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# Interpreting Technical Indicators

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## **INTRODUCTION**

The purpose of this booklet is to explain some of the major technical indicators and how those indicators can be used to help interpret price movement. At the same time we want to explain the technical methods we use in the analysis of the markets.

We have not included any discussion of chart patterns because that is such a large field that it cannot be covered adequately in a booklet of this size. Charting has been well covered by such books as Edwards & Magee's *Technical Analysis of Stock Trends* and others.

We encourage our subscribers to read and study as widely as possible on the fundamental and technical aspects of the markets. There are a growing number of good books on key market topics and there are also many educational seminars available around the country which can be good learning experiences.

For those who are new to the study of technical analysis, we might note that it is easy to become too narrowly focused on the intricacies of particular formulas or rules. One must constantly ask what a technical indicator is saying about the behavior of prices in general.

One of the reasons that Edwards and Magee's book *Technical Analysis of Stock Trends* became so popular is that the authors not only identified a series of chart patterns, but they also tried to explain the market behavior that was responsible for that pattern. For example, they might explain a double top by saying that a group of stock holders had a strong desire to sell at that level and therefore prevented the market from going any higher. Thus, Edwards and Magee do not just present a simplistic rule based on price action alone; rather they present a much broader and therefore more valuable explanation of how market behavior is represented by particular chart patterns.

Likewise, when one is studying oscillators or momentum, for example, one should consider what that indicator is saying about the price movement in general and not rely too heavily on the mathematics of a particular indicator without really understanding the market activity behind its behavior.

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## **SECTION 1: TECHNICAL INDICATORS**

### **Support/Resistance Levels**

#### **A. Definition**

Support and resistance levels are simply price levels at which price movement should stop and reverse direction. Support/resistance (S/R) levels are price levels which tend to act as a floor or a ceiling to future price movements.

A support level is a price level below the current market price at which buying interest should be able to overcome selling pressure and thus keep the price from going any lower. Conversely, a resistance level is a price level above the current market price at which selling pressure should be strong enough to overcome buying pressure and thus keep the price from going any higher.

In addition to acting as reversal points, S/R levels have several other basic characteristics. One is that S/R levels reverse roles once they are penetrated. For example, when the market price falls below a support level, that former support level will then become a resistance level when the market later trades back up to that level. As an illustration, if the S&P 500 index falls below a support level of 1075, then the 1075 level will reverse roles and become an overhead resistance level.

Another characteristic is that S/R levels vary in strength, leading to certain price levels being designated as major or minor S/R levels. For example, a 10-year high on a weekly bar chart would be a much more important resistance level than a minor 2-week trendline intersection point.

#### **B. Rationale**

Edwards and Magee in their book, *Technical Analysis of Stock Trends* (Chapter 13), set forth the view that S/R areas are established primarily at high-volume, heavily-traded price levels at which many buyers bought and many sellers sold the market. Edwards and Magee theorize that traders wish to "scratch" their losing trades and that high-volume trading areas will therefore act as S/R areas because there will be many investors with losing trades in that area who will want to scratch their trades. For example, if a stock trades heavily in the \$20/share area and then sells off sharply, investors who bought the stock in the \$20 area will want to sell their stock at that same \$20 level if and when the market rallies back up to that point. Their selling will therefore tend to cap the market at \$20.

While Edwards & Magee's theory provides a rationale for high-volume S/R areas, the theory is somewhat limited in that it does not explain how specific price levels (such as major high/lows) also act as S/R levels even though very little volume occurs at those levels. Furthermore, Edwards & Magee's book was written for the cash stock market and the theory was postulated for the behavior of longer-term stock market participants. As a result the theory is not as relevant for the fast-paced futures and options markets of today where highly-leveraged traders don't have the luxury of waiting for the markets to come back so they can scratch their trades. Edwards & Magee's theory is more applicable to longer-term position trading in the stock market.

A more general theory of S/R levels is that S/R levels work simply because so many market participants agree on the importance of these levels. These S/R levels therefore become self-fulfilling prophecies. For example, if the majority of key traders believe that the May 1998 high of 9312 on the Dow Industrials index is important,

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then it is important. Thus if the Dow Industrials index rallies back up to 9312, traders who are long will tend to take profits just under that level and traders who are bearish will tend to enter new shorts just under that level. This selling will cause the market to stop just short of the resistance level itself.

Assuming this theory is correct, a trader should not be looking for secret or obscure S/R levels, but should instead be looking for the common S/R levels being watched by the key traders.

Of course, there is a strong feeling among most traders that any widespread method of analyzing the markets is not likely to be useful simply because it is too widely used and thus becomes a "following the herd" technique. One way to filter the use of S/R levels is to look for sustained penetration of a S/R level; i.e., at least a close beyond the level, not simply a one or two tick intra-day penetration. Perhaps even a several day close beyond that level should be considered. A sustained penetration has a better likelihood of being correct, although one does forego some profit opportunity by waiting for a stronger signal.

### **C. Identifying Support/Resistance Levels**

Support/resistance levels can be identified through both technical analysis and fundamental analysis.

The best types of support/resistance levels based on technical analysis include:

- Major recent highs and lows
- Moving averages
- Retracement levels. The key retracement levels are 1/4, 1/3, 1/2, 2/3 and 3/4. The Fibonacci retracement levels of 38.2% and 61.8% are also important.
- Pivot points
- Gaps
- Trendline intersections
- Pattern areas such as the neckline of a head & shoulders pattern, the upper and lower boundaries of channels, etc.
- Congestion or high-volume areas

As an example of S/R levels, refer to Chart 1 which is a daily S&P 500 chart. Note the horizontal resistance level at 1012/1011 from the Fall of 1997. Note how the market met resistance at that level several times before breaking out decisively at the start of 1998. Also note how the market found support the day after breaking out, this an example of how an old resistance level becomes a new support level.

There are other less-obvious S/R levels which can be useful:

- Chart points on weekly charts
- Chart pattern objectives
- Price levels that correspond to overbought/oversold RSI levels
- Key S/R levels in the cash market

A trader who is trading the futures/options markets should not lose sight of the fact that S/R levels in the cash market are often more important than S/R levels in the futures markets. When the cash market hits an important S/R level and reverses, the futures market will reverse at the same time, wherever the futures price happens to be at the time. The futures market therefore stops when the cash market stops, even though the futures market itself may not be at any identifiable S/R level.

S/R levels based on fundamental factors are of two types: (1) prices that are important to the buy/sell decisions

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of cash market participants because they are key value-based prices, and (2) price levels that are being enforced by some market governing body

(1) The identification of value-based S/R levels essentially involves predicting prices at which key cash market participants will want to buy and sell as the market engages in its ongoing auction of supply and demand. For example, a trader watching a bull market in soybeans may feel that based on his knowledge of the behavior of soybean market participants, farmers will face an overwhelming temptation to sell their inventories when soybean prices rise to the psychological level of \$10/bushel. Conversely in watching a bear market, the trader may feel that soybean prices have fallen so low that the food processing companies will believe the price is a bargain and will engage in heavy spot and forward-buying strategies in order to lock in that price.

For commodity prices, an important value-based support level is likely to be the cost of production. The cost of production should provide a fundamental support price level for a commodity because demand for the commodity should increase as the price drops to that low level. At the same time, supply should decline sharply since producers can no longer make a profit by selling at that low price. Mining costs for precious metals, for example, have been dropping steadily in recent years, thus causing the production-cost support level to drop and to undercut precious metals prices. So far, however, there has not been an event that would cause precious metal prices to drop sharply enough to provide a real test of their production-cost support levels.

(2) Government or cartel S/R levels are determined to some extent by an exogenous controlling body such as a government or a group of suppliers acting as a cartel (e.g., OPEC). These price levels tend to act as S/R levels simply because that is the intention of the governing body which presumably has sufficient market control to enforce those levels. Examples include government price-subsidy support levels in the agricultural markets, currency target-zones which a government may seek to enforce, OPEC price targets in the crude oil markets, and price levels which the coffee cartel may try to enforce. Even though these price levels are not derived from technical analysis per se, a simple look at the chart picture may sometimes make these levels appear obvious. For example, a bear market in corn may establish a rounded bottom just above a government price support level and a currency might establish a choppy, sideways pattern within a government's target zone.

These price levels should provide support/resistance as long as the government or cartel is successful in enforcing the level. However, if the fundamentals begin to overwhelm the enforcement mechanism, then the price can break quickly through that level as pent-up pressures are released. For example, if the U.S. government does not want the dollar to rally above 150 dollar/yen because it fears the detrimental effect of a worsening trade deficit, then the Federal Reserve will intervene in the currency markets and sell dollars in the high-140 area. If intervention does not work, the Federal Reserve may even ease monetary policy in order to fundamentally undercut the dollar. If the government is successful in its strategy, the dollar may rally up to the 150 dollar/yen level several times but always fail to exceed that level. However, if the dollar has very strong bullish fundamentals which the government cannot change, then the dollar will tend to rally very sharply when it finally moves through the 150 dollar/yen level. This is because market participants will realize that the government has lost control of the market and that a new price trading range is being established. Technical short-covering is also likely to be strong because many traders may have gone short on the mistaken assumption that the government would be successful in protecting the 150 dollar/yen level. There is also likely to be new buying as market participants adjust to the new market value.

#### **D. Support/Resistance Levels as a Trading Tool**

Support/resistance levels are used by a large number of traders. There are two basic ways to use S/R levels:

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(1) for assessing market direction, and (2) for scalping and order placement.

(1) Market direction - S/R levels can be useful for assessing market direction because S/R levels can be considered "skirmish" levels at which buyers and sellers engage in a tug-of-war. The winner of that skirmish is temporarily the stronger party who presumably has control of the market and should be able to drive the market farther in that direction. For example, if the market can rally above an important resistance level, then the presumption is that the buyers have the upper hand and that the market is likely to go even higher.

(2) Scalping and order placement - S/R levels are also useful for identifying scalping points and price levels for placing orders. A trader looking for scalping opportunities, for example, would want to sell short just under an important resistance level because of the likelihood that the price will stop and sell off somewhat from that level, affording him or her a small profit when he/she covers his/her short position.

The longer-term trader can also use S/R levels for order placement, either for entering new positions or placing protective stops. For example, a trader who wants to buy into the market may wait until the market falls to a level just above an important support level. That trader may then place a protective sell-stop one or two support/resistance levels lower in the event that the market shows weakness by failing to remain above the support level the trader used to make his buy decision.

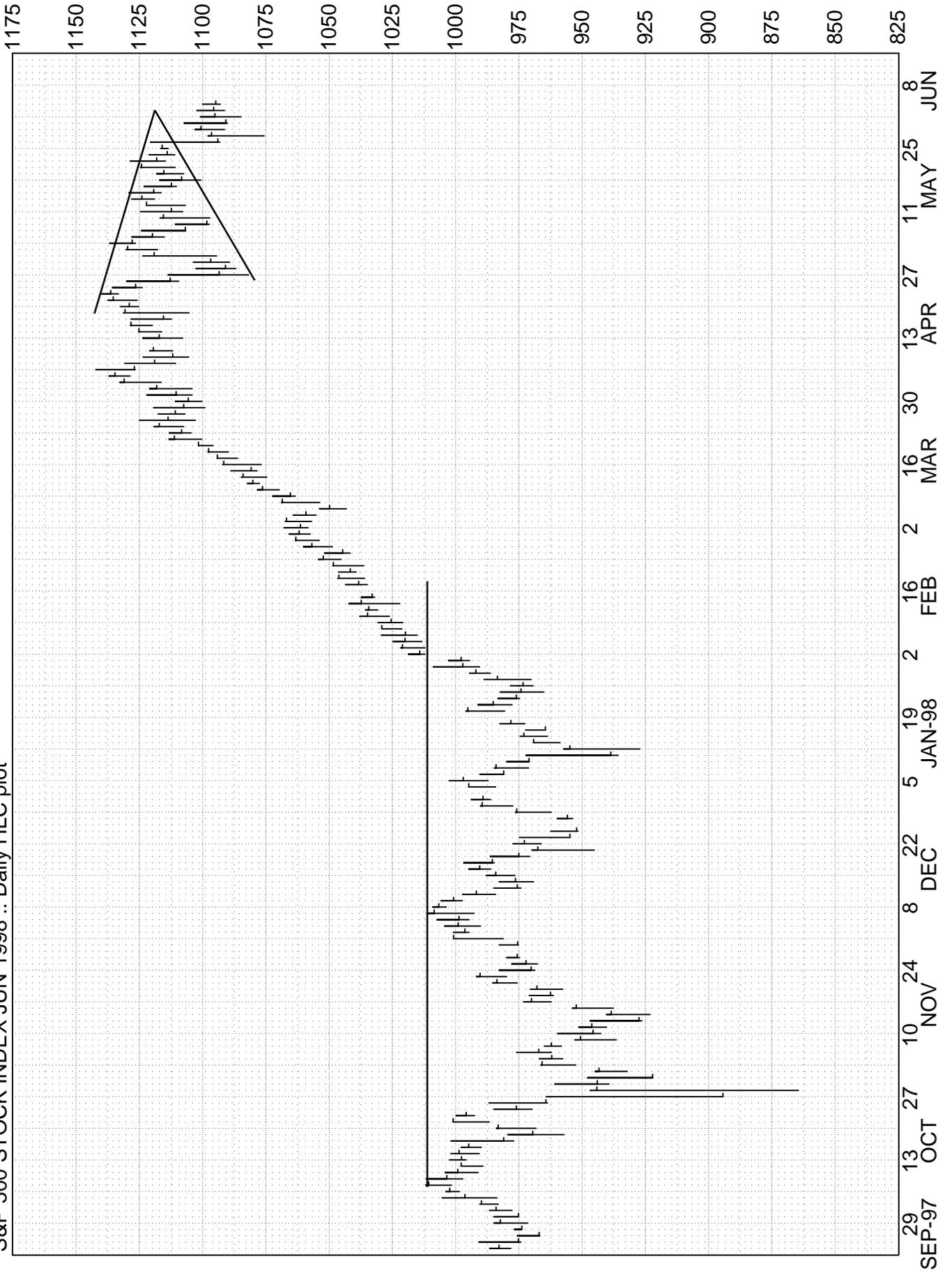
A trader may also wish to enter a new position by placing a sell-stop just beyond an important S/R level. The theory is that the market would be expected to move more quickly in that direction once the S/R level has been penetrated. For example, a trader might place a sell-stop just below an important support level to get short, with the idea that the market is likely to sell off sharply if the market falls below the support levels. This is because of other sell-stops in that area and because of new selling based on the general recognition that the market must be weak if it could not hold above that support level.

A trader would be well-advised to place such orders at least several ticks beyond the S/R level in order to compensate for the possibility that the market may move slightly beyond the S/R level and take out stops beyond that level before reversing.

There is a widespread view that locals in the futures pits go on "stop busting" expeditions, where they purposely try to push the market just beyond a S/R level to pick up some stops before the market reverses. For example, if there is important resistance level for T-bonds at 122-03, and a large local in the pit believes there may be large buy-stops at 122-04 and 122-05 but he also believes that 122-03 will hold as a resistance level, then the local may turn the market bid at 122-04 and 122-05 and try to get the brokers holding the 122-04 and 122-05 buy-stops to trade with him. In this way the local can get short at 122-04 and 122-05. Off-the-floor traders with buy-stops at 122-04 and 122-05 and who have their buy-stop orders filled, will then be very disgruntled when the 122-03 level doesn't quite hold and the market quickly turns down after hitting a high of 122-05. Putting a buy-stop at 122-08, or putting in a stop close-only at 122-03, is a way to compensate for the temporary market penetrations which sometimes occur through important S/R levels.

The idea that locals are capable of going on "stop busting" expeditions is exaggerated, however, and S/R levels in general do tend to work very well. There are very few locals that are capable of moving entire markets, and pit traders in general do not have more than a several tick influence on prices in large markets in which cash market arbitrageurs are active in the futures pits.

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S&P 500 STOCK INDEX JUN 1998 .. Daily HLC plot



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## Moving Averages

### A. Definition

A simple moving average is the average of the previous n-day number of closes. For example, a 10-day simple moving average (MA) is the average of the closing prices for the last 10 days. In calculating the MA each day, the earliest day is dropped and the latest day is added to the ten being averaged. Thus the 10-day period being averaged moves forward each day.

The effect of a moving average is to slow down the price movement so that the longer term trend becomes smoother (or less volatile) and therefore more obvious. The longer the period of the moving average, the smoother the price movement is.

Chart 2 shows two moving averages, a 10-day and a 30-day, overlaid on a daily bar chart of the June S&P 500 futures contract. Notice how the longer term average changes at a slower rate and therefore smooths the price action to a greater extent. The choice of a moving average depends on the trader's time frame for holding trades. Day traders, for example would use short-term MA's and position traders would use longer-term MA's.

Moving averages can be calculated on either a simple or an exponential basis. For a simple moving average the values for each day are all given the same weighting. For an exponential moving average, the values for each day are weighted differently using an exponential factor which gives greater importance to the values of the more recent days. In either case, however, the moving average is interpreted basically the same way for analysis.

For those who are interested, the formula for an exponential moving average (EMA) for n-days is:

$$n\text{-day EMA} = (1/n \times \text{new settle price}) + [(1-1/n) \times \text{yest EMA}]$$

$$\text{e.g., 3-day EMA} = (1/3 \times \text{new settle price}) + (2/3 \times \text{yest EMA})$$

A detailed discussion of exponential moving averages can be found in Kaufman's book *The New Commodity Trading Systems and Methods*.

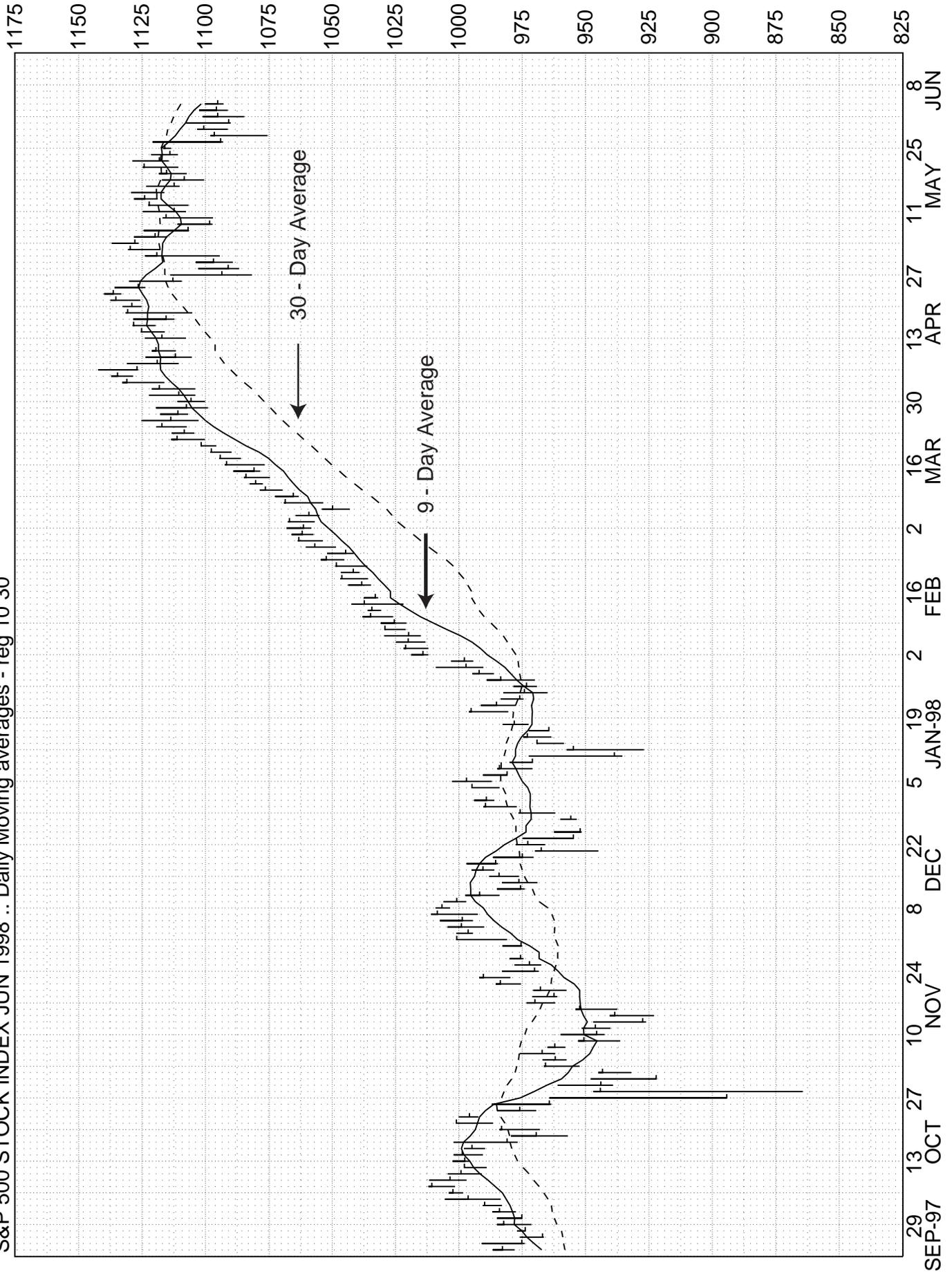
### B. Trading Uses

There are many ways to use moving averages in trading. Among the most popular are (1) moving averages as support/resistance levels, and (2) moving average crossovers as buy or sell signals.

(1) Moving averages often make effective support or resistance levels, that is, price levels at which the instrument should stop and reverse direction for some period of time. For example, refer to Chart 3 which is a daily bar chart of the June T-bond futures contract with its 9-day moving average overlaid. Notice how the contract throughout the October-January period found support and met resistance at the 9-day moving average many different times.

(2) Perhaps the simplest trading system involving moving averages is buying or selling when the price of an instrument moves above or below a particular moving average. For example, after an instrument has been trading below the 9-day moving average for several weeks, a trader may want to buy when the price crosses above that

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S&P 500 STOCK INDEX JUN 1998 .. Daily Moving averages - reg 10 30

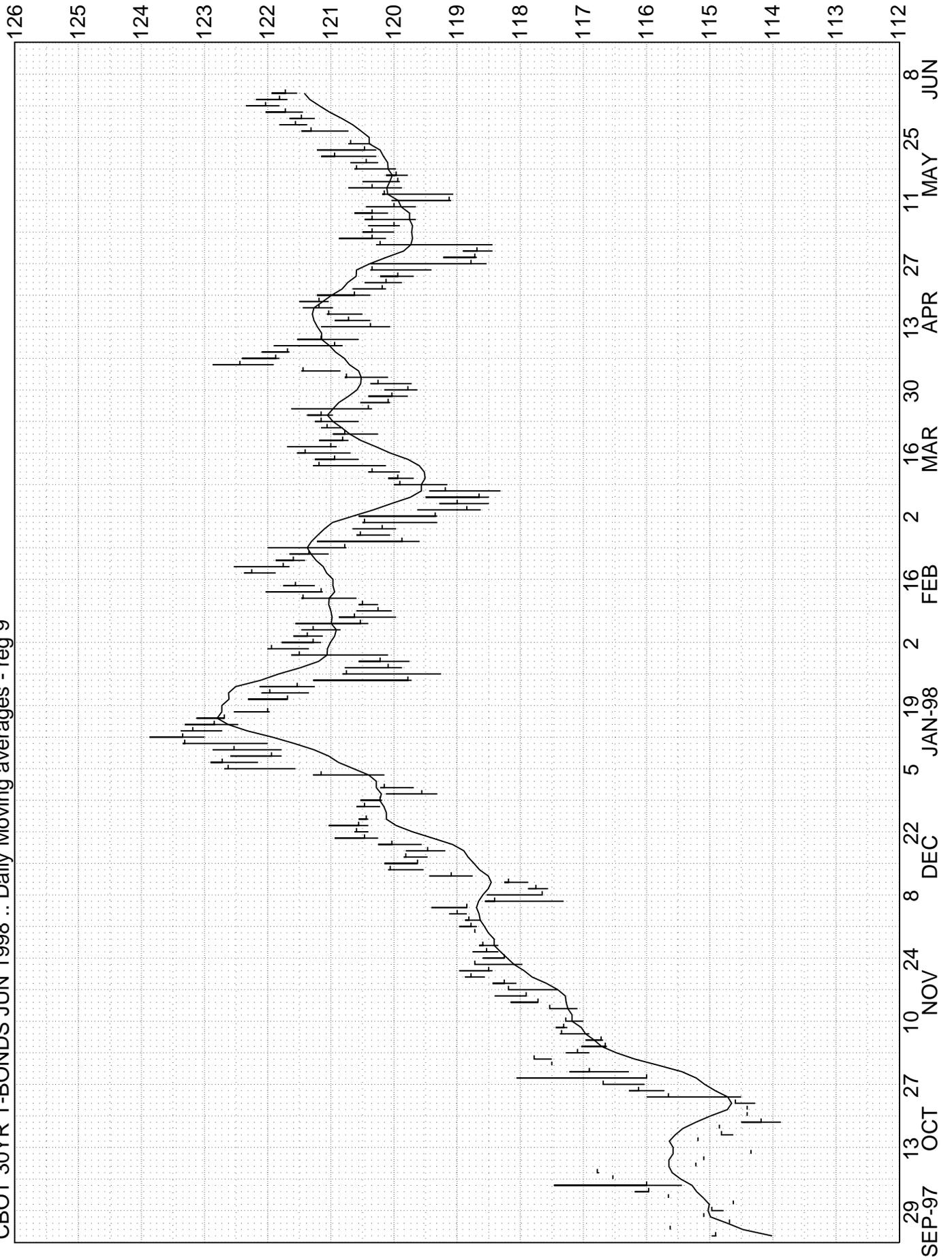


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moving average. The significance of such a cross-over is that the market has stabilized and turned higher and the instrument has thus been able to move above the average price seen over the past 9-days. This would indicate strength and that further price increases may occur. Notice how the T-bond price crossed above the 9-day average in late October and generated several winning trades in the direction of the trend.

Notice, however, that a trader using only a simple 9-day cross-over system would have made losing trades in January through April when the market was moving sideways. This illustrates that a simple moving average cross-over system only works well in a trending market. In a sideways market it will tend to give false signals.

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CBOT 30YR T-BONDS JUN 1998 .. Daily Moving averages - reg 9



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## Moving Average Difference Oscillator

### A. Definition

A Moving Average Difference Oscillator is simply the difference between two moving averages. The formula for this oscillator is the short-term moving average minus the long-term moving average.

For example, a 5-20 day oscillator is calculated as the 5-day moving average minus the 20-day moving average. A positive 5-20 oscillator means the 5-day MA is above the 20-day MA whereas a negative 5-20 oscillator means the 5-day MA is below the 20-day MA. The oscillator is quoted as a price rather than as an index or percentage. Optima provides several oscillator values in the section of the technical indicator report entitled "Moving Average Difference Oscillators."

It should be noted that in a strict sense, this indicator is not a true oscillator because the values do not vary between -1 and +1 as a true oscillator does. However, the term oscillator in reference to the moving average difference has come into common usage and therefore Optima uses the term. The most common method of watching a moving average difference oscillator is to plot the oscillator each day in the form of a line or histogram around a zero line. Chart 4 shows a daily Japanese yen futures contract chart, with 5 and 20-day moving averages overlaid, and the 5-20 day oscillator in the lower window. Notice how the crossover points for the two moving averages on the bar-chart line up with the zero crossover points of the oscillator which are much easier to see. The choice of the moving averages used in an oscillator is dependent on a trader's time frame and on the optimal value for a particular market. Popular intermediate-term oscillators are the 5-20 day the 9-18 day.

### B. Trading Use

A moving average difference oscillator can be used in several ways: (1) trend indication via an oscillator's direction and its cross-over of zero, (2) indication of overbought/oversold conditions, and (3) oscillator divergence versus price.

**(1) Using an Oscillator for Trend Indication** - The direction of an oscillator's movement generally provides an indication of the direction of the underlying market trend, and a reversal in the direction of an oscillator therefore suggests a reversal in the underlying market trend. For example, an oscillator which is rising is generally regarded as bullish, as long as the oscillator doesn't rise so high that it is in overbought territory. If the oscillator does rise into high territory, begins to slow down and finally turns downward, then the contract is giving an indication that it is losing upside momentum and that the short-term trend may be turning bearish.

Another way to use the oscillator as a trend indicator, is to watch for the oscillator to cross over its zero level. A well-known oscillator trading system involves buying an instrument when a particular oscillator crosses above the zero line and, conversely, selling when the oscillator crosses below the zero line. For example in Chart 4, if the 5-20 day oscillator has been above zero and is now moving downwards, a sell signal would be generated when the oscillator crossed below the zero line. This zero crossover means that the 5-day MA has now moved below the 20-day MA and that the short-term price action is therefore becoming more bearish. Notice that in Chart 4, a trader would have sold the market on February 18 as the 5-20 day oscillator crossed below zero. The trader would have stayed short until April 13 and then exited with a decent profit. However, the oscillator zero cross-over system, like most moving average systems, is only effective in trending markets and is prone to whipsaw in sideways markets.

**(2) Using an Oscillator as an Overbought/Oversold Indicator** - An oscillator can also be used to identify over-

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bought and oversold conditions by watching its absolute value. A very high (positive) oscillator value indicates that the shorter-term moving average is much higher than the longer-term average and that the current price may therefore be "too high" and may be getting ready to decline. At this high value, the instrument is said to be over-bought. A very low (negative) oscillator value indicates that the shorter-term moving average is much lower than the longer-term average and the current price may therefore be "too low" and may be getting ready to rise. At this low level, the instrument is said to be oversold. (See the RSI discussion for more on overbought and oversold conditions).

Since an oscillator is expressed in price terms, it does not have any pre-set level that is too high or too low, so one must look back over the history of the contract to see how high the oscillator has been before and therefore how high it must rise again to indicate an overbought condition. The opposite is true for an oversold condition.

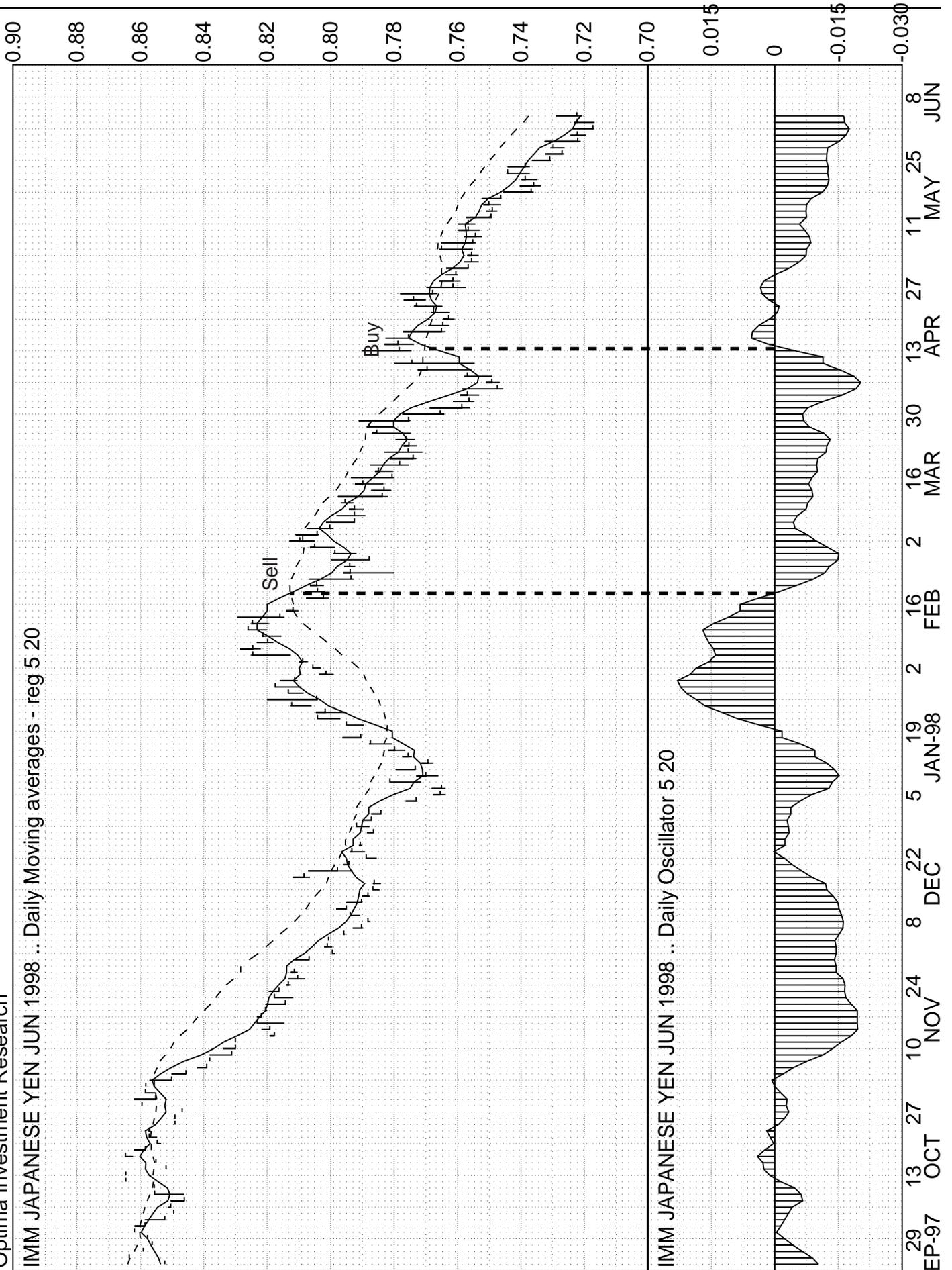
Notice that in Chart 4, the 5-20 day oscillator reached a very high historical level in late January and thus indicated an overbought condition. The market then declined for about the next eight weeks.

Using an oscillator as an overbought/oversold indicator suffers from the same limitation as any other overbought/oversold indicator. Overbought/oversold indicators only reach extreme levels during very strong trends which is a dangerous time to be trading against the trend on the assumption that the market move has been overdone.

**(3) Using an Oscillator for Assessing Divergence with Price** - Oscillators can also be used in conjunction with price movement to look for divergences and a possible reversal of trend. New price highs should theoretically be accompanied by new highs in the oscillator, and a price rally should be accompanied by a rising oscillator. The opposite should be the case for a bear market.

A divergence would occur, for example, when the price is reaching a new high but the oscillator is lagging and is not reaching a comparable new high. The conclusion is that the upward price movement has slowed and that the trend may be about to reverse. In Chart 4, for example, when the Japanese yen price fell to new lows in early-June, the oscillator did not and, in fact, it remained above the low that was established in early-April. This was an indication that the decline in May was of much lesser force than the February-April decline and that the downside momentum was slowing. This same type of divergence analysis is used with the RSI and momentum technical indicators that are discussed later.

IMM JAPANESE YEN JUN 1998 .. Daily Moving averages - reg 5 20



IMM JAPANESE YEN JUN 1998 .. Daily Oscillator 5 20

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## Relative Strength Index

### A. Definition

The Relative Strength Index (RSI) is one of the most popular overbought/oversold (OB/OS) indicators. The RSI was developed in 1978 by Welles Wilder.

The RSI is basically an internal strength index which is adjusted on a daily basis by the amount by which the market rose or fell. A high RSI occurs when the market has been rallying sharply and a low RSI occurs when the market has been selling off sharply. The RSI values range from zero to 100.

One characteristic of the RSI is that it moves slower when it reaches very overbought or oversold conditions, and then snaps back very quickly when the market enters even a mild correction. This brings the RSI back to more neutral levels and indicates that the price trend may be able to resume.

Welles Wilder originally used a 14-day RSI and the 14-day parameter is still used by many traders. However, the 9-day RSI appears to have gained more adherents because it is somewhat faster and more sensitive. For this reason, Optima uses the 9-day RSI. The overbought/oversold levels for the 9-day RSI are 80/20, as compared with 70/30 for the 14-day RSI.

The RSI should not be confused with the relative strength indicator which is commonly used in the stock market to assess the relative strengths between different stocks or between a stock and a stock index. Wilder's name "relative strength index" is actually somewhat misleading in that the RSI is not "relative" to anything else but is simply an internal strength index.

The general formula for the RSI is:

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

where  $RS = (\text{Avg of } n\text{-day up closes})/(\text{Avg of } n\text{-day down closes})$

Note: Optima uses  $n=9$  days so that this indicator is identified as a 9-day RSI.

The RS value is updated each day by multiplying both the up and down averages by 8, adding the current day's up, down or zero amount to the appropriate average and then dividing each by 9. The new RS value is then put into the RSI formula. This procedure produces a smoothing effect because it drops an average value from the price average each day rather than the actual price of 9 days ago.

The RSI calculation includes data going back to the beginning of the contract but is weighted towards the most recent 9 days. This is the consequence of the exponential averaging which is used in the calculation. Thus, the RSI in the first 9 days of trading in a contract is very erratic and reaches extreme levels and should therefore be ignored. The RSI calculation does not become sufficiently accurate until about 30 days of data are available.

Another consequence of the exponential weighting of the RSI formula is that one cannot simply use the last 9-days of price data in the formula and produce an accurate RSI value. Rather, one must begin the calculation in the first 9-days of the contract and then continuously update it from there.

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## B. Trading Uses

There are two basic ways to use the RSI, (1) as an overbought/oversold indicator, and (2) as a way to spot divergences between the movement of the RSI and the price of the underlying instrument.

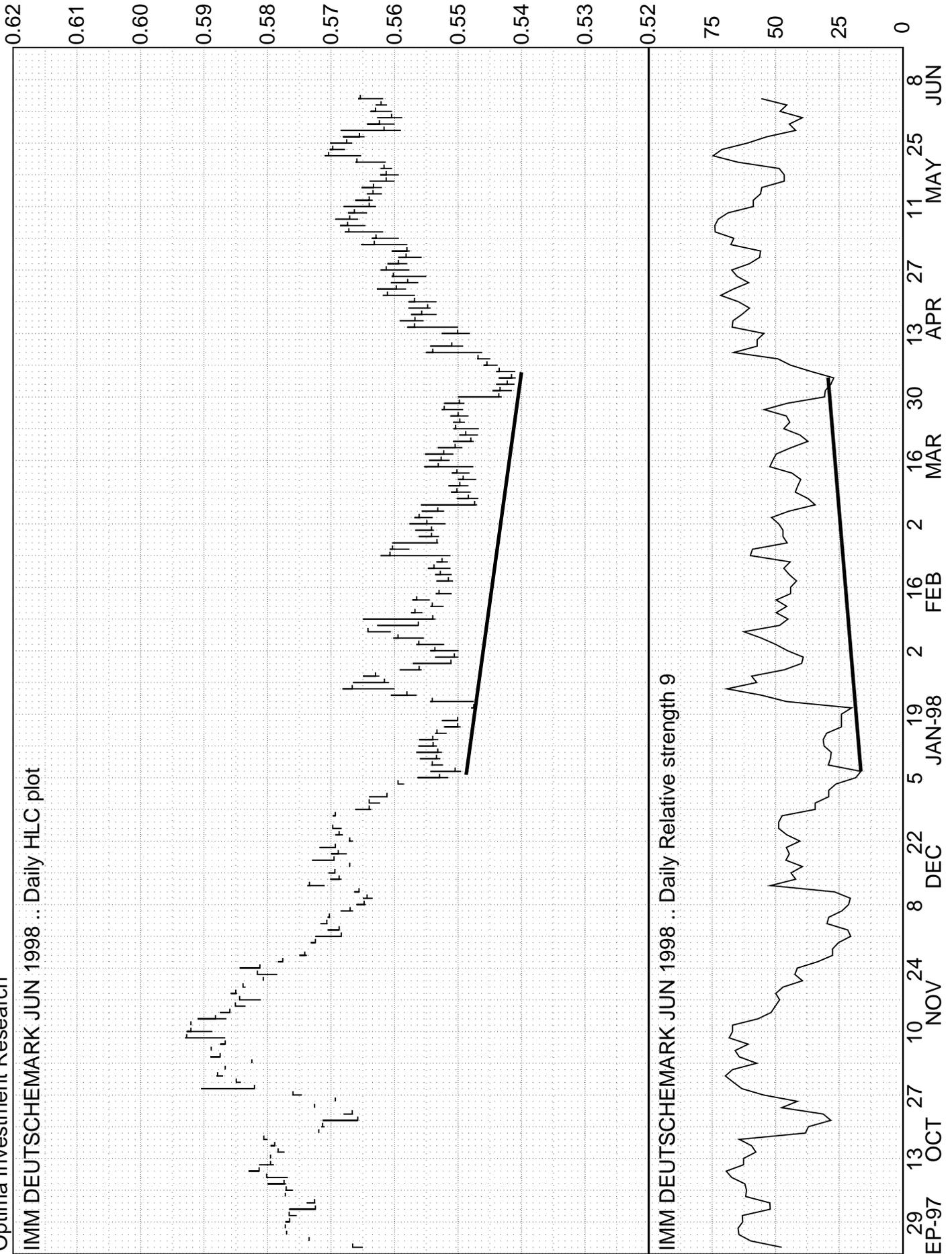
**(1) RSI as an Overbought/Oversold Indicator** - As an OB/OS indicator, a 9-day RSI value approaching 80 means that the market is overbought, i.e., the price is very high and almost everyone interested in this contract has already taken a position so that there are very few traders left to maintain buying pressure to push the price higher. There is also the possibility that because the price is so high, weak longs will begin to get out of the market. While the indicator by itself is not enough to trigger an automatic sell signal, it is a warning to be alert for any hint that long liquidation selling is beginning. On Chart 5, the 9-day RSI for the June Deutschemark futures contract moved up near the 80 level on several occasions, indicating that the market was due for some downward or sideways correction.

Conversely, a 9-day RSI value under 20 means that the market is oversold, i.e., the price is very low and almost everyone interested in this contract has either liquidated his position or has entered a short position, suggesting that there are very few sellers left to maintain the downward pressure on the contract. There is also the possibility that because the price is so low, new buying will soon begin to take place. On Chart 5, the RSI for the June Deutschemark contract fell to near 20 several times indicating several short-term bottoms.

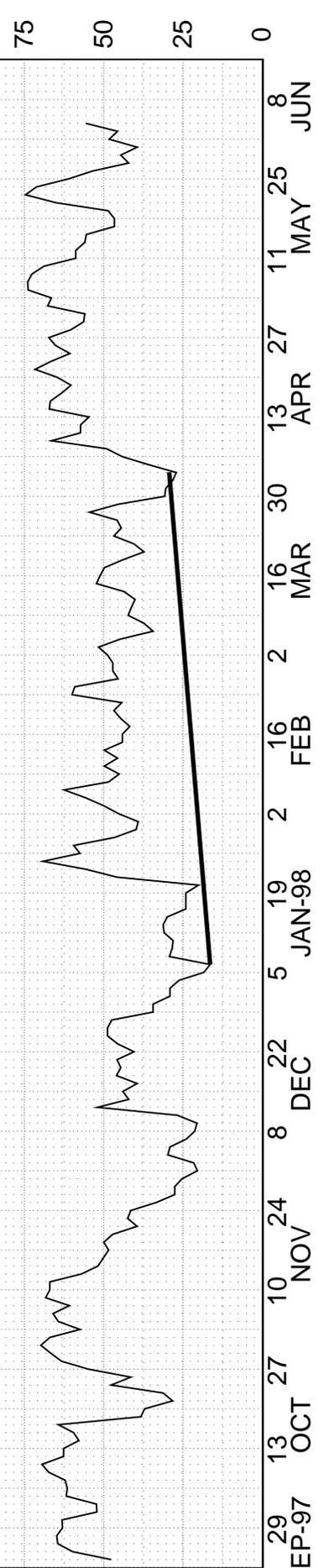
The RSI is very useful for gaining an overview of the overbought/oversold condition of the market. It should not be used in isolation as a trading signal, however. When the RSI rallies to 80, for example, the market is in a strong bullish trend and a trader who enters a new short position simply because the RSI is at 80 is trading against a strong bull trend. Rather, a trader watching a market with an RSI of 80 should perhaps wait for a better buying opportunity and possibly liquidate some of the long positions he/she may already own. If the trader is bearish on a market with an RSI of 80, he/she should at least wait to enter a short position until he/she gets some other indication that the bull trend is reversing, such as an outside-day-down reversal pattern or a breakdown in a trend-following indicator. Overbought/oversold indicators are useful tools when used in conjunction with other indicators, but are somewhat dangerous when used alone.

**(2) RSI and Divergence with Price Movement** - Another effective use of the RSI is to watch for divergences between the RSI and the price of the underlying instrument. For example, when prices have rallied to a new high but the RSI cannot rally to a comparable new high, then a divergence occurs. The weakness of the RSI is showing that prices are not as strong as they were during the previous rally and that the upward trend may therefore be waning. In Chart 5, note the bullish divergence that occurred during the early-January early-April period when prices were generally moving lower while the RSI was showing comparatively greater strength.

IMM DEUTSCHEMARK JUN 1998 .. Daily HLC plot



IMM DEUTSCHEMARK JUN 1998 .. Daily Relative strength 9



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## Momentum

### A. Definition

Momentum is simply the difference in prices over a period of time. Momentum is defined as the current settlement price minus the settlement price of n days ago. That positive or negative price difference is plotted around a zero line.

The general formula for momentum is:

$$M_n = P - P_n \text{ where:}$$

P is the latest settlement price

$P_n$  is the settlement price of n-days ago

The momentum line behaves in the following ways:

When the line is above zero:

- a rising line means the uptrend is getting stronger
- a level line means the uptrend is holding steady
- a falling line means the uptrend is fading

When the line is equal to zero:

- the trend is exactly sideways

When the line is below zero:

- a falling line means the downtrend is getting stronger
- a level line means the downtrend is holding steady
- a rising line means the downtrend is fading

### B. Trading Uses

Momentum can be used as a technical indicator in much the same way as the moving average oscillator is used. It can be used for identifying trends, overbought/oversold conditions and divergences. Again, the parameter used for the momentum indicator depends on a trader's time frame and the optimal value for a particular market.

Momentum can be used for trend identification by noting the direction of the line (e.g., rising line, bullish trend), the speed at which the line is rising or falling (e.g., steep rising line, very bullish trend), and the momentum line's cross-over of the zero level (e.g., a shifting trend).

Chart 6, for example, shows Sep T- bonds with the 30-day momentum line in the bottom window. A momentum zero cross-over system would have most recently told a trader to enter a long position on May 26. However, note the choppy signals that were given since mid-February when the market was not showing a clear trend.

Momentum can also be used as an overbought/oversold level by going back through the history of an instrument to note what constitutes an extreme level for a particular momentum line. Momentum can also be used in conjunction with the price activity to look for divergences. For example, if prices are rallying but the momentum

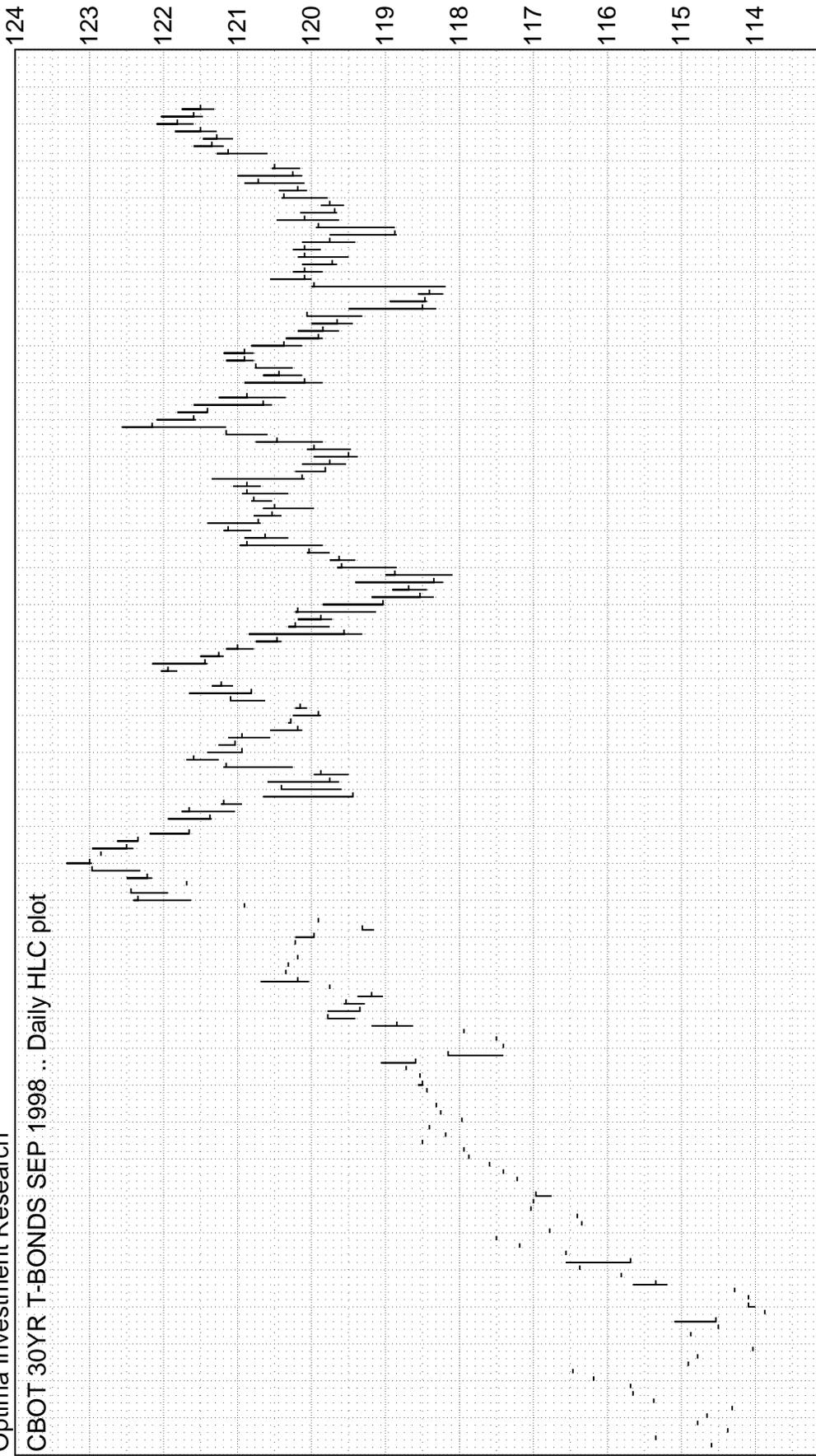
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line is falling, then prices are not rallying as sharply as they did in the recent past and the uptrend may be fading.

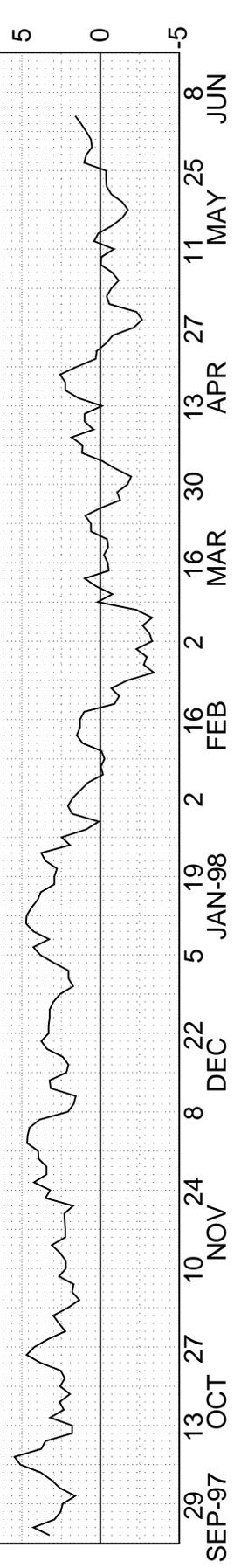
One of the disadvantages of the momentum indicator is that the momentum value can be distorted by a large price movement that occurred exactly n-days ago, i.e., a sharp advance or decline n-days ago could cause sudden shifts in the momentum line even though the current price showed little change. Another disadvantage is that it is difficult to know when the momentum line is moving into extreme ranges because each instrument has its own characteristics as to what constitutes extreme price movement.

Optima Investment Research

CBOT 30YR T-BONDS SEP 1998 .. Daily HLC plot



CBOT 30YR T-BONDS SEP 1998 .. Daily Momentum 30



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## Stochastics

### A. Definition

The stochastics indicator was developed by George Lane in the early 1960's. The stochastics indicator is based on the observation that as the price of an instrument increases, the daily closes tend to be closer to the upper end of the recent price range. Conversely, as the price decreases, the daily closes tend to be closer to the lower end of the recent price range.

The stochastic values simply represent the position of the market on a percentile basis versus its range over the previous n-day sessions. The percentile scale begins with zero at the bottom of the n-day range and ends with 100 at the top of the range.

There are three primary stochastic values: Raw K, %K, and %D. Raw K is the most basic value, %K represents a slowing of the Raw K value, and %D represents a slowing of the %K value (and thus a "double" slowing of Raw K). There are two parameters for stochastics, the n-day range over which the Raw K percentile is calculated, and the y-day exponential smoothing factor for %K and %D.

"Fast Stochastics" refers to comparing Raw K and %K, while "Slow Stochastics" refers to comparing the slower %K and %D values. However, it should be noted that there are a wide variety of different names for the stochastic values.

Raw K is simply the current settlement's percentile position versus the overall trading range seen over the previous n-days. For example, if the market settled at the very bottom of its 9-day range, then the Raw K value would be zero. If the market settled in the middle of its 9-day range, then the Raw K would be 50 and if the market settled at the very top of its 9-day range, then the Raw K value would be 100. As a note, Raw K is simply the inverse of Williams %R which uses an upside down scale with zero at the top and 100 at the bottom.

The formula for Raw K is:

$$\text{Raw K} = 100 [(C-L_n)/(H_n-L_n)], \text{ where}$$

C is the latest settlement price

$L_n$  is the lowest low for the past n-days

$H_n$  is the highest high for the past n-days

Note: The n-day range is a variable parameter.

Raw K is very volatile and tends to have little predictive value on its own. To make it more useful, two exponential moving averages of this value are calculated. Optima uses a 3-day exponential smoothing factor where:

%K is a 3-day exponential moving average of Raw K

%D is a 3-day exponential moving average of %K

The specific formulas used by Optima are:

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Today's %K =  $1/3$  Today's Raw K +  $2/3$  Yesterday's %K

Today's %D =  $1/3$  Today's %K +  $2/3$  Yesterday's %D

Note: For a explanation of exponential moving averages, see the section on Moving Averages.

Since %K and %D are both moving averages, they move more slowly than their underlying values and therefore present smoother lines. The %D line moves the slowest because it is a moving average of a moving average. Since these moving averages are exponentially weighted, the data that is included goes back to the beginning of the contract. Stochastics values, therefore, for the initial 9-days of a contract are very erratic and are of little use for analysis.

## **B. Trading Uses**

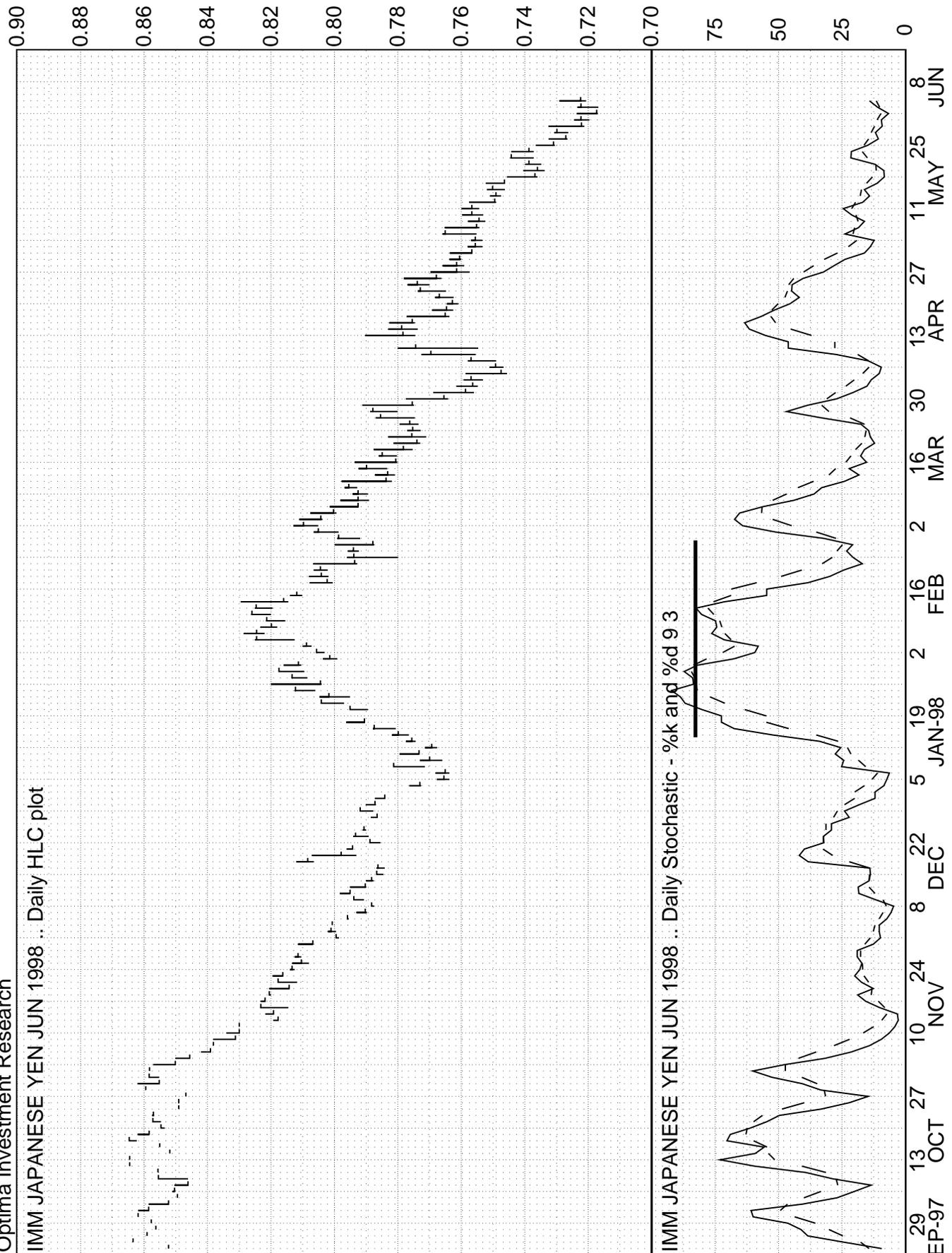
Stochastics can be used as both an overbought/oversold indicator and for cross-over signals. The first alert comes when the %D line moves into the territory above 80 or below 20. This indicates that the market has consistently rallied or sold-off versus its 9-day trading range and that the market movement may be overdone.

It is next necessary to analyze the data to determine if there is a divergence between the movement of the stochastic values and the actual price of the instrument being followed. For example, if the price of the instrument continues to rise to new highs, but the %D line does not also continue to make new highs, this is a bearish signal and indicates that the bull trend may be waning. The actual sell signal for this example occurs when the %K line crosses over the %D line, especially on the right side of the %D line, i.e., after the %D line has turned down.

Chart 7 shows the slow %K and %D stochastic values for the June 1998 Japanese yen futures contract. There are a number of occasions on the chart when %K crossed above/below %D with the absolute levels at fairly overbought/oversold levels. Note especially how the crossing on February 12 signaled the long downmove very accurately.

The stochastics system generally only has value when the market is in an overbought or oversold condition, i.e., when the %K and %D values are over 80 or below 20. It is therefore a type of overbought/oversold indicator and care must be taken when trading against a strong trend. According to Lane himself, the best use of stochastics is to buy into an established uptrend and to sell into an established down trend.

IMM JAPANESE YEN JUN 1998 .. Daily HLC plot



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## Pivot Point Analysis

### A. Definition

Pivot Analysis and the term Pivot Point are used in a variety of different ways in the literature on technical analysis. However, on the Chicago exchange floors, the Pivot Point is defined as the average of the previous session's high, low and settlement prices. Pivot analysis formulas are then used to calculate two resistance levels above the Pivot Point and two support levels below the Pivot Point. One characteristic of the pivot support and resistance numbers is that the range between the numbers will be larger as the daily range is larger, and vice versa.

The formulas for the five values are:

$$R2 = P + H - L$$

$$R1 = (2 \times P) - L$$

$$\text{Pivot Point} = (H + L + C)/3$$

$$S1 = (2 \times P) - H$$

$$S2 = P - H + L$$

where:

P = Pivot value

H = Session high

L = Session low

C = Session settlement

These are the formulas that are used by Optima. There are some other formulas which can be used to derive the support and resistance numbers but they are used much less frequently. For example, the first resistance level can also be defined as the Pivot Point value plus 1/2 the previous session's range. The first support level can be calculated similarly on the downside. The method that Optima uses, however, is the most widely used method and the same pivot numbers are carried internationally by at least one other major research firm.

### B. Trading Uses

Pivot numbers are used primarily as support/resistance numbers. Of the Pivot values, the Pivot Point itself is the best support/resistance level. The 1st and 2nd support/resistance levels have less reliability. All these pivot numbers, however, are very popular on the exchange floors and are used by a significant number of traders.

The Pivot Point itself can also be used as somewhat of a test price for the short-term trend. The Pivot Point represents a weighted average of the previous day's session since it is the average of the high, low and settlement. Thus if the market rallies above the Pivot Point, for example, the market may be indicating some strength. A weak market would be suggested by a price move below the Pivot Point.

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## Volume and Open Interest

### A. Volume

Volume is the total number of futures contracts traded during the entire trading day including the day, night and Globex sessions. Official volume figures for futures contracts are not available until the next day but estimated figures are available a short time after the markets close.

Volume can be used in two ways: (1) as a measure of the strength of a market trend, and (2) as a confirmation of price patterns.

(1) Volume is a measure of the intensity or urgency behind a price move. The general rule is that volume should increase in the direction of the existing price trend to confirm that trend. In an uptrend, for example, volume should increase as the price moves up and volume should decrease as the price moves down during corrections. In a downtrend, volume should increase on the downmoves and decrease during the corrective upmoves. These volume levels indicate that the current trend has strength and is likely to continue. If volumes are different than these, then a volume divergence is occurring and a change in the trend may be imminent.

(2) Volume can also be used to confirm a price pattern. In the Head & Shoulders pattern, for example, it is important that volume is light during the formation of the left shoulder and even lighter during the formation of the head. Volume should then be heavier on the subsequent move on the right shoulder through the neckline. Another example is that on Double and Triple Top patterns, it is important that there is lighter volume on the successive peaks with heavier volume on the downward moves. Triangle patterns are usually formed on lighter volume with heavier volume on the breakout from the pattern. In general, it is important to look for heavier volume on a breakout from chart patterns, trendlines and congestion.

### B. Open Interest

Open interest is the total number of outstanding futures contracts in existence at the end of the day. It is important to recognize that the figure represents the total number of outstanding longs or shorts, not the sum of both. This is because we are dealing with futures contracts and there must be a long for every short. Therefore we only count the number on one side of the trade.

The change in open interest is a measure of whether money is flowing into or out of the market. For example, when the price is rising and open interest is increasing, new long positions are being created and money is flowing into the market. This reflects aggressive new buying (which is pushing the price up) and is considered bullish. If, however, the price is rising but open interest is decreasing, this indicates that, while buying is pushing the price up, the buying is being done by short position holders who are covering their positions. This is considered bearish because the uptrend will probably run out of steam as soon as the short covering has been completed.

The reverse situation also occurs. When the price is falling and open interest is increasing, this indicates that the price decrease is due to selling being done to create new short positions. This is considered bearish because it is an indication that traders expect the downtrend to continue. On the other hand, if the price is falling and open interest is decreasing, this is an indication that discouraged holders of long positions (i.e., weak longs) are liquidating their positions. This is considered bullish because the downtrend will probably end as soon as most of the weak longs have liquidated their positions.

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## Historical Volatility

Historic volatility is a measure of the variability of the range of closing prices seen over a past period of time. To say it another way, historic volatility is essentially the standard deviation of closing prices over a period of time. A wide range of closing prices results in a higher standard deviation and thus in a higher historic volatility. Thus, a financial instrument with an historic volatility of 20% would have been closing over a much broader range than did a similar instrument with an historic volatility of only 10%.

Historic volatility is of primary concern to options traders who must constantly assess the volatility of the underlying instrument and the premiums that the options market is reflecting. Historical volatility always refers to the underlying instrument and not to the options on the underlying instrument.

Historical volatility can also be used as a tool by traders who are trading only the underlying instrument. Quantifying the volatility in a market can affect a trader's perception of how far the market can move and thus provides some help in making price projections and placing orders. High volatility can also sometimes indicate a trend reversal as heavy buying/selling comes into the market and causes sharp price reversals. Some traders try to avoid markets with high volatility and instead look for quieter markets which still have a clear trend.

### A. Definition

Historical volatility is defined as the standard deviation of the "price returns" over a given number of sessions, multiplied by a factor to produce an annualized volatility level. A "price return" is simply the natural log of the percentage price changes or  $\ln [P_t / P_{(t-1)}]$ .

The general formula for historic volatility is:

$$n - \text{session Hist. Vol.} = \sqrt{252} * \sqrt{\frac{\sum(R_t - \bar{R})^2}{(n-1)}}$$

Where:  $R_t$  (compounded price returns) =  $\ln [P_t / P_{(t-1)}]$   
where  $P_t$  is the settlement price in period  $t$

which is the average of the price returns  $\bar{R} = \frac{\sum(R_t)}{n}$

252 = the number of trading days in a year

$n = t - 1$  i.e., an  $n$ -day historical volatility.

$t$  = total number of prices used. Because it takes 1 additional session to produce the required number of price changes ( $n$ ),  $t$  must always equal 1 day more than the term of historical volatility ( $n$ ) being calculated. For example,  $t$  would equal 11 days for a 10-day historical volatility.

There are several different parameters in the historical volatility formula which can produce different, but still correct, volatility values. This is why no two information services are likely to produce exactly the same historical volatility figure. The parameters are: (1) trading sessions in a year (Optima uses 252), (2) the degrees of freedom (Optima uses one degree of freedom) which refers to the "1" in the  $n-1$  portion of the volatility formula, and (3) the number of sessions used to calculate an  $n$ -session historical volatility (Optima uses  $t = n+1$  sessions to produce  $n$  price changes). Optima follows the most widely used conventions.

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## **SECTION 2: STOCK MARKET INDICATORS**

### **Advance/Decline Line**

#### **A. Definition**

The Advance-Decline Line is simply the net number of advancing issues on a cumulative basis. The formula for the A/D Line is:

$$\text{A/D Line} = (\text{No. of Up Issues} - \text{No. of Down Issues}) + \text{Yest A/D Value}$$

The fact that the A/D Line includes yesterday's A/D value gives the indicator a cumulative effect and thus shows the net number of advancing issues over a period of time. The absolute value of the A/D Line is not important since the A/D value depends on the zero reference date that is used. The importance of the A/D Line lies in its relative value to other days and its chart patterns.

#### **B. Trading Uses**

An increasing A/D line shows that advancing issues are exceeding declining issues, thereby suggesting strength in the market. By the same token, a decreasing A/D line shows that declining issues are exceeding advancing issues, thereby suggesting weakness in the market. The A/D Line also can be analyzed with classic chart patterns and trendlines.

The A/D line is very useful for confirming price trends in the stock market and for identifying divergences which warn of trend reversals. In a stock market rally, an increasing A/D line would confirm the trend by showing that the majority of stocks are participating in the rally. On the other hand, a sideways or declining A/D line in a stock market rally would signal a divergence and would signal caution to the bulls. A declining A/D line in a rally would show that the majority of issues are declining and that the stock market rally is being fueled by a minority of stocks which may not be able to continue carrying the market higher.

In a stock market sell-off, a decreasing A/D line would confirm the bear trend by showing that the majority of stocks are participating in the sell-off. A divergence would emerge, on the other hand, if the A/D line was increasing in a bear market since the increasing A/D line shows that the majority of stocks are going up and that stock market prices are being carried lower by a minority of stocks.

Chart 8 shows a variety of stock market indicators along with the cash New York Stock Exchange Composite Index (NYFE). Note how the A/D line through the February/April 1998 price rally was able to keep pace with the price gains and make new highs as the price indexes made new highs. The A/D line during this rally thus confirmed the bull market. However, note the signal that the A/D line was giving in June 1998 when it fell to a 4-1/2 month low while the NYFE price index was still edging sideways. This meant that the majority of stocks were selling off and that only a small group of stocks were preventing the NYFE price index from plunging.

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## OVERBOUGHT/OVERSOLD INDICATOR

### A. Definition

The Overbought/Oversold Indicator (OB/OS) is simply a smoothed A/D Line. The smoothing is done by taking the 10-day exponential moving average of the A/D Line. The formula is:

$$\text{OB/OS} = .18 \times (\text{No. Up Issues} - \text{No. Down Issues}) + .82 \times (\text{Yest OB/OS Value})$$

The formula is the same as the Advance/Decline Line except that today's "No. of Up-Issues minus Down-Issues" is reduced in importance by multiplying it by 0.18, while yesterday's value is given greater weight by multiplying it by 0.82. This method of smoothing the A/D Line makes the A/D Line fluctuate within a much narrower range because of the heavy weighting given to past data.

### B. Trading Uses

The OB/OS indicator generally fluctuates in a range of +400 to -400. A level above +200 suggests an overbought market while a level below -200 suggests an oversold market.

**Overbought reading** - The significance of a high reading is that advancing issues have sufficiently exceeded declining issues so that the OB/OS value is pushed to a high level even though the exponential averaging factor of .82 for past data is dampening the indicator's movement. A sharp rise in the OB/OS indicator shows that advancing issues are exceeding declining issues by a very large margin, which indicates that a strong bull trend is in force and that a market correction may be due.

**Oversold reading** - The significance of a low reading is that declining issues have sufficiently exceeded advancing issues to push the OB/OS indicator to a low level. A low OB/OS value indicates a widely declining stock market and suggests that the decline has been sharp enough to possibly spark an upside technical correction.

As with other overbought/oversold type indicators (such as the RSI), caution must be used in simply selling an "overbought" market or buying an "oversold" market. This is because the trader would be going against a strong trend which has proven to be strong enough to push the overbought/oversold indicators to extreme levels.

The OB/OS indicator is shown in Chart 8. Note how the OB/OS indicator reached oversold status on three occasions (October 1997, January 1998 and April 1998) which turned out to be fairly significant market bottoms. The OB/OS indicator reached overbought status in October of 1997 accurately indicated the sharp correction that followed.

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## ADVANCE/DECLINE VOLUME LINE

### A. Definition

The Advance/Decline Volume Line is essentially the same as the Advance/Decline Line except that the A/D volume line uses up-minus-down *volume* in place of the A/D Line's up-minus-down *number of issues*. The A/D volume line uses net up-volume to gauge the strength or weakness of the market. The formula is:

$$\text{A/D Vol. Line} = (\text{Up-Volume} - \text{Down-Volume}) + \text{Yest A/D volume line}$$

The A/D volume line is a cumulative indicator which measures the net amount of up-volume (up-volume minus down-volume) from the zero reference day. The absolute value of the A/D volume line is not important since it depends on the day chosen for the zero reference day. The importance of the daily A/D volume figure lies in its relative value to other days and in its chart patterns.

While the A/D volume line is similar to the "On-balance Volume" indicator, it is considered to be a more accurate measure of up/down volume. This is because on-balance volume is calculated by assigning total volume as up-volume when the market closes higher or as down-volume when the market closes lower. The A/D volume line approach refines the on-balance approach by using the actual up and down volume figures rather than assigning total volume as up or down volume.

### B. Trading Uses

A rising A/D volume line is considered bullish because it shows that up-volume is exceeding down-volume. Conversely, a falling A/D volume line is considered bearish because it shows that down volume is exceeding up volume.

The A/D volume line can also be used to look at longer-term volume trends to see how long volume has been moving into up issues or down issues and the speed at which up/down volume changes are occurring. Classic chart patterns as well as trendlines can be observed and applied to the data.

The A/D volume line is very useful for confirming trends in stock market prices or for identifying price/volume divergences which warn of possible price reversals. A rising A/D volume line in a bull market confirms the bull market because it shows that net up volume is flowing into the market. However, a flat or declining A/D volume line in a bull market constitutes a divergence and shows that the volume of up-issues is drying up and is perhaps warning of a downside correction. Conversely, a declining A/D volume line in a bear market confirms the bear trend whereas a flat or rising A/D volume line in a bear market constitutes a divergence and warns of a possible upside correction.

Interpretation of the A/D volume line is basically the same as for the Advance/Decline Line since the A/D volume line is basically just an "Advance/Decline Line" for up-down volume.

The Advance/Decline volume line is shown in Chart 8. The A/D volume line during the February 1998 / April 1998 rally was extremely strong and led the rally all the way up. The significance of the strength in the A/D volume line during the strong February 1998 / April 1998 rally was that the majority of volume in the stock market was concentrated in the advancing issues and that volume in the weak issues was low. This was a bullish sign since it suggested that both volume and demand were flowing into the advancing issues, and that the declining issues were being left relatively alone.

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## TRIN - SHORT-TERM TRADING INDEX

### A. Definition

The Short-Term Trading Index, or TRIN, compares the ratio of the number of up/down *issues* with the ratio of up/down *volume* to measure the strength or weakness of the market. TRIN is used on an intra-day basis and is available from Quotron with the symbol TRIN. The formula is:

$$\text{TRIN} = (\text{No. Up Issues}/\text{No. Down Issues}) / (\text{Up Volume}/\text{Down Volume})$$

### B. Trading Uses

TRIN gauges the rate at which volume is flowing into the market relative to the ratio of advancing/declining number of issues. TRIN is based on the assumption that the direction and rate of volume is a leading indicator for the stock market. The data for TRIN is useful only for the current trading day and has no cumulative effect like the A/D Line.

#### TRIN of 1 is neutral

A TRIN of 1 is considered neutral because it means that the up/down volume and the up/down number of issues are both moving in the same direction in equal proportions. For example, the following three situations all give a neutral TRIN of 1:

$$\text{Bull Market: TRIN} = (1500/500)/(150\text{m}/50\text{m}) = 3/3 = 1$$

$$\text{Neutral Market: TRIN} = (1000/1000)/(100\text{m}/100\text{m}) = 1/1 = 1$$

$$\text{Bear Market: TRIN} = (500/1500)/(50\text{m}/150\text{m}) = (1/3)/(1/3) = 1$$

#### TRIN below 1 is bullish

*In a bull market*, a TRIN value below 1 is considered bullish because up-volume is unexpectedly high (i.e., up-volume is large relative to the ratio of up/down number of issues). In other words, a relatively large amount of volume is flowing into a limited number of advancing issues, suggesting that further volume is likely to flow into advancing issues. If TRIN is declining in a rising market, a bullish signal is given because it suggests that an increasing amount of volume is flowing into a limited number of advancing issues. For example:

$$\text{Bull Market: TRIN} = (1500/500)/(175\text{m}/25\text{m}) = 3/7 = .43$$

*In a bear market*, a TRIN value below 1 is also considered bullish because an unexpectedly low amount of volume is flowing into declining issues (i.e., down-volume is small relative to the ratio of up/down number of issues). If TRIN is declining in a bear market, a bullish signal is given because it shows that volume flowing into declining issues is drying up. For example:

$$\text{Bear Market: TRIN} = (500/1500)/(100\text{m}/100\text{m}) = (1/3)/1 = .33$$

#### TRIN above 1 is bearish

*In a bull market*, a TRIN value above 1 is considered bearish because an unexpectedly small amount of volume is flowing into advancing issues (i.e., up volume is relatively small compared to the ratio of up/down number of issues). If TRIN is rising in a bull market, a bearish signal is given because volume into advancing issues is drying up. For example:

Bull Market:  $TRIN = (1500/500)/(100m/100m) = 3/1 = 3$

*In a bear market*, a TRIN value above 1 is also considered bearish because an unexpectedly large amount of volume is flowing into declining issues (i.e., down volume is relatively high compared to the ratio of up/down number of issues). If TRIN is rising in a bear market, a bearish signal is given because it shows that volume is increasing into a limited number of declining issues. For example:

Bear Market:  $TRIN = (500/1500)/(25m/175m) = .33/.14 = 2.4$

The various values and significance of TRIN can be summarized as follows:

	Rising Market	Declining Market
TRIN below 1 (Bullish)	Bullish – High volume flowing into a limited number of up is-	Bullish – Low volume flowing into down issues
TRIN above 1 (Bearish)	Bearish – low volume flowing into up issues	Bearish – High volume flowing into a limited number of down

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## COMPARATIVE STRENGTH INDEX

### A. Definition

The Comparative Strength Index (CSI) compares the price activity of two different stock market indexes. The Comparative Strength Index is also called the "Comparative Relative Strength Index."

The "comparative" or "relative strength" concept is widely used in stock market analysis, not only to compare different stock market indexes, but also to compare stock market sectors (e.g., airlines, retail stocks) or individual stocks with the overall stock market. The Comparative Strength Index should not be confused with Wells Wilder's Relative Strength Index which is an internal strength indicator of a single market.

The general formula for the CSI is:

$$\text{CSI} = [(\text{Market Index} / \text{Base Index}) \times 100] - \text{CSI on Day \#1}$$

The specific CSI formula for the Dow Industrials index as the "Market Index" versus the S&P 500 index as the "Base Index," for example, is:

$$\text{CSI} = [(\text{DJIA} / \text{S\&P 500}) \times 100] - \text{CSI on Day \#1}$$

The multiplication factor of 100 is simply for purposes of scaling. Note that the value of the comparative strength indicator is based on Day #1 as the reference point, meaning that the absolute value of the indicator is not important; only its relative value is important.

### B. Trading Uses

The significance of the various values are as follows:

Rising CSI - A rising CSI value shows that the Dow Industrials index is outperforming the S&P 500. In a bull market, a rising CSI value shows that the Dow is rallying faster than the S&P 500 and that the Dow is leading the market higher. In a bear market, a rising CSI value shows that the broad S&P 500 market is falling faster than the Dow and that the broader market is leading the Dow lower.

Falling CSI - A falling CSI value shows that the Dow is under-performing the S&P 500. In a bull market, a falling CSI value shows that the Dow is rising slower than the broader S&P 500 market and that the S&P 500 is leading the Dow higher. In a bear market, a falling CSI value shows that the Dow is falling faster than the broader S&P 500 market and that the Dow is leading the broader market lower.

The CSI for the Dow Industrials index versus the S&P 500 index is shown in Chart 8. Note how the CSI indicator fell sharply from the middle of February to early April when the break-out to new all-time highs began. This indicated that the S&P 500 was leading the broad market higher. However, note how the CSI then rose steadily after April. This showed that the Dow took over the leadership position as the market went into a sideways trading pattern. This indicated that the market was worried about the quality of earnings in the broader market and was attracted to the blue-chip companies.

# NYSE INDICATORS

Optima Investment Research



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## CALL/PUT RATIO

### A. Definition

The Call/Put ratio is an overbought/oversold market sentiment indicator which utilizes stock market call/put option volume data. The formula is:

$$\text{Call/Put Ratio} = \text{CBOE Daily Call Volume} / \text{CBOE Daily Put Volume}$$

Optima uses the CBOE's "exchange-wide" volume in its calculations which includes the volume of all options on individual stocks. The volume of options on indexes, such as OEX options or S&P 500 options, is not included.

Optima tabulates and charts the daily call/put ratio and also the 10-day moving average of the ratio. The 10-day average of the call/put ratio smooths the daily call/put ratio and thus gives a longer-term perspective to the call/put ratio.

It should be noted that this is the *call/put* ratio, not the *put/call* ratio traditionally used by stock market technicians. The call/put ratio is simply the inverse of the put/call ratio. Optima uses the call/put ratio so that the indicator conceptually matches other overbought/oversold indicators with a high value for an overbought condition and a low value for an oversold condition.

### B. Trading Use

The interpretation of the call/put ratio is basically the same as for the bullish consensus. A very high call/put ratio is considered bearish because it shows that investors are trading heavily in calls and therefore the bullish activity may be overdone. The assumption is that a strong bullish market sentiment indicates that everyone is already bullish and therefore a correction is probably due.

By the same token, a very low call/put ratio is bullish because it shows that investors are trading heavily in puts and that bearish sentiment may be overdone.

Chart 9 shows the call/put ratio and the 10-day average of the call/put ratio plotted under the S&P 100 cash index price chart. The daily call/put ratio itself is fairly volatile and it is therefore difficult to attribute much significance to the up and down spikes. The 10-day average of the call/put ratio, on the other hand, provides a much clearer view of the behavior of options traders. In Chart 9 the average call/put ratio can be seen to be about 1.6 calls for every one put, with 1.7 – 1.9 representing an overbought level and with about 1.3 representing an oversold level. Note that the 10-day average call/put line follows the price action fairly closely and that the tops generally coincide fairly closely. For example, note how the peak on the chart in October of 1997 correctly anticipated the correction that followed.

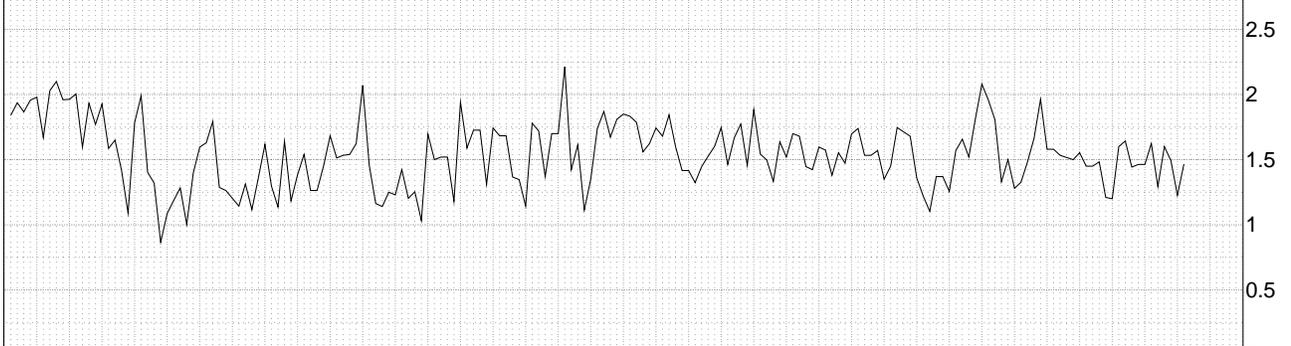
# OEX & SP INDEXES INDICATORS

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OEX .. Daily HLC plot



OEX .. Daily Call/put volume ratio



OEX .. Daily Call/put volume ratio 10-period avg



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## APPENDIX

### ANNOTATED BIBLIOGRAPHY OF BOOKS ON TECHNICAL ANALYSIS

Achelis, Steven B., **Market Indicator Interpretation Guide: Using The Technician**, Computer Asset Management, Salt Lake City, 1986.

This book provides a brief summary of the most popular stock market technical indicators.

Arms, Richard W. Jr., **The Arms Index**, Dow Jones-Irwin, Homewood, Ill., 1989.

Mr. Arms is the creator of the "Arms Index" which is otherwise known as "TRIN." This is therefore the most complete explanation of TRIN and using up/down stock market volume for assessing market direction.

Babcock, Bruce, Jr., **The Dow Jones-Irwin Guide to Trading Systems**, Dow Jones-Irwin, Homewood, Illinois, 1989.

This is a comprehensive description of the theory, creation and use of mechanical trading systems. It includes a systematic examination of which systems work and which ones don't work in various markets.

Bernstein, Jacob, **Short-term Trading in Futures: A Manual of Systems, Strategies and Techniques**, Probus Publishing, Chicago, 1987.

This is one of the few books available on short-term day trading. This is also one of the few books available which presents technical analysis in a more advanced way and presents a refinement of some of the basic technical indicators.

Cohen, A.W., **How to Use the Three-Point Reversal Method of Point & Figure Stock Market Trading**, Chartcraft, Inc., Larchmont, New York, 1985.

This is a very complete guide to constructing and using point and figure charts. Although it is directed primarily toward use in the stock market, it is very good for learning the basics of P&F charting. The book also covers pattern recognition and the use of technical indicators for the analysis of price movements.

Colby, Robert W. and Thomas A. Meyers, **The Encyclopedia of Technical Market Indicators**, Dow Jones-Irwin, Homewood, IL, 1988.

This book provides a very complete and comprehensive description of technical stock market indicators. Probably best used as a reference book to obtain detailed information about the value of the various indicators, how they are calculated and how they should be interpreted.

Edwards, Robert D. and John Magee, **Technical Analysis of Stock Trends**, John Magee Inc., 5th Edition, Boston, 1966.

This book is considered by many to be the classic treatise on chart patterns. It provides a very

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detailed description of chart patterns and their characteristics.

Eng, William F., **The Technical Analysis of Stocks, Options and Futures**, Probus Publishing, Chicago, 1988.

This is a good book for its chapter- sized explanations of popular trading methods.

Kaufman, Perry J., **The New Commodity Trading Systems and Methods**, John Wiley & Sons, New York, 1987.

This new edition completely revises and updates the work that was first published in 1978. After a brief explanation of the basic concepts of technical trading, the author evaluates the major trading systems and gives his opinion of which trading systems work best under what market conditions.

Malkiel, Burton G., **A Random Walk Down Wall Street**, W. W. Norton & Company, New York, 1985.

The author challenges the theory that stock prices can be predicted and thus takes a dim view of technical analysis as a basis for trading. Its value here is that the book helps to keep a technical analyst from becoming overconfident in his or her ability to read the market.

Murphy, John J., **Technical Analysis of the Futures Market**, The New York Institute of Finance, New York, 1986.

This book is an excellent overview of technical analysis as it applies to the futures market. The book is designed to meet the need for a complete reference on the subject.

Prechter, Robert R. Jr., **The Major Works of R.N. Elliott**, New Classics Library, Inc., Gainesville, Georgia, 1980.

Frost, Alfred J. and Robert R. Prechter, **Elliott Wave Principle**, 5th edition by New Classics Library, Gainesville, Georgia, 1985.

These two books are the primary sources of information on the Elliott Wave principle. The author, Robert Prechter, is the best known practitioner of the Elliott Wave principle.

Pring, Martin J., **Technical Analysis Explained**, McGraw-Hill Book Company, 1985.

This is the second edition of a very successful book first published in 1979. It contains a wealth of information about the working knowledge needed to understand, interpret and predict major market moves using the latest technical analysis tools and techniques.