

Algorithmic trading is set for phenomenal growth in the global derivatives markets. Jane Douglas-Jones investigates



Keeping control of the algorithms

Algorithmic trading is hot and if you are not in on the act, now is the time to start engineering algorithms, lest you get left behind. The benefits of this most intelligent and sophisticated of trading strategies are varied: speed, global reach and economies of scale, to name but three key advantages.

“The main driver behind the increase in algorithmic trading is, quite simply, alpha,” says Mark Palmer, general manager, Apama Products, at Progress Software. “Today, you have to be involved in algorithmic trading in order to compete. With traditional click trading it has been scientifically proven that it takes 83 milliseconds from the time that the brain fires the idea to trade to the time it takes to press a button. An algorithmic trading system is in and out of the market in that time.”

Another important driver is the move by the world’s major derivatives exchanges from floor-based trading to electronic execution. “This electronic environment lends itself to algorithmic trading,” says Vijay Kedia, president and CEO of Flextrade. “The initial ingredient required for algorithmic trading is for all of the exchanges and execution venues to be fully electronic with real time market data, orders and execution.”

Scott DePetris, global head of accounts at Portware adds that: “the adoption of the FIX protocol and the acceptance of some key market data standards have allowed both the buy and sell side communities to electronically access more markets, which in turn has led to a more widespread adoption of algorithmic trading.”

The dramatic growth of the derivatives markets themselves has also spurred the development of

algorithmic trading platforms. “We believe that algorithmic trading is part of the natural evolution of electronic trading markets and is being driven by the enormous growth in the derivatives markets in recent years,” says Jesper Alfredsson, head of algorithmic trading solutions at Orc Software, North America. “Increased volatility and faster moving markets create an environment where algorithmic trading can really make a difference. We believe the increase in algorithmic trading lies partly behind the growth in derivatives markets and partly because electronic trading at exchanges has become more mature. It is a natural next step from the floor, to electronic execution, to algorithmic trading.”

Algorithmic trading is attractive because it generates significant economies of scale. “We have a client on the sell side whose volume in the last three years of doing algorithmic trading has gone up by a factor of seven. Meanwhile, their staff count is down 80% in the same period,” says Palmer. “With algorithmic trading you can do more with less. This doesn’t mean that the traders are going away, they are just different – more quantitative.”

In addition, algorithmic strategies introduce a new layer of trading consistency. “One of the reasons behind the increase in algorithmic trading is that it is a way of offering consistency in execution across transactions,” says Ron Papanek, director of strategy at Riskmetrics Group. “Portfolio managers are still making their basic investment decisions in the same way but now they are using more efficient ways of actually identifying and executing those trades and that is where they are relying more heavily on algorithmic trading.”

Meanwhile, one of the most important drivers of growth in this area can be summarised by a simple phrase: algorithms beget algorithms. DePetris explains: “Algorithms, in many markets, have reduced transparency and reduced visible liquidity, therefore if a firm has a large order it may need to employ similar methods to locate liquidity at the various sources. In essence, that firm may have the need to adopt algorithms in order to electronically find liquidity and minimise market impact. Algorithms can often locate liquidity and react to it much more efficiently than a human can.”

The desire to trade algorithmically will push the trend into more asset classes and become the natural choice for increasing numbers of market participants. “Although there are certainly asset-class specific nuances, the underlying processes of algorithms are fairly transferable from one to another,” says DePetris. “The drive, which initially emanated from the US equity market, has flowed into other asset classes simply because there is a lower barrier to entry as the technology already exists and it is relatively simple to transfer algorithmic strategies from one asset class to another.”

Hedge funds

Market participants have noticed a significant increase in the usage of algorithms by the hedge fund community. “The growth of algorithmic trading is being driven in large part by the growth

of hedge funds. These funds have an increasing amount of assets under management,” comments Papanek. “In addition, they are trading in more complex strategies. I believe that this trend will continue.”

The hedge fund community has seen growth in various types of multi-strategy trading. Capital structure arbitrage is just one example. “With arbitrage strategies, it is common to execute on an ‘if...then’ basis,” explains Papanek. “If one security is sold then you would buy another security. Algorithmic trading strategies allow hedge funds to execute arbitrage trades more efficiently. For example, in merger arbitrage, where you want to sell the acquiring company and buy the target, it makes sense to automate that strategy and to use computers that will enable you to get consistent execution.”

In addition, many hedge fund managers are ex-investment bankers and traders, with knowledge of the advantages of algorithms. “These managers typically want to introduce algorithmic trading within a hedge fund structure,” says Alfredsson. “Therefore, the expertise and interest in algorithmic trading is strong within the hedge fund community.”

Alfredsson believes that another important factor in the uptake of algorithmic trading by hedge funds lies with changes in the listed derivatives market’s structure. “Many exchanges now allow direct access from customers enabling a

THE WORLD OF THE ALGORITHM

At first glance, the world of algorithmic trading can seem extremely complex. At second glance, it is almost overwhelming so. At its most basic level the algorithmic process feeds off two key ingredients – market data and electronic connectivity. From that, there are four different components that make up algorithmic trading.

The first component is an alpha model. This model looks at what a firm should trade and when it should trade. “This decision is often made by a quantitative style black box model,” explains Scott DePetris, global head of accounts at Portware. “This can also be achieved by a portfolio manager or an algorithm that is programmed to look at many variables and come up with an optimised list of what to buy and sell. This is what is commonly referred to as black box trading.”

The second key stage in the

process is completed by execution algorithms and it is this component that market players traditionally refer to as algorithmic trading. “This is what brokers are offering to the buy side to execute their orders,” says DePetris. “This stage consists of benchmark strategies, simple time slicing models, intelligent order types and smart order routing. Within the derivatives world, sell side and buy side firms have created these algorithms to offer synthetic order types to their customer base. This is where I have seen the widest adoption of algorithmic trading in the derivatives world.”

According to DePetris, the third and fourth components in the algorithmic trading process are often the most overlooked. “The third piece concerns the matching engines that the exchanges use to match the orders,” he explains. “Some are simply time and price

priority models. Others are much more complex.”

Finally, the fourth component involves post-trade and trade cost algorithms and is a key driver in moving this process forward via the creation of more intelligent algorithms. “They algorithmically capture market data from every point during the trade cycle and create a historical database with that data,” says DePetris. “They then use that data to see how today’s trading went but also and more importantly to build a library to show how certain parameters and particular algorithms have worked in different market environments. All of the post trade algorithms help us to go back to the previous components and enable us to better choose what and when to buy, how better to execute orders and how to work with the matching parameters that exchanges utilise.” ■

hedge fund to compete with an exchange member in a totally different way. Also exchange fees have decreased due to improved competition in both the futures and equities space. Meanwhile, portfolio margining has driven down clearing costs so the advantage of being a broker dealer or an exchange member almost disappears. We have seen a number of traditional prop trading firms actually restructuring themselves to become hedge funds. I believe these structural changes have boosted the use of algorithms by hedge funds," he says. "Getting started has also become easier as there are now vendors in the market offering hedge funds advanced algorithmic trading solutions with native exchange connectivity."

Risks

Algorithmic trading is not without its risks, of course. "The risk is risk," explains Palmer. "Just as quickly as you can make money you can lose money. When you start to automate behaviour, it is crucial for a firm to undertake pre-flight testing of its algorithms and it should also put controls in place in case the algorithm goes bad."

Papanek adds: "One of the biggest risks that the regulators are concerned about is the systemic risk that hedge funds are all making very similar bets. Many algorithmic trading models are designed for arbitrage strategies, to exploit a market anomaly quickly and repetitively. The potential risk arises when these anomalies turn out to be longer-term trends which, if many funds are treating them like short term anomalies, could put a lot of funds on the wrong side of the trade. Algorithmic trading does reduce the risk of human error, but it increases the risks that human judgement would otherwise override."

In addition, many regulators are worried about the risks inherent with allowing machines to take

control. "There is always the risk that an algorithm will go bad and spawn thousands of orders at a price level that you do not want," says DePetris. "However, this risk is really no different than when you have hundreds of traders on a trading floor and one of them leans over and puts their elbow on the enter key. The crucial point here is for firms to put the risk management systems in place that will oversee an algorithm's behaviour and is able to warn firms if that algorithm starts to behave in a way that it is not supposed to. In this way, the development of algorithmic trading will lead to more sophisticated risk management systems."

Flextrade's Kedia agrees: "While there are some who worry that algorithmic trading will lead to disasters, unforeseen volatility or risk, I feel it forces firms to trade in a more disciplined way with more back testing and more testing of worst case scenarios."

However, with automated systems and technologies, it is easier to play the system than ever. "Regulators now want to monitor in real time what they call 'extremely lucky individuals'," says Palmer. "One of the things they are looking for is 'one, two, three: go' trading. This refers to a situation where two traders at different firms pre-plan a trade that will cancel each other out and raise the volume of a certain stock which will trigger the 'buy' indicator in a lot of automated systems. Regulators are interested in using algorithmic technology to watch out for patterns of misbehaviour and for the algorithmic systems that have gone bad."

Another concern that could limit the development of algorithmic trading is a lack of bandwidth. "As algorithms gain traction, bandwidth becomes an ever greater concern," says DePetris. "Will the exchanges be able to handle the increasing amount of order flow that algorithms generate? A lot of new technology needs to be built in this area. Each exchange is addressing this issue in different ways. We need to be able to handle the amount of message flow that algorithms will create. The minute you try to throttle that by imposing limits, the algorithmic trading world will become stifled."

Algorithmic experts believe that exchanges should see this issue as an opportunity and not a threat. "The exchange that can prove it can handle all of the message flow currently being created and the flow that may be created in the future will have a definitive competitive advantage," states DePetris.

Traders believe that, in terms of its potential, algorithmic trading is still in its infancy. "The sophistication of algorithmic trading will continue to grow and there really is no limit as to what can be engineered," concludes Kedia. "For the world's financial markets, algorithms are the natural next step in the journey to become electronic." Firms must now make sure that they are prepared for the future and that future is algorithmic trading. ■

WANTED: ROCKET SCIENTISTS

The potential of algorithmic trading is seemingly without limit. However, algorithms are only as good as the engineers that can build them and it is here that the derivatives industry faces a major challenge – the lack of qualified personnel to build the platforms.

"With the explosion of algorithmic trading in today's market there is a huge shortage of experts who can build algorithms," says Vijay Kedia, president and CEO of Flextrade. "However, supply and demand is cyclical – there are times of shortage and then times of saturation." Scott DePetris, global head of accounts at Portware agrees: "One of the most difficult things is finding human capital, especially since algorithmic trading is a relatively new area. As it moves across asset classes and becomes more widely utilised, increasing numbers of people will become educated. However, today it is still very difficult to attract and retain these individuals."

Indeed, the continued of algorithmic trading has created an entirely new breed of traders. This new breed consists of traders with expertise in computer science and Phd level qualifications. A trader in today's derivatives markets needs to have an extremely sophisticated knowledge and understanding of technology akin to that required by NASA. The derivatives industry has certainly come a long way from its bright jacket wearing, ticket waving floor trading roots. ■