Rules-based trading in Retail FX:
getting the robots to do all the work

There was a time when people dreamed of tomorrow's world; a place where robots did all the work and humans sat around, directing operations and getting fat. For traders in electronic foreign exchange trading, that day is here. Rules-based trading in retail FX is now a robot-friendly zone. Heather McLean takes a look at what the major pundits in this industry have to say about the decision to kick back and let R2-D2 and C3PO take over.

Buy or DIY?

If a retail trader chooses to trade with an automated system, they can either purchase or design their own system. Yet the main motivation and a foundation for automating a strategy is the existence of such a strategy at all, scientist and developer at M I G Investments, Anna Serbinenko, claims. She says only traders that already have a consistent trading approach requiring little to no human decision making and generating stable profit, would usually consider automation applied to real money.

"Developing a consistently profitable strategy can be time consuming and knowledge demanding. Trading experience plays a non-negligible role in the process," she states.

Although creating an automated trading system can provide almost unlimited customising options and flexibility, there are also risks. For one, explains David Stuart, chief operating officer at Alpari UK, technical expertise is required to create any system; the more complicated your trading strategy, the more difficult it will be to create a well written automated system that is able to execute your strategy accurately.

Serbinenko continues: "Many traders have not yet developed a consistently profitable strategy on their own, or are not completely satisfied with their strategy's performance. They still want to save time and effort by automating their forex trading. For those users, a reasonable suggestion is definitely to use one of the many commercially available trading solutions."

However, Betsy Waters, global director of dbFX, says: "The number one question traders should ask themselves is, 'Is an automated FX system an appropriate investment for me?' For example, if the investor or trader is new to retail forex trading, they may get a better understanding of the market by trading directly. Whereas if a trader starting out is not

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Anna Serbinenko
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ready to self trade, they can obtain a professional forex manager to trade for them."

When choosing an automated trading system a trader should consider his own trading and investment goals, Waters says. If they are looking for a low risk investment, the automated FX trading system should be a less aggressive system that may have a lower potential return, but will match their personal risk profile, she explains. "Once you have determined your own parameters it is easier to select the automated FX trading system that matches your investment objectives," she adds.

Big bucks

Yet another factor to consider, says Max Faust, research and development specialist at Dukascopy, is resources. "If you decide to implement your own trading system, it will cost you much more than if you hired a third party solution. So, before making a decision you should properly assess your goals."

As with any business decision, the benefit of which automated FX trading system a retail FX trader should adopt has to outweigh the cost. The latter includes not only the price eventually paid to purchase an automated trading strategy, but also the cost in terms of time spent for development, risk adopted by the strategy, and opportunity costs of non-received profit from alternative investments, states Serbinenko.

When it comes to the buy versus build decision, available developmental resources should be quantified first, agrees Jeffrey Lins, executive director of quantitative research and algorithmic trading at Saxo Bank. "There are systems out there that might fit quite fine for 99% of what a trader wants to do, but if that last 1% is only achievable by breaking things and hacking them back together, then there may be little value left in the 99% at the end of all that," he claims. "On the other hand, data interfaces and some kinds of logic are very difficult to code very efficiently, whereas some off the shelf solutions have been well optimised for these tasks."

Stuart says that the cost structure of automated systems can sometimes be a burden for traders. Some systems are charged on an initial flat-fee basis whereas others work on a subscription basis. A system that has a high cost will lead to its users expecting a higher return on the funds allocated.

He comments on the level of profitability over time: "Traders are usually very particular about using automated systems, so one of the core requirements is that the system has a reasonable level of profitability within a particular time period. Evidence of solid performance over time tends to be the pivotal factor by which systems are judged."

Third party liability

Vice president of customer experience at Interbank FX, Marilyn McDonald, says that one of the biggest issues traders face with automated trading is that the systems have been written with a specific set of parameters in mind. This means if the market behaviour changes, the system can fail. "It is important to research the system and understand why it is placing the trades that it is," she warns. "If a system works well in a trending market, then it will likely fail spectacularly when the market consolidates or whip saws."

With regard to purchasing a third party system, it is essential to conduct appropriate due diligence on the system provider, warns Stuart. He says potential users must not forget to consider the following questions: does the provider have a fully mechanical, technical analysis-based trading strategy that can be fully automated?; can they write the full trading program?; is the provider's automated FX trading strategy flexible and adaptable to market changes?

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"It is also a good idea to back test the system before committing actual funds," continues Stuart. "One problem with purchasing a third party system is that you are limited to those strategies that are available; this may not suit your trading objectives and you may not be able to customise the system code."

Testing

As to what factors may influence which automated FX trading system retail FX traders should adopt, McDonald says risk is a big one. "Each individual trader has their own risk tolerance, and some can stomach roller-coaster-like draw downs that would make others gnaw their fingernails off. I would also advise forward testing. Back testing on many systems isn't done on tick data, doesn't include spread data and in some instances is done on extrapolated data. I would advise forward testing on a demo account and then on a live account with the smallest lot size your broker offers; at Interbank FX that is .01 of a mini lot or $100 notional."

On what tools are now available to help more advanced traders develop and back test their own strategies, Waters says more advanced traders who have programmed to an API can obtain historical data from their forex provider and back test their programs. dbFX offers several APIs including the market standard FIX connection.

Waters adds: "If traders have developed their automated strategies on a charting package they will

be able to fully back test their strategies; most major charting packages allow this. As with any back testing, you are only simulating the results and can not account for all factors influencing execution, such as slippage on stop orders, so they should bear in mind that results from back testing are not completely indicative of future results."

Lins comments: "I think a lot is made of the importance of back testing in the space of trading strategies. There are several reasons that lead me to say that too much may be being made about back testing. That is not to say that it is not an important tool when applied appropriately, just that it is very often done quite poorly without the real conceptual rigor that it requires, and this can lead to some very spurious inferences that make it more of a detriment than a benefit."

Yet trading platforms are becoming more and more user friendly over time, making testing any system relatively easy and straightforward, even for less experienced traders, claims Stuart. Almost every broker now offers free demonstration accounts that enable people to test their automated systems using real prices and without risk to their funds. "Allowing a system to trade in a test environment for a sufficient amount of time is essential because any errors that occur will not be over-costly, and it also provides the opportunity to tweak the system before risking real funds," comments Stuart.

Marilyn McDonald
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System requirements

Due to the fact that the automated FX trading market is very sensitive to any changes in the IT industry, traders today are much more demanding in regards to the performance capacity of the automated systems they use. As a result, some of the trading platforms with automated trading functionality use much more system resources than manual platforms, continues Faust.

He adds: "Normally it should not happen, as it's possible to adopt and optimise an auto trading engine to use the minimum system resources. With such a platform, the additional resources are needed only in case you run several processes simultaneously, or use other applications while your strategy is running."

Automated trading merely replaces manual trading, and both are equivalent in terms of load on the computer, the network and the platform, claims Serbinenko. However, calculations leading to trading decision-making can vary greatly in what concerns the

Jeffrey Lins
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volume of calculations and analysis to be done, from simple moving average for trend detection, up to generating millions of potential scenarios for advanced risk evaluation. The required hardware requirements vary accordingly.

The optimal hardware and trade platform requirements for carrying out automated FX trading are, McDonald claims: Windows 2000, XP or Vista; 2 .0 GHz or faster CPU 512 MB RAM (1GB recommended); screen resolution 1024x768 or higher; modem connection speed 36.6 Kbps or faster; Internet Explorer version 7.0 or Mozilla Fire Fox 2.0 or later; if using Mac, first install a Windows operating system.

On what are the optimal hardware and trade platform requirements for carrying out automated FX trading, Lins quips: "The optimal hardware would be the fastest processor and the largest memory linked to the fastest communication interface in the Universe." However, he adds: "The question might be posed in terms of a minimum, regarding what hardware capacity is required for carrying out automated trading. Here, it depends on the traders' objectives and what computations need to be made.

"I think that the lower bound for really good high frequency trading algorithms or those that make use of a vast corpus of complex information, like parsing news texts to learn what moves the market in certain contexts and acting upon in it real time, is simply the use of state of the art hardware, and surely nothing less than 64-bit processing," comments Lins. "That shouldn't sound daunting to the retail trader who is interested in automatic or algorithmic trading, since these are pretty specialised branches of econometrics or econophysics or machine learning, and not necessarily the field of everyone involved in the market.

"It's just a reality check for those who do aspire to some of these routes. I hear a lot of voices looking for tons of very high resolution data, however I believe that the majority of these people have nothing near the computing power to really make use of this data if they ever get to it," Lins concludes.

Serbinenko says an important consideration is a good internet connection with the trading server. "Even a genius trading decision is useless, not to mention frustrating, if the trade cannot be communicated to the server and executed all because of a humble internet connection. This is the main reason why when running even relatively simple automated trading strategies, traders often use virtual or dedicated servers."

Learn a language

Armed with software development skills, a trading strategy, and widely available open source packages to aid in the integration of FIX interfaces, systems of varying complexity can be built using Java, C#, C++, Python and other programming languages. These solutions are fairly platform agnostic and can be built on a variety of platforms from Windows to Linux to Mac OS X.

Where speed becomes less critical, there are some very good, more specialised programming languages that lend themselves well to the kinds of mathematics and data structures that are often involved in finance, particularly high frequency finance, says Lins. One of these is R, which is a powerful language for statistical computing, that natively comprehends classes of objects like vectors, matrices and time series. "This kind of language is going to work very well for a trader with a strong quantitative background, looking to translate equations into code in a way that is intuitive for a mathematician or statistician," notes Lins.

Beyond that, for traders who are looking for a platform that automates their trading ideas, which are based on compact representations like so-called technical indicators, such as a moving average or relative support index (RSI), a ready-made toolbox

that allows them to go in and assemble certain heuristics based on a series of conditions is the best answer states Lins.

Lins explains: "The generation of trading signals on this basis has been a possibility of several systems for many years. More recently, platforms are integrating automatic execution on these kinds of signals; Saxo Bank's own Trade Commander which is integrated into the Saxo Trader trading platform is one such system. This is the end of the spectrum that is really the best fit for the broadest set of retail traders and one that can help act under very fast changes in the market, also bringing added discipline to a trader's activity, when it comes to faithfully executing a strategy."

MetaTrader frenzy

Among the major automated forex solution providers in this space are Alpari UK's Systematic platform, developed in partnership with Tradency, and also Collective II, an arena where traders can create and sell trading robots and strategies or test ones that have been placed online.

Yet there is one platform hailed above the rest. MetaTrader 4 from MetaQuotes is a comprehensive solution that allows users to code their own systems from scratch via its own programming language, Meta Quotes Language 4(MQL), which is a simplified version of the well known C++ with built-in trading functions.

MetaTrader 4 has a very large following, and is one of the most popular platforms for building mechanical trading systems. The programming community has a lot of support for it, and there is really a cottage industry that has sprung up around this product, comments McDonald.

Serbinenko adds: "The offer of trading platforms on the market is significant, but automated trading capable platforms are more rare. By far the most preferred retail trading platform is MetaTrader, offering
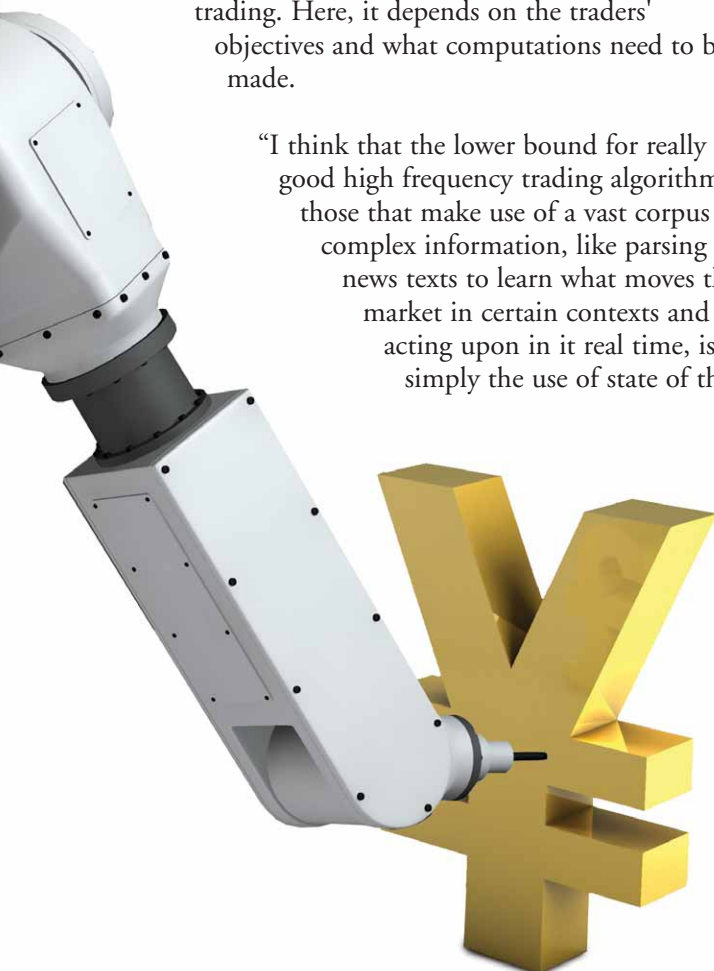
the possibility to automate one's trading strategy using expert advisors, programs coded and compiled using the built-in MetaEditor. The language used for programming is MetaQuotes Language 4 (MQL4).

"The platform also allows for programming of custom indicators and other auxiliary tools that do not necessarily trade live, but can deliver accurate real time calculations, indications, signals and alerts for successful decision making," maintains Serbinenko. "The most important advantage of this solution is that the trader does not have to be a professional developer to program his own strategy, as the MQL4 language can be learned by anyone!"

MetaTrader 4 has exceptional capability because traders are able to code any conditions they wish as well as being able to fully back test them, says Stuart. Another tool recently available, which some may want to consider, is community, Stuart adds. "The MetaTrader community has been growing rapidly over the past few years with both novice and experienced MQL 4 programmers frequently participating via forums and community sites."

MQL 4 has offered a solution for automated trading which remains popular within the retail FX traders segment, agrees Faust. He adds: "One of the reasons for its popularity is due to the fact that for years there was no strong competition on the market. The situation has recently changed dramatically. New solutions, such as JForex, are becoming increasingly popular, offering new functionality regarding automated strategy implementation and execution, designed not only for the retail market but also for FX professionals."

More sophisticated traders

The availability of industry standard interfaces such as FIX and proprietary APIs supporting electronic price acquisition, deal execution and order placement, have eased the sophisticated retail trader's entry into custom development of black box trading systems.

As more providers offer APIs, and more traders connect to multiple services simultaneously, the potential for alternate strategies, for example, the discovery and exploitation of arbitrage

opportunities among multiple providers, increases says Serbinenko.

As to how high frequency and more sophisticated retail FX traders can take advantage of trading and pricing APIs for automated FX, Faust says in order to successfully run a strategy with a high frequency of updates, asynchronous API should be used. Asynchronous API allows the sending of trading signals without a delay for the response time. It is crucial for the traders who use sophisticated automated strategies, he claims.

As for the strategies themselves, they are as numerous and different as are their developers, Serbinenko claims. "A commonly used measure for comparison among strategies is their past performances. It does not however reflect all the crucial parameters. The same performance can be shown by strategies adopting radically different levels of risk. So just as in classical investment analysis, risk-reward considerations are determinant and the answer depends on the investor's risk capacity and risk preference."

Lins says decisions about methodologies and technical solutions should always be made contingent upon particular objectives and the conditions under which the trader will be working. "No one has the luxury of

occupying that frictionless place in the trading universe where information and transactions are perfect, instantaneous and free. Therefore, for some individual situations, some issues may be more important than others."

Having said that, Lins points to two objectives for an algorithmic or automated trading system. The first is price discovery and price prediction, which are essentially trying to analyse the microstructure in the market from prices from one or several venues or making predictions about future prices from past prices and other information flows. Then there are those approaches he calls predatory, which are essentially designed to detect and exploit the failures of humans and systems to transmit intended prices accurately or fast enough.

"The latter activity is quite difficult to bring in line with the economic rationale of why markets and prices exist, despite the fact that some participants in the market seem to be out there looking for this kind

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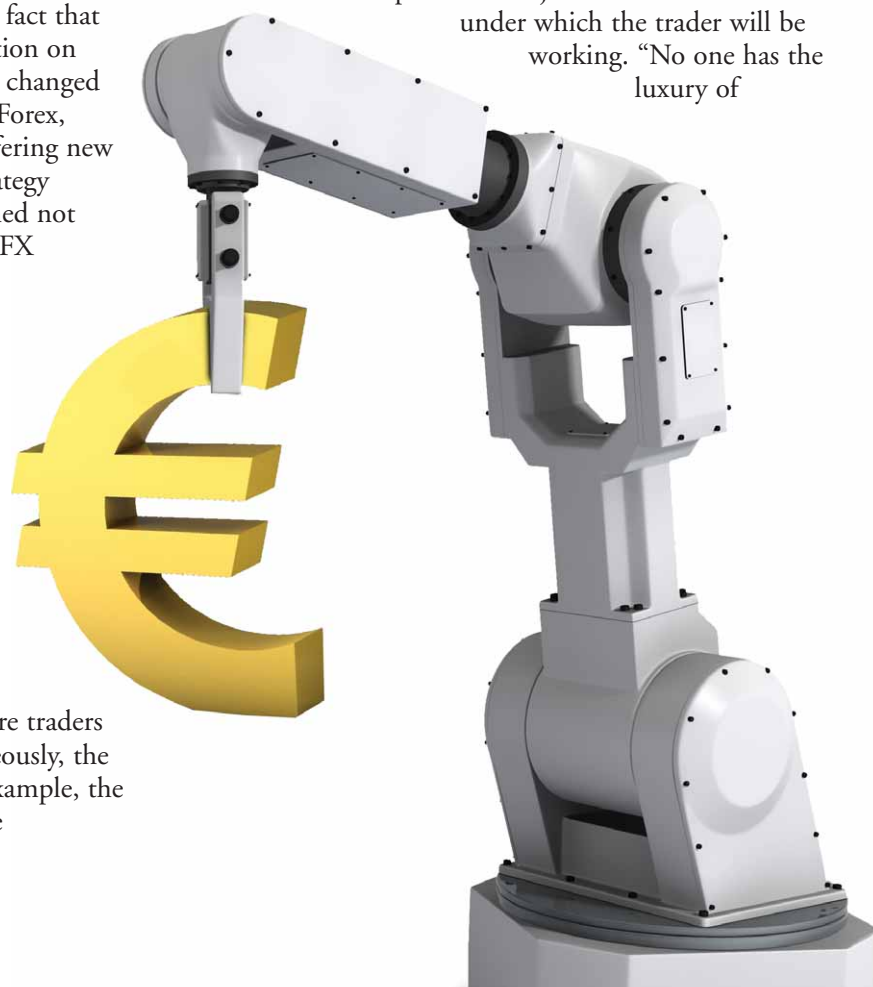
Betsy Waters
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of free lunch," says Lins. "So, I can say right away that whatever other considerations might be made, the first one has to be whether there is going to be any place to trade with a system that is essentially designed to exploit the counterparty. I don't think there is."

On a different note, according to recent academic research on trading practice, Serbinenko states that high frequency trading hides more risk than long term strategies. "It has been shown that in spite of seemingly analogous charts, the behaviour of the market is different. As a consequence, models and strategies developed for traditional long term trading are simply inappropriate for intraday operations. Most of this increased risk cannot be taken away by diversification, but just being aware of the risk and knowing one's options already provides ground for wise trading decisions. Using trading APIs, one can program scripts for risk evaluation capable of performing complicated calculations within fractions of a second."

Web revolution

The internet has revolutionised almost every industry, trading more so than others. Today there are hundreds of websites, portals, forums and community sites that support traders and automated trading. The internet has enabled people with similar interests to congregate in one space and share valuable

information free of charge. Through a simple search one can find dozens of forums where automated systems are provided for free, in addition to advice, programming tips and guidelines for dealing with automated systems.

There are websites and forex providers who provide access to a variety of automated trading strategies and other systems for retail traders. Users should be cautious when trading on multiple automated trading strategies that they do not conflict with one another, warns Waters. Additionally, she states that these sites typically charge an added commission to the trader in order to pay the system designer and possibly the website providing the listing.

"Traders should look at the profitability of these systems after commissions have been paid and compare the profitability to the amount of commissions they are paying. They should check exactly what services are provided, the costs involved, and whether the system meets their investment objectives after all commissions," advises Waters.

Some of these sites also offer 'trading signals', comments Waters. She says if someone is trading on one of these signals, they should check on factors such as who is creating them, if the person is a professional manager, if they are regulated, what country they are located in and what the regulatory environment of that country is.

Future innovation

It is unlikely that future innovation will focus on order types, claims Stuart. He says it is more likely that future automated systems will be able to rewrite themselves in response to changing market conditions. "Human involvement can never be fully replaced, although a smarter level of automation can still be achieved. The biggest problem for automated systems is that they are not dynamic enough, which means they are profitable for a certain time, only to lose their edge at some stage in the future. I believe that new innovations will allow more sophisticated systems to be created that can grasp this concept and adjust their trading style and trading parameters accordingly.

"Further down the line we may even see fundamental factors implemented in automated systems, not only from a basic numerical perspective in terms of macroeconomic data but also aspects such as expectation, confidence and risk preferences that are difficult to numerate," Stuart summarises.