	50	81	70	90	60	
+	0	33	60	31	0	0	0	42	0	50	66	33	0	42	33	42	100	60	50	44	0	54	0	50	12	10	36	
-	66	80	66	33	0	0	80	37	0	42	50	60	33	55	0	68	50	62	85	50	0	66	50	66	40	69	58	
+	33	30	33	66	0	0	50	0	25	0	57	50	40	66	44	100	26	50	37	14	37	0	33	50	33	60	39	
-	62	50	25	36	0	0	50	55	0	0	60	25	12	71	75	33	57	50	64	50	69	0	20	44	25	100	54	50
+	37	50	50	63	0	0	50	33	0	60	25	75	14	16	33	42	50	33	30	0	80	0	55	75	0	45	44	
-	57	50	71	53	0	0	71	60	0	66	66	66	14	75	63	60	25	15	62	20	0	78	66	68	28	46	55	
+	42	50	28	30	0	0	28	33	0	75	0	16	33	33	71	25	27	40	76	37	80	0	33	26	71	53	40	



Figure 8.2: Concluded

	BO	BP	C	CC	CD	CL	CO	CP	FC	GC	HO	MO	JY	LB	LC	LH	LV	NY	O	OJ	PB	PL	S	SF	SV	SM	SP	SU	TB	TR	W	T%	T#					
+++++	0	60	50	66	0	0	64	47	0	66	0	55	0	37	50	45	75	50	0	86	33	66	0	37	0	87	66	0	10	50	112	CC	GC	O	PL	SF	SU	TB
+++++	87	20	37	33	0	0	35	47	0	33	0	44	100	62	37	55	25	50	100	13	50	33	0	56	0	12	26	100	80	45	99	80	LB	PB	TR	W		
+++++	50	66	55	12	0	0	85	0	100	0	33	0	75	33	71	42	57	100	71	66	100	0	40	0	100	66	44	37	56	84	BP	CP	GC	LC	NY	PB		
+++++	50	33	44	75	0	0	100	14	0	0	66	100	25	66	28	57	42	0	21	16	0	0	40	0	40	0	33	55	62	40	60	CC	CO	JY	LB	LH		
+++++	27	66	33	42	0	0	33	64	0	40	0	40	100	75	0	36	44	61	66	66	20	44	0	46	0	75	72	60	60	52	119	BP	LB	LC	PB	PL	SU	TB
+++++	63	25	50	57	0	0	66	28	0	60	0	60	0	25	100	63	22	38	33	33	60	44	0	53	0	25	27	40	26	43	98	CO	LH	S				
+++++	83	62	62	55	0	0	60	100	0	75	0	66	33	66	75	70	0	87	42	42	85	40	0	50	0	72	83	36	37	60	113	BO	CP	GC	JY	LC	LH	
+++++	16	37	25	44	0	0	40	0	0	25	0	33	66	33	25	29	0	12	57	57	14	60	0	50	0	18	16	57	37	35	66	LB						
+++++	50	36	33	75	0	0	33	35	0	33	0	100	28	62	50	65	85	75	45	40	62	0	83	0	60	68	37	50	54	144	CC	JY	O	PB	SM	TB		
+++++	50	54	66	25	0	0	58	64	0	66	0	0	57	37	50	34	14	40	25	55	60	37	0	16	0	40	26	62	50	43	116	C	GC					
+++++	33	0	42	45	0	0	20	72	0	66	0	75	33	54	57	61	83	55	100	64	60	62	0	60	0	100	62	66	63	59	117	CP	GC	JY	O	PB	SU	TH
+++++	66	100	57	54	0	0	60	18	0	33	0	25	66	36	42	30	16	45	0	29	40	37	0	40	0	0	37	33	36	37	74	BO	BP	LB				
+++++	0	36	50	59	0	0	71	58	0	80	0	88	80	46	66	70	40	66	0	61	58	62	0	66	0	50	33	66	57	132	CO	GC	JY	LB	LH	NY		
+++++	100	54	50	36	0	0	28	41	0	20	0	11	20	46	33	17	50	26	100	33	41	37	0	33	0	75	35	66	16	37	87	BO	PB	SU	TR			
+++++	62	0	57	36	0	0	62	85	0	66	0	84	0	80	50	61	12	63	33	33	75	52	0	30	0	71	33	0	38	52	122	CP	GC	JY	LC	S	SU	
+++++	37	85	42	41	0	0	37	14	0	33	0	15	100	20	50	38	87	36	66	53	25	47	0	70	0	28	57	100	53	45	106	BP	LB	O	PB	SM	TR	
+++++	100	42	66	47	0	0	77	50	0	0	0	75	66	44	54	50	60	66	100	57	62	30	0	64	0	80	41	46	88	56	142	BO	C	CO	JY	LB	OJ	
+++++	0	42	33	52	0	0	22	50	0	100	0	25	33	55	36	43	20	22	0	42	37	70	0	35	0	20	55	53	11	40	102	GC	SF					

















Figure 8.3: Continued

Table with multiple columns (80 BP, C, CC, CD, CL, CP, FC, GC, HO, JY, LB, LC, LH, NY, O, OJ, PB, PL, S, SF, SV, SM, SP, SU, TR, T, W) and a long list of alphanumeric codes on the right. The codes include combinations like 'CC CO TB', 'CP S', 'BP CP LH SU TB', 'W', 'CC GC JY LB LH', 'GC NY OJ SF TH', 'LH PB PL TB', 'C JY U SU', 'CC GC JY OJ PB SF', 'CP LH PB PL TB', 'CC CP LH OJ SM TR', 'NY OJ PL', 'GC JY LB SF SM SU TB', 'C CP TB', 'JY TR', 'CP LH S TB', 'BP CP CC SM TR', 'NY PB', 'CC CP O SU', 'CP LH OJ', 'C CC O TB', 'CP LH S TB', 'C GC JY O SM SU W', 'CC CP GC LH', 'LP O OJ TR', 'OJ PB', 'C JY O PB SM SU', 'CC TB', 'LP NY OJ PB SM', 'CP LH PL TB', 'C CC JY LB NY OJ SU', 'GC JY OJ TB W', 'C CC CP LH', 'BO JY TR W', 'BO W', 'C JY NY OJ PL S', 'CP LH SU', 'BO JY PB SU', 'LB LH', 'BO C CC JY O PL', 'CP GC SM TR', 'CC O', 'C CP CC S TR'.





Figure 8.3: Concluded

	BO	BP	C	CC	CD	CL	CO	CP	FC	GC	HO	JY	LB	LC	LH	NY	O	OJ	PB	PL	S	SF	SV	SM	SP	SU	TB	TR	W	T%	
++++++	(+)	50	25	0	80	0	0	77	41	0	25	0	50	16	0	0	28	75	40	45	55	50	0	12	0	0	50	55	33	39	
++++++	(-)	50	50	100	20	0	0	22	50	0	75	0	50	66	0	50	40	57	25	40	45	33	50	0	75	0	100	50	44	66	54
++++--	(+)	0	50	10	37	0	0	55	0	0	43	0	28	20	0	100	37	14	41	50	33	16	53	0	41	0	38	20	69	38	36
++++--	(-)	100	50	90	62	0	0	45	84	0	56	0	71	80	0	0	62	57	58	50	66	83	46	0	58	0	61	60	23	61	60
++++--	(+)	33	20	44	83	0	0	38	41	0	33	0	50	62	0	0	66	66	16	37	27	53	50	0	53	0	41	25	34	46	41
++++--	(-)	66	70	44	16	0	0	61	52	0	66	0	40	37	0	100	33	33	83	62	72	46	42	0	46	0	47	75	65	53	54
++++--	(+)	50	16	50	44	0	0	57	37	0	35	0	50	100	0	50	60	50	28	18	60	37	0	85	0	0	40	80	52	41	
++++--	(-)	50	66	37	55	0	0	42	62	0	65	0	100	50	0	0	50	40	25	71	81	40	62	0	14	0	100	40	20	42	55
++++--	(+)	100	40	36	40	0	0	54	22	0	54	0	25	20	0	0	27	0	50	50	50	25	22	0	50	0	57	100	28	30	39
++++--	(-)	0	60	54	60	0	0	45	77	0	45	0	75	80	0	100	72	100	50	50	62	66	0	50	0	42	0	71	70	58	59
++++--	(+)	44	16	83	28	0	0	54	50	0	80	0	57	0	0	50	16	50	50	63	37	37	0	62	0	38	25	20	33	44	
++++--	(-)	55	83	16	71	0	0	45	50	0	20	0	42	100	0	100	50	66	50	50	36	62	62	0	37	0	61	50	70	66	53
++++--	(+)	100	50	45	28	0	0	54	40	0	33	0	60	0	0	33	33	66	37	31	45	42	0	62	0	25	100	29	35	40	
++++--	(-)	0	33	54	71	0	0	45	60	0	66	0	40	100	0	0	33	50	33	62	98	54	28	0	37	0	50	0	58	64	54
++++--	(+)	0	30	33	50	0	0	50	36	0	50	0	66	50	0	100	66	14	50	50	50	66	66	0	40	0	50	33	35	37	45
++++--	(-)	66	70	66	50	0	0	42	63	0	50	0	33	50	0	0	33	85	50	50	50	16	22	0	60	0	0	33	64	62	50
++++--	(+)	50	0	66	50	0	0	66	25	0	0	0	20	50	0	100	50	42	33	83	50	50	33	0	75	0	25	33	100	16	45
++++--	(-)	50	50	33	50	0	0	33	75	0	100	0	80	50	0	0	50	57	33	16	33	50	66	0	25	0	75	66	0	83	51

T# ----- 65% -----  
 62 CC CO OJ  
 85 C GC LB SM SU W  
 85 LH TR  
 149 80 C CP JY LB PL S  
 97 CC NY O  
 127 80 BP GC LH OJ PL TB  
 68 LH SM TR  
 91 BP JY P8 PL SU  
 62 80 TB  
 93 CP JY LB LH NY O  
 75 C GC  
 89 8P CC LB LH O TR W  
 66 80 OJ TB  
 88 CC GC LB PL  
 71 JY LH NY S SF  
 79 80 8P C O  
 40 C CO LH P8 SM TR  
 45 CP GC JY SF SU T8 W





















Figure 8.4: Concluded

	80	8P	C	CC	CD	CL	CO	CP	FC	GC	HO	JY	LB	LC	LH	LV	O	OJ	PB	PL	S	SF	SV	SM	SP	SU	TB	TR	W	T%
+++++	62	40	33	40	0	0	57	18	0	38	0	25	36	50	67	35	77	40	66	45	50	0	0	14	0	33	0	20	23	44
+++++	37	50	66	60	0	0	42	81	0	52	0	75	63	50	32	64	22	40	33	45	50	100	0	85	0	66	0	80	76	53
+++++	27	50	72	37	0	0	57	60	0	83	0	66	53	73	59	57	60	71	80	66	60	100	0	33	0	76	0	66	42	57
+++++	72	50	18	62	0	0	42	40	0	16	0	33	38	26	40	42	40	28	20	33	40	0	0	66	0	23	0	33	57	41
+++++	57	72	20	66	0	0	62	54	0	48	0	25	28	64	70	50	83	54	83	37	50	50	0	75	0	65	0	57	60	55
+++++	42	27	80	33	0	0	37	42	0	52	0	50	71	35	29	50	16	36	16	62	50	0	0	25	0	35	0	42	40	43
+++++	40	42	31	50	0	0	61	55	0	75	0	100	40	59	56	52	40	66	57	44	60	100	0	40	0	55	0	50	33	52
+++++	59	57	56	41	0	0	38	40	0	25	0	0	60	36	37	47	60	33	42	55	40	0	0	60	0	44	0	50	66	45
+++++	56	37	50	61	0	0	40	35	0	30	0	37	41	52	50	35	50	38	66	38	55	0	0	33	0	58	0	44	38	45
+++++	40	62	50	38	0	0	60	64	0	69	0	62	58	47	46	58	50	61	33	61	45	100	0	50	0	41	0	55	53	53
+++++	56	66	44	57	0	0	46	62	0	54	0	66	80	71	57	62	0	62	25	62	33	0	0	20	0	62	0	50	87	56
+++++	34	33	55	42	0	0	53	37	0	45	0	33	20	28	42	37	100	25	75	37	66	0	0	60	0	37	0	50	12	41
+++++	52	28	47	25	0	0	46	61	0	69	0	60	80	44	40	50	60	55	42	55	40	50	0	66	0	23	0	20	50	47
+++++	47	71	47	75	0	0	53	38	0	30	0	40	20	33	44	38	40	44	42	44	60	50	0	33	0	61	0	80	50	46
+++++	67	54	50	50	0	0	68	57	0	30	0	100	64	63	31	37	57	50	50	37	50	100	0	40	0	57	0	25	28	53
+++++	32	45	50	50	0	0	31	42	0	70	0	0	35	36	62	28	50	50	62	41	0	0	60	0	42	0	75	71	45	
+++++	60	50	40	0	0	0	75	88	0	33	0	0	33	50	56	62	50	50	16	15	37	50	0	66	0	71	0	40	60	48
+++++	30	50	60	60	0	0	25	11	0	66	0	100	66	50	43	37	50	37	83	76	62	50	0	33	0	28	0	60	40	48

T# ----- 65% -----  
 127 LH O PB  
 155 C CP JY SF SM SU  
 118 C GC JY LC OJ PB  
 84 BO SM  
 156 BP CC LH O PB SM  
 121 C LB  
 143 GC JY OJ SF  
 125 W  
 139 PB  
 164 GC SF  
 119 BP JY LB LC W  
 86 O PB S  
 118 GC LB SM  
 115 BP CC TR  
 111 60 CO JY SF  
 94 GC TR W  
 95 CO CP SM SU  
 95 CC GC JY LB PB PL



Figure 8.5: Continued

Table with columns: BO, BP, C, CC, CD, CL, CO, CP, FC, GC, HO, JV, LB, LC, LH, NY, O, OJ, PB, PL, S, SF, SV, SM, SP, SU, TB, TH, W, TH, T, W, T, W, T, W. The table contains multiple rows of data with numerical values and some text labels.

















Figure 8.5: Concluded

	BO	BP	C	CC	CD	CL	CO	CP	FC	GC	HO	JY	LB	LC	LH	LV	O	OJ	PB	PL	S	SF	SV	SM	SP	SU	TB	TR	W	T%	
++++++	(+)	66	0	50	0	0	45	16	0	50	0	0	0	80	50	37	0	50	0	57	50	50	0	0	0	50	0	66	80	42	
++++++	(-)	25100	50	0	0	0	34	75	0	50	0	0	0	100	20	50	62100	50100	42	50	50	0	0	0	0	50	0	0	20	54	
++++++	(+)	53	0	38	0	0	46	44	0	33	0	0	71	37	42	66	25	60	0	55	57	0	0	0	0	100	0	66	66	48	
++++++	(-)	46	0	53	0	0	53	44	0	66	0	0	28	62	57	33	50	40100	44	42100	0	100	0	0	0	0	0	33	33	49	
++++++	(+)	38	0	44	0	0	53	59	0	50	0	0	60	60100	12	71	75	50	37	55	50	0	0	0	0	0	0	33	66	51	
++++++	(-)	46100	55	0	0	0	38	40	0	50	0	0	40	40	0	75	28	25	33	62	44	50	0	0	0	0	0	66	33	45	
++++++	(+)	50	0	33	0	0	64	31	0	83	0	0	37	28	0	60	66	25	20	50	75	50	0	66	0	0	0	50	50	45	
++++++	(-)	50	0	66	0	0	35	68	0	16	0	0	62	71100	40	33	75	80	37	25	50	0	33	0	100	0	0	50	50	54	
++++++	(+)	40	0	46	0	0	57	31	0	55	0	0	66	12	0	50	33	80	75	44	20	0	25	0	14	0	0	50	16	40	
++++++	(-)	50100	46	0	0	0	35	68	0	44	0	0	33	87100	50	66	20	25	55	80100	0	50	0	85	0	85	0	50	83	56	
++++++	(+)	40	0	46	0	0	60	35	0	66	0	0	40	28	75	0	50	0	80	71	54	0	0	0	0	0	66	0	33	33	45
++++++	(-)	50	0	46	0	0	40	64	0	33	0	0	60	64	25100	50100	20	28	45100	0	100	0	33	0	33	0	66	66	51		
++++++	(+)	45	0	33	0	0	40	50	0	33	0	0	50	25	50	36100	37	33	40100	50	0	100	0	0	0	0	66	40	43		
++++++	(-)	54	0	66	0	0	60	50	0	66	0	0	50	75	50	63	0	62	66	60	0	50	0	0	0	0	33	60	56		
++++++	(+)	50	0	16	0	0	44	63	0	62	0	0	62	83	37100	60	62	16	30100	0	0	0	0	0	0	0	66	66	49		
++++++	(-)	50100	83	0	0	0	55	36	0	37	0	0	66	37	16	37	0	40	37	83	70	0	0	100	0	0	33	33	47		
++++++	(+)	44	0	62	0	0	57	28	0	50	0	0	0	50	60100	0	57	50	0	75	0	0	0	100	0	0	0	20	50		
++++++	(-)	55100	37	0	0	0	42	71	0	50	0	0	0	50	40	0	100	42	50100	25100	0	0	0	0	0	0	0	0	80	49	

T% ----- 65% -----  
 53 BO LC TR W  
 68 BP CP LB O PB  
 61 LB NY SU TR W  
 63 GC PB SF SM  
 67 LH O OJ SU W  
 59 BP NY TR  
 56 GC O S SM  
 67 C CP LC LH OJ PB SU  
 60 LB OJ PB  
 84 BP CP LC LH O S  
 67 GC LH PB PL SU  
 75 NY OJ SF SM TR W  
 50 O S SM TH  
 65 C GC LC PB  
 61 LH O SF TR W  
 59 BP C LB PL S SM  
 37 NY S SM SU  
 36 BP CP O PL SF W





















Figure 8.6: Concluded

	BO	BP	C	CC	CD	CL	CO	CP	FC	GC	HO	JY	LB	LC	LH	LY	O	OJ	PB	PL	S	SF	SV	SM	SP	SU	TB	TR	W	TM	
++++++	(+)	29	100	55	50	0	0	40	50	0	41	0	33	37	40	25	38	33	40	75	42	30	85	0	37	0	33	47	52	53	44
++++++	(-)	64	0	44	50	0	0	50	50	0	58	0	62	60	66	46	58	50	25	57	61	14	0	50	0	55	52	47	46	51	
++++++	(+)	40	0	41	50	0	0	36	100	0	66	0	50	20	50	50	66	54	33	37	41	22	33	0	42	0	80	56	53	33	45
++++++	(-)	40	100	50	50	0	0	63	0	0	33	0	50	60	50	40	33	36	66	62	50	55	66	0	57	0	20	37	46	46	49
++++++	(+)	87	33	55	57	0	0	50	53	0	25	0	33	66	31	60	25	46	40	87	50	33	20	0	50	0	75	50	32	55	46
++++++	(-)	12	66	33	42	0	0	50	40	0	75	0	66	33	62	26	75	53	40	12	50	66	60	0	50	0	25	50	60	44	50
++++++	(+)	44	37	46	33	0	0	52	55	0	63	0	50	16	61	62	57	23	69	66	40	55	42	0	60	0	54	38	66	77	52
++++++	(-)	44	62	40	66	0	0	42	44	0	36	0	50	83	30	37	42	76	30	33	60	44	42	0	20	0	45	38	33	22	42
++++++	(+)	28	50	35	57	0	0	66	30	0	66	0	71	20	31	38	20	44	45	46	28	60	62	0	60	0	46	42	53	44	44
++++++	(-)	71	50	64	42	0	0	33	70	0	33	0	28	60	68	61	80	55	54	53	71	33	37	0	30	0	46	57	46	53	53
++++++	(+)	33	33	27	50	0	0	46	77	0	66	0	66	50	66	25	50	60	22	54	57	30	60	0	20	0	83	87	58	41	50
++++++	(-)	66	66	63	50	0	0	46	22	0	33	0	33	50	33	75	50	30	66	36	42	61	40	0	80	0	12	41	58	45	45
++++++	(+)	50	0	46	16	0	0	70	46	0	50	0	60	66	38	50	50	36	63	37	44	50	37	0	30	0	80	62	40	55	47
++++++	(-)	50	100	53	83	0	0	30	53	0	50	0	40	0	50	50	54	36	62	55	37	62	0	69	0	20	37	59	44	49	49
++++++	(+)	60	60	12	57	0	0	33	60	0	66	0	50	33	52	50	40	30	22	80	70	55	66	0	28	0	25	29	34	50	45
++++++	(-)	40	40	75	28	0	0	66	40	0	33	0	50	50	38	50	60	70	77	20	30	44	26	0	71	0	75	64	62	50	51
++++++	(+)	50	33	60	50	0	0	71	50	0	57	0	42	40	52	45	66	12	50	42	16	45	71	0	50	0	50	65	38	30	49
++++++	(-)	50	66	40	50	0	0	28	33	0	42	0	42	40	47	54	33	87	50	57	83	54	28	0	50	0	50	35	50	70	48

T# ----- 65% -----  
 107 BP PB SF  
 126 JY LH  
 85 CP GC NY SU  
 91 BP OJ SF W  
 127 BO LB PB SU  
 136 BP GC JY NY S  
 131 OJ PB TR W  
 107 CC LB O  
 104 CO GC JY  
 125 BO CP LC NY PL  
 94 CP GC JY LC SU TB  
 88 BO BP LH OJ SM  
 116 CO LB SU  
 121 BP CC SM  
 108 GC PB PL SF  
 124 C OJ OJ SM SU  
 100 CO NY SF  
 99 BP O PL W





Figure 8.7: Continued

Table with 27 columns (80 BP, C, CC, CD, CL, CO, CP, FC, GC, HO, JY, LB, LC, LH, NY, O, OJ, P8, PL, S, SF, SV, SM, SP, SU, TB, TR, W, T%, T#) and rows of data with status indicators (+, -, +++) and codes (BP, CP, LC, LH, NY, O, OJ, P8, PL, S, SF, SV, SM, SP, SU, TB, TR, W, T%, T#).

















Figure 8.7: Concluded

	BO	BP	C	CC	CD	CL	CO	CP	FC	GC	HO	HU	JY	LB	LC	LH	NY	O	OJ	PB	PL	S	SF	SV	SM	SP	SU	TB	TR	W	T%			
++++++	(+)	25	0	12	61	0	0	44	40	0	66	33	57	40	33	25	41	48	58	40	33	0	40	0	33	40	35	0	41	123	JY	----- 65% -----		
++++++	(-)	75	0	87	38	0	0	55	59	0	33	61	42	60	66	62	58	52	41	59	66	0	40	0	58	60	65	100	56	168	BO	C NY SF W		
++++++	(+)	45	100	66	43	0	0	42	70	0	50	52	66	77	42	28	60	57	63	46	60	0	57	0	54	33	42	33	50	135	BP	C CP LC LH		
++++++	(-)	54	0	33	56	0	0	50	30	0	54	0	47	33	22	57	71	40	42	36	53	40	0	42	0	45	66	50	66	49	132	O	TB W	
++++++	(+)	57	0	55	61	0	0	40	52	0	50	0	66	61	0	66	50	45	50	45	33	55	54	0	54	0	71	50	52	44	53	169	JY	LH SU
++++++	(-)	42	100	44	38	0	0	50	48	0	33	34	0	33	45	45	43	55	66	44	45	0	45	0	25	50	41	55	43	138	BP	PL		
++++++	(+)	37	100	25	44	0	0	64	56	0	68	0	33	53	40	60	28	60	46	40	57	50	0	45	0	52	66	52	12	50	163	BP	GC TB	
++++++	(-)	62	0	75	55	0	0	35	43	0	31	0	66	46	60	40	57	35	60	42	50	0	54	0	45	22	40	87	47	152	C	JY W		
++++++	(+)	33	100	25	63	0	0	35	31	0	60	0	71	60	0	40	35	57	40	80	27	35	62	0	44	0	33	33	50	62	46	135	BP	JY P8
++++++	(-)	55	0	75	36	0	0	57	68	0	40	0	14	40	100	60	64	42	53	20	72	65	37	0	55	0	62	66	50	37	52	152	C	CP LC PL TB
++++++	(+)	77	0	72	50	0	0	71	60	0	63	0	0	71	25	83	41	28	37	38	58	37	50	0	28	0	64	25	54	33	53	140	BO	C CO GC LB LH
++++++	(-)	22	0	27	50	0	0	28	40	0	16	0	100	21	50	16	58	57	62	55	41	62	50	0	71	0	36	75	45	66	44	116	JY	SM TB W
++++++	(+)	20	0	44	53	0	0	41	40	0	30	0	75	35	100	55	63	70	42	56	50	33	0	40	0	50	70	38	27	48	135	JY	LC OJ TB	
++++++	(-)	80	0	55	46	0	0	58	55	0	50	0	25	50	0	44	50	36	29	57	43	50	66	0	60	0	50	30	61	72	50	140	BO	SF W
++++++	(+)	38	0	0	47	0	0	70	54	0	71	0	100	37	50	0	44	50	57	47	28	40	55	0	63	0	37	41	26	100	45	116	CO	GC JY W
++++++	(-)	6	1100	100	52	0	0	30	45	0	28	0	0	50	50	100	55	37	35	52	71	60	44	0	36	0	62	50	73	0	52	133	BP	C LH PL TR
++++++	(+)	53	0	40	67	0	0	44	71	0	64	0	50	30	100	50	12	66	53	43	70	40	60	0	54	0	50	68	30	50	53	139	CC	CP LC O PL TB
++++++	(-)	46	0	40	32	0	0	55	28	0	35	0	50	69	0	50	62	16	46	56	30	60	40	0	36	0	50	31	60	50	44	115	LB	





















Figure 8.8: Concluded

	BO	BP	C	CC	CD	CL	CO	CP	FC	GC	HO	JY	LB	LC	LH	LV	O	OJ	PB	PL	S	SF	SV	SM	SP	SU	TB	TR	W	T%	
+++++	(+)	75	66	25	14	0	0	0	0	0	0	0	0	0	50	80	66	100	50	0	66	40	0	0	16	0	20	33	0	100	46
+++++	(-)	25	33	75	71	0	0	0	0	0	0	0	0	0	50	20	33	0	50	0	33	60	0	0	83	0	60	66	0	0	50
+++++	(+)	100	100	80	50	0	0	0	0	0	0	0	0	0	40	100	100	33	100	0	25	33	50	0	50	0	20	0	0	66	56
+++++	(-)	0	0	20	50	0	0	0	0	0	0	0	0	0	60	0	0	66	0	0	50	33	0	0	50	0	80	100	0	33	38
+++++	(+)	0	50	20	75	0	0	0	0	0	0	0	0	0	50	0	33	100	100	0	0	0	0	0	75	0	50	60	0	0	48
+++++	(-)	100	50	80	25	0	0	0	0	0	0	0	0	0	50	100	66	0	0	0	100	100	0	0	25	0	50	40	0	100	52
+++++	(+)	66	50	33	66	0	0	0	0	0	0	0	0	0	60	0	0	0	0	0	100	75	0	0	25	0	71	100	0	0	57
+++++	(-)	33	50	66	33	0	0	0	0	0	0	0	0	0	40	100	0	100	0	0	25	0	0	0	50	0	28	0	0	0	59
+++++	(+)	0	30	50	50	0	0	0	0	0	0	0	0	0	71	40	0	80	0	0	33	50	0	0	71	0	85	100	0	0	53
+++++	(-)	100	70	50	50	0	0	0	0	0	0	0	0	0	28	40	100	20	100	0	66	50	100	0	28	0	14	0	0	0	45
+++++	(+)	0	50	0	33	0	0	0	0	0	0	0	0	0	57	50	100	0	0	50	66	100	0	50	0	42	100	0	100	50	
+++++	(-)	100	50	100	33	0	0	0	0	0	0	0	0	0	42	50	0	100	100	0	50	33	0	0	50	0	57	0	0	0	47
+++++	(+)	50	60	50	100	0	0	0	0	0	0	0	0	0	33	50	50	100	0	0	50	20	100	0	100	0	66	42	0	0	51
+++++	(-)	50	40	50	0	0	0	0	0	0	0	0	0	0	66	50	33	0	100	0	50	80	0	0	0	33	42	0	100	44	
+++++	(+)	0	60	0	0	0	0	0	0	0	0	0	0	0	50	80	66	0	50	0	16	0	0	33	0	0	0	0	0	0	38
+++++	(-)	0	40	100	0	0	0	0	0	0	0	0	0	0	42	20	33	100	50	0	83	0	0	66	0	100	100	0	50	57	
+++++	(+)	33	0	50	100	0	0	0	0	0	0	0	0	0	50	50	0	0	100	0	75	33	0	0	100	0	60	0	0	0	52
+++++	(-)	66	100	50	0	0	0	0	0	0	0	0	0	0	50	25	0	0	0	0	25	66	0	0	0	40	0	0	0	0	42

29 BO BP LH NY O PL W  
 32 C CC SM TB  
 28 BO BP C LH NY OJ W  
 19 O SU TB  
 24 CC O OJ SM  
 26 BO C LH NY PL S W  
 22 BO CC PL S SU TB  
 15 C LH O  
 35 LC O SM SU TB  
 30 BO BP NY OJ PL SF  
 22 NY S SF TB W  
 21 BO C O OJ  
 30 CC O SF SM SU  
 26 LC OJ S W  
 19 LH NY  
 28 C O S SM SU TB  
 20 CC OJ PL SM  
 16 BO BP S

T% ----- 65% -----

**Figure 8.9: Daily Closing Patterns: Bear/Bull/Bear Markets**

	80	8P	C	CC	CD	CL	CO	CP	FC	GC	HO	JY	LB	LC	LH	NY	OJ	P8	PL	S	SF	SV	SP	SP	SP	IB	TR	W	T%	T#
--	(+)	0	51	0	0	0	56	56	0	54	0	0	0	50	60	0	58	49	0	54	48	0	46	0	57	46	0	52	51	1041
--	(-)	0	46	0	0	0	42	41	0	43	0	0	0	48	39	0	39	47	0	40	50	0	50	0	38	50	0	46	45	913
--	(+)	0	43	0	0	0	54	45	0	37	0	0	0	46	42	0	52	49	0	50	43	0	46	0	45	45	0	52	47	1007
--	(-)	0	49	0	0	0	45	50	0	61	0	0	0	50	54	0	46	49	0	48	56	0	50	0	51	50	0	47	50	1071
+-	(+)	0	40	0	0	0	40	47	0	57	0	0	0	60	51	0	53	56	0	49	32	0	50	0	43	44	0	51	48	1045
+-	(-)	0	43	0	0	0	59	46	0	40	0	0	0	36	46	0	42	43	0	47	67	0	47	0	54	51	0	45	48	1030
++	(+)	0	49	0	0	0	45	37	0	43	0	0	0	45	38	0	40	45	0	48	38	0	36	0	49	38	0	34	42	787
++	(-)	0	46	0	0	0	52	59	0	55	0	0	0	49	56	0	57	53	0	49	36	0	60	0	49	53	0	62	54	1012
---	(+)	0	61	0	0	0	53	53	0	54	0	0	0	53	67	0	62	47	0	56	36	0	49	0	63	44	0	54	51	472
---	(-)	0	35	0	0	0	45	44	0	43	0	0	0	46	32	0	42	49	0	45	63	0	48	0	33	50	0	41	45	412
---	(+)	0	51	0	0	0	50	42	0	40	0	0	0	41	42	0	53	53	0	50	40	0	51	0	42	42	0	57	47	492
---	(-)	0	40	0	0	0	50	55	0	58	0	0	0	47	53	0	46	45	0	49	59	0	47	0	55	53	0	42	50	525
+-	(+)	0	52	0	0	0	36	45	0	58	0	0	0	60	56	0	58	59	0	42	32	0	52	0	41	45	0	54	49	531
+-	(-)	0	41	0	0	0	63	50	0	40	0	0	0	36	41	0	40	40	0	51	67	0	45	0	53	50	0	43	47	511
---	(+)	0	38	0	0	0	48	38	0	46	0	0	0	55	33	0	44	44	0	48	37	0	36	0	55	39	0	36	42	429
---	(-)	0	57	0	0	0	50	60	0	52	0	0	0	39	57	0	52	54	0	50	61	0	61	0	44	53	0	60	54	544
---	(+)	0	42	0	0	0	57	56	0	53	0	0	0	48	56	0	56	51	0	52	61	0	43	0	54	47	0	48	51	533
---	(-)	0	55	0	0	0	40	41	0	44	0	0	0	48	43	0	43	46	0	44	38	0	52	0	43	50	0	51	46	476
+++	(+)	0	37	0	0	0	58	49	0	36	0	0	0	50	44	0	50	46	0	30	47	0	43	0	47	49	0	51	47	496
+++	(-)	0	59	0	0	0	40	44	0	63	0	0	0	50	54	0	46	52	0	46	52	0	50	0	47	46	0	48	49	518
+++	(+)	0	48	0	0	0	42	50	0	54	0	0	0	60	44	0	48	52	0	46	31	0	48	0	47	46	0	48	48	493
+++	(-)	0	42	0	0	0	57	43	0	41	0	0	0	37	53	0	45	47	0	43	68	0	48	0	52	50	0	48	48	489
+++	(+)	0	57	0	0	0	42	41	0	40	0	0	0	37	43	0	35	47	0	47	40	0	37	0	47	35	0	34	42	333
+++	(-)	0	38	0	0	0	54	52	0	60	0	0	0	59	53	0	61	51	0	49	60	0	56	0	50	57	0	60	54	424
---	(+)	0	52	0	0	0	54	60	0	63	0	0	0	42	60	0	71	44	0	47	41	0	46	0	80	51	0	53	52	215
---	(-)	0	47	0	0	0	45	36	0	36	0	0	0	57	40	0	28	55	0	41	58	0	50	0	20	44	0	46	45	188
---	(+)	0	66	0	0	0	49	50	0	41	0	0	0	31	42	0	66	51	0	48	57	0	50	0	42	41	0	58	49	232
---	(-)	0	27	0	0	0	50	50	0	54	0	0	0	62	52	0	33	48	0	51	42	0	52	0	52	55	0	41	48	230
---	(+)	0	54	0	0	0	39	50	0	71	0	0	0	43	60	0	57	65	0	34	37	0	57	0	48	48	0	66	50	267
---	(-)	0	41	0	0	0	60	50	0	28	0	0	0	0	40	0	39	34	0	56	72	0	40	0	44	49	0	33	46	246
---	(+)	0	35	0	0	0	44	39	0	40	0	0	0	53	30	0	36	39	0	54	33	0	28	0	52	38	0	50	40	197
---	(-)	0	61	0	0	0	52	57	0	59	0	0	0	38	55	0	60	58	0	45	53	0	70	0	47	55	0	45	55	274
---	(+)	0	46	0	0	0	49	52	0	54	0	0	0	33	77	0	48	47	0	51	61	0	42	0	59	52	0	43	51	261
---	(-)	0	53	0	0	0	50	45	0	42	0	0	0	60	22	0	51	52	0	45	39	0	51	0	36	45	0	56	46	240
---	(+)	0	30	0	0	0	61	47	0	40	0	0	0	33	46	0	51	45	0	51	50	0	50	0	52	43	0	40	46	244
---	(-)	0	63	0	0	0	38	47	0	59	0	0	0	66	53	0	48	53	0	44	50	0	41	0	47	54	0	60	51	274
---	(+)	0	48	0	0	0	37	50	0	57	0	0	0	73	37	0	55	40	0	51	46	0	50	0	56	47	0	44	47	259
---	(-)	0	45	0	0	0	62	44	0	38	0	0	0	20	58	0	40	59	0	48	53	0	48	0	43	47	0	52	49	267
---	(+)	0	57	0	0	0	38	37	0	39	0	0	0	28	42	0	35	45	0	50	55	0	28	0	55	63	0	33	39	171
---	(-)	0	42	0	0	0	56	59	0	60	0	0	0	71	57	0	58	54	0	44	44	0	68	0	45	61	0	60	57	245
+++	(+)	0	63	0	0	0	54	48	0	50	0	0	0	60	75	0	60	51	0	61	28	0	50	0	57	35	0	55	51	244
+++	(-)	0	30	0	0	0	43	51	0	45	0	0	0	40	25	0	35	42	0	32	71	0	47	0	36	58	0	38	44	213
+++	(+)	0	30	0	0	0	51	37	0	37	0	0	0	53	42	0	44	56	0	55	31	0	53	0	45	47	0	52	46	249
+++	(-)	0	60	0	0	0	48	58	0	62	0	0	0	40	53	0	55	42	0	44	68	0	44	0	54	49	0	47	51	272
+++	(+)	0	50	0	0	0	32	43	0	47	0	0	0	72	55	0	60	54	0	51	44	0	47	0	31	41	0	45	48	251
+++	(-)	0	44	0	0	0	67	46	0	50	0	0	0	28	40	0	39	45	0	45	55	0	50	0	68	54	0	50	48	252
+++	(+)	0	43	0	0	0	46	39	0	50	0	0	0	56	36	0	53	49	0	41	50	0	43	0	56	40	0	23	44	221
+++	(-)	0	52	0	0	0	53	60	0	46	0	0	0	40	59	0	43	49	0	55	50	0	54	0	43	55	0	76	53	262
+++	(+)	0	34	0	0	0	66	63	0	52	0	0	0	60	39	0	62	53	0	58	60	0	43	0	45	41	0	52	52	256
+++	(-)	0	60	0	0	0	30	34	0	47	0	0	0	40	60	0	37	42	0	54	0	54	0	55	56	0	47	45	222	
+++	(+)	0	46	0	0	0	56	52	0	32	0	0	0	62	42	0	48	48	0	45	42	0	35	0	41	56	0	60	49	242
+++	(-)	0	53	0	0	0	41	40	0	67	0	0	0	37	52	0	45	51	0	47	57	0	60	0	47	37	0	40	47	233
+++	(+)	0	45	0	0	0	47	57	0	45	0	0	0	59	43	0	42	64	0	45	0	45	0	36	45	0	57	49	210	
+++	(-)	0	40	0	0	0	52	42	0	40	0	0	0	40	56	0	48	35	0	41	88	0	51	0	63	53	0	42	48	204

Figure 8.9: Continued

Table with columns: BO BP, C, CC, CD, CL, CO, CP, FC, GC, HO, JY, L8, LC, LH, NY, O, OU, PB, PL, S, SF, SV, SM, SP, SU, TR, IR, W, T%, and a right margin with codes like 1\*, 65%, and various alphanumeric strings. The table contains multiple rows of data, many with leading signs like (+) or (-).









# Figure 8.9: Continued

	BO	BP	C	CC	CD	CL	CO	CP	FC	GC	HO	JY	LB	LC	LH	NY	O	OJ	PB	PL	S	SF	SV	SM	SP	SU	TB	TR	W	T%						
-----+	(+)	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.100	0	0	0	0	0	0	0	0	0	0	0	0.33	42	24 GC OJ				
-----+	(+)	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.100	0	0	0	0	0	0	0	0	0	0	0	0.54	42	30 CO CP NY S SU W				
-----+	(+)	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.100	0	0	0	0	0	0	0	0	0	0	0	0.66	53	34 CP GC NY OJ S SF				
-----+	(-)	0.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.100	0	0	0	0	0	0	0	0	0	0	0	0	0.33	10	28 SM SU TB W			
-----+	(-)	0.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.44	0	0	0	0	0	0	0	0	0	0	0.71	0	28 SM SU TB W				
-----+	(+)	0.42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.83	0	0	0	0	0	0	0	0	0	0	0	0.70	0	34 CO CP OJ PB TB			
-----+	(-)	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.16	0	0	0	0	0	0	0	0	0	0	0	0	0.30	45	29 S SM W		
-----+	(+)	0.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0.66	49	27 GC LH PR S W		
-----+	(-)	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0.20	66	28 BP CP NY SF SU TB	
-----+	(+)	0.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0	19 BP CP LH OJ PR	
-----+	(-)	0.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0.33	33	11 TB	
-----+	(-)	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0.66	44	22 LH PB	
-----+	(-)	0.100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.100	0	0	0	0	0	0	0	0	0	0	0	0	0	0.25	0	44	
-----+	(+)	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0.60	0	26 BP GC OJ SF SU TB W	
-----+	(+)	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.100	0	0	0	0	0	0	0	0	0	0	0	0	0	0.20	0	29 BP CP NY SF SU TB	
-----+	(-)	0.100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0.33	25	30 BP GC LH PB SM SU TB	
-----+	(+)	0.100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.100	0	0	0	0	0	0	0	0	0	0	0	0	0	0.66	27	25 BP NY PB S	
-----+	(-)	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0.40	64	32 BP CO LH OJ SF W	
-----+	(+)	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0.46	0	29 SF	
-----+	(-)	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0	33 LH NY W	
-----+	(+)	0.100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.65	0	0	0	0	0	0	0	0	0	0	0	0	0	0.62	0	30 BP CP GC S W	
-----+	(-)	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0.66	40	47 BP PB TB	
-----+	(+)	0.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0.25	0	30 CP NY PB S SM	
-----+	(-)	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.100	0	0	0	0	0	0	0	0	0	0	0	0	0	0.80	0	32 BP CO LH OJ SF W	
-----+	(-)	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0.25	47	30 CP NY PB S SM	
-----+	(+)	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0.40	64	32 BP CO LH OJ SF W	
-----+	(-)	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0.20	40	30 CO NY TB	
-----+	(-)	0.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0.71	0	25 BP NY S	
-----+	(-)	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.44	0	33 CO OJ SM
-----+	(+)	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.71	0	25 BP NY S
-----+	(-)	0.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.44	0	32 BP W
-----+	(-)	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.55	0	29 SU W
-----+	(+)	0.100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.60	0	43 BP LH NY OJ SF TB
-----+	(+)	0.100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.33	0	29 BP LH NY OJ PR
-----+	(+)	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.60	0	28 CO CP GC
-----+	(-)	0.28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.50	48	28 CO CP GC
-----+	(+)	0.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.42	0	31 GC LH S SF SU
-----+	(-)	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.57	0	30 BP CO CP PB W
-----+	(+)	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0.33	0	24 CO CP LH PB SM	
-----+	(-)	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.66	50	30 CO LH W
-----+	(-)	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.40	0	27 BP GC NY OJ
-----+	(+)	0.100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0	16 BP CP OJ W
-----+	(-)	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.40	0	19 CO LH SM SU TB
-----+	(+)	0.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.66	48	18 LH OJ PB TB
-----+	(-)	0.4																																		





Figure 8.9: Continued

	BO	BP	C	CC	CD	CL	CO	CP	FC	GC	HO	JV	LB	LC	LH	LY	O	OJ	PB	PL	S	SF	SV	SM	SP	SU	TB	TR	W	T#
+++++	(+)	0	50	0	0	66	66	0	50	0	33100	0	0	0	0	100	0	33100	0	33	50	0	100	0	50	36	0	0	51	
+++++	(-)	0	50	0	0	33	33	0	50	0	0	0	0	0	0	100	0	66	0	66	50	0	0	0	50	63	0	100	48	
+++++	(+)	0	0	0	0	77	40	0	33	0	0	0	0	0	0	100	33	0	44	0	40	0	0	40	0	50	0	80	50	
+++++	(-)	0	100	0	0	22	40	0	66	0	0	0	0	0	0	66	0	100	55	0	50	0	0	60	0	50	0	20	45	
+++++	(+)	0	0	0	0	33100	0	50	0	50	0	0	0	0	0	0	0	100	50	0	40	50	0	0	0	0	0	100	45	
+++++	(-)	0	0	0	0	66	0	50	0	50	0	0	0	0	0	0	0	30	0	60	50	0	100	0	100	100	0	0	54	
+++++	(+)	0	40	0	0	50	25	0	0	0	0	0	0	0	0	0	66	80	0	33	0	0	50	0	66	0	50	48		
+++++	(-)	0	40	0	0	50	75	0	0	0	0	0	0	0	0	0	33	20	66	100	0	50	0	100	33	0	50	48		
+++++	(+)	0	0	0	0	28	33	0	75	0	0	0	0	0	0	0	50	33	0	25	50	25	0	100	50	0	66	43		
+++++	(-)	0	100	0	0	71	66	0	25	0	0	0	0	0	0	0	50	66	0	0	75	0	75	0	50	0	33	54		
+++++	(+)	0	50	0	0	37	42	0	75	0	0	0	0	0	0	50	66	33	0	100	0	20	0	75	0	0	50	0	54	
+++++	(-)	0	50	0	0	62	57	0	25	0	0	0	0	0	0	50	100	0	33	60	0	0	80	0	63	0	0	54		
+++++	(+)	0	25	0	0	55	85	0	83	0	0	0	0	0	0	25	0	100	0	33	0	0	80	0	100	27	0	52		
+++++	(-)	0	75	0	0	44	14	0	16	0	0	0	0	0	0	0	0	66	0	50	0	66	0	100	62	0	0	45		
+++++	(+)	0	0	0	0	44	25	0	0	0	0	0	0	0	0	50	28	42	0	14	0	14	0	66	75	0	33	47		
+++++	(-)	0	60	0	0	55	75	0	0	0	0	0	0	0	0	100	50	71	57	60	100	85	0	33	25	0	68	62		
+++++	(+)	0	100	0	0	20	85	0	0	0	0	0	0	0	0	0	100	0	0	60	100	0	0	50	72	0	100	57		
+++++	(-)	0	0	0	0	80	14	0	100	0	0	0	0	0	0	0	100	0	0	80	0	0	80	0	50	27	0	41		
+++++	(+)	0	0	0	0	50	40	0	66	0	0	0	0	0	0	100	57	0	50	50	86	0	75	0	66	50	0	52		
+++++	(-)	0	100	0	0	50	60	0	33	0	0	0	0	0	0	42	0	40	50	33	0	25	0	33	50	0	100	47		
+++++	(+)	0	33	0	0	33	20	0	100	0	0	0	0	0	0	50	33	33	0	75	0	0	86	0	33	50	0	50	42	
+++++	(-)	0	33	0	0	66	80	0	0	0	0	0	0	0	0	100	50	66	66	25	100	0	33	0	66	43	0	50	54	
+++++	(+)	0	100	0	0	33	40	0	25	0	0	0	0	0	0	33	0	50	50	85	50	0	50	0	66	42	0	40	42	
+++++	(-)	0	71	0	0	60	75	0	66	0	0	0	0	0	0	66	100	0	60	14	30	0	50	0	33	42	0	46	46	
+++++	(+)	0	14	0	0	40	25	0	33	0	0	0	0	0	0	50	40	50	42	0	0	0	50	50	35	0	60	50		
+++++	(-)	0	0	0	0	66	0	0	0	0	0	0	0	0	0	50	100	0	40	30	0	0	50	0	50	57	0	20	42	
+++++	(+)	0	66	0	0	33100	0	77	0	0	0	0	0	0	0	60	0	50	53	40	0	50	0	50	50	0	100	60	42	
+++++	(-)	0	50	0	0	33	40	0	50	0	0	0	0	0	0	100	75	0	40	28	0	66	0	50	0	41	0	33	50	
+++++	(+)	0	50	0	0	66	60	0	50	0	0	0	0	0	0	25	0	60	71	0	33	0	33	0	100	38	0	66	49	
+++++	(-)	0	0	0	0	25	33	0	50	0	0	0	0	0	0	20	40	42	28	25	100	0	66	0	0	50	0	0	37	
+++++	(+)	0	100	0	0	75	66	0	50	0	0	0	0	0	0	80	40	57	71	0	75	0	83	0	50	0	100	60	42	
+++++	(-)	0	50	0	0	66	0	25	0	0	0	0	0	0	0	20	25	50	86	0	86	0	22	0	50	50	0	40	42	
+++++	(+)	0	50	0	0	33100	0	75	0	0	0	0	0	0	0	100	80	75	50	33	100	0	77	0	50	50	0	50	59	
+++++	(-)	0	0	0	0	33	60	0	50	0	0	0	0	0	0	100	66	40	87	33	100	0	40	86	33	0	0	50	50	
+++++	(+)	0	100	0	0	66	40	0	50	0	0	0	0	0	0	33	0	40	12	66	0	60	0	33	66	0	100	48	42	
+++++	(-)	0	0	0	0	12	100	0	60	0	0	0	0	0	0	56	0	20	75	0	50	0	33	0	100	36	0	0	42	
+++++	(+)	0	0	0	0	87	0	40	0	0	0	0	0	0	0	33	0	60	25	50	100	0	66	0	63	0	0	54	54	
+++++	(-)	0	25	0	0	66	50	33	0	0	0	0	0	0	0	100	0	16	0	25	0	25	0	33	25	0	0	33	33	
+++++	(+)	0	75	0	0	33	50	0	66	0	0	0	0	0	0	100	0	100	83	75	100	0	50	66	75	0	100	64	41	
+++++	(-)	0	25	0	0	60	50	0	100	0	0	0	0	0	0	100	33	0	100	37	50	50	50	0	100	63	0	100	56	
+++++	(+)	0	75	0	0	40	25	0	0	0	0	0	0	0	0	66	0	62	0	70	0	70	0	70	0	36	0	42	42	
+++++	(-)	0	100	0	0	50	33	0	100	0	0	0	0	0	0	100	83	75	55	43	50	0	55	0	33	0	33	52	52	
+++++	(+)	0	0	0	0	50	66	0	100	0	0	0	0	0	0	16	0	25	44	66	50	0	44	0	100	66	0	66	47	
+++++	(-)	0	50	0	0	50	50	0	100	0	0	0	0	0	0	0	80	71	55	40	33	0	33	0	63	0	66	56	56	
+++++	(+)	0	100	0	0	30	42	0	33	0	0	0	0	0	0	100	20	14	44	40	66	0	66	0	36	0	33	41	31	
+++++	(-)	0	0	0	0	70	57	0	66	0	0	0	0	0	0	0	25	16	0	16	0	16	0	16	0	42	0	60	37	
+++++	(+)	0	33	0	0	0	70	57	0	66	0	0	0	0	0	0	75	66	0	28	0	0	83	0	100	57	0	20	58	
+++++	(-)	0	66	0	0	50	60	0	50	0	0	0	0	0	0	100	0	0	0	60	0	60	0	30	50	66	0	50	42	
+++++	(+)	0	28	0	0	50	40	0	50	0	0	0	0	0	0	100	0	100	100	40	100	0	50	0	50	33	0	50	54	
+++++	(-)	0	57	0	0	33	100	0	50	0	0	0	0	0	0	20	25	16	0	25	16	75	50	0	50	57	0	50	40	
+++++	(+)	0	75	0	0	25	50	0	100	0	0	0	0	0	0	80	75	75	83	25	50	0	44	0	50	42	0	50	57	
+++++	(-)	0	0	0	0	25	50	0	100	0	0	0	0	0	0	100	33	0	50	60	25	100	0	40	0	33	0	0	45	
+++++	(+)	0	25	0	0	75	50	0	0	0	0	0	0	0	0	66	0	50	40	0	75	0	60	0	66	0	66	0	66	52

T# 65%-----  
24 CO CP LH PB SM  
23 NY OJ S W  
30 CO LH W  
27 BP GC NY OJ  
16 BP CP OJ W  
19 CO LH SM SU TB  
18 LH OJ PB TB  
1B CP S SF SU  
22 GC SU W  
28 BP CO CP LH PB SF SM  
25 GC OJ S  
29 NY BP SF SM SU  
32 CP GC PB W  
28 BP NY OJ SM SU  
22 SU TB  
36 CP LH OJ SF SM W  
32 BP CP NY OJ SF TB W  
23 CO GC PB SM  
34 GC LH SF SM SU  
31 BP W  
29 GC S SM  
37 CO CP LH OJ PB SF SU  
27 BP S SU W  
26 GC LH NY  
32 BP CP GC  
27 NY SF  
30 CO LH  
39 BP CP GC W  
35 LH NY S SM  
34 CO PB SU W  
22 SF SM  
35 BP CO CP LH PB S W  
25 CO S  
37 CP GC LH NY OJ SF SM  
32 LH NY PB SF SU  
31 BP CO S TB W  
24 CP LH PB SU  
31 CO SF SM  
16 CO NY  
31 BP GC LH OJ PB S  
32 BP GC LH OJ SU W  
24 NY SM  
34 BP LH NY OJ  
31 CP GC S SU TB W  
42 GC NY OJ W  
31 LH SF SM  
22 BP S  
34 CO GC OJ PB SM SU  
24 NY TB  
31 BP LH OJ PB SF  
26 CO S  
37 CP LH NY OJ PB  
28 BP GC LH SF  
32 CO NY S TB W

Figure 8.9: Concluded

	80	BP	C	CC	CD	CL	CO	CP	FC	GC	HO	JY	LB	LC	LH	NY	OJ	PB	PL	S	SF	SV	SM	SP	SU	TB	TR	W	T%
++++++	(+)	0	0	0	0	0	60	14	0	50	0	0	0	0	0	0	11	25	0	50	100	0	25	0	100	54	0	50	38
++++++	(-)	0	100	0	0	0	40	85	0	50	0	0	0	0	0	0	77	75	0	50	0	0	75	0	0	36	0	50	58
++++++	(+)	0	66	0	0	0	50	50	0	66	0	0	0	0	0	0	50	50	0	66	100	0	25	0	66	28	0	100	52
++++++	(-)	0	33	0	0	0	50	50	0	33	0	0	0	0	0	0	50	50	0	33	0	0	75	0	33	64	0	0	45
++++++	(+)	0	0	0	0	0	25	20	0	50	0	0	0	0	0	0	50	60	0	0	66	0	50	0	50	22	0	0	37
++++++	(-)	0	100	0	0	0	75	80	0	50	0	0	0	0	0	0	50	40	0	100	33	0	50	0	50	77	0	0	62
++++++	(+)	0	0	0	0	0	25	20	0	75	0	0	0	0	0	0	33	33	0	50	0	0	60	0	50	83	0	50	52
++++++	(-)	0	100	0	0	0	75	60	0	25	0	0	0	0	0	0	66	66	0	50	0	0	40	0	50	16	0	50	45
++++++	(+)	0	100	0	0	0	33	40	0	66	0	0	0	0	0	0	57	0	50	75	0	0	25	0	0	16	0	20	44
++++++	(-)	0	0	0	0	0	66	60	0	33	0	0	0	0	0	0	42	100	0	33	0	0	50	0	0	83	0	80	54
++++++	(+)	0	100	0	0	0	71	0	0	50	0	0	0	0	0	0	100	0	0	33	66	0	0	0	50	25	0	0	46
++++++	(-)	0	0	0	0	0	28	100	0	50	0	0	0	0	0	0	100	50	0	66	33	0	100	0	50	75	0	100	53
++++++	(+)	0	66	0	0	0	75	33	0	0	0	0	0	0	0	0	25	14	0	71	100	0	50	0	100	50	0	100	48
++++++	(-)	0	33	0	0	0	25	66	0	100	0	0	0	0	0	0	100	75	85	0	14	0	50	0	50	0	0	0	48
++++++	(+)	0	75	0	0	0	60	25	0	0	0	0	0	0	0	0	33	0	50	0	40	0	100	0	50	66	0	0	44
++++++	(-)	0	25	0	0	0	40	75	0	0	0	0	0	0	0	0	66	0	50	100	0	0	50	0	50	33	0	100	52
++++++	(+)	0	100	0	0	0	28	50	0	100	0	0	0	0	0	0	50	0	0	66	0	0	50	0	100	50	0	0	52
++++++	(-)	0	0	0	0	0	71	50	0	0	0	0	0	0	0	0	50	16	0	0	0	0	50	0	0	50	0	100	44

T\* ----- 65% -----  
 23 SF SU  
 35 BP CP LH NY OJ PB SM  
 27 BP GC LH NY S SF  
 23 SM  
 24 SF  
 40 BP CO CP LH S TB  
 29 GC PB TB  
 25 BP CO LH NY  
 26 BP GC PB S  
 32 CO NY TB W  
 19 BP CO LH SF  
 22 CP OJ S SM TB W  
 22 BP CO LH S SF SU W  
 22 CP GC NY OJ PB  
 17 BP SM TB  
 20 CP NY PB SF W  
 18 BP GC PB S SU  
 15 CO NY W

# Figure 8.10: Daily Closing Patterns: Whipsaw Markets

----- 65% -----

	80	8P	C	CC	CD	CL	CO	CP	FC	GC	HO	JY	LB	LC	LH	LY	OJ	P8	PL	S	SF	SV	SM	SP	SU	T8	TK	W	T*
---	48	0	53	49	0	0	56	56	0	56	0	51	52	55	42	49	55	59	55	0	0	50	0	62	47	54	50	53	
---	(-)	0	42	49	0	0	42	41	0	41	0	42	45	42	47	44	40	38	40	0	0	42	0	37	48	44	45	43	
---	(+)	46	0	48	50	0	0	49	48	0	44	0	50	48	43	45	56	47	43	41	0	0	48	0	43	50	51	49	48
---	(-)	50	0	48	47	0	0	47	46	0	53	0	45	50	49	50	37	49	54	53	0	0	44	0	52	44	47	46	48
---	(+)	48	0	49	48	0	0	51	46	0	48	0	41	54	54	38	43	47	48	48	0	0	48	0	57	44	53	41	48
---	(-)	47	0	46	48	0	0	45	48	0	46	0	53	47	43	57	49	50	49	46	0	0	45	0	40	49	43	55	48
---	(+)	47	0	40	48	0	0	41	41	0	34	0	46	46	45	52	41	43	43	50	0	0	42	0	44	48	42	43	43
---	(-)	52	0	56	49	0	0	56	54	0	65	0	49	52	50	45	52	53	54	46	0	0	52	0	53	48	54	53	52
---	(+)	55	0	60	53	0	0	58	63	0	57	0	47	51	53	51	50	56	61	50	0	0	53	0	60	53	60	49	55
---	(-)	44	0	36	45	0	0	39	35	0	38	0	47	46	44	34	43	39	36	44	0	0	40	0	39	41	40	45	41
---	(+)	50	0	49	47	0	0	54	49	0	50	0	50	44	47	50	54	49	44	42	0	0	49	0	50	51	55	49	48
---	(-)	47	0	46	51	0	0	43	45	0	49	0	45	44	47	50	54	49	44	42	0	0	49	0	50	51	55	49	48
---	(+)	45	0	45	47	0	0	40	45	0	47	0	38	52	58	45	44	47	54	53	0	0	45	0	51	48	51	38	47
---	(-)	54	0	48	49	0	0	46	50	0	48	0	56	44	39	50	49	49	49	42	0	0	47	0	48	46	60	48	1580
---	(+)	53	0	42	51	0	0	42	40	0	31	0	42	46	48	50	41	51	55	53	0	0	44	0	60	43	49	48	47
---	(-)	46	0	54	47	0	0	56	56	0	68	0	50	51	54	42	52	58	58	39	0	0	40	0	58	49	44	43	1451
---	(+)	41	0	48	46	0	0	54	52	0	64	0	56	52	58	29	48	54	57	60	0	0	43	0	69	46	53	53	1759 GC
---	(-)	54	0	45	52	0	0	43	45	0	44	0	38	45	39	62	47	40	39	35	0	0	44	0	62	42	50	51	1719
---	(+)	41	0	47	53	0	0	46	48	0	39	0	54	50	49	38	54	46	43	41	0	0	43	0	37	33	48	45	1470
---	(-)	54	0	50	44	0	0	50	47	0	57	0	42	46	48	50	41	51	55	53	0	0	47	0	39	49	48	49	1572
---	(+)	53	0	52	48	0	0	53	47	0	52	0	45	50	50	33	43	47	48	44	0	0	44	0	60	43	49	48	1618
---	(-)	41	0	44	48	0	0	45	47	0	44	0	50	48	46	62	49	50	48	52	0	0	49	0	64	41	55	45	1612
---	(+)	38	0	58	46	0	0	40	41	0	40	0	46	46	50	50	42	49	45	46	0	0	46	0	30	53	41	50	1576
---	(-)	61	0	58	52	0	0	56	52	0	59	0	48	52	45	50	53	48	52	52	0	0	44	0	28	43	39	45	1215
---	(+)	61	0	56	53	0	0	60	57	0	71	0	48	51	57	60	55	53	61	41	0	0	50	0	71	51	57	51	1445 SU
---	(-)	38	0	41	45	0	0	39	42	0	28	0	49	48	40	30	41	43	35	52	0	0	45	0	52	50	43	40	627 GC SU TK
---	(+)	50	0	41	46	0	0	56	54	0	61	0	47	54	52	60	52	43	35	41	0	0	41	0	33	38	30	45	41
---	(-)	47	0	56	52	0	0	40	39	0	38	0	51	44	47	40	40	53	62	58	0	0	40	0	62	38	53	55	48
---	(+)	45	0	42	50	0	0	53	44	0	50	0	37	54	55	41	44	54	47	52	0	0	50	0	42	44	43	42	725
---	(-)	54	0	52	47	0	0	42	52	0	40	0	56	41	41	50	44	43	51	43	0	0	51	0	46	42	44	37	764
---	(+)	64	0	44	51	0	0	49	40	0	30	0	48	47	35	69	41	38	40	64	0	0	39	0	53	54	55	60	766
---	(-)	35	0	53	46	0	0	50	55	0	69	0	49	51	62	30	52	56	58	33	0	0	45	0	52	50	43	40	731 NY
---	(+)	59	0	52	44	0	0	53	53	0	57	0	58	50	56	27	53	60	55	50	0	0	48	0	42	46	56	57	851 GC
---	(-)	38	0	42	53	0	0	45	45	0	40	0	35	47	43	63	42	34	40	47	0	0	40	0	62	38	53	55	846
---	(+)	47	0	44	50	0	0	48	45	0	46	0	43	51	43	40	58	39	45	48	0	0	46	0	44	49	56	48	713
---	(-)	47	0	52	47	0	0	49	50	0	50	0	53	47	54	50	37	58	53	46	0	0	46	0	44	49	56	48	742
---	(+)	53	0	49	45	0	0	51	47	0	57	0	40	46	45	11	52	48	44	48	0	0	49	0	56	43	40	48	790
---	(-)	37	0	47	50	0	0	46	47	0	39	0	56	53	52	77	41	50	53	43	0	0	49	0	56	41	57	47	838
---	(+)	37	0	42	45	0	0	39	44	0	38	0	48	45	41	63	42	48	44	58	0	0	45	0	37	54	40	47	862 NY
---	(-)	62	0	55	53	0	0	57	48	0	61	0	48	54	55	36	54	48	53	40	0	0	40	0	20	43	59	46	633
---	(+)	47	0	64	53	0	0	60	67	0	49	0	46	52	48	52	48	59	61	57	0	0	51	0	79	54	60	49	763 SU
---	(-)	52	0	31	45	0	0	37	31	0	45	0	46	44	50	29	43	36	38	39	0	0	47	0	57	52	52	51	811 CP
---	(+)	51	0	56	50	0	0	53	50	0	41	0	54	37	43	50	53	53	48	41	0	0	47	0	42	45	47	45	611
---	(-)	48	0	38	48	0	0	45	50	0	56	0	40	62	53	50	38	43	50	52	0	0	56	0	47	50	53	44	847
---	(+)	45	0	49	45	0	0	40	48	0	43	0	38	50	59	44	43	40	49	52	0	0	56	0	39	47	46	46	813
---	(-)	55	0	46	51	0	0	47	47	0	55	0	58	48	39	55	54	57	47	38	0	0	48	0	51	58	56	62	772
---	(+)	38	0	39	51	0	0	34	43	0	31	0	43	48	45	28	40	36	41	43	0	0	54	0	65	51	43	47	789
---	(-)	61	0	55	47	0	0	62	55	0	68	0	50	50	50	71	50	60	58	45	0	0	61	0	35	45	52	48	853 GC NY
---	(+)	50	0	44	47	0	0	54	51	0	50	0	55	56	60	33	46	52	61	68	0	0	52	0	61	43	43	51	829 PL
---	(-)	46	0	49	55	0	0	42	45	0	34	0	40	42	37	60	48	43	37	26	0	0	38	0	58	52	56	46	694
---	(+)	38	0	49	52	0	0	42	49	0	34	0	60	50	56	37	52	52	41	27	0	0	48	0	34	54	40	47	770
---	(-)	58	0	49	42	0	0	53	45	0	62	0	36	45	41	50	43	46	57	65	0	0	42	0	65	40	58	50	784 SU
---	(+)	52	0	57	52	0	0	54	47	0	43	0	47	54	58	42	36	46	56	43	0	0	50	0	68	39	55	43	50
---	(-)	45	0	40	44	0	0	44	46	0	51	0	47	44	37	57	55	50	40	56	0	0	45	0	28	54	42	52	663

Figure 8.10: Continued

													----- 65% -----												T#							
	BO	BP	C	CC	CD	CL	CO	CP	FC	GC	HO	JY	LB	LC	LH	LY	OC	OJ	PB	PL	S	SF	SV	SM	SP	SU	TB	TR	W	T#		
++++	36	0	32	46	0	0	41	37	0	40	0	44	48	61	35	38	51	46	35	0	0	0	0	42	0	50	41	34	45	44	535	
++++	64	0	62	51	0	0	54	57	0	60	0	50	50	35	64	53	46	51	64	0	0	0	0	50	0	50	48	57	54	42	631	
-----	69	0	60	50	0	0	50	65	0	40	0	42	55	60	66	47	53	67	50	0	0	0	0	50	0	66	66	75	57	55	256	
-----	30	0	39	47	0	0	30	34	0	60	0	56	44	39	33	47	39	29	50	0	0	0	0	46	0	33	29	25	33	41	192	
-----	38	0	45	50	0	0	67	65	0	56	0	56	55	54	66	51	40	35	35	0	0	0	0	48	0	50	48	72	61	51	324	
-----	47	0	54	50	0	0	32	35	0	40	0	43	45	45	33	35	57	63	64	0	0	0	0	46	0	50	42	27	32	45	288	
-----	50	0	42	55	0	0	58	45	0	60	0	35	46	62	20	53	50	50	56	0	0	0	0	57	0	16	44	52	42	49	357	
-----	60	0	52	42	0	0	41	52	0	25	0	61	53	34	60	38	50	49	39	0	0	0	0	35	0	83	52	47	57	47	341	
-----	57	0	44	56	0	0	42	37	0	40	0	50	38	33	77	39	31	54	68	0	0	0	0	38	0	42	43	36	39	44	318	
-----	42	0	55	43	0	0	57	59	0	59	0	47	61	63	22	57	60	45	25	0	0	0	0	54	0	57	48	63	55	53	386	
-----	42	0	39	44	0	0	54	51	0	52	0	56	50	57	33	54	64	56	48	0	0	0	0	42	0	62	45	60	45	52	404	
-----	52	0	36	54	0	0	45	46	0	48	0	40	50	42	66	41	27	38	52	0	0	0	0	50	0	37	54	35	52	43	335	
-----	56	0	48	40	0	0	44	45	0	45	0	36	50	47	40	58	36	45	40	0	0	0	0	38	0	42	51	62	50	44	341	
-----	43	0	48	54	0	0	55	52	0	51	0	60	47	57	40	33	61	53	60	0	0	0	0	58	0	57	41	31	46	52	402	
-----	61	0	56	41	0	0	58	49	0	58	0	44	43	44	25	53	39	40	46	0	0	0	0	50	0	50	28	56	58	47	406	
-----	38	0	42	54	0	0	36	42	0	37	0	51	56	53	75	43	57	56	53	0	0	0	0	48	0	50	65	44	34	48	414	
-----	33	0	42	37	0	0	42	50	0	21	0	52	43	50	55	48	50	49	55	0	0	0	0	46	0	40	39	36	51	44	328	
-----	66	0	57	62	0	0	54	43	0	78	0	41	56	46	44	51	47	50	41	0	0	0	0	48	0	80	57	63	48	53	387	
-----	37	0	61	57	0	0	58	68	0	51	0	46	46	43	71	43	60	53	54	0	0	0	0	42	0	66	58	64	50	54	385	
-----	62	0	33	40	0	0	39	31	0	44	0	43	51	56	28	43	35	45	45	0	0	0	0	51	0	33	41	35	44	43	306	
-----	50	0	60	56	0	0	60	46	0	44	0	39	66	35	33	62	47	50	34	0	0	0	0	56	0	53	65	47	40	49	417	
-----	50	0	34	39	0	0	40	49	0	52	0	39	66	61	66	31	51	50	57	0	0	0	0	32	0	33	34	52	50	46	390	
-----	37	0	57	37	0	0	54	42	0	43	0	34	46	60	40	55	38	46	58	0	0	0	0	42	0	50	57	66	42	47	374	
-----	62	0	36	59	0	0	43	50	0	53	0	59	52	38	60	38	58	51	31	0	0	0	0	53	0	50	39	22	57	48	385	
-----	18	0	45	46	0	0	42	41	0	23	0	48	50	45	50	29	45	40	0	0	0	0	0	41	0	63	56	48	60	44	327	
-----	81	0	52	50	0	0	54	56	0	76	0	48	48	45	50	46	65	54	46	0	0	0	0	50	0	36	7	48	35	52	387	
-----	59	0	36	50	0	0	46	54	0	40	0	47	54	55	14	48	44	60	46	0	0	0	0	53	0	66	50	35	56	51	440	
-----	41	0	49	51	0	0	39	52	0	31	0	47	43	42	71	48	50	38	46	0	0	0	0	40	0	40	40	43	40	46	42	267
-----	57	0	48	53	0	0	43	52	0	37	0	72	47	57	0	48	55	42	27	0	0	0	0	51	0	40	40	46	53	53	335	
-----	47	0	54	40	0	0	55	44	0	62	0	25	45	42	100	44	42	56	66	0	0	0	0	67	0	66	45	66	35	55	338	
-----	56	0	61	46	0	0	53	43	0	54	0	40	60	57	50	42	39	58	40	0	0	0	0	28	0	33	42	33	59	41	254	
-----	39	0	36	50	0	0	46	54	0	40	0	55	40	40	50	48	56	38	60	0	0	0	0	44	0	50	47	45	50	46	375	
-----	28	0	19	44	0	0	46	38	0	28	0	48	43	63	28	37	56	41	34	0	0	0	0	53	0	37	50	55	50	50	412	
-----	71	0	77	52	0	0	51	53	0	71	0	46	53	36	71	59	41	53	65	0	0	0	0	40	0	40	40	46	53	53	335	
-----	57	0	48	53	0	0	66	55	0	84	0	55	46	53	60	55	52	59	33	0	0	0	0	67	0	66	45	66	35	55	338	
-----	42	0	48	46	0	0	33	44	0	16	0	44	53	43	20	41	47	37	53	0	0	0	0	28	0	33	42	33	59	41	254	
-----	63	0	40	44	0	0	48	48	0	66	0	38	54	48	55	53	46	35	36	0	0	0	0	44	0	50	47	45	50	46	375	
-----	36	0	56	53	0	0	46	42	0	33	0	38	43	51	44	43	50	63	63	0	0	0	0	53	0	37	50	55	50	50	412	
-----	53	0	40	40	0	0	50	40	0	44	0	36	61	50	40	30	58	47	50	0	0	0	0	48	0	66	40	33	34	46	376	
-----	46	0	57	55	0	0	43	54	0	30	0	31	41	46	50	53	39	52	47	0	0	0	0	41	0	63	56	66	62	49	401	
-----	75	0	44	46	0	0	55	46	0	21	0	49	60	36	50	42	41	34	59	0	0	0	0	51	0	63	56	47	43	46	391	
-----	25	0	51	50	0	0	43	48	0	78	0	49	36	60	50	45	55	64	40	0	0	0	0	45	0	27	43	52	56	51	434	
-----	35	0	48	35	0	0	52	55	0	60	0	61	50	56	20	50	57	55	56	0	0	0	0	43	0	62	30	41	65	51	406	
-----	63	0	44	64	0	0	44	44	0	36	0	30	45	43	60	46	39	43	39	0	0	0	0	52	0	37	56	58	31	45	358	
-----	38	0	44	61	0	0	51	46	0	50	0	58	52	49	50	59	39	45	54	0	0	0	0	54	0	53	46	53	45	49	385	
-----	50	0	54	38	0	0	45	48	0	46	0	41	47	49	50	40	56	52	35	0	0	0	0	39	0	46	43	46	50	47	363	
-----	37	0	43	47	0	0	43	43	0	57	0	33	50	46	0	47	59	48	47	0	0	0	0	48	0	57	54	58	31	47	401	
-----	36	0	52	47	0	0	56	55	0	42	0	64	50	52	80	41	40	51	38	0	0	0	0	49	0	28	41	37	68	49	425	
-----	41	0	42	53	0	0	37	37	0	62	0	41	48	35	100	37	48	40	65	0	0	0	0	50	0	15	45	35	40	43	290	
-----	58	0	55	43	0	0	60	54	0	37	0	48	52	62	0	59	48	56	35	0	0	0	0	50	0	84	51	65	50	53	354	
-----	57	0	67	48	0	0	61	70	0	44	0	48	56	53	44	50	55	69	69	0	0	0	0	46	0	40	47	42	56	55	388	
-----	42	0	30	50	0	0	43	36	0	48	0	48	41	43	22	44	40	30	23	0	0	0	0	46	0	60	47	57	43	40	282	
-----	53	0	52	43	0	0	49	43	0	38	0	54	40	50	60	47	59	46	52	0	0	0	0	54	0	37	45	68	48	49	406	
-----	46	0	42	56	0	0	50	51	0	61	0	39	59	47	40	44	35	52	41	0	0	0	0	40	0	50	51	31	43	47	395	



Figure 8.10: Continued

Table with 29 columns (BP, C, CC, CD, CL, CO, CP, FC, GC, HO, JY, LB, LC, LH, NY, O, OJ, PB, PL, S, SF, SV, SM, SP, SU, TB, TR, W, TW) and 100 rows of data. Includes column headers and a secondary set of column headers on the right side.













Figure 8.10: Concluded

	BO	BP	C	CC	CD	CL	CO	CP	FC	GC	HO	JV	LB	LC	LH	NY	O	OJ	PB	PL	S	SF	SV	SM	SP	SU	TB	TR	W	T%	
++++++	(+)	33	0	25	60	0	0	37	35	0	71	0	0	46	33	50	0	33	35	16100	0	0	0	63	0	0	42	0	37	41	
++++++	(-)	66	0	62	40	0	0	50	64	0	28	0	0	53	66	41	0	66	64	83	0	0	0	16	0	100	57100	62	56		
++++++	(+)	50	0	77	52	0	0	58	81	0	66	0	0	14	12	83100	40	28	60	0	0	0	33	0	33	60	40	44	52		
++++++	(-)	50	0	22	42	0	0	41	18	0	33	0	0	71	87	16	0	60	57	40	0	0	0	55	0	66	33	60	55	44	
++++++	(+)	75	0	50	44	0	0	50	35	0	50	0	0	78	41	70	0	40	62	52	54	0	0	54	0	50100	37	52			
++++++	(-)	25	0	37	55	0	0	50	58	0	50	0	0	14	58	30100	40	37	47	45	0	0	0	45	0	100	50	0	37	43	
++++++	(+)	33	0	60	53	0	0	40	27	0	25	0	0	25	60	54100	50	50	35	80	0	0	0	70	0	36	57	72	40	47	
++++++	(-)	66	0	40	38	0	0	55	72	0	75	0	0	75	40	45	0	50	37	64	20	0	0	30	0	63	28	27	60	50	
++++++	(+)	33	0	31	52	0	0	40	55	0	100	0	0	25	57	41	0	55	28	23100	0	0	0	37	0	50	40	33	33	42	
++++++	(-)	66	0	52	47	0	0	60	44	0	0	0	0	75	42	58100	33	71	76	0	0	0	62	0	50	60	66	66	55		
++++++	(+)	57	0	63	38	0	0	75	45	0	28	0	0	87	66100	75	11	57	46	58	0	0	0	55	0	100	50	50	66	55	
++++++	(-)	42	0	36	61	0	0	12	45	0	71	0	0	12	33	0	25	88	42	53	41	0	0	44	0	25	50	22	41		
++++++	(+)	0	0	37	40	0	0	53	45	0	33	0	0	55	87	40100	40	44	58	28	0	0	0	53	0	71	40	40	48		
++++++	(-)	100	0	62	60	0	0	38	45	0	66	0	0	44	12	60	0	60	55	41	42	0	0	46	0	100	14	60	60	48	
++++++	(+)	50	0	33	61	0	0	64	63	0	0	0	0	58	50	42	0	66	53	75	0	0	0	30	0	50	55	20	44	52	
++++++	(-)	50	0	66	27	0	0	35	36	0	0	0	0	41	50	57	0	100	33	46	25	0	0	70	0	50	33	80	44	44	
++++++	(+)	0	0	66	72	0	0	75	42	0	50	0	0	83	41	63	50	33	36	42	0	0	0	57	0	100	40100	50	49		
++++++	(-)	100	0	33	27	0	0	25	57	0	50	0	0	16	58	27	50	50	63	57100	0	0	0	42	0	0	60	0	50	48	

T# ----- 65% -----  
 67 GC PL SM  
 92 BO LC O PB SU TR  
 78 C CP GC LH NY  
 67 LB LC SU  
 102 BO LB LH TR  
 85 NY SU  
 95 NY PL SM TR  
 103 BO CP GC LB  
 71 GC PL  
 94 BO LB NY OJ PB TR W  
 86 CO LB LC LH NY SU W  
 64 GC O  
 77 LC NY TR  
 78 BO GC SU  
 74 OJ PL  
 62 C O SM TR  
 59 C CC CO LB SU TR  
 58 BO PL



## Island Tops and Bottoms

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A chart pattern which has been popular with traders for many years is the “island.” Island signals can come at any time, however, they occur most often at important tops and bottoms. Unfortunately, it is not possible to know that an island is an island until after it has become an island. If this sounds like a line from *Alice’s Adventures in Wonderland*, to you, it will become clear if you think about it for a while. Let’s first define our terminology.

An *island top* is defined as a price bar whose trading range falls entirely outside the range of the bar before it and the bar after it. An *island bottom* is defined as a price bar whose trading range falls entirely outside the range of the bar before it and the bar after it. Figure 9-1 illustrates *island top* and *island bottom* signals. Figures 9-2 through 9-4 illustrate island signals in several markets. It is possible for island signals to be formed over a period of two, three, four or five days. Consider Figure 9-5, which illustrates multiple-day islands. Also examine Figures 9-6 through 9-9, which show multiple-day islands tops in various markets.

My test results on multiple- and one-day island tops and bottoms were impressive. The test results are shown in Figure 9-10. The algorithms for island tops are as follows.

### One-Day Island Top

$$L2 > H1 \text{ and } L2 > H3$$

### Multiple-Day Island Top

$$L2, L3 \dots L_n < H1 \text{ and } L2, L3 \dots L_n > H_n$$

where:

L2 = low of day 2;

H1 = high of day 1;

H3 = high of day 3;

L<sub>n</sub> = low of nth day; and

H<sub>n</sub> = high of nth day

It should now be clear to you that it is not possible to know that an island top is being made until the last day has been formed. What may appear to be an island top day or a multiple island top could, in fact, prove to be nothing more than a breakaway gap. A breakaway gap is defined as a price bar surrounded by gaps before and after it, and which precedes a substantial price move in the direction of the gap.

Island bottoms have also been touted as reliable signals. Although island tops and bottoms are not very common price bar signals, they do seem to occur at critical market junctures. Single- and multiple-day island bottoms are defined as follows:

### One-Day Island Bottom

$$H2 < L1 \text{ and } H2 < L3$$

### Multiple-Day Island Bottom

$$H2, H3 \dots H_n < L1 \text{ and } H2, H3 \dots H_n < L_n$$

where:

H2 = high of day 2;

L1 = low of day 1;

L3 = low of day 3;

H<sub>n</sub> = high of nth day; and

L<sub>n</sub> = low of nth day

Again it should be clear that it is not possible to know that an island bottom is being made until the last day has been formed. What may appear to be an island bottom day or a multiple island bottom could, in fact, prove to be nothing more than a "break-away gap."

## THE TEST

In order to test one- and multiple-day island top and bottom signals, I used the following rules:

1. A one-day island top was considered a sell signal. A short position was taken on the close of the day the island was completed. The position was considered stopped out when the low of the day before the last day of the island formation was penetrated on a closing basis. If this occurred the position was closed out at a loss.

2. A multiple-day island top formation follows the same rules. A close above the lowest low of the string of days which form the multiple day island top was used as the stop loss point.

3. A one-day island bottom was considered a buy signal. A long position is taken on the close of the day the island was completed. The position was considered stopped out when the high of the day before the last day of the island formation was penetrated on a closing basis. If this occurs the position was closed out at a loss.

4. A multiple-day island bottom formation follows the same rules. A close below the highest high of the string of days which form the multiple-day island bottom was used as the stop loss point.

**Figure 9.1: Island Top and Island Bottom Signals**

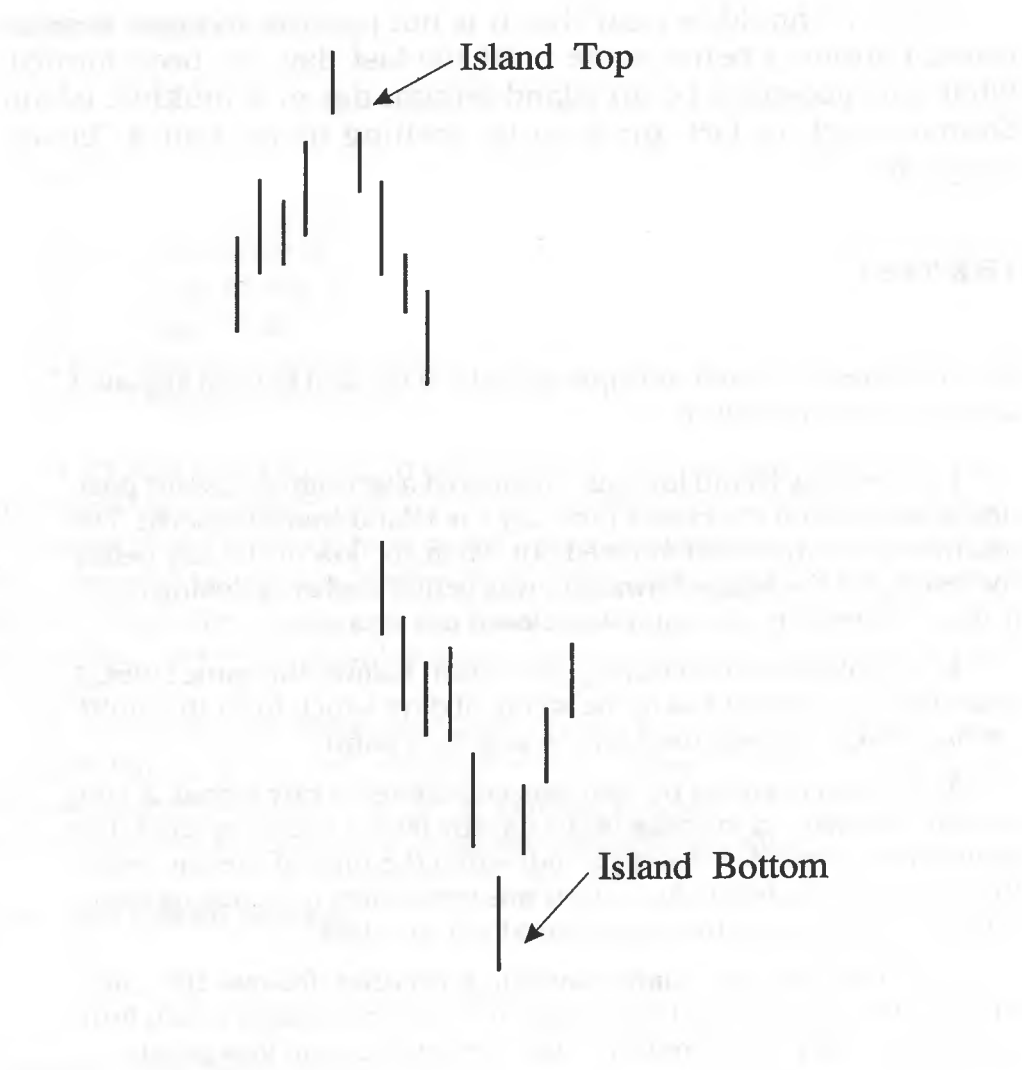


Figure 9.2: 1-Day Island Top—July 1986 Corn

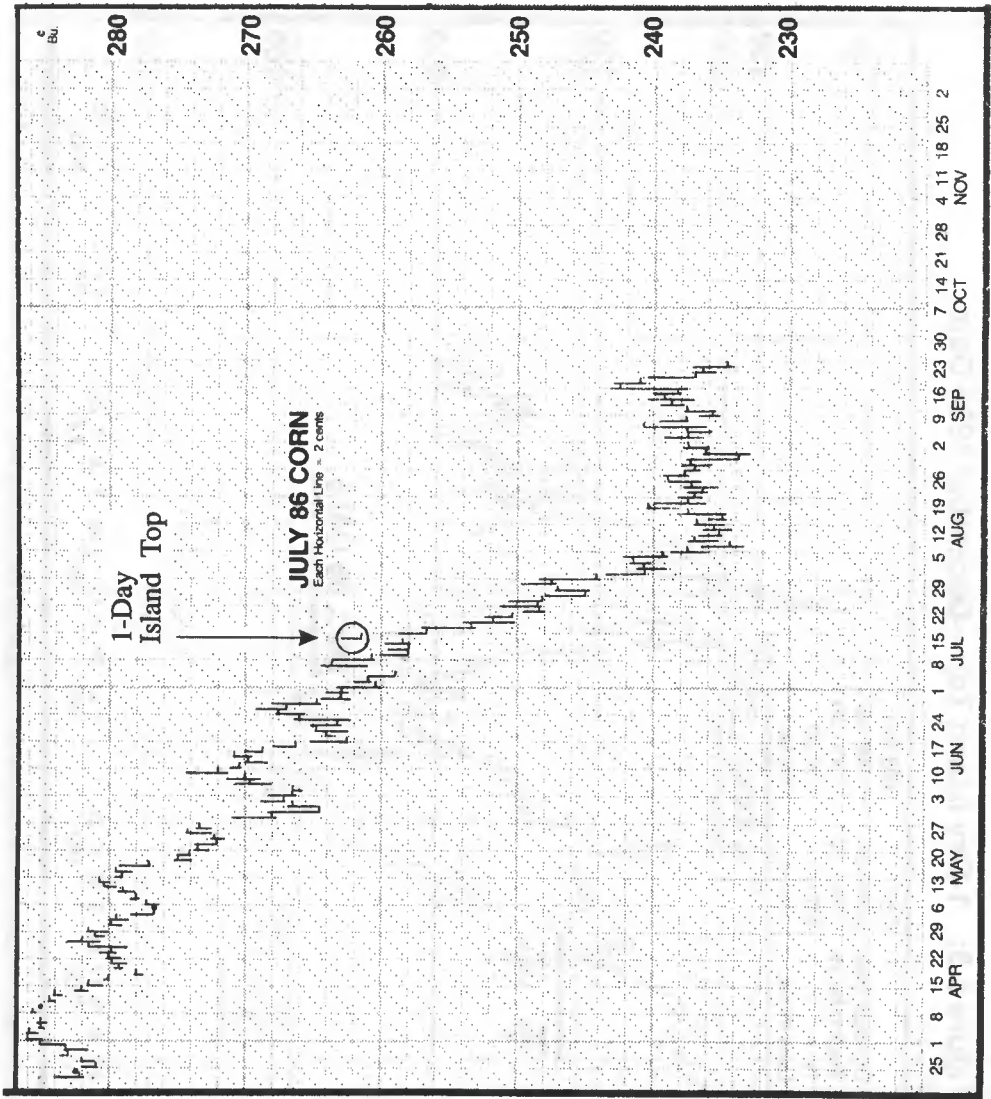


Figure 9.3: 1-Day Island Top—December 1986 Oats

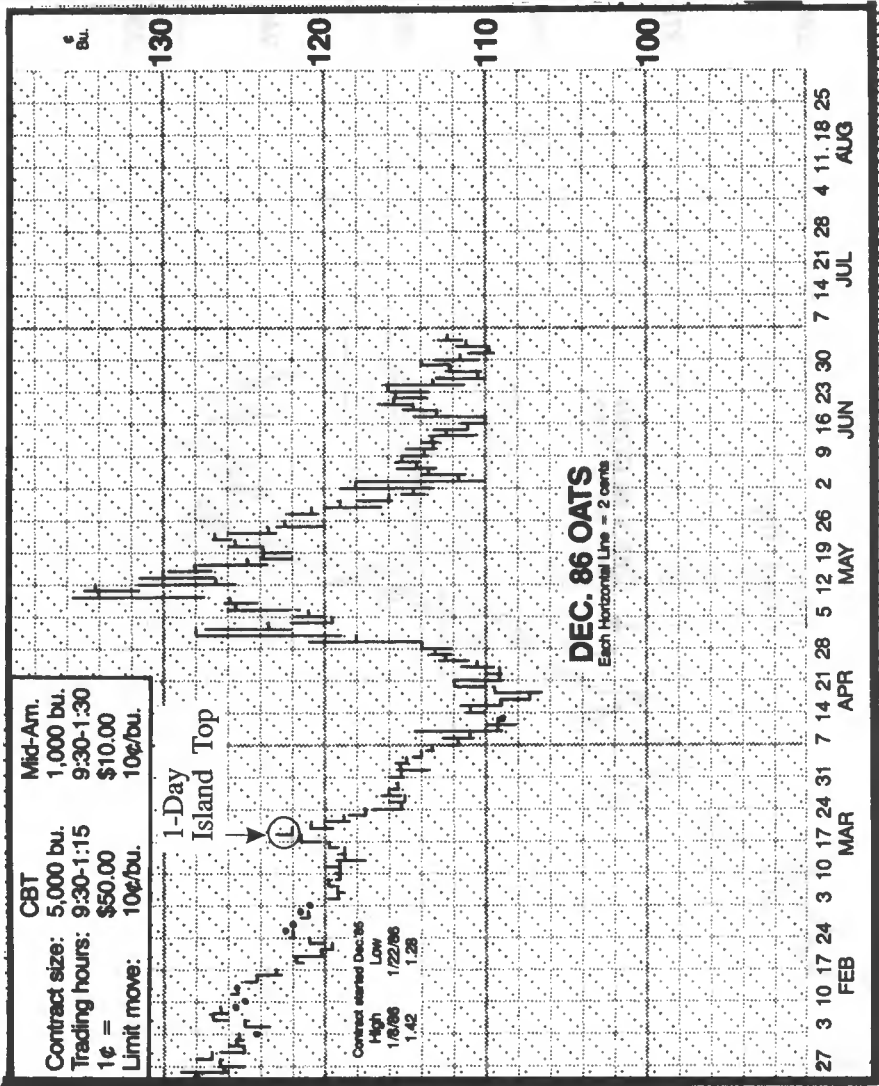
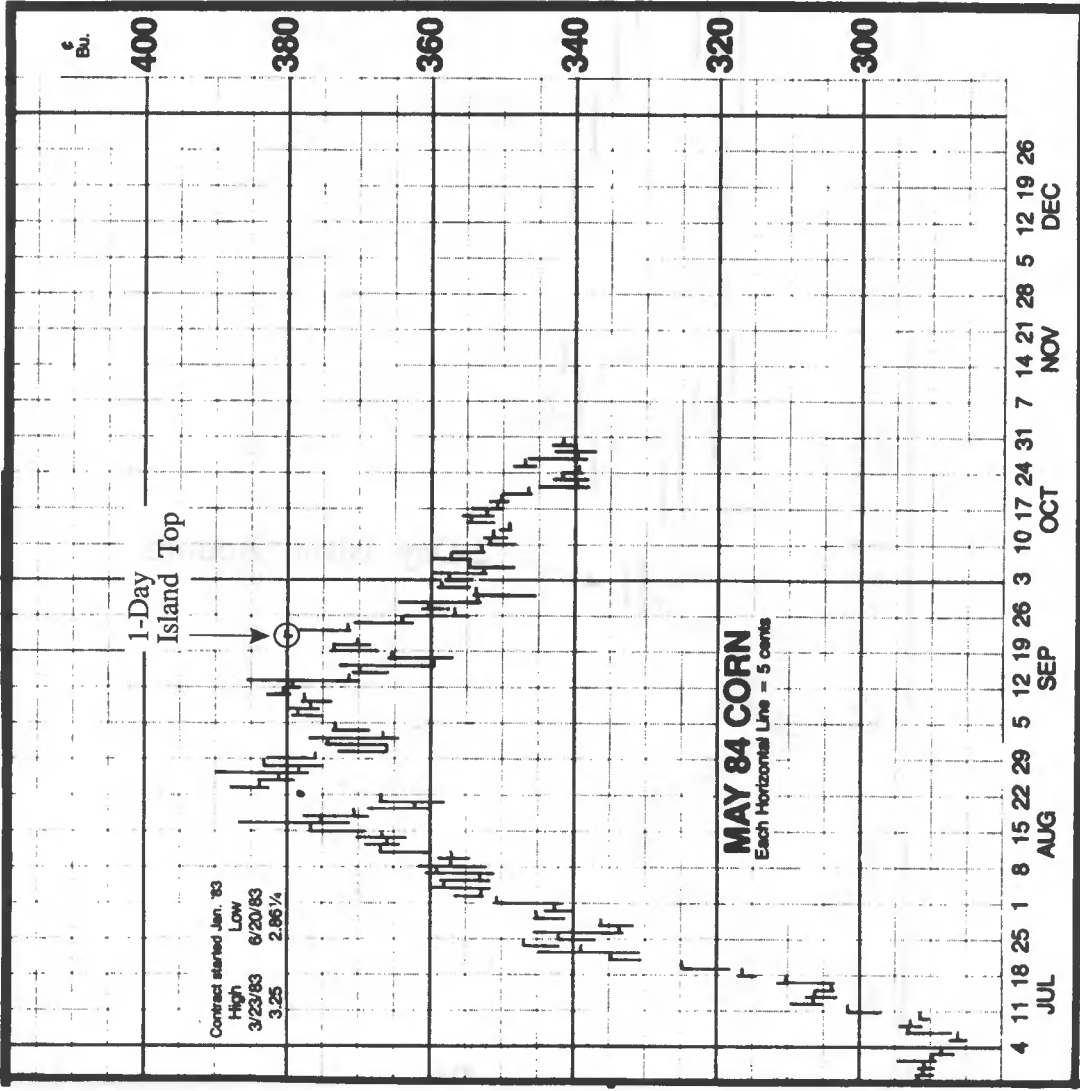


Figure 9.4: 1-Day Island Top—May 1984 Corn



**Figure 9.5: 2-Day Island Top and Bottom**

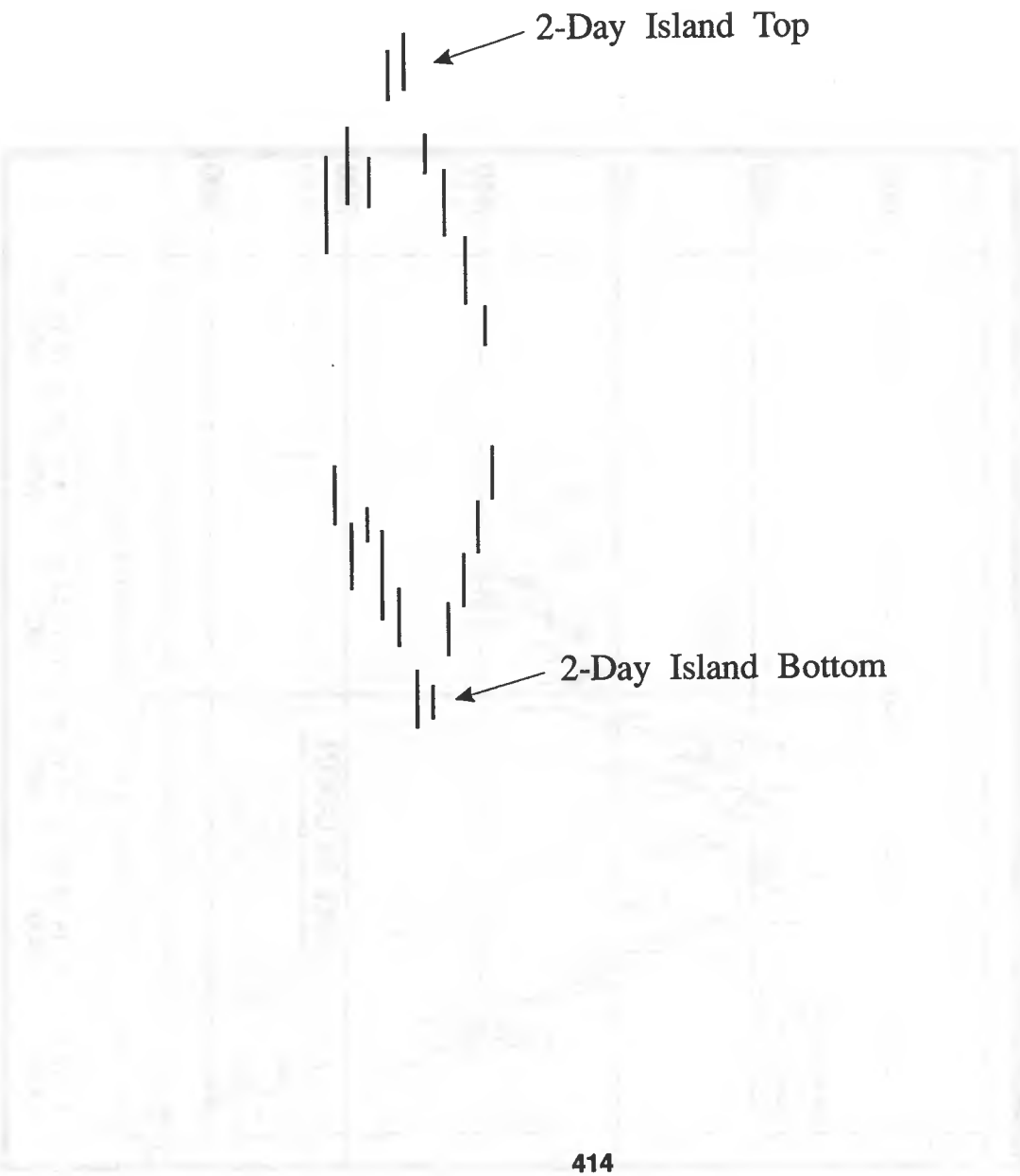
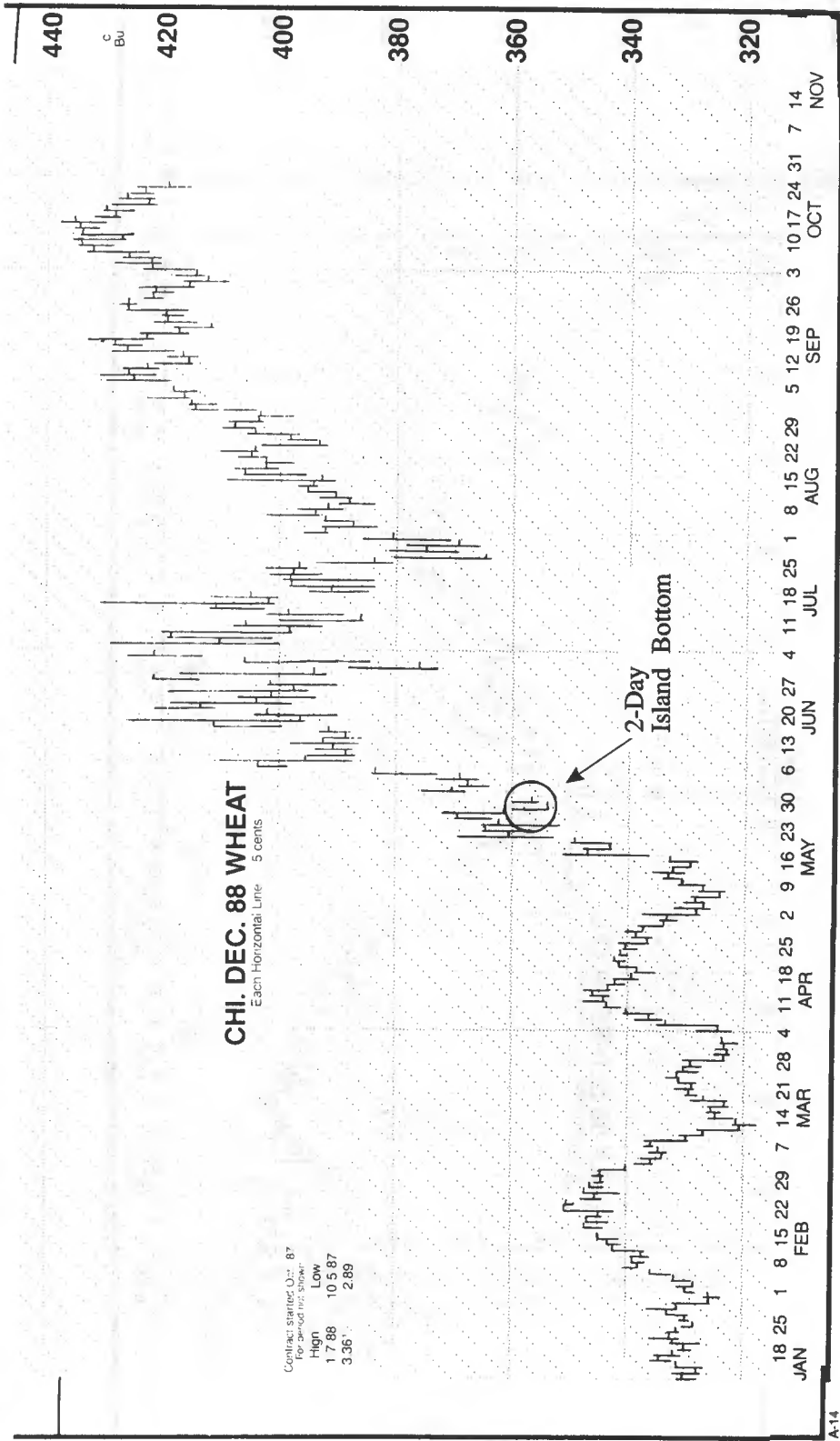




Figure 9.6: 2-Day Island Bottom—December 1988 Wheat



**Figure 9.7: 2-Day Island Top—July 1988 Soybean Oil**

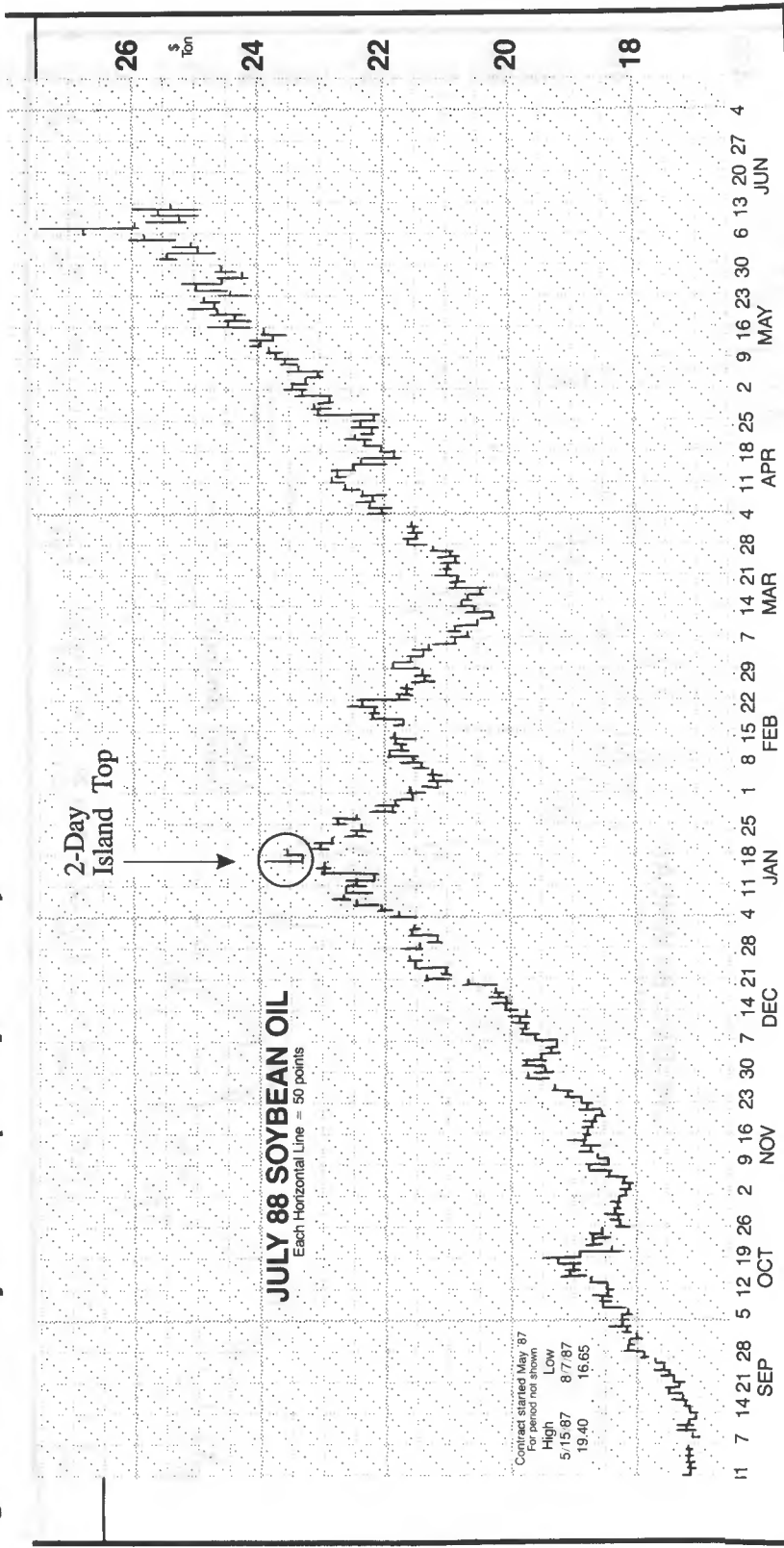


Figure 9.8: Multiple Day Island Tops and Bottoms—June 1980 Gold

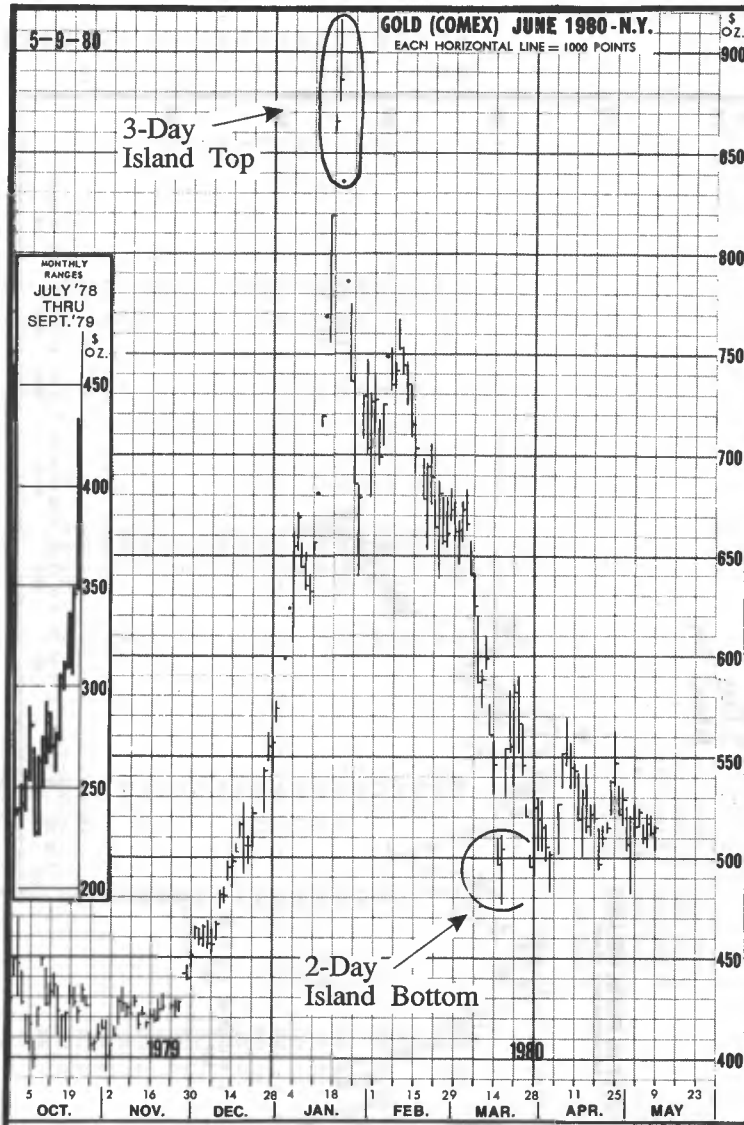


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**Figure 9.9: 2-Day Island Top—July 1986 Pork Bellies**

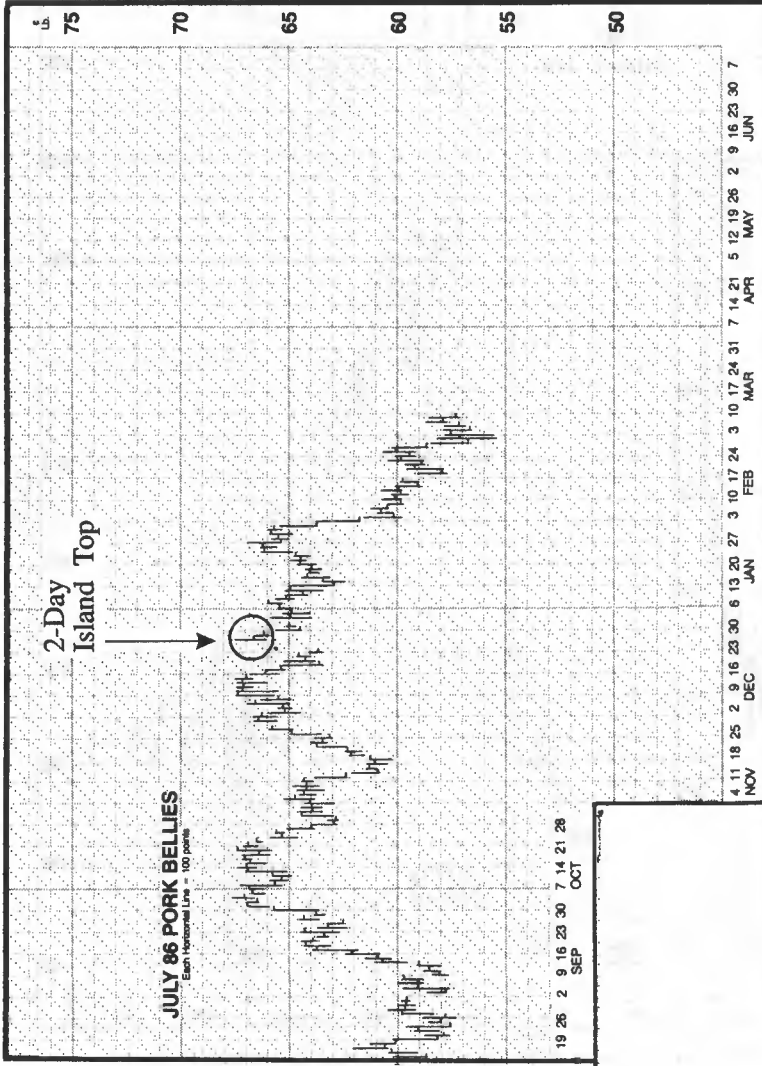


Figure 9.10: Summary of 1-, 2-, 3-, 4-, and 5-Day Island Signals

Market	1 DAY		2 DAY		3 DAY		4 DAY		5 DAY		TOTAL	
	COUNT	AVG +/-	COUNT	AVG +/-	COUNT	AVG +/-	COUNT	AVG +/-	COUNT	AVG +/-	COUNT	AVG +/-
BO	21	-.43	8	2.07	7	1.42	3	-.74	2	-1.64	41	.29
BP	100	.16	37	1.63	8	-.73	3	-3.13	0	.00	148	.42
C	32	-.84	12	7.36	4	-5.19	0	.00	3	7.67	51	1.25
CC	54	2.23	20	7.59	9	13.23	4	-6.65	4	-5.50	91	3.76
CD	213	9.05	52	22.00	23	-1.15	8	-11.97	5	38.27	301	10.43
CO	91	1.35	37	-1.40	10	1.93	5	3.09	3	-6.02	146	.60
CP	122	.83	38	6.66	13	1.93	2	12.70	4	14.10	179	1.31
GC	75	7.08	23	8.30	7	-9.89	1	-13.90	1	11.00	107	6.07
JY	139	.27	36	.46	13	-.04	4	1.27	0	.00	192	.30
LB	37	1.25	16	-2.58	8	-3.01	4	-3.37	2	21.05	67	.14
LC	21	.75	15	-.22	2	2.57	0	.00	0	.00	38	.46
LH	59	.66	18	.54	8	-.04	7	.04	2	-.67	94	.50
NY	38	2.38	16	-.90	11	.58	3	-.71	2	-1.86	70	1.10
O	51	-2.09	24	18.45	10	-.25	5	-10.32	3	7.75	93	3.28
OJ	87	.89	39	1.61	8	-4.17	1	-2.75	1	-1.30	136	.76
P8	19	.93	13	-1.39	4	9.72	3	-3.92	0	.00	39	.68
PL	99	-3.92	25	-8.18	7	-6.51	4	-13.70	5	34.66	140	-3.71
S	26	8.80	21	15.41	5	98.02	3	148.75	1	18.12	56	26.91
SF	172	.10	51	.01	15	-.29	7	1.58	2	6.70	247	.15
SM	36	1.89	19	-1.31	3	4.60	3	-5.70	0	.00	61	.66
SU	69	.68	31	1.28	6	-.12	3	1.03	0	.00	109	.81
T8	16	-.17	8	-.25	1	-1.48	3	-.53	5	1.14	33	-.06
TR	15	1.36	8	-1.29	6	-.60	1	-2.94	4	2.22	34	.37
W	9	24.19	9	1.08	4	-8.31	0	.00	1	-25.00	23	7.36

----- GRAND TOTALS -----		
#	AVG \$	TOT \$
1 DAY ISLAND	1601	406012.06
2 DAY ISLAND	576	184697.81
3 DAY ISLAND	192	57692.39
4 DAY ISLAND	77	5853.66
5 DAY ISLAND	50	78345.19



# IntraDay Timing Signals

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Advances in computer technology and software development which began in 1980's have opened a vast new area of research to futures traders in the 1990's. The ability to test systems using daily price data is now standard procedure, and the ability to develop and thoroughly test trading systems using intraday data is rapidly gaining in popularity. In testing systems and trading signals on daily and intraday data, I've discovered that there are some signals and indicators which do not perform well on daily data but which have shown impressive historical results on intraday data.

This Appendix will discuss some of my findings in the area of intraday timing signals. While I do not intend it to serve as a thorough evaluation and examination of such signals, I do believe that it will serve as an excellent starting point. Remember that the amount of historical data which has been evaluated in preparing the tests discussed in this Appendix is limited. It covers about one year of tic-by-tic data. Given the large number of price tics each day and the number of trades examined, the test can be considered valid; however, I advise those who are seriously interested in pursuing these indicators to subject them to more scrutiny.

### **Opening Price Gap Signals**

For many years traders have been fascinated with opening price gaps. The feeling among traders has been that price gaps provide important information about a market. Before examining some of these ideas, let's first define the term "opening price gap" as follows:

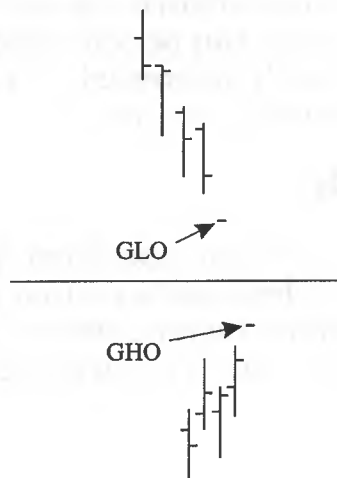
*An opening price which is below the previous day's low price is defined as a "gap lower open" (GLO).*

*An opening price which is above the previous day's high price is defined as a "gap higher open" (GHO).*

Figure 1 shows GLO and GHO signals. As you can see, I've shown the GLO signal following a downtrend and the GHO signal following an uptrend. The general feeling among traders regarding price gaps is that a gap higher opening during a daily uptrend can turn into an important short-term sell signal if the gap is filled (i.e., if the market declines to within the gap or to below the high of the previous day). Conversely, a gap lower opening during a declining daily trend sets up a possible reversal to the upside if the gap is penetrated on the way back up.

While these conclusions seem reasonable, the only scientific way to validate their efficacy is to subject them to a thorough test using intraday data. There are several commercially available software packages available for this purpose, and by the time you read this book there may be several others. I prefer to use Omega TradeStation.

**Figure A.1: GHO and GLO**



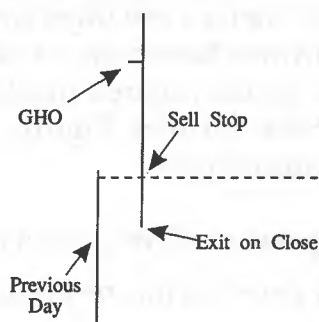


## Opening Gap Penetration Signals

An intraday timing signal popularized by Larry Williams used gap openings as its primary parameter. The “OOPS” signal, as Larry called it, used the following rules:

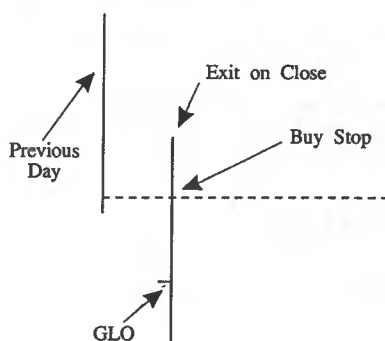
1. If market open is greater than previous day's high (GHO), then sell short on a stop one tic below the previous day's high, (see Figure 2). Exit on the close of the day. Use either a money management stop loss or a stop loss above the high of the current day.

Figure A.2: OOPS Sell Signal



2. If market open is lower than previous day's low (GLO), then buy on a stop one tic above the previous day's low (see Figure 3). Exit on the close of the day. Use either a money management stop loss or a stop loss above the low of the current day.

Figure A.3: OOPS Buy Signal



The OOPS signal sounds simple enough, but there are various parameters which may be tested in order to fully analyze its performance. Among these are:

1. Size of the opening gap.
2. Number of tics penetration through previous low or high.
3. Size of stop loss.
4. Trailing stop loss, if any.
5. Price target, if any.

The OOPS signal is easily tested using the advanced features of TradeStation since the parameters are objective and easily converted to mathematical algorithms. Based on an examination of OOPS parameters with the most active futures markets, I found that its best performance was in S&P futures. Figure 4 shows the system test using the following parameters:

1. Size of opening gap twenty-five points or more.
2. Size of low or high penetration ten points.
3. Stop loss \$1500.
4. Trailing stop loss \$1500.

**Figure 4-1: Results of OOPS Trade System in S&P Using One Year of Data, 15 Point Opening Gap and 15 Point Penetration**

Performance Summary: All Trades			
Total net profit	\$ 11625.00	Open position P/L	\$ 0.00
Gross profit	\$ 20400.00	Gross loss	\$ -8775.00
Total # of trades	30	Percent profitable	67%
Number winning trades	20	Number losing trades	10
Largest winning trade	\$ 2725.00	Largest losing trade	\$ -1500.00
Average winning trade	\$ 1020.00	Average losing trade	\$ -877.50
Ratio avg win/avg loss	1.16	Avg trade(win & loss)	\$ 387.50
Max consecutive winners	7	Max consecutive losers	3
Avg # bars in winners	4	Avg # bars in losers	3
Max intraday drawdown	\$ -2925.00		
Profit factor	2.32	Max # contracts held	1
Account size required	\$ 2925.00	Return on account	397%
Performance Summary: Long Trades			
Total net profit	\$ 9475.00	Open position P/L	\$ 0.00
Gross profit	\$ 10975.00	Gross loss	\$ -1500.00
Total # of trades	9	Percent profitable	89%
Number winning trades	8	Number losing trades	1
Largest winning trade	\$ 2725.00	Largest losing trade	\$ -1500.00
Average winning trade	\$ 1371.88	Average losing trade	\$ -1500.00
Ratio avg win/avg loss	0.91	Avg trade(win & loss)	\$ 1052.78
Max consecutive winners	7	Max consecutive losers	1
Avg # bars in winners	4	Avg # bars in losers	4
Max intraday drawdown	\$ -1500.00		
Profit factor	7.32	Max # contracts held	1
Account size required	\$ 1500.00	Return on account	632%
Performance Summary: Short Trades			
Total net profit	\$ 2150.00	Open position P/L	\$ 0.00
Gross profit	\$ 9425.00	Gross loss	\$ -7275.00
Total # of trades	21	Percent profitable	57%
Number winning trades	12	Number losing trades	9
Largest winning trade	\$ 1675.00	Largest losing trade	\$ -1500.00
Average winning trade	\$ 785.42	Average losing trade	\$ -808.33
Ratio avg win/avg loss	0.97	Avg trade(win & loss)	\$ 102.38
Max consecutive winners	4	Max consecutive losers	4
Avg # bars in winners	3	Avg # bars in losers	3
Max intraday drawdown	\$ -3775.00		
Profit factor	1.30	Max # contracts held	1
Account size required	\$ 6775.00	Return on account	32%

As you can see, the results were impressive. Slippage and commission of \$75 per trade were deducted from the average trade and positions were all closed out at the end of the day. (While the OOPS signal was also tested on currencies, crude oil and several other markets, I cannot as yet report results or parameters. I suggest, however, that you experiment on your own using various gap sizes and point penetrations.)

### *Variations on OOPS*

In addition to the basic OOPS signal, I have also tested what I have called the gap on open price signal (GOOPS). The rules are as follows:

1. Market must gap higher or lower on open.
2. Wait one hour after open before entering any trades.
3. If market is above opening price at end of one hour after a GLO, then buy at market with stop loss below low of day or use money management stop loss.
4. If market is below open at end of one hour, then place buy stop X tics above opening price and use same stop loss procedure as in #3.
5. If market is below opening price at end of one hour after a GHO, then sell at market with stop loss above high of day or use a money management stop loss.
6. If market is above opening after one hour, then sell on stop X tics below opening price using same stop loss procedure as in #5.

As noted above, the GOOPS signal must be more thoroughly evaluated using various parameters.

### Consecutive Closes

The Consecutive Closes (CC) indicator is simple to understand. The following abbreviations are used in my discussion of the CC indication:

CC = consecutive closes

CCU = consecutive closes up

CCD = consecutive closes down

CCU or CCD preceded by a number indicates the number of consecutive closes up or down (i.e. 4 CCU = 4 consecutive up closes).

I tested 3, 4, 5 and 6 CCU and CCD. The trading rules are as follows:

1. A buy or reverse to long signal occurs on the close of trading of the *n*th consecutive up close.
2. A sell or reverse to short position occurs on the close of the *n*th consecutive down close.
3. The unit of time varies according to test.

### Sample Buy and Sell Signals

A buy signal using a 4CC system, therefore, might appear as follows:

Closing Price	Change	Count
4550	+25	+1
4545	-05	-1
4560	+15	+1
4565	+5	+2
4590	+25	+3
4600	+10	+4 Buy on Close of this time period

A sell signal occurs on the fourth consecutive lower close. The position would be entered on the close of trading and held until either stopped out or until reversed by a contrary CC signal.

As you can see, the system requires no computer or sophisticated mathematical formulae. It is easy to implement and monitor provided you have access to intraday data. Figure 4 illustrates sample buy, reverse to long, sell and reverse to short signals.

A hybrid CC system which enters the market on one CC combination and exits on another should be considered. We know that markets move up more slowly than they move down; hence, a 5CC entry signal and a 3CD exit/reverse combination might prove much more effective than a CC entry and exit system which uses the same CC units.

**Figure 5: Test #1 4cc, 60-Minute S&P; \$75 Shippage and Commission; \$3,000 Initial Stop Loss; \$1,800 Trailing Stop Loss**

**Performance Summary: All Trades**

Total net profit	\$ 40625.00	Open position P/L	\$ 0.00
Gross profit	\$ 88400.00	Gross loss	\$ -47775.00
Total # of trades	86	Percent profitable	44%
Number winning trades	38	Number losing trades	48
Largest winning trade	\$ 12725.00	Largest losing trade	\$ -1875.00
Average winning trade	\$ 2326.32	Average losing trade	\$ -995.31
Ratio avg win/avg loss	2.34	Avg trade(win & loss)	\$ 472.38
Max consecutive winners	5	Max consecutive losers	7
Avg # bars in winners	15	Avg # bars in losers	6
Max intraday drawdown	\$ -9725.00		
Profit factor	1.85	Max # contracts held	1
Account size required	\$ 9725.00	Return on account	418%

**Performance Summary: Long Trades**

Total net profit	\$ 32250.00	Open position P/L	\$ 0.00
Gross profit	\$ 57275.00	Gross loss	\$ -25025.00
Total # of trades	45	Percent profitable	47%
Number winning trades	21	Number losing trades	24
Largest winning trade	\$ 12725.00	Largest losing trade	\$ -1875.00
Average winning trade	\$ 2727.38	Average losing trade	\$ -1042.71
Ratio avg win/avg loss	2.62	Avg trade(win & loss)	\$ 716.67
Max consecutive winners	5	Max consecutive losers	5
Avg # bars in winners	19	Avg # bars in losers	7
Max intraday drawdown	\$ -9275.00		
Profit factor	2.29	Max # contracts held	1
Account size required	\$ 9275.00	Return on account	348%

**Performance Summary: Short Trades**

Total net profit	\$ 8375.00	Open position P/L	\$ 0.00
Gross profit	\$ 31125.00	Gross loss	\$ -22750.00
Total # of trades	41	Percent profitable	41%
Number winning trades	17	Number losing trades	24
Largest winning trade	\$ 5575.00	Largest losing trade	\$ -1875.00
Average winning trade	\$ 1830.88	Average losing trade	\$ -947.92
Ratio avg win/avg loss	1.93	Avg trade(win & loss)	\$ 204.27
Max consecutive winners	8	Max consecutive losers	10
Avg # bars in winners	11	Avg # bars in losers	6
Max intraday drawdown	\$ -12450.00		
Profit factor	1.37	Max # contracts held	1
Account size required	\$ 12450.00	Return on account	67%

**Figure 6: Test #2 4cc, 60-Minute S&P with Same Parameters as Test #1**

**Performance Summary: All Trades**

Total net profit	\$ 22550.00	Open position P/L	\$ 0.00
Gross profit	\$ 48425.00	Gross loss	\$ -25875.00
Total # of trades	37	Percent profitable	35%
Number winning trades	13	Number losing trades	24
Largest winning trade	\$ 12800.00	Largest losing trade	\$ -1875.00
Average winning trade	\$ 3725.00	Average losing trade	\$ -1078.13
Ratio avg win/avg loss	3.46	Avg trade(win & loss)	\$ 609.46
Max consecutive winners	3	Max consecutive losers	5
Avg # bars in winners	37	Avg # bars in losers	11
Max intraday drawdown	\$ -9975.00		
Profit factor	1.87	Max # contracts held	1
Account size required	\$ 12975.00	Return on account	174%

**Performance Summary: Long Trades**

Total net profit	\$ 14150.00	Open position P/L	\$ 0.00
Gross profit	\$ 35425.00	Gross loss	\$ -21275.00
Total # of trades	26	Percent profitable	31%
Number winning trades	8	Number losing trades	18
Largest winning trade	\$ 12800.00	Largest losing trade	\$ -1875.00
Average winning trade	\$ 4428.13	Average losing trade	\$ -1181.94
Ratio avg win/avg loss	3.75	Avg trade(win & loss)	\$ 544.23
Max consecutive winners	2	Max consecutive losers	7
Avg # bars in winners	40	Avg # bars in losers	11
Max intraday drawdown	\$ -10800.00	Max # contracts held	1
Profit factor	1.67	Return on account	103%
Account size required	\$ 13800.00		

**Performance Summary: Short Trades**

Total net profit	\$ 8400.00	Open position P/L	\$ 0.00
Gross profit	\$ 13000.00	Gross loss	\$ -4600.00
Total # of trades	11	Percent profitable	45%
Number winning trades	5	Number losing trades	6
Largest winning trade	\$ 4975.00	Largest losing trade	\$ -1625.00
Average winning trade	\$ 2600.00	Average losing trade	\$ -766.67
Ratio avg win/avg loss	3.39	Avg trade(win & loss)	\$ 763.64
Max consecutive winners	1	Max consecutive losers	2
Avg # bars in winners	31	Avg # bars in losers	11
Max intraday drawdown	\$ -2525.00	Max # contracts held	1
Profit factor	2.83	Return on account	152%
Account size required	\$ 5525.00		



*Test #1: Sixty-Minute S&P Futures 4CC Performance Summary*

Figure 5 shows the results of this test. I consider them impressive. The test covered about one year of tic-by-tic data and eighty-four trades. The accuracy rate was 46 percent, with seven maximum consecutive losers. It was necessary to use a rather wide initial stop loss as well as a large trailing stop loss given the volatile nature of S&P futures. Admittedly a large percentage of the net profit came from one large profit of over \$12,000, but the system performance even without this trade is still very respectable at over \$394 profit per trade.

*Test #2: Thirty-Minute S&P Futures 6CC Performance Summary*

Now examine the results of the thirty-minute S&P method using 6CC as the indicator. The results here are even more impressive than they were for the sixty-minute test on an average trade basis. Do note, however, that nearly half of the net profits were the result of one large winner of nearly \$13,000. But even if we remove this winner from the total figure, the net profit per trade is still very high (see Figure 6).

**Figure 7: 30-Minute S&P, 7cc, with Same Parameters as Test #1****Performance Summary: All Trades**

Total net profit	\$ 24275.00	Open position F/L	\$ 0.00
Gross profit	\$ 37100.00	Gross loss	\$ -12825.00
Total # of trades	20	Percent profitable	45%
Number winning trades	9	Number losing trades	11
Largest winning trade	\$ 12575.00	Largest losing trade	\$ -1875.00
Average winning trade	\$ 4122.22	Average losing trade	\$ -1165.91
Ratio avg win/avg loss	3.54	Avg trade(win & loss)	\$ 1213.75
Max consecutive winners	3	Max consecutive losers	4
Avg # bars in winners	42	Avg # bars in losers	9
Max intraday drawdown	\$ -4200.00		
Profit factor	2.89	Max # contracts held	1
Account size required	\$ 4200.00	Return on account	578%

**Performance Summary: Long Trades**

Total net profit	\$ 18325.00	Open position P/L	\$ 0.00
Gross profit	\$ 29725.00	Gross loss	\$ -11400.00
Total # of trades	14	Percent profitable	43%
Number winning trades	6	Number losing trades	8
Largest winning trade	\$ 12575.00	Largest losing trade	\$ -1875.00
Average winning trade	\$ 4954.17	Average losing trade	\$ -1425.00
Ratio avg win/avg loss	3.48	Avg trade(win & loss)	\$ 1308.93
Max consecutive winners	3	Max consecutive losers	3
Avg # bars in winners	44	Avg # bars in losers	10
Max intraday drawdown	\$ -4325.00		
Profit factor	2.61	Max # contracts held	1
Account size required	\$ 4325.00	Return on account	424%

**Performance Summary: Short Trades**

Total net profit	\$ 5950.00	Open position P/L	\$ 0.00
Gross profit	\$ 7375.00	Gross loss	\$ -1425.00
Total # of trades	6	Percent profitable	50%
Number winning trades	3	Number losing trades	3
Largest winning trade	\$ 4525.00	Largest losing trade	\$ -900.00
Average winning trade	\$ 2458.33	Average losing trade	\$ -475.00
Ratio avg win/avg loss	5.18	Avg trade(win & loss)	\$ 991.67
Max consecutive winners	1	Max consecutive losers	2
Avg # bars in winners	39	Avg # bars in losers	6
Max intraday drawdown	\$ -1150.00		
Profit factor	5.18	Max # contracts held	1
Account size required	\$ 1150.00	Return on account	517%

Figure 7 shows the performance summary of the 7CC indicator in thirty-minute S&P futures. The results are impressive even considering that more than one-half of the net profits were derived from only one trade. At \$1,213.75 per trade after slippage and commission I think you'll find this approach well worthwhile. Note also that the maximum number of consecutive losers was only five. I have not tested too many other CC periods or time frames; I suggest you do so if you have an interest in this approach. The ideal situation, of course, would be to find a combination of timeframe and CC length which produces consistent profits without a high percentage of the net profit per trade being the result of only one or two trades.



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