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Developing A Trading Model For The S&P 500

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SECTION I - Introduction

Modern futures are a tactical procedure by which traders buy or sell a commodity in the future. They came about because of the inadequate marketplace of the mid-1800's. "Problems of supply and demand, transportation, and storage, however, led to a chaotic market place and the logical development of futures markets" (Catania 3). When harvest time came around, farmers' grain yields would far exceed the needs of the local millers. The millers knew this and would bid the farmers down to just pennies for a bushel of wheat or corn. These were the lucky farmers. The other farmers who harvested their crops later in the year found a market place that was supersaturated. Often they would end up dumping the grain on Chicago's city streets, where it spoiled. These problems with supply and demand created an unreliable market that made farming more difficult and the end consumers never knew what prices to expect at the local grocery store.

This was only one phase of the problem though. Some years there were droughts and other disasters that caused the crops to fail. At times like these, supplies dwindled, prices soared, and people went hungry. Businesses became insolvent because they lacked the necessary raw materials to produce marketable goods. Farmers had food for their families but no income to pay for manufactured goods. It is apparent that without a fair market for goods, chaos ruled the day.

To rid themselves of chaos, farmers started to deal in forward contracts which stated that goods would be delivered in the future for an already set price. The first of these contracts was for 3000 bushels of corn in 1851. These contracts immediately proved their usefulness because they were so much better than the prior markets that suppliers and purchasers had experienced.

But these early forward contracts did have shortcomings dealing with a means of standardization. There were no set quantities that forward contracts held. Even more importantly, there were no set quality standards to be met. The result was the times for delivery varied with every forward contract. To help offset these concerns, the Chicago Board of Trade took measures to standardize grain forward contracts by developing the futures contract.

The futures contract is one of the most common mechanisms to complete a sale between a buyer and seller for commodity traders. This contract is a "standardized, legal agreement to make or take delivery of a specific commodity at a designated place sometime in the future" (Catania 11). The commodities market place started out in the late 1800's by trading butter, eggs, milk, corn, wheat, soybeans, coffee, and cotton.

The market place is filled with two types of people. The first type are speculators because they actually do not want to make or take delivery of the commodity, but rather seek to profit from a change in the price. This group of people is willing to accept considerable risk for the opportunity of making a substantial monetary gain. They buy when anticipating rising prices and sell when anticipating falling prices. For obvious reasons, they do not bet their monthly mortgage payment on a market direction. The second group of people, called hedgers, make up the producers, processors, storehouses, and other brokers who wish to buy or sell the actual commodity. When hedgers purchase or sell a commodity, they successfully establish a known price level weeks or months in advance of the time they actually wish to make the exchange.

These two types of traders participate in all of the commodity markets around the world. "One of the most important is the CBO, The Chicago Board of Trade, which

executes contracts in agricultural commodities" (Mayo 667). This is not the only place where agricultural futures contracts can be bought or sold. For example, because of geography, wheat markets exist in Kansas City and Minneapolis. Individual brokers trade these commodities. The broker or the brokerage firm for which he works owns a seat on the commodity exchange. This "seat" gives him the right to bid and offer at open outcry the commodity being traded. Nevertheless, on needs to understand that futures terms can be misleading. For instance, to say that one wishes to buy a contract actually means that he wants the right to be able to buy a certain product in the future. The same holds true for selling a contract.

For example, let's say that farmer Jones has approximately 500,000 bushels of corn in his fields that will be ready to harvest in November. He has been watching the price of corn, and at this point the price is at a ten-year high, $3.25 per bushel. Farmer Jones knows that he can make a profit by selling his corn at this price. More importantly, he will be satisfied with this price. So in order for Jones to sell his unharvested corn today at $3.25 per bushel, he needs some facility to do this. The Chicago Board of Trade is his solution. He calls a local commodity broker and offers to sell 500 contracts of corn futures. Each corn future has a trading unit of 1,000 bushels. His broker in turn sends the order into the Chicago Board of Trade where it is sold at open outcry in the trading pit. The buyers of these contracts have just received the rights to 1,000 bushels of corn per contract delivered to them in December, at a price of $3.25 per bushel. To protect the buyers of this contract, the corn will have to meet a set standard or else a discount will be given to the buyers.

Leverage is the most important key behind profits and losses, and means the ability to control the whole value of a futures contract with only a fraction of the actual price. Think again about those 500 corn future contracts which farmer Jones sold. The purchasers of those contracts at $3.25 per bushel might only be required to have a capital margin on account of $.30 per bushel. They only need $.30 per bushel x 1000 bushels per contract for a total of $300 to control a contract of December corn worth $3250. This capital is not payment for the futures contract, but it is a security deposit to ensure contract performance. If the price of December corn rises, then the purchasers will not have a margin call. But if the price of December corn falls lower than $3.25 a bushel, then the purchaser of the contract will have to provide additional funds, or else the contract will be sold by the broker to settle the account.

That is how leverage works by allowing a small capital monetary percentage to control the total contract. The smaller the margin requirement in relation to the size of the futures contract, the greater the leverage. If a person speculates in futures contracts and the price moves in the direction that is favorable to him, leverage will yield large profits in relation to the required margin. On the other hand, if the price moves in an adverse direction, then large losses will quickly mount against the beginning capital margin requirement. Thus, leverage is a two-edged sword.

For example, if a buyer assumes that stock prices will rise, he will purchase one March S&P 500 stock index futures contract at 800. Also, assume that their stock brokers require them to keep $10,000 in an account as a margin requirement. Since the value of the future contract is $500 times the index, each 1 point move in the index represents a $500 gain or loss.

Therefore, an increase in the stock index from 800 to 820 would double the amount of the margin deposited with the broker from $10,000 to $20,000. Conversely, a decrease from 800 to 780 would completely wipe out all the capital margin requirement with the broker. That makes a 100% gain on the margin with only a 2.5% change in the stock index!

An absolute prerequisite for anyone considering trading in futures contracts is to clearly understand leverage as well as any gain or loss that will result from any given change in the futures price of the particular contract being traded. If you cannot afford the risk, or even if you are uncomfortable with the risk, the only sound advice is "Don't trade". Futures trading is definitely not for everyone.

Margins and leverage are directly linked to each other. "A margin payment on a futures contract is a performance bond guaranteeing that both the buyer and the seller will perform according to the terms of the contract" (Sander 8). This margin is not a down payment, but it can be thought of as an insurance policy for the broker. As has been shown above, a very small change in the S&P 500 stock index can completely wipe out a margin deposit. This type of price movement necessitates the margin requirements. Maintenance on these margin accounts differs between brokers and brokerage houses. Also, a speculator can assume a higher margin requirement because he doesn't have any other cash positions which can counteract adverse price movement.

A further market risk is **Volatility.** When the market is experiencing large price movements, it is said to be very volatile. Therefore, a market with high volatility is one with high risk. For example, in 1988 the December corn future had been trading at around 40,000 contracts per day for the last five months. Then on May 16, it burst out with

63,000 contacts after the mid-west grain report was issued. The report stated that fewer acres of corn were actually planted then previously estimated because of the wet spring. This report sparked the price increase from $2.25 a bushel up to $3.70 per bushel. During this rise in price the volume of corn contracts peaked at 126,000 traded per day. "The volume/price behavior of December corn is representative of all the futures markets and instructs us that dramatic price changes are accompanied by significant changes in volume" (Kroll 133). During these times brokerage houses require a larger percentage of a commodity contract's price in a margin account. Thus, this three-way relationship between leverage, margins, and volatility is very important to futures traders.

SECTION II - The Trading Model

Creating and testing **a trading model** demands a basic understanding of what a futures contract is and some of the variables that affect it. The model to be presented can be implemented in today's marketplace with predictable success. The first step in creating such a model is to determine the information to be used. This information will vary widely among futures traders because the price can be very expensive. The range is from free to over $300 dollars a month for real-time quotes. The free services like CNBC just show the Dow Jones Industrial composite, Standard & Poor's 500 stock index (S&P 500), National Association of Security Dealers Automatic Quotation system (NASDAQ) composite, and a ticker tape. The problem with this form of data is that these numbers will have to be manually entered into a trading program, a time-consuming process making intraday trading impossible. Manually entering numbers into a computer program at the end of day is only feasible for charting larger market trends. The important difference between these services is that real time gives continual price quotes of stocks, bonds, stock indexes, and commodities at the price they are currently being traded for via electronic data signals. These quotes are provided by real-time service providers such as Signal Company.

The individual prices are transferred via television cable or by satellite. Cable is the preferred highway of transfer because most homes and business have easy access to it. If you purchase real-time data, Signal will send a receiver box and a password for installation at your trading location. Installation is a simple process of splicing the television cable to the back of the signal box and then hooking up a parallel port connection from the Signal receiver box to a personal computer (PC). Now that the (PC)

is physically connected to the receiver box the only other step is to install the software that Signal provides which configures the (PC) to accept the electronic data feed with the correct password. The last step in installation is customizing the computer program that will be able to utilize this expensive real-time data.

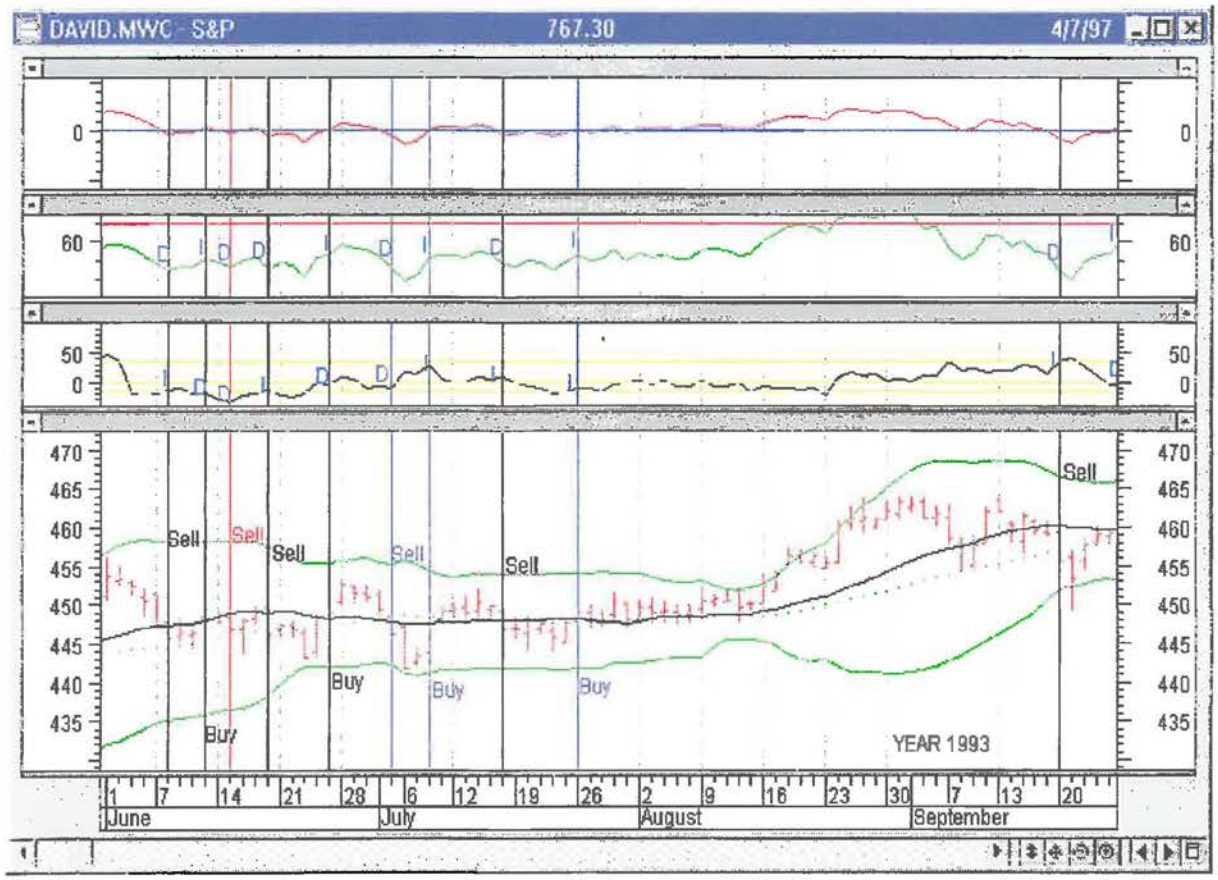
MetaStock RT is one prominent computer program that will transform real-time data into usable charts, indicators, and studies. MetaStock RT collects real-time data from the Signal receiver and updates all of the designed instruments in use. Every price tick in the commodity trading pits results in updated information that providing the latest market information immediately. By utilizing this software a futures trader can enter many successful intraday trades.

Unfortunately, limited economic resources can reduce real time trading possibilities. Therefore, the standard MetaStock for Windows "version 5.1" presents a viable option for developing a futures trading model. This software package costs around $300with no other data feed costs. All price quotes are manually entered at the end of the trading day. In view of the preceding considerations, MetaStock for Windows "version 5.1" is preferred.

The last step before getting in and working with the parameters of the MetaStock software is to decide which commodity to trade. The (S&P 500) stock index represents a good trading vehicle. First is because of its popularity, meaning that many traders buy and sell (S&P 500) futures contracts, thereby leading to market equilibrium. According to Robert Daigler, this stock index has been rising in the number of contracts traded since its inception in 1982 (44). Approximately 60,000 (S&P 500) futures contracts are traded every day on the Chicago Mercantile Exchange. The second reason is its market breadth.

This stock index is composed of the 500 largest companies currently trading on the (NYSE) and (NASDAQ). The immense size of this stock composite assures traders of an accurate reflection of market strength, weakness, and, more importantly, direction. The third reason is that this index is directly tied to the cash price of the 500 composing companies, thus giving a perfect medium of exchange without ever having to deliver or receive shipment of goods.

The trading model is interpreted by understanding the significance of each quadrant. The first quadrant contains a price oscillator which displays the difference



between two moving averages of a security's price. "Moving average analysis typically generates buy signals when a short term moving average (or security's price) rises above a longer-term moving average. Conversely, sell signals are

> generated when a shorter-term moving average (or security's price) falls below a longer-term moving average. The Price Oscillator illustrates the cyclical and often profitable signals generated by these one- or two moving - average systems." (Achilles 241)

This difference is expressed in point form. When the moving average crosses the **(0)** line the model will signal to buy a futures contract if the moving average is coming out of negative territory and into positive. If the moving average is leaving positive ground and crossing the **(0)** line into negative, than a futures contract should be sold. The Price Oscillator's formula is ((shorter moving average - longer moving average) / shorter moving average) x 100.

The second quadrant contains the Relative Strength Index. "The name Relative Strength Index is slightly misleading as the (RSI) does not compare the relative strength of two securities, but rather the internal strength of a single security" (MetaStock 364). The formula for (RSI) = 100-[100/(1+(U/D))], where U = an average of upward price change, and D = an average of downward price change. In this model it is immaterial if the (RSI) is one increasing (I) or two decreasing (D); what is crucial is whether or not the direction of movement is synonymous with Chaikin's Volatility indicator.

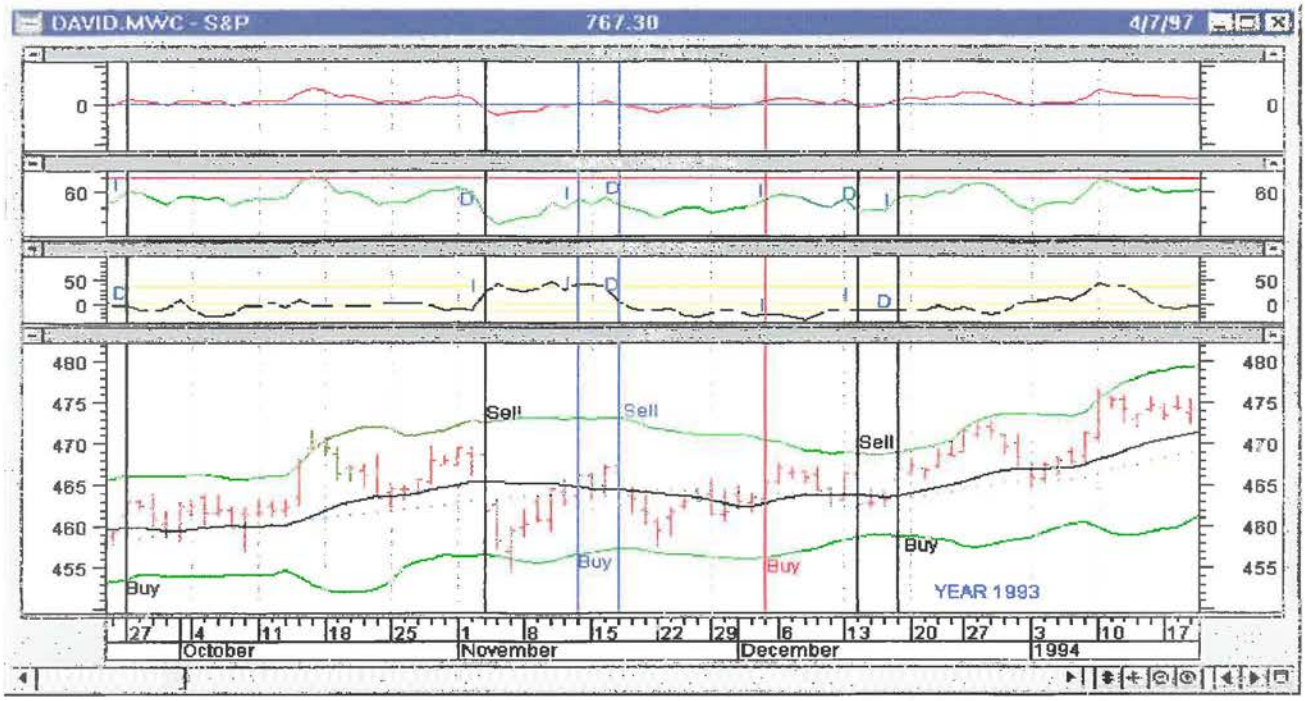
The third quadrant contains Chaikin's Volatility indicator. Chaikin's volume accumulation is a sensitive intraday measure of volume in relation to price action (Murphy 189). Volume analysis helps in identifying internal strengths and weaknesses that exist under cover of price action. Very often, volume divergence and price movement are the only clues that an important reversal is about to take place. The Chaikin Oscillator is an excellent tool for generating buy and sell signals when its action is compared to price

movement. This indicator, as used in this model, needs to be moving in the same direction as the (RSI) before a futures trade is entered. For example, if the Price Oscillator is moving from positive territory to negative and both the (RSI) and Chaikin's Volatility indicator are decreasing, then a positive sell signal has occurred, and a futures contract should be sold.

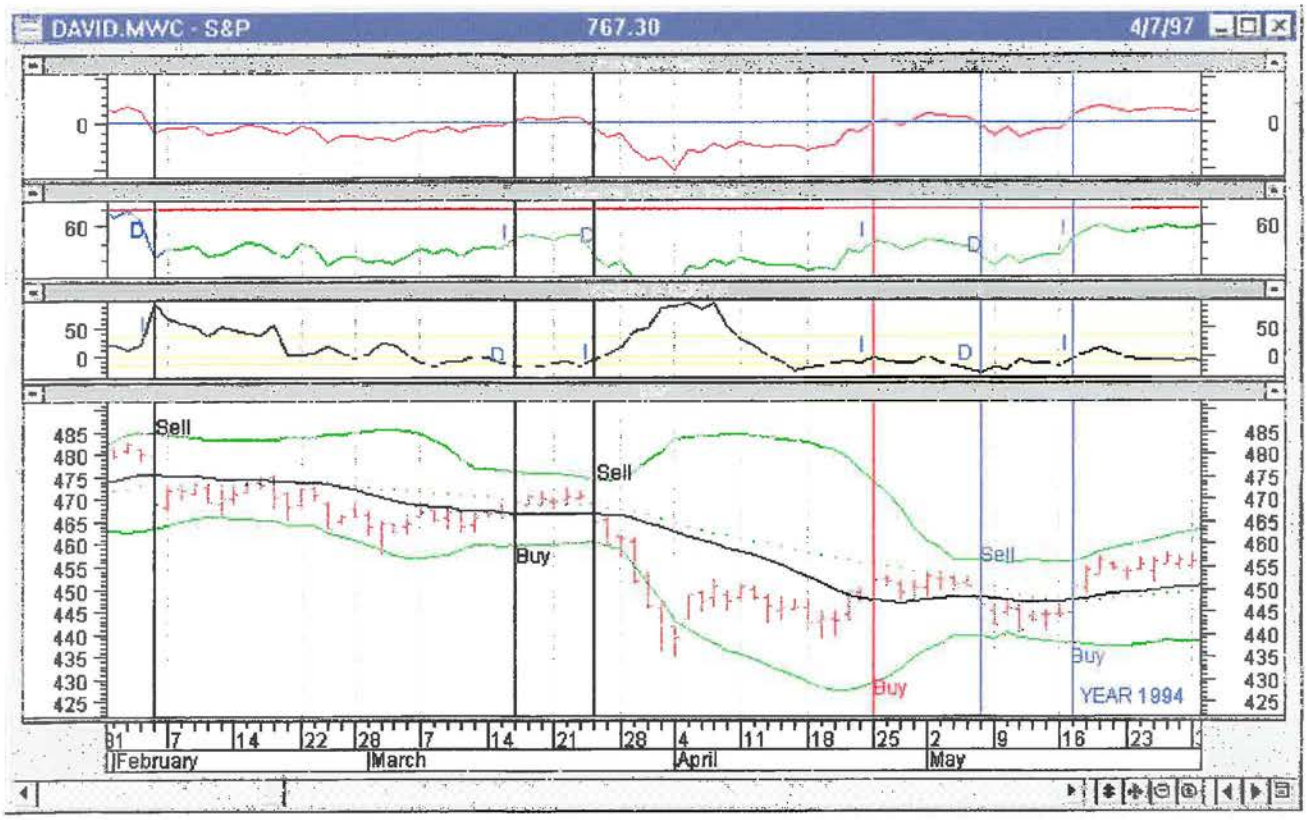
The fourth and final quadrant contains the price of the S&P 500 on that specific date. The small horizontal bar on the left-hand side of each intraday tick represents the opening price of this security while the horizontal bar on the right-hand side represents the closing price of the security on each respective day. The green channels that surround the security are Bollinger bands. These bands are plotted at two standard deviation levels above and below the moving average of the (S&P 500). These bands are significant because they help by statistically predicting the longer term direction of the commodity.

The Research in the following section, shows some of the work generated for this trading model. Beginning on June 1, 1993, when the (S&P 500) was trading at 450 (see page 9) and continues through April 4, 1997, when the (S&P 500) was trading at 760. Horizontal lines combine to give signals which are printed in three different colors. The blue color represents a signal yielding successful results. The red color represents a signal yielding unsuccessful results. Finally, the black color represents an incomplete signal that is never entered.

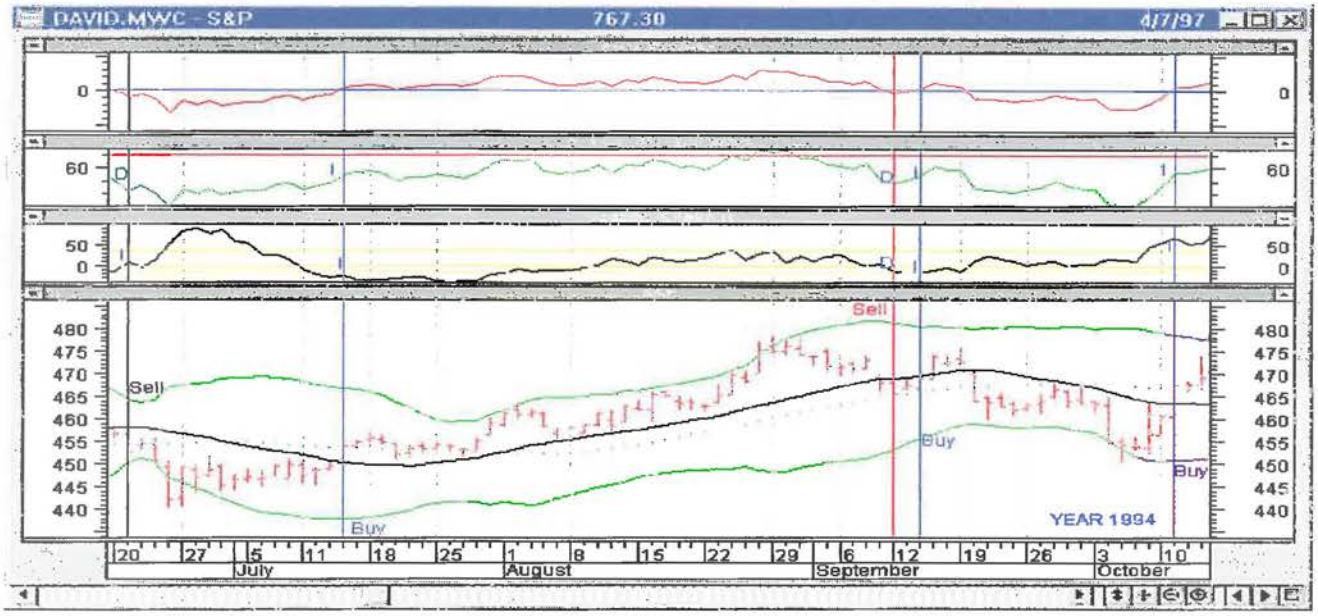
The following is a portion of the trading model from September 27, 1993, through January 19, 1994. Note that on November 17, 1993, a futures trader can make money even when the commodity's price is declining (see page 12).



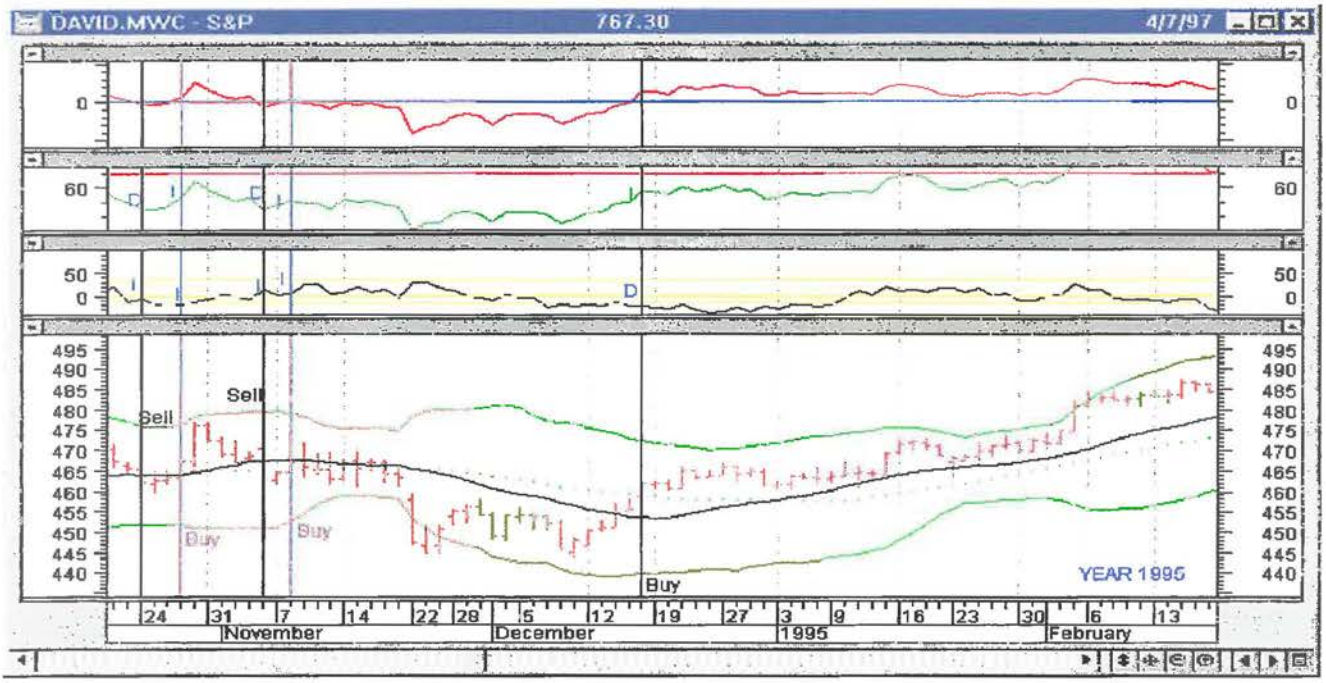
The following is a portion of the trading model from January 31, 1994, through May 27, 1994. Even though the (S&P 500) decreased over this time period, the model still gave 3 signals, 2 of them being correct.



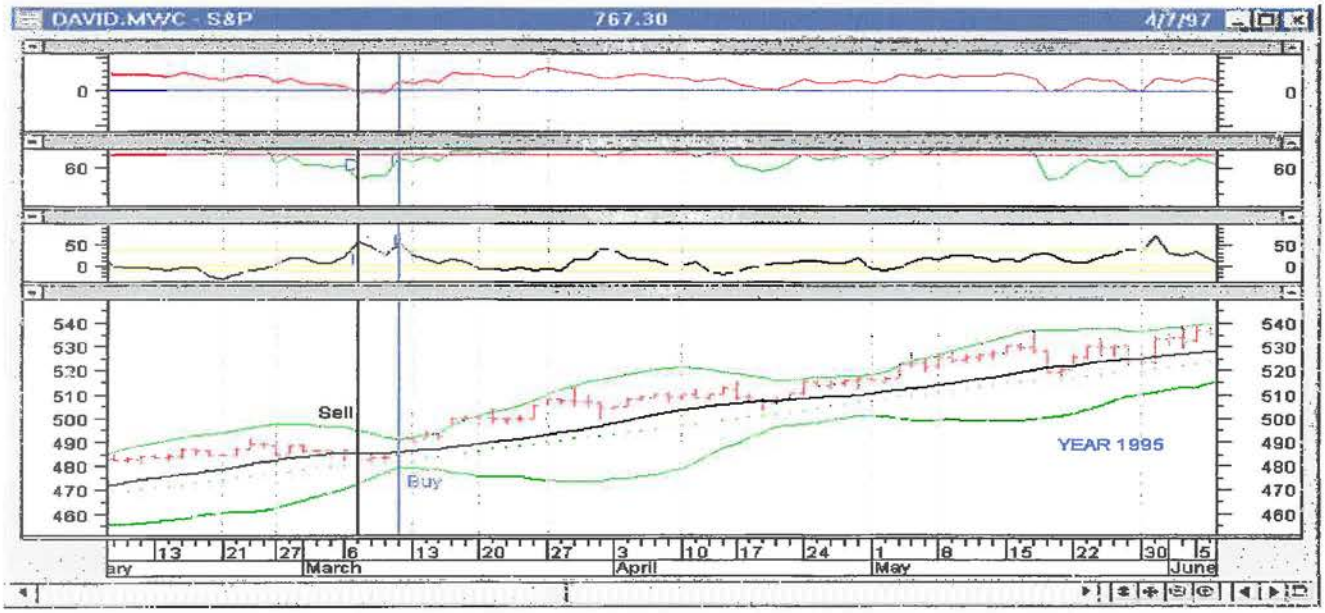
The following is a portion of the trading model from June 20, 1994, through October 13, 1994. On June 14, a perfect buy signal was generated by the trading model that predicted an upward trend throughout the whole month of August.



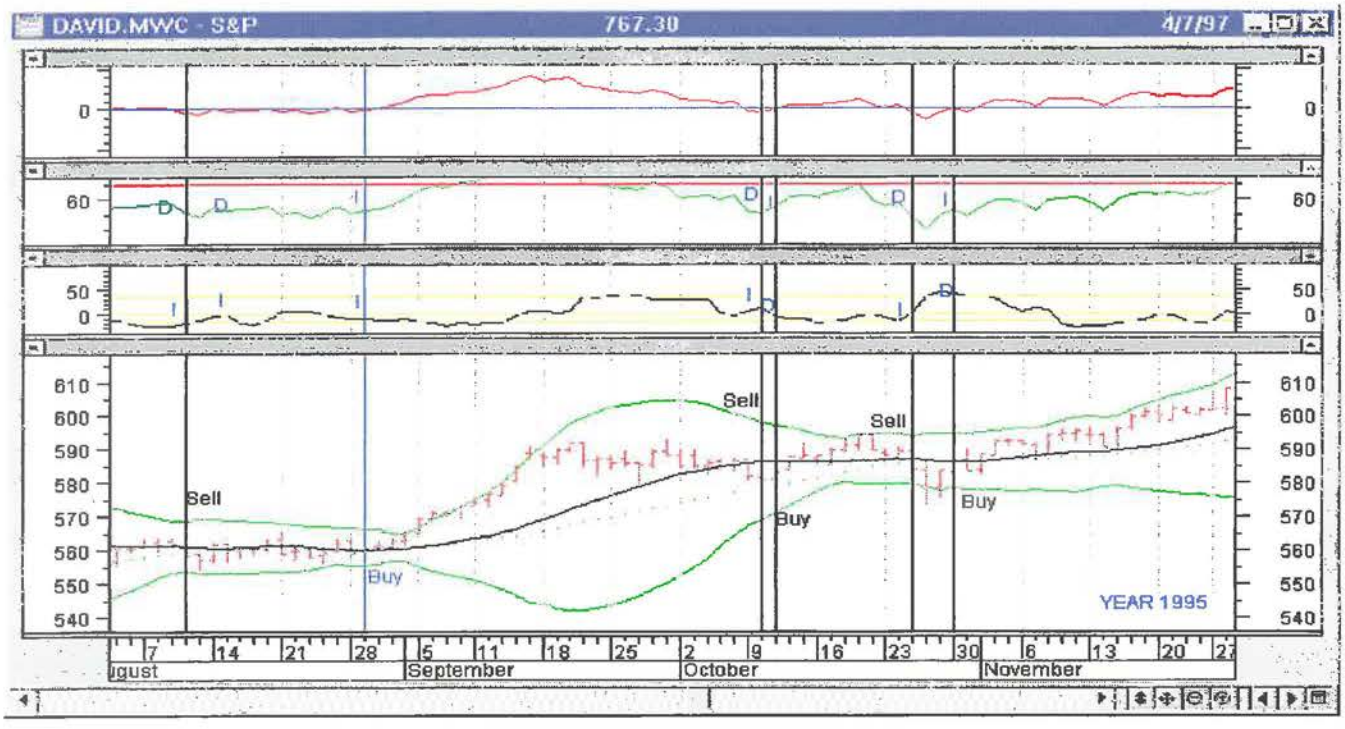
The following is a portion of the trading model from October 24, 1994, through February 17, 1995. It is unfortunate that the signal on December 16, 1994, was not complete, because the (S&P 500) trended nicely after this date.



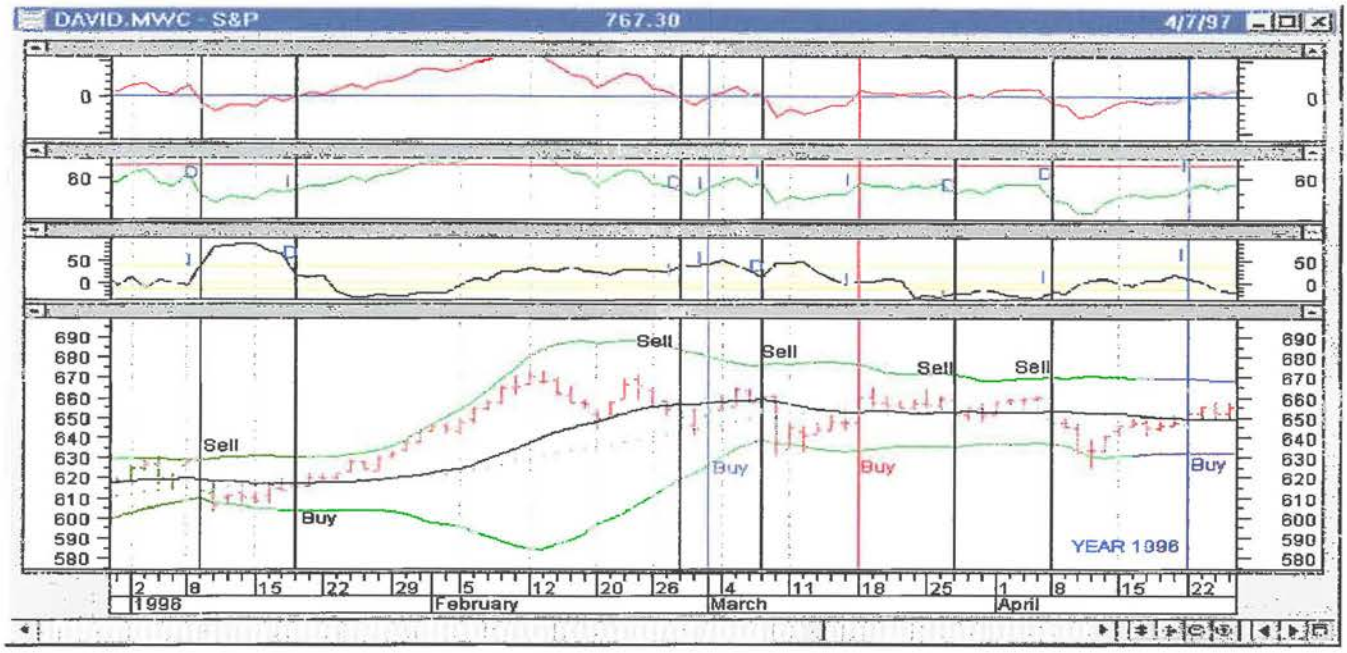
The following is a portion of the trading model from February 8, 1995, through June 5, 1995. On March 10, a complete buy signal was generated which would result in over 100 (S&P 500) index points gained.



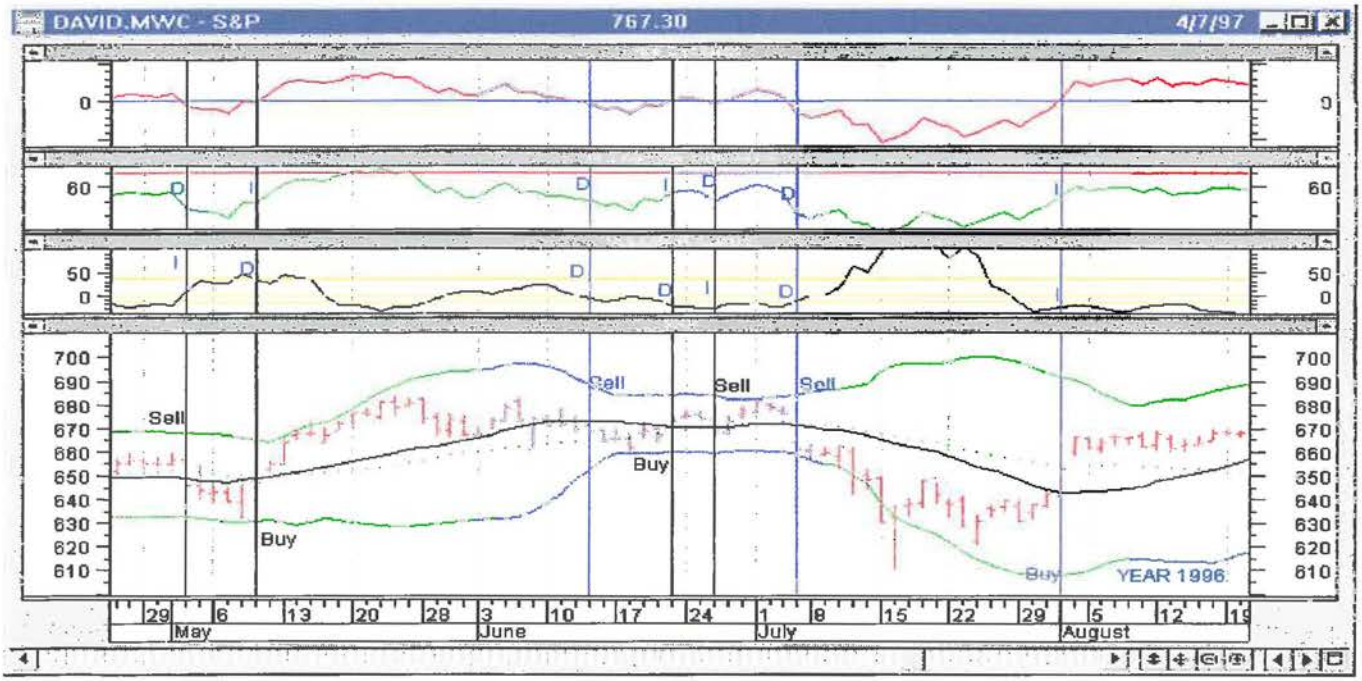
The following is a portion of the trading model from August 3, 1995, through November 28, 1995. Volatility increased during the month of September causing the Bollinger bands to widen.



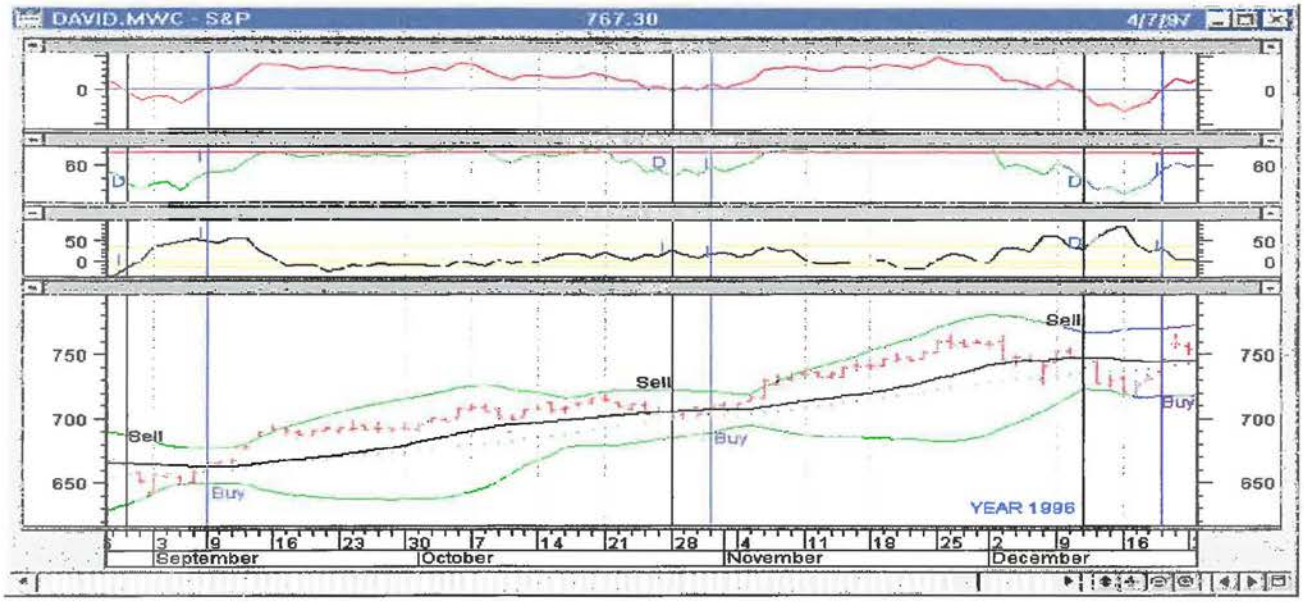
The following is a portion of the trading model from January 2, 1996, through April 25, 1996. This time period was unusually volatile causing a lot of incomplete signals.



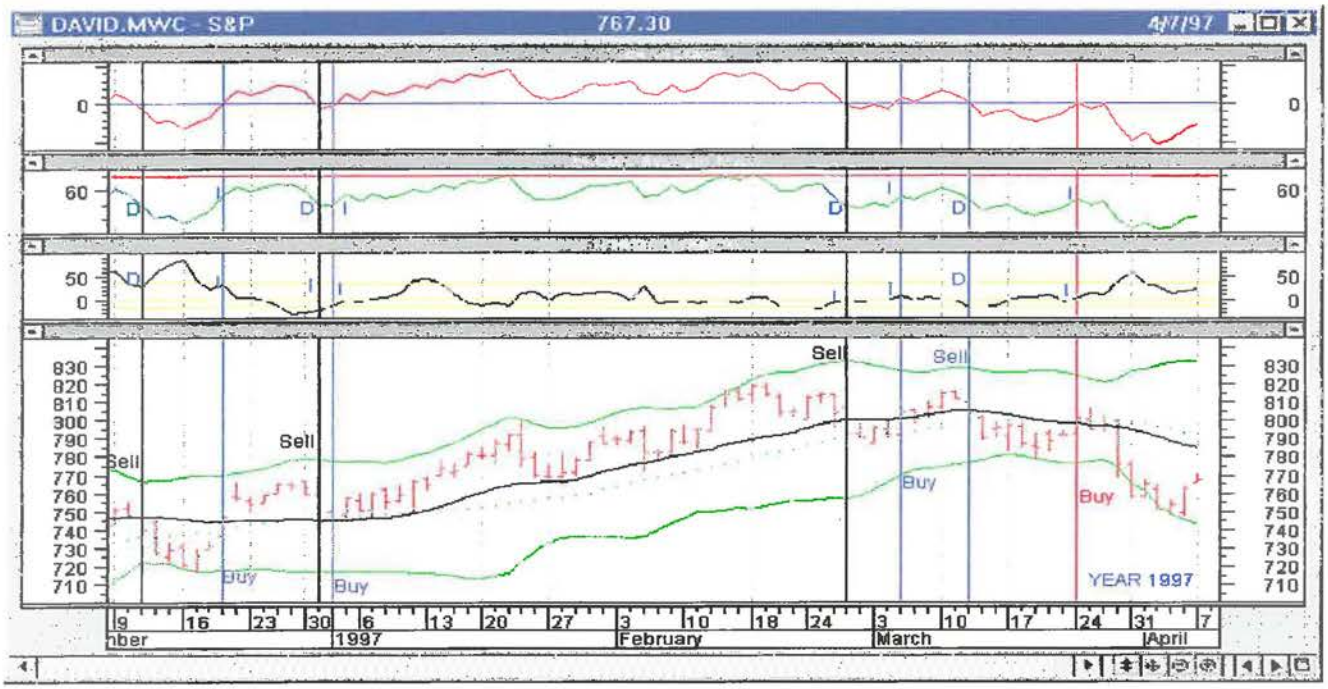
The following is a portion of the trading model from April 25, 1996, through August 20, 1996. On July 5, a complete sell signal was given that captured over 30 (S&P 500) stock index points.



The following is a portion of the trading model from August 27, 1996, through December 20, 1996. October 31, had a very important complete buy signal because the model quickly reversed back to a buy following the longer trend started in September.



The following is a portion of the trading model from December 9, 1995, through April 7, 1997. On December 31, a complete buy signal was generated that predicted the (S&P 500) stock index price direction for the next 2 months spanning over 50 points.



In each of the forgoing examples of the trading model, the trader must enter a trade the following morning after a complete signal. If this had been done, 26 of the 32 signals will be correct, giving this model a success rate of 81 percent. This success rate results in an optimistic gain of 340 points, equaling $170,000.

SECTION III - Conclusion

This model's success rate of predicting a price trend in the S&P 500 can be a major benefit to a futures trader. On the other hand, one major problem currently exists with this model. The model does not predict when to exit a trade. Research seems to indicate that a trader can enter the market the following day after a complete signal and at the same time, place a stop order, five points above the future's purchase price for a sell signal or five points below the future's purchase price for a buy signal. This stop order can then be moved down or up respectively to assure the trader's minimizing losses and maximizing gains. With a stop order of five points entered, the maximum loss will be $2500 plus minimal broker fees for each contract traded.

Currently, research is being conducted to determine a successful indicator on when to exit a trade. Such ongoing study is imperative for a destined trader because, when he has enough capital, he can implement this model into active trading and realize economic benefits.

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