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Intro to
Trading Systems

A trading system is computer code which analyzes market price action and other inputs, then outputs trading signals on when to buy, sell, put in a stop, take profits, and so on. Trading systems are known by many other names — including automated trading, trading strategies, black boxes, algorithmic (or algo) trading, high frequency trading, pattern trading, trend following, trading models, trading programs, and so on.

But all of these have the same basic make up. They are a compilation of rules, usually programmed into computer code, for how to trade a market. The market can be anything: an individual stock, bonds, ETFs, commodity futures, an exchange rate, and more. A simple example of a trading system would be a moving average cross over system with the following rules: Example

To enter a position:

1. If the 13 day Moving Average (MA) crosses above the 39 day MA, then buy at open tomorrow.

2. If the 13 day MA crosses below the 39 day MA then sell at open tomorrow.

To exit a position:

1. Upon a long entry, place a sell stop at a point equal to the enrty price minus one Average True Range (ATR), and a Sell Limit order equal to the entry price plus one ATR.

2. Cancel either order if the other is filled.

3. Do the same, but in reverse for a short entry.

What is a Trading System

The grand majority of trading systems are based upon technical analysis as in the example above; which uses two pieces of technical analysis (moving average and average true range). Technical analysis is best explained as a method of finding trading

ideas based upon the analysis of past prices only, with no consideration of so called fundamental factors such as supply and demand. (contrast technical analysis with fundamental analysis which considers a company's product line, profit margins, management, etc).

As it concerns people looking to invest in trading systems, not develop them on their own — trading systems are usually "black box", meaning the end user does not know what technical analysis is used inside of the trading system's code. The technical analysis inside of the system can be as basic as moving averages, oscillators, and relative strength indicators; or very complex with the use of fibonnacci retracements, neural nets, artificial intelligence, chaos theory, and more.

It is important to note a few things that a trading system is not. A trading system is not the same thing as a trading platform. A trading platform is a "front end" piece of software which allows people to enter orders for trading. Trading Technologies, E*TRADE's online order entry, and TradeStation are examples of trading platforms; and while you can set up a trading system to trade on these trading platforms — they are not the same thing. And a trading system is not a "market letter" or the like in which so called gurus put out support and resistance levels, outright buy or sell recommendations, or sector rankings. These "calls" are not rules based, and cannot be programmed into code; thus are not trading systems.

What is a Trading System Investment?

Most trading systems are developed by third party scientists or market specialists who either keep the system to themselves to trade with, or try and make a business out of their development by selling or leasing the trading system to hedge funds, CTAs, or individual investors. The norm now is for the developer to simply lease the use of the system to clients on a monthly basis through a trading system broker or automated trading system platform such

as iSystems. A trading system investment involves a system assist broker or advanced platform like iSystems running the system software on its machines on behalf of the client and monitoring the system signals minute by minute throughout the trading day, entering any buy and sell signals issued by the system into client accounts, while a monthly fee for the system comes out of the client account.

Characteristics of Trading Systems

Perhaps the most important characteristic of trading systems is that their trading rules can be tested on historical data to see how that set of rules (how the trading system) would have done in the past. There are inherent dangers to doing this revolving around the old saying that hindsight is 20/20; but the ability to look backwards remains a defining characteristic of trading systems.

For example, we ran the simple moving average system outlined above on Crude Oil futures from May 2001 through May 2011 — and found that it had 10 winning trades totaling a hypothetical $188K in profits, and 13 losing trades totaling -$65K, for a net profit of $122,000 on the hypothetical backtest with a drawdown of -$44K. (not bad — but again, it isn't real — it just tells us what this code looks like looking backwards right now, not what actually happened, and not what is going to happen).

Moving Average System---Back Testing		
Crude Oil	Winning Trades	Losing Trades
5/01-5/11	10	13
Total Profit	$188,000	-$65,000
Net Profit	$122,000	
Drawdown	-44,000	

Note: HYPOTHETICAL PERFORMANCE RESULTS HAVE MANY INHERENT LIMITATIONS, SOME OF WHICH ARE DESCRIBED BELOW. NO REPRESENTATION IS BEING MADE THAT ANY

ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THOSE SHOWN; IN FACT, THERE ARE FREQUENTLY SHARP DIFFERENCES BETWEEN HYPOTHETICAL PERFORMANCE RESULTS AND THE ACTUAL RESULTS SUBSEQUENTLY ACHIEVED BY ANY PARTICULAR TRADING PROGRAM. ONE OF THE LIMITATIONS OF HYPOTHETICAL PERFORMANCE RESULTS IS THAT THEY ARE GENERALLY PREPARED WITH THE BENEFIT OF HINDSIGHT. IN ADDITION, HYPOTHETICAL TRADING DOES NOT INVOLVE FINANCIAL RISK, AND NO HYPOTHETICAL TRADING RECORD CAN COMPLETELY ACCOUNT FOR THE IMPACT OF FINANCIAL RISK OF ACTUAL TRADING. FOR EXAMPLE, THE ABILITY TO WITHSTAND LOSSES OR TO ADHERE TO A PARTICULAR TRADING PROGRAM IN SPITE OF TRADING LOSSES ARE MATERIAL POINTS WHICH CAN ALSO ADVERSELY AFFECT ACTUAL TRADING RESULTS. THERE ARE NUMEROUS OTHER FACTORS RELATED TO THE MARKETS IN GENERAL OR TO THE IMPLEMENTATION OF ANY SPECIFIC TRADING PROGRAM WHICH CANNOT BE FULLY ACCOUNTED FOR IN THE PREPARATION OF HYPOTHETICAL PERFORMANCE RESULTS AND ALL WHICH CAN ADVERSELY AFFECT TRADING RESULTS.

Trading systems can keep your trading consistent, and remove emotions from trading. If you have ever said you wanted to buy a stock when it got down to a certain level, then cancelled the order when you saw the Fed has just raised rates or — you have let emotions interfere with your trading (and I would wager the result was poor).

A trading system will execute its rules no matter what is happening in the outside world, for better or worse. This helps with practical matters such as eliminating the need for you to be sitting at a computer all day in order to place a trade when the perfect set up happens, and that in turn makes your trading consistent by applying the same rules to the market day in a day out, whether you are working, on vacation, or watching the market. Trading systems

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have a long volatility profile that stems from their internal makeup which more often than not looks to risk a fixed amount, while allowing for profits to run. This creates a return profile in which the system can have winning trades between 40% and 60% of the time (much lower than most would expect), but make more than they lose on the winning trades (sometimes significantly more). In times when markets are moving crazily (like 2008), this long volatility profile allows for the system to risk the same amount it always has, but has the potential to make several times more than it normally does thanks to the increased volatility. One of the most appealing characteristics of trading systems for the individual investor is that they generally have somewhat reasonable minimum investment amounts between $5,000 and $50,000.

On the flip side, trading systems do have some characteristics which some investors may find unappealing. Chief among these are trading systems tendency to be more volatile than their managed futures program brethren, although often less volatile than trading futures on one's own. Because trading systems have nobody actively managing them, they can have larger swings up and down, and can stay "out of phase" longer — causing larger drawdowns.

Finally, trading systems have been plagued in the past by often unrealistic hypothetical results. This is usually a result of an overzealous system developer who may have curve fit the program to show an equity curve which goes straight up, or the result of an unscrupulous broker showing results without the inclusion of commissions, slippage (the difference between where the trading system signals a buy/sell, and where the client actually gets filled because the market is moving at the time of the signal). In fact, the iSystems by TradingMotion platform was started with the idea to build a website focused on showing investors how trading systems had really done in client accounts.

Brief History of Trading Systems

Trading systems trace their roots all the way back to 1949 when Richard Donchian launched Futures, Inc., one of the first publically held commodity funds, which used set rules to generate buy and sell signals. Obviously, without the internet and computers the systems of the 1950s were much different than today.

Back then system developers relied on ticker tapeand charting individual markets by hand. A time consuming task for sure, and probably the only time that system trading was literally more of a "art" than a science. However, despite the challenges that early system traders encountered, an idea was born. Today, system trading has become the preferred method of trading by banks, CTAs, and individual investors from around the world.

The idea of rules based systems trading became more popular amongst traders in the 1980s when famous traders like turtle trader Richard Dennis and Boston Red Sox owner John Henry began applying mathematical entry and exit rules to the commodity markets. As technology improved, the barriers to entry for retail investors to use trading systems became less severe over time. During the mid-1990s some trend following models were made available for purchase as investors could use their own personal computers to crunch data and generate signals before calling their broker with trades for the day. It was not until the late 90s, that the enhancement of the internet allowed traders to begin running systems on live data and generating signals for their accounts in real time.

The advent of the Chicago Mercantile Exchange's emini futures in the late 1990s was the final push for trading systems to enter the mainstream, allowing traders to bypass the trading floor with orders routed to an electronic exchange called Globex. Now, a computer could not just calculate where orders should be placed, but actually place the trade direct on the exchange as well. Trading systems as a standalone investment through your futures broker

have partial roots back to Attain Capital's founding partner Walter Gallwas.

In 1998, Walter asked one of his clients, Jack Telford, if Jack would consider allowing some of Walter's other clients to follow the signals of a trading system Mr. Telford had coded into TradeStation. Mr. Telford said yes, for a small fee - and in doing so the system assist model as it is known today was born.Prior to that, people purchased trading systems and system developers had to support software, build websites, handle payments, and field customer calls. Today, most system-assist business is done via a monthly subscription to the signals, with the client never having contact with the developer of the system.

Types of Futures Trading Systems

There are thousands of different futures trading systems which operate on everything from Crude Oil to stock market futures like the e-Mini S&P, with as many different methods for analyzing those markets as there are combinations of the hundreds of technical indicators in the world — making it somewhat difficult to categorize trading systems.

The easiest way we have found to categorize trading systems is by their hold period, or time frame they analyze and trade upon. The following are the four basic time frames trading systems operate on — and by connection, the main types of trading systems:

Day Trading

A day trading system is defined by a single characteristic: that it will NOT hold a position overnight, with all positions covered by the end of the trading day. This appeals to many investors who don't like the prospect of something happening in China causing the US market to open down -5% against their open position. It also means there is no margin needed for holding positions, which equates to lower minimum investment amounts. Day trading systems usually focus on a single market, and that market is usually one of the high volume, high

liquidity markets such as emini S&P futures, 30yr Bond futures, and Euro Stoxx. They are often thought of as the high frequency trading outlined above, but generally are no more active than most other trading — with about 12-18 trades per month.

Generally speaking, day trading systems identify a short term trend during the trading day, get in line with that trend, and look for the market to close at or near the high/low in that direction in order to be profitable. Range bound markets usually result in no trades for day traders, while whipsaw markets which see prices up 0.5%, back down -0.5%, and finishing the day around even (for example) usually cause losses.

Swing Trading

These types of systems hold positions for several days to weeks, and again operate mainly on highly liquid markets like the stock index futures, bond futures, and more recently energy futures.

Their general approach is to ride market "swings" for a few days, then exit or reverse the position and ride the swing the other way. This ability to "book profits" after a few days allows them to not require long term trends to be successful — a benefit when traditional long volatility programs struggle during range bound markets. And their ability to hold positions a few days allows for them not to be dependent on the market closing at or near its high or low of the day as day trading systems usually require to be successful.

One downside to swing systems is their propensity to get caught "out of phase". Whereas a day trading system has a new canvas every day on which to operate, a swing system's trade today can be affected by whether it went long or short yesterday, and tomorrow's trade affected by what happens today, and so on. This can create a scenario where losing trades beget losing trades until the phase is over with an extended move in one direction. Despite the above, merging the single market, low minimum, fixed risk characteristics of day trading systems with

the more room to operate and let profits run multiple days characteristics of trend following systems.

Trend Following

The "old man" of trading systems, trend following is the classic approach employed by some commodity indexes, billion dollar hedge funds, and the infamous "Turtles". Trend following systems generally operate on a portfolio of commodity markets across the grains, energies, metals, softs, interest rates, and currencies. They continuously monitor each market, waiting for each one to "break out" of its normal trading range and begin a long term trend. The system attempts to ride these trends as long as possible. With huge, multi-year trends like Crude Oil going from $60 to $120 and Euro Currency futures moving from 1.50 down to 1.20 - the allure of trend following systems is easy to see. There are many pros to trend following, including: the ability to ride the sometimes months long trends which do develop in commodity markets from time to time, following several markets and commodity sectors, a variable risk per trade based on the distance between the breakout level and the moving average, and fact that a form of trend following is used by some of the largest commodity trading advisors in the world.

The number one con, however; is the drawdowns which can be associated with trend following. Trend following systems are known for taking numerous small losses during false breakouts, in exchange for large (but rare) large winning trades when markets do trend. For most individual investors, those periods of small losses can prove psychologically overwhelming. Another con is that trend following trading systems usually require larger minimum investment amounts, so that there is sufficient capital to put on trades in several markets should trends emerge and have enough margin to hold those positions overnight. Ways to trade Trading Systems While trading systems can operate on various markets, not just futures; our focus in this piece is on futures trading systems.

There are many ways you can trade futures trading systems:

You can develop your own system using the built in indicators and backtesting functions of a program like TradeStation, (or purchase a trading system online from someone) and run it yourself, following each signal issued and placing the trades or letting the computer place the trades for you (this isn't perfect technology yet — and we don't recommend letting a computer run free following signals unless you have millions of dollars invested in technology infrastructure with backups, auto-failovers for internet connection, generators, and the like).

You can go to one of the websites which list hundreds of systems posted by anyone with an internet connection — then subscribe to follow a system's signals via email, instant message, or through an autotrade service where trades are placed directly in your account. The trading system is then run on the developer's computer, and the signals sent to a main server, which then tells your broker to execute the signals for your account.

The danger of investing through trading systems with this approach is that the trading system resides on the system developer's computer — not your broker's or the system subscription site. With the system on the developer's computer only, there is no telling what that developer is doing to generate signals (buying when his dog goes to the green bowl, selling when he eats from the red bowl?), and no insight into what sort of technology the developer has (is backup in place, what happens when they go on vacation, what happens if the neighbors kid starts hitting buttons on the computer?)

And finally, there is no way to know if the developer is changing the code every time there is a losing trade or the like. All in all, this may be a reasonable approach to get a taste of trading systems, but it sounds scary if considering putting any real money towards trading systems. Finally, you can use a server based automated trading system platform such as iSystems (the first of its kind) which runs the trading

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systems on its machines in house. By requiring that developers send their trading system code into iSystems to load on its machines, all of the problems with the code running on the developers' machines are removed. The question of technology infrastructure is immediately answered — insuring a secure data connection and no missed signals, and new abilities such as testing the system on out of sample data or other markets is opened up.

Summary

Trading systems have come a long way in the past 15 years, moving from mainly purchased trend following systems to leased day and swing trading systems traded by investors themselves, to the broker-assist model where brokers executed systems for clients, to the trade-follow online services where clients choose a system or trader to 'follow' in their account, to the next iteration – iSystems – where clients can start and stop automated trading systems through an online platform which executes the orders directly in their account via server based execution.

Unfortunately, many of the same problems which were around years ago remain, such as developers and brokers showing performance without the costs of the investment (commission, slippage, and system cost), and new issues such as those surrounding automatic placing of trades being signaled by developer's computers.

There is better technology available these days, and the iSystems by TradingMotion platform was built leveraging that technology. Through it all, systematic trading through automated trading systems has remained a viable piece of alternative investments. It is not a place where one should put their entire nest egg, and as noted above is more volatile than investments in managed futures programs; but it does have a place in some portfolios for investors looking to boost returns a little, get exposure to markets they don't currently have access to (Crude Oil futures or German Dax futures, for example) or add some long volatility exposure.

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