FX ALGO NEWS

TOP STORIES

Banque de France boosts efficiency with FX Algo use

The Banque de France (BdF) has increased its use of algorithms for executing foreign exchange trades, according to its most recent annual report. The French central bank notes that over 60% of trades are now handled on an electronic platform, of which 20% are executed using algorithms. The 2017 annual report explains that in order to increase its operational efficiency, the Banque de France has been actively modernising its trading infrastructure in the foreign exchange market. "These innovative trading tools ensure optimal transaction execution for the Bank's proprietary and client orders, all at the best possible cost and with minimal impact on the market," the report says.

In June, the French central bank announced it would be further developing these capabilities by deploying Quod Financial's adaptive FX platform (QFX). According to the bank, this new platform will provide a set of algorithms to seek liquidity and manage market impact, with total control over the execution. In addition, the QFX real-time analytical tool will further enable BdF's in-depth understanding of liquidity and participants activity on both a single order and an aggregate level.

"Banque de France is a technology innovator and the logic of this project is to stay ahead of the rapid changes in the capital markets," says Mickael Rouillère, chief technology officer, Quod Financial. "Banque de France wants full control on how it provides liquidity to the market, with minimal information leakage and powerful surveillance tools coupled with the ability to analyse events."

Algos on the agenda at TradeTech FX Europe

The development of algorithmic FX trading and TCA were notable themes during this year's TradeTech FX Europe event, which was held in September in Barcelona.

Speaking at the conference a panel of FX market participants agreed that the use of algorithms will likely increase. However, uptake has been relatively slow on the buy-side despite the market moving towards an equities style model through more automation.

"We were early participants in the algorithm space ," said Gordon Noonan, head of FX trading at Schroders Investment Management. "I've seen a lot of peers over the past six months or so, who in the past have told me they would never use algorithms, beginning to ask questions."

Speakers also highlighted how the growth of algorithmic trading in the equities markets has led to subsequent traction of 'algo-wheels' as a method for gauging the performance of FX liquidity providers in establishing the route to best execution.

Whilst the growing popularity of TCA data on the performance of FX algorithms with members of the buy side was another key topic of discussion.

IN THIS ISSUE

SEB launches FX algo trading on Bloomberg and FXall

SEB has started offering FX algos through the multibank portals Bloomberg and FXall, becoming the first Scandinavian bank to do so.

According to SEB, clients will have direct access to multiple diverse liquidity pools that they would not be able to access without algos. Clients can now place their orders directly through the newly created portal, FX Algos. SEB's offering covers a range of customisable algorithms, from passive to aggressive, including execution evaluation with a TCA report.

"We see our algorithmic execution products as an important complement to our existing market-making services and are looking forward to supporting our clients across their diverse execution requirements," says Svante Hedin, co-head of trading at SEB.


Svante Hedin

Parkash and Daniels join Nomura as algo demand grows

Until recently, algo usage was predominantly concentrated in Northern Europe and the US. Nomura's e-FX team has however noted that while algo uptake in these regions continues to grow, this is now being joined by increased client interest from EMEA and Asia, as well as some more mature markets. In line with these changing algo trends, Nomura recently made two senior hires to its e-FX teams in Singapore and London. Ashvin Parkash joins the Singapore office as global head of e-FX distribution, prior to which he served for five years as head of e-distribution for Asia with BNP Paribas.
Ian Daniels also joins the London office as head of e-FX distribution, EMEA. Before joining Nomura, Daniels was with RBS/Natwest for over two decades where he held a number of FX roles, most recently as head of e-FX sales, EMEA.

Parkash explains that in Asia, Nomura's algo user client base is primarily located in Australia, Singapore and Hong Kong, but with new interest coming from other locations. "While the main demand tends to be for G10, we are also seeing increased interest in EM currencies from both the CEEMEA and Asia regions," Parkash adds. There is also growing demand for algo strategies across Nomura's whole client base, which is mainly driven by the real money names using algos in their quest for best execution, says Daniels. "The hedge fund community sees value in using our algos for larger executions and we continue to see more usage from them," he adds. "Larger banks looking to optimise execution are also showing deeper interest in understanding how our algos can assist them."

The Nomura algo suite is currently available on both its single dealer platform and Bloomberg but will soon be making its strategies available on the major third-party venues as well. According to Parkash, Nomura will also be further modifying its TCA solution over the coming months to ensure the information provided continues to be relevant. "In addition, we will continue to optimise the available strategies and increase flexibility to enhance the user experience – we are taking direct feedback from clients and incorporating their requirements," says Parkash. In general, although Nomura has only relatively recently entered the algo space, client take-up has been strong, Daniels notes. "Clients can choose to allow the algo to perform in default mode or tailor it specifically to their needs. The access to liquidity, flexibility and customisability we offer are proving extremely popular," he adds.


Ashvin Parkash


Ian Daniels

Jefferies creates next generation algo trading platform

The past couple of years have seen a number of changes in the FX market which is driving demand for greater transparency; from the introduction of MiFID II and the launch of the FX Global Code of Conduct through to improved client awareness of best execution. Yet although this has prompted an increased uptake in algorithmic trading solutions, the sophisticated tools available on sell side trading desks have not always been there for buy side use as well, says Brad Bechtel, global head of FX, Jefferies.

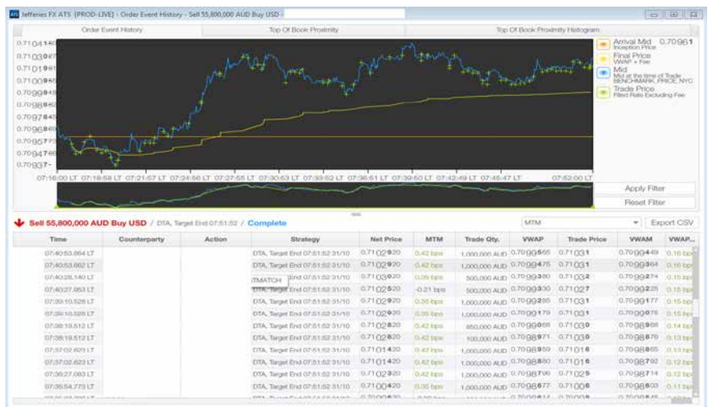

Brad Bechtel

FX ATS

To address the balance, Jefferies has launched its own FX algorithmic trading system (FX ATS). The platform is the first fully customisable algorithmic trading solution available in the market, allowing clients to leverage the same core technology that market makers use to formulate their price and intelligently execute trades, Bechtel explains. "Every trade is executed against direct market access (DMA) liquidity, interdealer broker ECNs or customer ECNs, maximising spread earned while minimising the client's footprint in the market," he says. "It's more than just offering algo execution strategies, it's the next generation of where algos can go."

Launched after two years of development, Jefferies FX ATS offers buy side clients the flexibility to control their execution if needed and the ability to marry that to the right liquidity for the right currency pair. The platform also offers full TCA to clients, which provides robust, real time analysis during the course of the execution.

However, the way Jefferies has approached creating FX algo trading solutions is very different to that of the Tier 1 banks, says Bechtel. "We've created a lot of flexible functionality that allows traders to switch their preferences on-the-fly, without having to re-enter orders or cancel orders, or if they prefer they can also opt for 'set-it-and-forget-it' static algos," he adds. "The market has become a little too complex relative to what the participants need, so we keep our automated solutions relatively straightforward."


FX ATS

In keeping with this ethos, Jefferies currently offers three automated algos and a hybrid algo, which blends five distinct execution strategies into one. According to Bechtel, customers generally use algos in order to earn spread and minimise market impact, which they are able to achieve with this selection of strategies. He adds that clients also want access to all the liquidity on the various ECNs, which is a service most other algo providers are not able to accommodate.

CORE STRENGTHS

Instead, Jefferies' FX ATS comprises two core strengths - the algo strategies and the liquidity behind them. Bechtel explains: "This is an area which hasn't had much focus from the sell side institutions. They are more focused on their algos and how the interfaces look on the front end, but there is very little focus on the liquidity behind the algos."

As one of the newer entrants to the algo market, Jefferies believes it has been able to create a bespoke solution tailored to their client needs, which also utilises the latest technology and functionality. "The arms race of algo front-end capability has largely played out and now the focus is shifting to the liquidity behind the experience and market impact," Bechtel explains. "Jefferies as an institution has a saying which is 'clients first always'. We designed our algorithmic trading solution with that in mind."

Ideal launches algo monitoring solution

Ideal Prediction has developed an algo monitoring offering to support the identification, monitoring, and assessment of Algo health aligned with regulatory requirements and industry leading practices. We asked the firms CEO, John Crouch, to tell more about this.


John Crouch

Why independently monitor algo health?

Institutions have increasingly relied on algorithms to execute trades and minimize transaction costs. Yet several events, resulting in catastrophic losses and over one billion dollars in fines, brought the risk associated with algos to the forefront. Regulators and senior management have highlighted that algo-induced flash events would undermine market confidence. Thus, firms need to balance optimizing algorithm performance with implementing rigorous risk control. The FX Global Code of Conduct, MiFID II, and reputational risk are top of mind for the industry. Ideal Prediction provides an innovative monitoring platform to assist clients with mitigating risk.

What is this new monitoring platform?

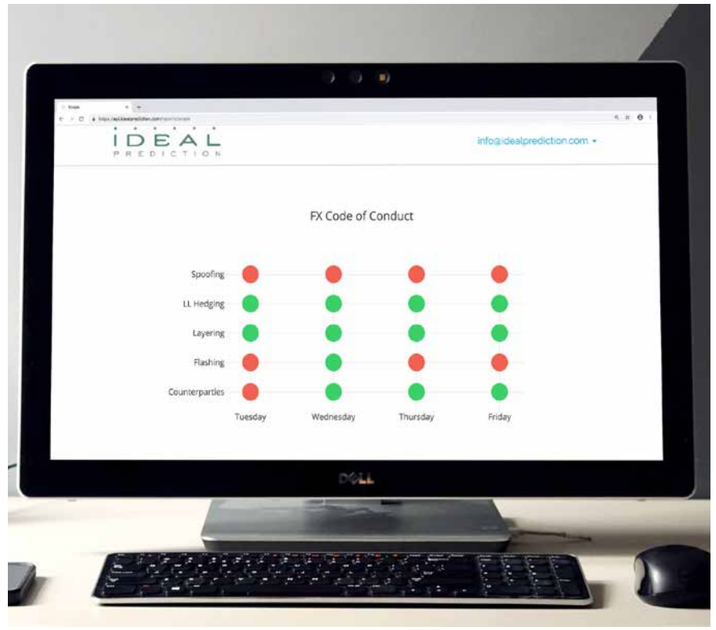
Our clients require independent analysis and risk controls beyond basic mandated TCA. Our trading analytics technology combined with a regulatory lens provides an elegant solution for the market."Ideal Prediction created a flexible and scalable analytics platform that empowers an independent review of algorithmic trading activity.

How does this offering work?

The algo monitoring platform extracts data from the client's existing infrastructure, creating a seamless transition for our clients. The offering provides a set of monitoring capabilities in the initial deployment. The software is then customized via agile development to address individual client needs: transparency within the organization, alignment with regional regulations, and operational risk. The framework automates tedious workflows to realize rapid tangible benefits and efficiencies.

Why is it compelling?

The inherent need to adopt algos to remain competitive has left companies vulnerable to significant risk and losses. Are trading firms willing to stake their reputation and profits to undertake the challenges of this constantly evolving marketplace? With innovation and disruption always comes increased risk. Ideal Prediction brings expertise and technology that delivers real benefits to manage that risk.



360T expands algo suite to meet growing corporate demand

In the last four years, the number of liquidity providers offering algo execution strategies has risen significantly, with currently close to 20 banks now providing services. This in turn further raises the profile of FX algos among corporate treasurers, with a growing number becoming curious about their usage and benefits, explains Simon Jones, Chief Growth Officer of 360T, Deutsche Börse Group's FX unit.


Simon Jones

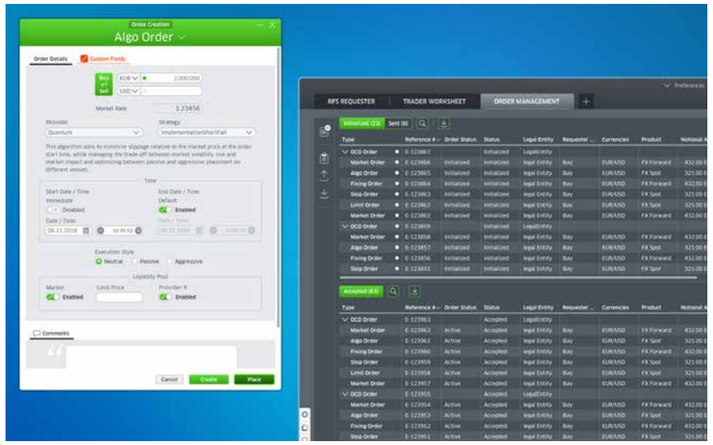
In response to this increased demand, 360T has further expanded the number of liquidity providers available through the 360T TEX platform, bringing the number of available algo strategies to over 60. According to Jones, the move will enable more corporates to integrate algo execution strategies into their workflow, bringing liquidity providers and clients closer together.

"The difficulty for banks has been to not only ask their clients to embrace algos, but to alter their workflow," adds Jones. "Yet for many of our clients we provide a whole myriad of treasury services and a full workflow solution. In just a flick of a switch, we can integrate algo strategies into their workflow and they will be up and running within an hour."

In addition, 360T provides the full range of related services for the client all from the same GUI, from post-trade allocation to reporting. Within the 360T TEX platform, the 360T EMS also offers advanced workflow solutions, liquidity and compliance tools to the institutional and corporate market. For corporates who run multiple desks around the world, they may then decide to use a bank algo to centralise that workflow, says Jones.

EXPANDING STRATEGIES

A number of 360T's liquidity providers are also looking to further expand their range of algo execution strategies beyond spot and into additional FX instruments which are of interest to corporates, such as NDFs, according to Jones.



360T's algo suite enables corporates to integrate algo execution strategies into their workflow, bringing liquidity providers and clients closer together

"However, the real watershed moment - and there are a couple of providers who have this in their pipeline - will be when banks begin to offer some element of algorithmic execution around swaps as well," he adds. "Swaps have been poorly served for a host of reasons, either in terms of credit or infrastructure, but people are beginning to think outside the box."

In a move towards remedying this, 360T also launched independent streaming FX swap market data in 2018. The swaps data feed (SDF) is the result of a collaboration with 14 banks who supply their swaps data to 360T, which is then aggregated and published for use by regional banks, non-bank market makers and middle offices. Jones explains: "One of the difficulties around algorithmic execution is having a reliable benchmark to know where the market is. This is a unique offering in the FX market and is the first independent benchmark available for swaps. Since we launched a few months ago, the market response and feedback has been extremely positive."

NEWS FEATURE

FMSB issues new Statement of Good Practice on algo trading

The FICC Markets Standards Board ("FMSB") has published a Transparency Draft of a new Statement of Good Practice on Algorithmic Trading in FICC Markets. The use of computer algorithms to facilitate trading in FICC markets has increased at a rapidly growing pace over recent years and has the potential to adversely impact market and firm stability and to harm clients. This new Statement of Good Practice sets out a number of core statements of good practice related to the use of algorithms in firms' FICC businesses.


Mark Yallop

EXTENDING THE COVERAGE

In certain jurisdictions, significant new regulation – in particular MiFID II – has been introduced to cover this area. However, there are certain types of FICC related activity which are not subject to MiFID, such as trading of spot FX and physical commodities not on a MiFID regulated venue, and this Statement of Good Practice is intended to apply to the use of algorithms in all FICC businesses, including those not covered by MiFID.

CORE PRINCIPLES

The Statement sets out a number of core principles, which are designed to ensure appropriate behaviour and governance in relation to algorithmic trading or the operation of a venue involving an algorithmic trading system. The statements of good practice include that firms engaged in algorithmic trading should:

- Put in place adequate and effective structures and mechanisms to provide for appropriate oversight, supervision and controls.
- Have appropriate pre- and post-trade controls in operation in relation to algorithmic trading.
- Have a formal risk management function independent of the front office to determine appropriate levels for pre-trade risk controls as well as to monitor the financial exposure and non-financial risks associated with algorithmic trading.
- Consider formalising a specific risk appetite for their algorithmic trading activity.

Mark Yallop, Chair of FMSB said: "The use of algorithmic trading systems has increased enormously over recent years, yet some of these systems lie outside of the reach of current regulatory oversight such as that of MiFID II. The statements of good practice that we set out today are designed to apply to all firms engaged in algorithmic trading practices, including those operating in areas untouched by regulation. We are doing this because we believe this will enhance the stability of markets in the longer term and tackle a growing area which, if left untouched, could become the source of potential market conduct risk and instability".FMSB members and other interested parties were invited to comment on the proposed Statement of Good Practice and FMSB will be issuing the final document in due course. This is the twelfth Standard or Statement of Good Practice (including those in their consultation period) to have been published by FMSB since it was set up in 2015 in response to the Fair and Effective Markets Review in the UK with a mandate to improve conduct and raise standards in the wholesale Fixed Income, Commodity and Currency markets. All materials published by FMSB are available at www.fmsb.com

More flexibility with less complexity - Streamlining the algorithmic FX trading process

The earliest algos delivered enhanced execution from a black box with minimal transparency, but buy-side firms now want to know more about how the strategies work, driving banks to lift the veil and provide greater insight, flexibility and customisation. Joel Clark reports.

To some extent this is probably the dream of every one of the hundreds of thousands of institutions that use the foreign exchange markets each day. They want accessible trading tools that are not excessively complicated but can nonetheless be adapted to meet the specific requirements of their business with the lowest possible costs and resources.

That this is still a work in progress in one of the world's oldest and most liquid financial markets should come as no surprise. Algos came later to the FX market than to equities and for many banks, asset management firms and corporates, they are still in the early stages of maturity. But as the FX market evolves, so too do the demands of its users. Initially they might have been willing to dabble in a new algo with fairly low expectations, but now they have more advanced requirements.

"We are having more and more conversations with our clients about algo execution strategies and how they can best apply these to their needs. They have a deep curiosity and need for a lot of detail on each strategy. Obviously, we're very supportive in sharing these details, increasing the transparency on how our algo platform works to ensure our clients have a solid understanding from start to finish," says Fergal Walsh, global head of algorithmic execution for foreign exchange and local markets at Citi.

"It's important that we provide a complete package of information," he adds. "That's before, during and after each algo execution that clearly shows what strategy is being used, how it is progressing and how liquidity is. Having a 24/5 dedicated algo execution team that services these requests is very important to our clients – when not every detail is always available on a chart or screen."

While it is impossible to track exactly how much of daily FX trading flows through algos today, it seems fair to assume from the number of bank and third party providers and the level of investment, that it represents a growing chunk of the market. Providers say demand for algos is rising as market participants increasingly look to reduce costs and take greater control over execution.

"By using algos, clients have an opportunity to determine the level of market impact their trading behaviour will have. Control over market impact is a major differentiator, because clients may have a very different execution horizon when compared to a traditional risk transfer," says Kasper Folke, head of e-FX and the algo quant team at Nordea.

USING ALGOS TO INCREASE TRANSPARENCY

Transparency is a key factor that attracts firms to algos as an alternative to risk transfer, particularly in an era when regulators are demanding more robust evidence of best execution. If FX market users can clearly show their stakeholders the parameters of particular algos rather than simply handing orders over to a sales contact and trusting that best execution will be achieved, they should ultimately have more satisfied investors.

Heightened demand for transparency has led to a subtle

Kasper Folke

"If you stick to treating algos as black boxes, it becomes almost impossible for clients to understand which algo might best suit their use case,"

Fergal Walsh

"As FX liquidity has fragmented across multiple trading venues, placing order interest and minimising market impact has become a more skilled job, which has strengthened the case for algo execution,"

change in the way in which algos are marketed and distributed. While some of the earliest equity market algos operated under colourful names with little detail provided – based on the premise that clients were buying into the advanced technological expertise of the bank and didn't need to see under the hood – many banks now disseminate much more granular information about how their algos work.

Keith Hill

"One of the great things about algos is that they minimise potential information leakage, which reduces execution risk at the outset,"

"The market can be clearly divided between those providers that operate very sophisticated algos with superb performance but without any real explanation of how they work, and those that really look to help their clients understand the risks they are taking and the benefits that can be achieved with particular strategies," says Keith Hill, global co-head of e-FX sales at Societe Generale Corporate & Investment Banking (SG CIB).

The push for greater transparency and less black box algos doesn't necessarily preclude the use of imaginative branding, as long as the reasons for that branding are clearly articulated. In addition to a hybrid time-weighted average price (TWAP+) algo, SG CIB operates two further algo strategies known as Falcon and Nightjar. Like the birds themselves, the Falcon algo is very fast while the Nightjar is stealthy and discreet. If properly explained, such names can help clients to better understand the type of strategy they are being offered.

"Explaining the meaning of the names helps clients to understand the principle behind the algo, but this is only the first step," says Hill. "Where clients find our algo advisory to be particularly useful is when we take the time to explain exactly how the algos operate, the nature of internal and external liquidity, and the governance of the algos within the bank."

MATCHING ALGOS TO TRADING OBJECTIVES

Effective and transparent marketing is all well and good, but many buy-side firms still need support in matching their trading objectives with the most suitable and relevant algo tools. This can be a challenge because banks generally avoid giving outright trading advice or directing which tools should be used, but must rather offer constructive guidance that ensures clients have all of the relevant information they need to make their own decisions.

"Most clients will typically have a certain portion of their business that they execute on voice, algos and multi-dealer platforms, but we have to be very careful not to give explicit advice because we will never know their business as well as they do. Our priority is to be very transparent on how our five algos work so that they can make their own decisions," says Stamos Fokianos, global head of e-business at Crédit Agricole Corporate & Investment Bank.

Arming clients with the right information to choose the algos most suited to their trading objectives can happen at a number of levels, ranging from brief high-level descriptions that very concisely explain what an algo does to much more detailed explanations of how it will perform in different market conditions and what kinds of strategy it is geared towards.

Nordea's Folke explains that the transmission of this kind of information starts with the bank's algo naming conventions but then extends to more advanced mechanisms to support clients through their decision-making processes.

"Our naming scheme relates closely to the trading objective, so for example the passive market-following algorithm is simply called "Make". We have also adopted a decision tree approach that uses a series of questions to guide the client towards the algo best suited to particular trading objectives," Folke explains.

"If you stick to treating algos as black boxes, it becomes almost impossible for clients to understand which algo might best suit their use case," he adds. "Instead, we are trying to expose as clearly as possible the ideas behind each algorithm, which also ensures the algorithms are comparable across our entire suite."

In many cases, the matching of algos to trading strategies comes back to the key parameters that define those algos. So in the case of SG CIB's product set, for example, Nightjar might naturally be suited to a client with a large order that wants to avoid market impact by executing stealthily, while a trader that wants to get in and out of the market as quickly as possible would naturally opt for Falcon.

Stamos Fokianos

"Algo strategies are often very similar from one bank to the next, but it is the customisation and controls that differ,"

"Generally we use two axes – urgency and discretion – to map algos to execution strategies," explains Patrick Guevel, global head of FX algo execution at SG CIB. "Nightjar is well suited to those clients that want to be very slow and discreet in their execution while Falcon is much faster. For those that are just beginning to use algos, we suggest starting with TWAP+, which has elements of both Nightjar and Falcon."

EXTENDING ACCESSIBILITY

In the initial phase of algorithmic execution, dealers would typically make their algos available to clients through their single-dealer platforms, which required firms to maintain connections to multiple platforms in order to access bank developed algos. As demand for algos expands however, they are gradually becoming more readily accessible via multi-dealer platforms and application programming interfaces (APIs).

Crédit Agricole CIB's FX algos are still relatively new, having been launched last year, but in addition to the voice channel they are already available through several multi-dealer platforms including Bloomberg, FX Connect, 360T and FXall, and API access will be added in the coming months.

"The preferred access method depends very much on individual clients, their connectivity to the multi-dealer platforms and the strength of their relationships with salespeople. Using a platform avoids having to give out information to sales, but we have seen some very large algo orders come in on voice, often because clients like to use a salesperson that they really trust," says Fokianos.

Customisation is critical in attracting and retaining algo users.

Direct connectivity to algos via APIs is becoming increasingly popular, Fokianos adds. "Having invested heavily in their order and execution management systems, it is much easier and more efficient for firms to send orders directly to a bank via an API to get them executed algorithmically, thereby achieving straight through processing."

Accessibility of algos is not only about physical connections, however. It also means demystifying algo execution so that corporates and financial institutions with little experience of the practice are not intimidated by unfamiliar jargon and phraseology.

Corporates, for example, are increasingly using algos to improve FX execution, but some might still be put off by a lack of understanding of how different tools work. It falls to providers to ensure product names and descriptions are clear and accessible to all, and that they are providing the right level of client advisory services on a case-by-case basis.

"We try to keep the marketing as simple as possible so that clients can really understand what each algo does and how the technology works. We use machine learning and artificial intelligence to build a predictive bias into the algos, which helps both our own market makers and the clients to see where the market is going and direct the strategies accordingly," says Jean-Michel Binefa-Kerbrat, global co-head of e-FX sales at SG CIB.

Guevel adds: "Algo execution works best when it is delivered as a real partnership with clients so that they understand how we operate each algo and why they should use a particular strategy depending on their trading objectives. It is constantly evolving and our most active clients give us ongoing ▶

Patrick Guevel

"Algo execution works best when it is delivered as a real partnership with clients so that they understand how we operate each algo and why they should use a particular strategy depending on their trading objectives,"

feedback that helps us to develop and improve our algos."

LEVERAGING TCA TO MANAGE RISK

Algo execution might have tangible advantages in reducing costs and market impact but it is not without its risks, and banks say they can use transaction cost analysis (TCA) not only to satisfy regulatory requirements to pursue and evidence best execution but also to help users keep track of the risks they face.

"The big difference between traditional risk transfer and execution algos is that clients carry the market risk with algos. When choosing an algo and setting its parameters, they must weigh up the market risk against the risk of market impact. In most cases they should aim to execute as fast as possible, but not so fast that they move the market against themselves," says Nordea's Folke.

TCA comes in many forms and while most banks now offer some form of post-trade reporting to give clients a summary level view of how their algos performed, the drive for best execution has led to much more granular requirements for both pre- and post-trade reporting, as well as a need to combine internal and external trade analysis.

SG CIB, for example, offers its own TCA to give clients a detailed report on every trade and help them better understand liquidity as well as the trading venues that were used, but it has also partnered with TCA provider BestX to provide clients with independent validation of the quality of its algos. Analysis has shown Nightjar to perform particularly well for those clients requiring stealthy execution, says Hill.

"We have also deployed pre-trade analytics to give clients a better understanding of market liquidity and greater confidence when using algos. One of the great things about algos is that they minimise potential information leakage, which reduces execution risk at the outset. Helping clients understand which risks they are mitigating, and which risks they are taking on, in the case of an algo executing over a longer period, is a key part of our role," Hill explains.

Nordea's Folke agrees: "Pre-trade analytics plays a key role in ensuring the choice of algo and the parameters of that algo make sense in current market conditions, while post-trade analytics then serve to validate the pre-trade input. But analytics alone are not enough; one has to establish a feedback loop between pre- and post-trade analytics to be able to learn what is the best way to execute."

CUSTOMISING ALGOS

Important as transparency, reporting and accessibility might be, true flexibility is only achieved when algo users are given the freedom to customise algos to suit their own individual needs. While most banks begin by offering a standard set of tools, often starting with the most basic TWAP, it is only when they grant users greater control of the algo's parameters that they really differentiate themselves from their competitors.

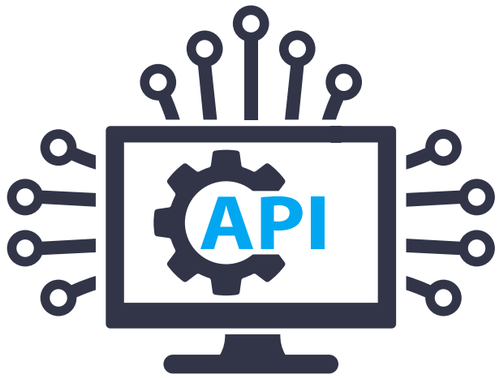
"Algo strategies are often very similar from one bank to the next, but it is the customisation and controls that differ," says Fokianos. "We have built in a lot of additional controls so that users can manage key parameters including the length of time an algo will run and its sensitivity to spot rate changes. This customisation is critical because one cannot compete by simply offering the same tools and the same liquidity as others."

Most banks agree that customisation is critical in attracting and retaining algo users. At its most basic level, customisation might involve setting limit prices above which a client will not buy and below which a client will not sell. Those parameters can often be adjusted on the fly if market conditions necessitate more aggressive or conservative strategies.

Some banks have taken customisation a step further. "Beyond the standard parameters such as aggressiveness and execution time, we offer customisation that goes further under the hood of

Jean-Michel Binefa-Kerbrat

"We try to keep the marketing as simple as possible so that clients can really understand what each algo does and how the technology works,"



Direct connectivity to algos via APIs is becoming increasingly popular

the algos, such as liquidity sources and algorithm logic, but we have not yet seen much interest in this," says Nordea's Folke. "While some clients do have very specialised requirements that require customisation, we feel mostly that the standard parameters of the algos offer sufficient choice to cover the needs of our clients."

Customisation is not only the domain of the banks, however. Some multi-dealer platforms are taking the demand for greater control to the next level by allowing users to switch from one algo to another while trades are already in progress. This switching functionality is not yet widely available, but it offers a glimpse of the kind of advanced user control towards which the FX algo world is slowly moving.

"The greatest risk when using an algo is managing sudden market moves, and some multi-dealer platforms will now allow users to switch algos during execution. This is a very advanced feature that means customisation is no longer confined to fine tuning, but one can actually switch from a passive to an aggressive algo or vice versa, thereby managing risk on the fly," says Fokianos.

Ultimately the true test of an algo is whether it guides the user to the best liquidity in a particular currency pair in the most efficient way. As banks continue to develop their algo execution services, customisation, flexibility and transparency will remain critical, but it is the access to liquidity that will likely determine where firms choose to source their algos on an ongoing basis.

"We have invested in ensuring we use those trading venues where there is deep liquidity available in a very efficient and low-footprint way. As FX liquidity has fragmented across multiple trading venues, placing order interest and minimising market impact has become a more skilled job, which has strengthened the case for algo execution," says Citi's Walsh.

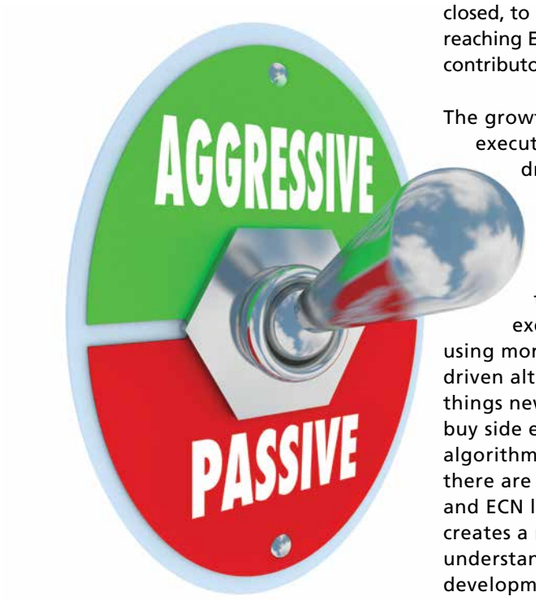
EXPERT OPINION


James L. Singleton

The Buy Side, Bank Algos and ECNs – It's Complicated !

By James L. Singleton, CEO of Cürex Group

Most buy side organizations, particularly asset managers, have traditionally avoided prime brokerage relationships with their banks in the context of their FX trading activity. The reasons for this are understandable given the margin requirements and explicit cost of such an arrangement. Traditionally, the buy side has been limited to trading bilaterally with individual banks due to their ISDA relationships. The onset of algo platform offerings by large global banks opened the door, previously closed, to buy side institutions reaching ECNs and their multi-contributor liquidity.



Algo products fall broadly into aggressive or passive strategies

The growth of this algorithmic execution alternative has been dramatic, particularly as regulators have enacted best execution mandates, and the buy side has been receptive to the benefits of executing their FX trades using more intelligent, machine-driven alternatives. But like all things new, the interaction of buy side execution style, specific algorithmic functionality (hint: there are many idiosyncrasies), and ECN liquidity characteristics creates a need for better understanding if these market developments are going to provide the benefits to all parties, which is of course the aim.

BEST EXECUTION ROLL-OUT

The introduction and promotion of bank provided FX algorithmic products coincided with the build-up to MiFID II's best execution roll-out. It also followed a period of enforcement actions that highlighted market behaviour that had been detrimental to customers' FX trading objectives. To address these and other issues, banks began offering algorithmic products that offered access to third party liquidity options - ECNs, as well as the banks' own liquidity. The algo products fall broadly into aggressive or passive strategies, and more often than not have been named after exotic animals. The algo providers charge a set price per million that covers all costs related to the execution. They also provide customers with transaction cost analysis of their trading activity. On a number of levels, these algo products deliver greater efficiency and choice for the buy side institution that is looking for best available price, transparent execution cost and post-trade TCA. But it is probably worth saying upfront that algo execution is not a simple default for meeting a customer's best execution mandate.

WHAT'S AN ALGO?

Simple question – simple answer: algos are trading programs that take orders and execute them in smaller pieces based on passive or aggressive strategies over some period of time. Without regard to their specific intelligence, algos will seek to find the best available price for the execution of each slice of the larger order. But as we scratch beneath the surface, there is more to think about. For example, an interesting characteristic of algos is the programs' need to execute at the top of book price.

That consistent tendency might negate the benefit of tapping liquidity at pricing levels below the top of book – perhaps a missed opportunity at times. Given the intelligence built into algos and their various passive and aggressive strategies, how do algos interact with the specific characteristics of the ECNs connected to the algo platforms – and should you care?

ASSESSING ALGO PLATFORM LIQUIDITY

Bank algo platforms connect to multiple ECNs that provide pricing which faces client orders. The bank offering the algo typically provides its own pricing as well. When the algo bank provider executes a client order using its own liquidity, that execution is "internalized." All banks offering algos will disclose this internalization potential to their clients. MiFID II's standard of best execution requires the market participant be informed and knowledgeable of all its trading alternatives. So what does a typical buy side institution know about the various FX ECNs connected to its chosen bank algo platform? Our guess is little or nothing at all. What should it know? We would suggest a few, but very important details:

- Is the ECN's pricing firm or subject to last look?
- Is the ECN's liquidity streaming or subject to interest?
- Is the ECN fully anonymous or not?
- Does the ECN allow its liquidity providers to trade with each other?

We would hope that the buy side user of algos would know the basics about the ECNs connected to the platform and be curious how those ECNs interacted with the algo strategies being employed. If a buy side institution does not pursue answers to those questions, it is not reasonable to assume that it has followed a best execution protocol when using a bank algo.

CONCLUSION

As the title of this article suggests, the relationship among the parties engaged in the algo environment is complicated. And ironically, while the emergence of algo execution is an important leap forward in the best execution quest, elements of algo functionality and its market impact remain somewhat an open question. Suffice it to say that the sophistication of many bank algos is ahead of many buy side institutions' knowledge base. The sales pitch for bank algos includes the benefit of reaching more liquidity faster. But that benefit can be undercut by the potential for signaling if the algo tries and fails to execute when facing last look liquidity. We are encouraged by the growth of algos and their benefits for the buy side. But the buy side will need to study how using different algos may impact their best execution process, particularly as they face ECNs with different rules and liquidity characteristics. It's still early days but there's plenty to think about!

Implementation and usage – the benefits of achieving a more solid understanding of algorithmic FX toolsets

Guy Hopkins is Founder of FairXchange


Guy Hopkins

It is no secret that algo trading in FX is increasing. After steady but somewhat modest growth for a number of years, the last year in particular has seen a faster uptake in usage. This has been prompted by a number of factors, with MiFID II's increased focus on best execution in particular prompting many to reach for algo strategies as a way to evidence execution quality. While algos can indeed provide a wide variety of benefits, it is important to be thoughtful about their implementation and usage.

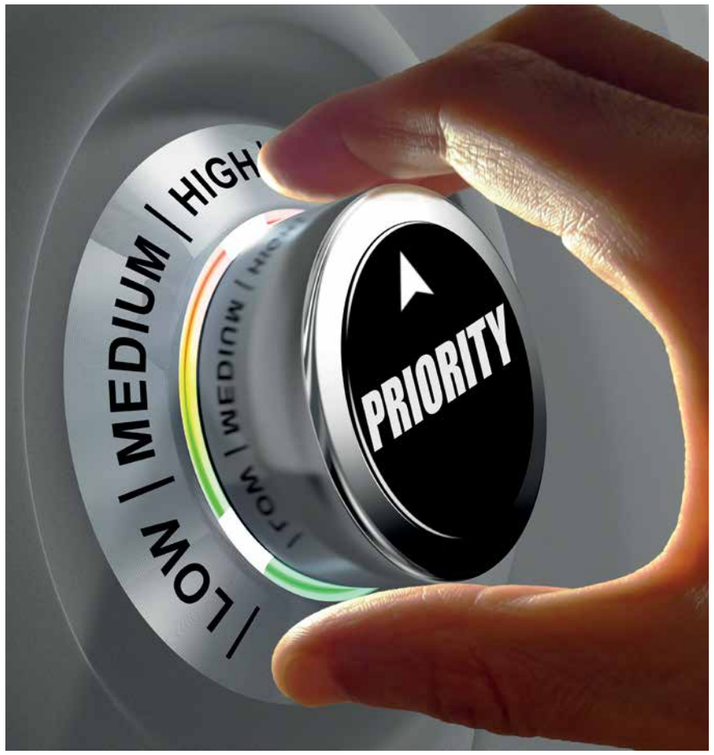
Innovation in execution technology has been rapid, but until recently the tools required to successfully deploy and manage these new tools have lagged far behind. Algo strategies that may be considered quite simple in their approach – "commoditised" even – are highly sophisticated execution tools which can vary significantly between providers. Moreover, the choice of strategy is only one of a number of key decisions that need to be made as part of the broader execution process. In this article we'll review some of these factors and consider ways in which they may be addressed.

It is well understood that different participants have different motivations for starting to use algos: reducing transaction costs in comparison to trading in full on a "risk transfer" price; achieving a representative average over an interval, or perhaps taking a directional view and seeking to average into (or out of) a position.


Should we rotate our panel of providers and strategies, and if so how?

This informs the benchmarks that are chosen to be measured against, and consequently the strategies appropriate to achieving or outperform those benchmarks. This seems a simple exercise but we should consider what the implications of this benchmark selection may be. Consider the TWAP - perhaps the most widely used algo strategy. A TWAP is designed to replicate a simple average of market prices over the trading interval – effectively seeking to minimise tracking error. If we achieve a good result against the TWAP benchmark, we might assume we have achieved a positive outcome.

What would we say if we were to discover that the TWAP created significant market impact during the interval? Superficially our performance might look good, but ultimately we are measuring ourselves against our own activity in the market. For a trader seeking to exploit a favourable move this would be a very poor outcome, as the algo has reduced her opportunity to benefit from the averaging effect; and even as a trader merely seeking to track "the market", can we in all honesty say we have achieved a good outcome for our clients if we see significant market impact, albeit alongside great benchmark performance?



Many algos have an urgency setting

SOME KEY DECISIONS NEED TO BE MADE

So we can see there are subtleties here that we should be aware of, which influence a number of key decisions we must then make. Which providers should we consider using? What kind of liquidity is suitable for our trading objectives – should we be seeking to access external market liquidity or are we better off trading with a provider that can demonstrate an ability to internalise? How much should we be involved in the liquidity management process? Should we rotate our panel of providers and strategies, and if so how? And perhaps most importantly of all, how should our traders interact with these strategies? Back to our TWAP example, again its superficial simplicity belies some complex decisions to be made, particularly around timing. Setting an appropriate interval for a TWAP algo is not an easy task – too short and we risk creating unnecessary market impact, too long and we take unnecessary market risk.

As the algos get more complex and parameter driven, this task becomes progressively harder. Many algos have an urgency setting which the user can increase or decrease depending on their tolerance for both market impact and market risk. Unsurprisingly these settings differ between providers and are calibrated by individual currency pair. We may now be faced with the unenviable task of trying to compare provider A's "medium" setting against provider B's "number 3" urgency. We have to make choices about which algo to use, and at what speed. We may also have instructions not to trade beyond a certain level, and maybe even to opportunistically consume liquidity if the market comes in our favour to a certain degree.

ADDRESSING THESE QUESTIONS

Suddenly what appears to be a simple, seemingly automated process has become a very complex one with many moving parts. How do we even begin to address these myriad questions? This is where analytical tools, powered by rich, high quality data come into their own. A number of innovative companies have emerged in recent years who are helping their clients start to address some of these issues. It's important to recognise that this goes far beyond what one might think of when hearing the phrase "TCA"; satisfying one's regulatory obligations is of course of paramount importance, but meaningful data analysis goes far beyond that - it is a commercial exercise as much as a regulatory one.

These tools are designed to assist throughout the algo process – post-trade analysis can be used to assess and compare strategies, providers, liquidity and trader involvement, while pre-trade capabilities can provide important decision support tools to traders before they interact with the market. They can give us a better understanding of how algos perform and how we can best utilise them.

In any conversation about algos these days it is only a matter of time before one hears the words "machine learning" and "artificial intelligence". Without question these play a hugely important role, in particular for providers of algos who rely on them to optimise both the execution strategies and the liquidity with which they interact. I would view the recent development of "algo wheels" – the automated selection and calibration of different strategies - with some caution however.

Before trying to automate anything we should first be confident that we have a solid understanding of the tools we are using and how they may behave – otherwise we risk trying to come up with an answer to a question we don't yet fully comprehend.

Optimising execution quality and the increasing need for pre-trade TCA

Stuart Farr is President of Deltix.


Stuart Farr

There has been a marked uptick in the use of TCA (Transaction Cost Analysis) services within the FX market over the last few years. Doubtless significantly inspired by the FX Global Code and MiFID II, the use of TCA in FX has been suggested in some quarters to be a box-ticking exercise (although this charge is similarly levelled at TCA in other asset classes too).

This is unfortunate, and maybe it's time for a name change. The very name 'TCA' suggests an after-the-fact analysis which may never see the light of day again. Implicit here is the need for 'pre-trade TCA': helping traders intelligently decide the most appropriate execution algo for the required objective (how to execute) and on which venue (where to execute). Note that we use 'execution algo' here in the broadest sense, covering the method of order execution in general; whether using market, limit and other order types or true execution algos such as TWAP. We use 'venue' to include ECNs, banks and non-bank liquidity. Whatever the requirements are for regulatory, or indeed client reporting, surely the most important aspect of TCA (or 'execution analysis') is the use of post-trade analytics to inform and improve current and future (pre-trade) order execution.

ONGOING EXECUTION ANALYSIS

Optimising execution quality means performing ongoing execution analysis in real-time to enable traders to make informed decisions for subsequent orders. The key point here is that market characteristics (e.g. volume, spreads and volatility) continually change. Therefore, measurement of execution quality should be continuous and part of the workflow of order execution in order that decisions on algo selection and venue are based on current market conditions and the extent to which they deviate from historical market conditions for similar orders.

The essential component required for such on-going analysis and decision-making is recording faithfully, in real-time, the full depth of the order book for each liquidity venue to which the firm is connected. With multiple liquidity providers (LPs), this is the proverbial "drinking from the firehose" which requires the ability for the trading system to ingest quote updates and trades at rates measured in hundreds of thousands per second.

A key aspect here is that this quote recording system is plugged into the trading firm's production trading infrastructure. As such, the latencies and infrastructure implicit in the trading firm's particular set-up are baked into the historical time-series thus recorded, and it is more straightforward to intertwine orders, executions and the state of the order book at the time of each order and execution.

Once this recording system is part of the trading infrastructure, a time-series of trading-firm specific quotes and trades is automatically created and maintained. Again, by being part of the production trading infrastructure, this time-series production receives the necessary care and attention befitting such a valuable resource. This systematically maintained time-series database (or better, 'knowledge base') is the cornerstone of implementing a systematic approach to improving FX execution quality by appropriate algo and venue selection.

Of course, the lack of a central tape or official close prices as in equities and futures markets begs the question as to the relevant benchmark for measuring FX execution quality. But, when a firm is using TCA as part of a solution to improve execution quality (versus box-ticking), then the benchmark can and should be specific to the objectives of that firm's FX trading (e.g. hedging versus intra-day trading).

WHERE TO EXECUTE

Because of the fragmented nature of liquidity in the FX market, improving FX order execution is not just about how to execute (i.e. which execution algo to use). FX execution analysis has to operate across venues, so where to execute is also critical. This is preferably undertaken in real-time by a smart order routing (SOR) algo. SOR algos determine venue selection typically by looking at the best bid or offer simultaneously provided by each of the connected LPs. Depending on the time of day, currency pair, order size, required aggressiveness, etc, the SOR algo may send child orders to multiple LPs and may use multiple levels of liquidity. The intelligent SOR algo accounts for the historical fill ratio and rejections. Even if a venue offers the current best price, it may be more risky to route the flow to this venue if historically this location has a high rejection rate. Thus, it is essential to SOR operation to have access to the time-series of market data, orders and actual executions in order to calculate fill and rejection profiles for each liquidity venue. The calibration of the SOR algo should be continually evaluated. This is done by back-testing candidate SOR algos (including different parameterisation of the 'same' algo) against the firm's own knowledge base of market data, orders and executions.

In summary, we need to combine traditional FX TCA with liquidity analysis across multiple venues and provide pre-trade analytics on current and historical data to provide traders with relevant and current analytics to optimise execution quality for the next order.

Electronic Trading and Algorithmic Execution

27th-29th March 2019, London, UK

The first day of the programme looks into the nature of electronic markets and examines different types of orders and algorithmic execution. Day two focuses on electronic market-making and the market microstructure, examining both the market risks and regulatory challenges. Day three comprises of a more advanced, in-depth coverage of execution algorithms alongside trading strategies and signals. Participants will examine in detail the evolving structure of the markets as driven by regulation and analyze ways to achieve and demonstrate best execution.

Practical workshops allow participants to explore the implementation of a market-making engine as well as analyzing methods of algorithmic execution, benchmark performance and TCA metrics.

londonfs.com/programmes/Electronic-Trading/Overview/

CORTEXiX

The FX spot algorithm execution service from BNP Paribas

CHAMELEON

Chameleon is a third generation adaptive algorithm designed to work large size orders directly into the interbank markets. It camouflages the order by breaking it down into smaller manageable clips that it fills over the execution window. Chameleon's objective is to fill the order on the passive side of the market. It has smart order placement logic, where it varies its clip size based on real-time market activity to blend into the market. If the open market orders are not filled in a timely manner, Chameleon will briefly switch to smart aggress mode, where it will aggress various FX trading venues to ensure the order is being filled. Its stealth logic prevents its trading patterns from being easily identified during execution.

VIPER

Aggressive, adaptive algorithm designed to work mid to large orders into the market. The objective of Viper is to break up a block order into smaller clips and aggress all FX trading venues seeking out optimal price execution. Viper will monitor market movement and adapt its execution strategy between passive and aggressive execution styles. Viper order placement logic is highly randomised to mask any patterns whilst working an order. Its key feature is Smart Aggress logic, that will intelligently sweep liquidity across all FX trading venues while minimising any market signals.

IGUANA

Iguana is an adaptive time-based algorithm that looks to dynamically work an order based on a user-defined schedule. Similar to TWAP characteristics, Iguana uses advanced logic that enables it to react favourably to market movements. It adapts the speed of execution based on a user-defined end-time or duration, and looks to passively fill an order while constantly adapting to the market environment.

More information is available at: https://cortex.bnpparibas.com/public/ix.html#

Quadron Capital

a firm intent on putting the science of mathematical modelling back into the business of profit making and money management

Quadron Capital is a fund advisory firm that specializes in quantitative algorithmic trading strategies, providing investment solutions for a broad range of investors and managers. The company also acts as a silent partner or white label to some of the worlds leading money managers and funds who use Quadron's strategies to create sustainable alpha for their own client base. We asked CEO, Leroy Lawrence, to tell us more about his firms use of trading algorithms and plans for the future.

Leroy, how did you become involved in the world of trading and investment management?

I began as a Stockbroker in Frankfurt. It was my second job out of university. I didn't really know much about anything at the time, but I was a natural on the sales end and took a great interest in the markets. I also got to read through an endless list of Corporate documents for analysis and met with many board members. It gave me a very good understanding about corporate governance and what makes a company investible to the market.

When was Quadron Capital launched and how would you describe its mission and key investment objectives?

Quadron launched in February 2014 as a Bermuda domiciled Fund Advisor. The original business plan was for it to incorporate a number of very smart quants. The goal was to build a number of automated futures and currencies algorithms for one sole hedge fund.

Who are the key members of your team at Quadron and what roles do they have within the firm?

Our key person for trading strategy and development is Jacques, a quant formerly from PNB Paribas. We also have Will, a PhD from Canada who develops high frequency algorithms. We have a number of other staff including a PhD mathematical modeler and API integration specialists. On the business end, the board, including the CEO make strategy decisions. We are not currently so sales- orientated as we have strong partner/client relationships in place.

Our high frequency algorithms can place a thousand trades a day

Leroy Lawrence

What do you particularly like about the currency markets and what are you looking to exploit from them?

Liquidity is one of the main attractions. Without it as seen in many single stock markets outside of the FTSE100 or Dow for example, trading can be very cumbersome and time limiting. The currency market can throw up lots of news lead surprises, but our quality comes in our ability to deal with these challenges in new and creative ways. We like a challenge and don't tend to fold under pressure.

Who are Quadron's client base and what do these investors particularly like about how your team manage and create value with money entrusted to you?

Our clients are now our partners. We used to have traditional client / service relationship, but now we work with regulated money managers and funds who white label our products. We build, rebuild and customise our products to suite their client needs. That way our partners can have all of the expertise we have but fashion it into something specific.

What range of instruments are you mainly trading and over what sort of timeframes?

We trade the most liquid G10 currencies. We like to hold positions for as short a time as possible. Seldom overnight and vert rarely over the weekend. Our high frequency algorithms can place a thousand trades a day. Sometimes we also trade in Futures.

Quadron offers two key managed accounts. Please explain what these strategies are, how they differ and the type of trading that is undertaken with them including some of the key indicators that are employed?

Our two key managed accounts used to be our benchmark accounts so that we could report monthly on our performance. People like to see lineal performance before becoming involved with you, but more pressing questions of risk controls and strategy began to become more important and specific. So, we stopped trading the two

benchmark accounts last year and concentrated on building custom algorithms with partners instead.

How much research and development has gone into building your signature Alpha Box Fund and how do you go about fine-tuning it?

As a company we had worked with and tested around 50 quants beforehand. With the current team we used their many years of skill and experience and created the strategy and legal structure we felt best suited our potential client base.

Much of the "secret sauce" that drives your positive results is clearly based on proprietary statistical tools and quantitative analysis that allow your systems to better identify patterns in currency markets. But how does that does work in practice and lead to improved performance?

We constantly analyse the statistics and data. As you can imagine we are very secretive about our 'sauce'.

What trading and technology platforms do you use and what are your preferred programming languages?

We use MQL for MT4 trading as it is very popular with partners and easy to connect with. We also use C# with Multi Charts and Java API for integration.

Whilst the currency market is extremely volatile and difficult to get right each month, currencies present a level of liquidity not seen in any other asset class.

Your literature talks about a Multi-Algorithm concept. What is that and how do you employ it?

In-house we use the term 'cases' for multiple rule-based algorithms that work as one overall algorithm. It allows us to have a simple overall risk control methodology whilst maximising the amount of activity. This is very beneficial considering that market movement can become very limited during certain parts of the year or leading up to regular data announcements.

What forms of risk are a threat to your positive trading months and how have you gone about protecting and guarding against these?

Our risks are typical of the market, both systematic and unsystematic. We don't tend to see any technical problems in live trading. This is because we operate a slow update protocol. This prevents anything dramatic from happening.

How dependent is your trading on low latency infrastructure and bespoke high-end IT and what steps have you taken to manage and address this?

Our HFT trading is extremely delicate and reliant on both very low latency and reliable multi data feeds. This is achieved by having our execution near to the exchange. A lot of our time is spent on custom API integrations for HFT partners.

Why do you think algorithmic trading is becoming increasingly popular for investment managers especially those who are heavily focused on generating returns from the currency markets?

Most of the market is automated. Money managers want to be able to predict roughly what their month returns will be for their incoming and existing clients. Whilst the currency market is extremely volatile and difficult to get right each month, currencies present a level of liquidity not seen in any other asset class. End clients are often not fans of long lock-ins.

Many money managers are now also utilising Machine Learning and Artificial Intelligence to improve their trading performance and make allocation of capital more efficient. Has Quadron started to use these technologies as well or plans to do so in the future?

In house we have been working on machine learning techniques. We haven't seen any AI strategies that are reliably better than our own just yet. I think our future machine learning products will become our standard in the not so distant future.

How important are the views of your partners in guiding the development of your strategies?

Very. We consider our white label products to be theirs. We are just the advisors and engineers attempting to achieve their wishes. This does mean there can be a clash between our experience and their wishes sometimes. However, we have good relationships with our current partners.

How have your funds been performing recently and what plans do you have for adding to your current offerings and exploiting new investment opportunities, particularly with currencies?

Last year we struggled to create the previous levels of alpha due to major news driven events such as Brexit and Trump trade wars with China and Turkey. This has left our alpha risk taking somewhat subdued into this year. We are not terribly alarmed by this as we are about long-term gains rather than making rash strategy decisions that could damage our overall alpha. I expect our numbers become more bullish again as we move forward.

We use MQL for MT4 trading as it is very popular with partners and easy to connect with

Algorithmic crypto trading: market specifics and strategy development

By Marek Koza, Product Owner of Empirica's Algo Platform

Among trading professionals, interest in crypto-currency trading is steadily growing. At Empirica we see it by an increasing number of requests from trading companies, commonly associated with traditional markets, seeking algorithmic solutions for cryptocurrency trading. However, new crypto markets suffer from old and well-known problems. In this article, I try to indicate the main differences between traditional and crypto markets and take a closer look at a few algorithmic strategies that are currently effective in the crypto space.
Differences between crypto and traditional markets constitute an interesting and deep subject in itself which is evolving quickly as the pace of change in crypto is also quite fast. But here I only want to focus on algorithmic trading perspectives.

LEGISLATION

First, there is a lack of regulations in terms of algorithmic usage. Creating DMA algorithms on traditional markets requires a great deal of additional work to meet reporting, measure standards as well as limitations rules provided by regulators (e.g., EU MiFIDII or US RegAT). In most countries crypto exchanges have yet to be covered by legal restrictions. Nevertheless, exchanges provide their own internal rules and technical limitations which, in a significant way, restricts the possibility of algorithmic use, especially in HFT field. This is crucial for market-making activities which now requires separated deals with trading venues.

DERIVATIVES

As for market-making, we should notice an almost non-existent derivatives market in the crypto-world. Even if a few exchanges offer futures and options, they only apply to a few of the most popular cryptocurrencies. Combining it with highly limited margin trading possibilities and none of index derivatives (contracts which reflect wide market pricing), we see that many hedging strategies are almost impossible to execute and may only exist as a form of spot arbitrage.

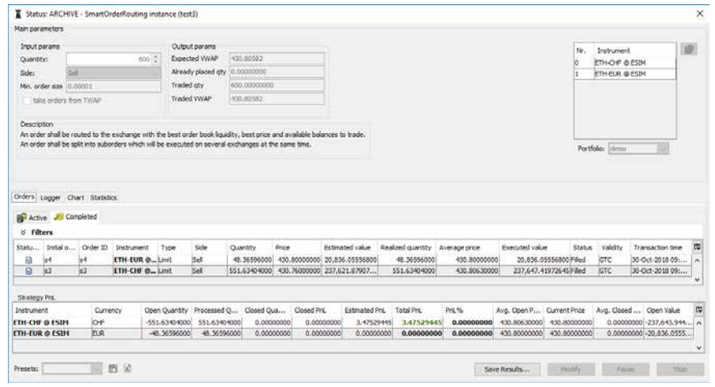
Liquidity is and most probably will remain, one of the biggest challenges for cryptocurrency trading

DECENTRALIZATION

The above-mentioned facts are slightly compensated for by the biggest advantage of blockchain currencies - fast and direct transfers around the world without banks intermediation. With crypto-exchange APIs mostly allowing automation of withdrawal requests, it opens up new possibilities for algorithmic asset allocation by much smaller firms than the biggest investment banks. This is important due to two things. Firstly, there is still no one-stop market brokerage solution we know from traditional markets. Secondly, cryptocurrencies trading is distributed among many exchanges around the world. It could therefore be tricky for liquidity seekers and heavy volume execution. It implies there is still much to do for execution algorithms such as smart order routing.

CONNECTIVITY

Another difference is direct market access for algorithmic trading. While on traditional markets DMA is costly, cryptocurrency exchanges provide open APIs for all their customers that may be used without upfront prerequisites. Although adopted protocols are usually easy to implement, they are often too simplistic. They do not usually offer advanced order types. Besides, order life-cycle status following is cumbersome and trading protocols differ among exchanges since each one requires its own implementation logic. That makes a costly technical difference compared to traditional markets with common standards, including FIX protocol.



A smart order routing strategy GUI

MARKET DATA

Fast, precise and up-to-date data are crucial from an algorithmic trading perspective. When a trader develops algorithms for crypto-trading, she should be aware of a few differences.

APIs provided by crypto-exchanges give easy access to time & sales or level II market data for everyone for free. Unfortunately, data protocols used in the crypto space are unreliable and trading venue systems often introduce glitches and disconnections. Moreover, not every exchange supports automatic updates and an algorithm has to issue a request every time it needs to check on the state of a market, which is difficult to reconcile with algorithmic strategies.

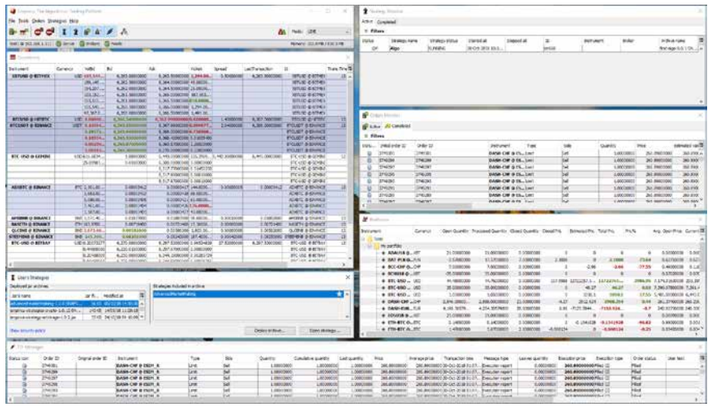
Price differences among exchanges for the most actively trading crypto-assets, are much smaller than a year ago

The APIs of most exchanges allow downloading of historical time & sale data, which is important in the algorithmic developing process. However, historical level II data are not offered by exchanges.
We should also notice that despite being immature, the systems of crypto trading venues are evolving and becoming more and more professional. This forces trading systems to follow and adapt to these changes, which adds big costs to systems' maintenance.

In the following sections I overview a few trading algorithms that are currently popular among crypto algo traders because of the differences between traditional and crypto markets listed above.

SMART ORDER ROUTING

Liquidity is and most probably will remain, one of the biggest challenges for cryptocurrency trading. Trading on bitcoin and etherium and all other altcoins with smaller market capitalisation, is split among over 200 different exchanges. Executing a larger



Empirica algorithmic trading platform front-end app (TradePad) for crypto-markets.

volume on any type of assets often requires seeking liquidity on more than one trading venue. To achieve that, cryptocurrency traders may apply smart order routing strategies. These follow limit order books for the same instrument from different exchanges and aggregates them internally. When an investment decision is made, the strategy splits the order among exchanges that offer best prices for the instrument. A well-designed strategy will also manage partially filled orders left in the order book in case some volume disappears before the order has arrived at the market. This strategy could be combined with other execution strategies such as TWAP or VWAP.

ARBITRAGE

The days when simple cross-exchange arbitrage was profitable with manual execution are over. Nowadays price differences among exchanges for the most actively trading crypto-assets, are much smaller than a year ago and transactional and transfer costs (especially for fiat) still remain at a high level. Trading professionals are now focused towards using more sophisticated arbitrage algorithms such as maker-taker or triangular arbitrage. The former works by quoting a buy order on one exchange, based on VWAP for a particular amount of volume from another exchange (the same instrument) decreased by expected fees and return. A strategy is actively moving quoted order and if the passive gets executed, it sends a closing order to the other exchange. As the arbitrage is looking for bid-bid and ask-ask difference and maker fees are often lower, this type of arbitrage strategy is more cost-effective.

Triangular arbitrage may be executed on a single exchange because it is looking for differences among three currency pairs which are connected to each other. To illustrate, let us use this strategy with BTCUSD, ETHUSD and ETHBTC pairs. This strategy keeps following order books of these three instruments. The goal is to find the inefficient quoting and execute trades on three instruments simultaneously. To understand this process, we should notice that ratio between BTCUSD and ETHBTC should reflect the ETHUSD market rate. Contrary to some FX crosses, all cryptocurrency pairs are priced independently. This creates numerous possibilities of using triangular arbitrage in crypto space.

MARKET MAKING

Market making should be considered more as a type of business than as just a strategy. The main task of a market maker is to provide liquidity to markets by maintaining bid and ask orders to allow other market participants to trade any time they need. Since narrow spreads and adequate prices are among the biggest factors of exchange' attractiveness, market making services are in high demand. On the one hand, crypto exchanges have special offers for liquidity providers, but on the other hand, they require from new coins issuers a market maker before they start listing an altcoin.

These agreements are usually one source of market maker income. Another one is a spread - a difference between a buy and a sell prices provided to the other traders. The activity of a market maker is related to some risks. One of them is inventory imbalance - if a market maker buys much more than sells or sells much more than buys, she stays with an open long or short position and takes portfolio risk, especially on volatile crypto markets. This situation may happen in markets with a strong bias, or when market maker is quoting wrong or delayed prices, which will immediately be exploited by arbitrageurs. To avoid such situations, market makers apply algorithmic solutions such as different types of fair price calculations, trade-outs, hedging, trend and order-flow predictions, etc. Technology and math used in market making algorithms are an interesting subject for future articles.

SUMMARY

Fast developing crypto markets are attracting a growing number of participants, including more and more trading professionals from traditional markets. However, the crypto space has its own specificity such as high decentralization, maturing technology and market structure. Compared to other markets, these differences make some strategies more useful and profitable than others. Arbitrage - even simple cross-exchange is still very popular. Market making services are in high demand. Mid-sized and large orders involve execution algorithms like smart order routing. At the end of the day to embrace the fast changing crypto environment, one needs algorithmic trading systems with an open architecture that evolves alongside the market.

Aqua POV – from JP Morgan

With Hannah Baum, Head of EMEA eFICC sales at J.P. Morgan

In what ways does the strength and experience of JP Morgan's market making franchise put it a good position to meet the increasing demand for algorithmic FX trading?

JPMorgan has one of the largest and most sophisticated eFX franchises on the street. In certain pairs, flows are as large as volume traded on the primary market. Our wide distribution network spans across all regions and client sectors resulting in a wide breadth of client flow. JPMorgan algo participants benefit from the ability to offset natural client interest in an undisclosed manner which reduces their overall market impact. In addition, our market making research is factored into the algorithmic liquidity seeking execution which increases the accuracy and effectiveness of the order.

What steps have you taken to help clients become more comfortable with FX algo execution?

We have recently launched a pre trade analytics tool giving clients access to a number of real time benchmarks. Features include liquidity profiles by currency pair, a real time volume gauge and fill distribution transparently displayed, all allowing clients to make informed decisions at the point of order entry and during the life of the order. We've started publishing aggregated observations based on empirical data following certain market events to evidence the value of algo execution vs risk transfer . This allows clients to better assess the effectiveness of algorithmic execution in different market conditions. As well as providing clients with JPMorgan TCA on demand, we support independent TCA providers. This is complimented by the full eSales coverage service which includes the monitoring of orders, a constant dialogue during execution regarding the performance and data driven conversations post trade.

What are the key benefits that clients are getting from using your FX algos?

We offer a breadth of strategies across a wide range of currency pairs and crosses. JPMorgan's large electronic market making franchise gives us a deep understanding of the market microstructure which helps determine optimal algo participation within the ECNs. Our internalisation network offers a unique pool made up of genuine reciprocal risk. In addition we are able to leverage our cross asset algorithmic research to build and enhance the offering. The enhanced transparency offering through real time tools and TCA reports allow clients to make more informed decisions in a bid to improve their execution quality whilst lowering their overall transaction costs.

DESCRIPTION & CAPABILITIES

- The Aqua POV is a dynamic, liquidity seeking algorithm that adapts to specific market conditions.
- It increases its participation during times of high liquidity and slows execution when conditions reverse.
- The order takes advantage of different liquidity scenarios to manage market impact through specific user parameters.
- It uses a real time volume estimation

NAME OF THE STRATEGY: AQUA POV

EXECUTION OBJECTIVES

- The algo's main objective is to participate at the optimal point of liquidity and frequency to minimize market impact while managing the associated time risk.
- The urgency parameter allows the user to easily control market impact vs market/time risk.

WHEN TO USE IT

- It can be used for any currency at any time of day.

KEY PARAMETERS & FEATURES

- Multi asset: Aqua is a successful strategy already used in our cash Equities and Futures market.
- Easy to use: Only one parameter necessary 'urgency'
- Adaptive: to real time market liquidity conditions.
- Urgency allows users to easily control market impact vs market/time risk, adapting both the speed of execution and trading trajectory to real time conditions.
- A data driven approach to order routing maximizes fill rates while limiting information dissemination.

Passive algo execution

By Dr Cameron Mouat, CEO of Aoraki Advisors

The class of Passive algos ranges from mechanical floating algos to those with sophisticated order working and microstructure models. They are used across most client segments, although how they are used can vary. Less experienced traders might simply be looking at an algo which captures spread in any market condition. However, more active algo traders include passive algos as a tool alongside other execution methods. This article will discuss passive algo execution and the benefits and pitfalls when using this class of algo.

DrCameron Mouat

TYPES OF PASSIVE ALGOS

Although passive algos can be thought of as slow execution or low participation execution, we consider them to be an algo that predominantly executes by making prices. In fact, the execution may be very quick if there are sufficient aggressors on the other side. We define Passive algos to be those that execute by not crossing the spread and do not have a schedule or trade rate target. These include floating algos, orders pegged to near-touch or mid, those sending resting orders to an internal order books and combinations of these. However, the definition excludes algos such as TWAP or VWAP and participation based algos, although it should be noted that these algos can have passive settings.

Now consider a mechanical floating algo which posts orders on ECNs. When a single GTC passive order is placed on an ECN or exchange at the near-touch (bid for a buy order, offer for a sell order), there are two possible outcomes:

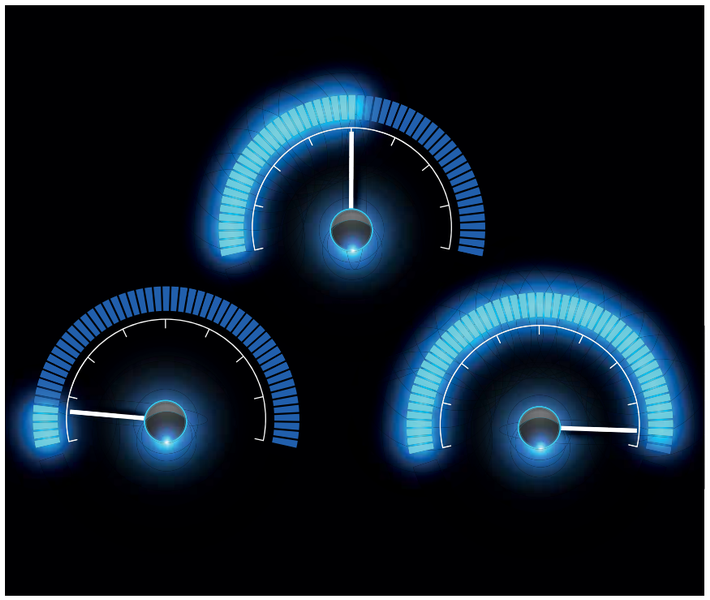
1. the order gets filled and we have captured some spread

   or

2. the market moves away and the order is not filled

   There might also be a time constraint, so a third option is that:

3. the order is not filled but the market has not changed during the time interval.



Execution via passive algos can be very quick if there are sufficient aggressors on the other side

For a floating or pegged algo, if the order has not been filled, it must be moved to either close the spread or closer to the best bid or offer. In the case of a buy order we would move it up, and in the case of a sell order we would move it down. Again, once this has happened we are left with the three possible outcomes mentioned above. This process can continue until we eventually get a fill.

From the initial situation of trying to capture one spread, it is evident that we can have a significantly worse result as the market continues to move away and the algos response is always a passive order following the market. It should be noted that the distribution of performance versus initial mid is not symmetric, with a reasonable possibility of capturing the initial spread but also the possibility of executing significantly worse as the market moves away.

Once a fill has occurred, the passive algo then needs to choose how quickly it reloads another order. If the order is reloaded too quickly at the same level, the algo could have an impact by preventing price improvement. However, if it is reloaded too slowly, trading opportunities against desirable counterparties might be missed. The optimisation of order placement, to maximise execution and minimise adverse selection and market signals, is a desirable component of a passive algo.

It is also important for passive algos to optimise liquidity and to find other market participants with natural offsetting flow. Mechanically placing orders on multiple ECNs dominated by more informed market makers, where there is less likelihood of being filled, gives signals of your intentions to the market. Some algos reduce signals by employing anti-gaming logic or by placing resting orders against internal bank order books. An internal resting order could be "dark" inside the banks crossing engine or distributed as part of their price feed to other clients. This gives the order access to a pool of market participants which might not be reached when sending orders solely to ECNs.

There is a lot more to be discussed with regards to utilising banks resting orders which will be saved for another time, but passive algos that dynamically combine internal resting orders with routing to desirable ECNs, utilises the best of both liquidity options. Being able to customise who sees your price is essential in not getting picked off, and some algo providers give traders the functionality to choose the destination of passive orders. For traders who have less experience in choosing these destinations, there are plenty of independent experts to help out.

USING PASSIVE ALGOS

If the market is stationary or spreads are wide, then crossing the spread can be costly relative to execution risk. These trading conditions occur frequently when trading less liquid currencies; currency pairs outside of main trading hours; or on bank holidays. A good passive algo can be used to save spread and soak up available liquidity, however patience is needed as activity can be sporadic. To be more opportunistic, a discretion component based off spread size or available liquidity can be added alongside a participation cap.

In more volatile markets, execution risk is greater with passive algos, and solely using them is more likely to lead to an unsatisfactory outcome. The passive nature of the algo may result in adverse selection and missing good trading opportunities, and although each fill would still capture spread, it could be at a detriment to the overall execution performance. In this instance an algo that contains some aggressive component is needed.

Many traders use passive algos concurrently with other execution methods. The passive algo soaks up liquidity and captures spread, ideally from natural opposing flow, either via internal resting orders or on ECNs. However, at opportune times the trader will actively take additional volume by either a streaming price or a more aggressive algo. This gives the trader additional flexibility and control. There are also implementations of more automated algo switching. Credit Suisse, for example, has a Float algo which can be configured to switch to a more aggressive and opportunistic algorithm like Guerrilla if the price moves outside of trader defined levels.

CONCLUSION

We have reviewed some aspects of trading passive algos, including how they can be applied successfully and how execution can go wrong. Thankfully, pre-trade analytics have become more readily available to traders, and they can be better informed in determining if market conditions are suitable for this style of execution. This means that when the circumstances are right or when used alongside more aggressive execution styles, passive algos can play an important role in the execution toolbox.

SOME FEATURES TO CONSIDER WITH A PASSIVE ALGO:

- Algo switching: If market breaks out of the current trading range switch to another algo. For example, trade as a passive algo unless market moves above a level and then trade using an opportunistic algo.
- Automated algo switching based on market regime: Similar to algo switching above except the algo decides when to switch based off changes in market conditions.
- Anti-Gaming: Intelligent order working to ensure that more informed traders are not picking off a mechanical algo.
- External and Internal liquidity: Combine ECN liquidity with dark pool access matching other client orders or matching against principal pricing.
- Choosing destinations of ECNs: An option for active algo traders to choose destinations of their passive orders.
- Aggressive Discretion: A component which trades aggressively if the spread decreases. Potentially useful when actively executing on a less liquid currency pair. For example, lift offer if offer lowers to within 5 pips of bid.
- Participation cap: Set a max participation cap on the execution.

INFORMATION & RESOURCES

BANKS

Bank of America Merrill Lynch
bofaml.com/en-us/content/instinct-fx-built-to-outperform.html

Barclays
barx.com/foreign-exchange/fx-orders/gator-orders.html

BNP Paribas
cortex.bnpparibas.com/public/ix.html

Credit Agricole
ca-cib.com/our-solutions/global-markets/foreign-exchange-and-precious-metals

Citi
citifx.com/electronic-solutions/citifx-intelligent-orders.html

Credit Suisse
credit-suisse.com/uk/en/investment-banking/global-markets/international-trading-solutions/sales-and-trading/etrading.html

HSBC
gbm.hsbc.com/solutions/markets/fx-algos

Jefferies
jefferies.com/Commodities/Foreign-Exchange-Precious-Metals-Trading/3s/778

JP Morgan
jpmorgan.com/global/markets/execute/fxalgos?source=cib_ps_li_fxalgosvideo0918#3sect

Morgan Stanley
morganstanley.com/matrixinfo/assets/pdf/FID_Matrix_Brochure%20FX_2014_OCT.PDF

Northern Trust
northerntrust.com/asset-servicing/united-states/services/capital-markets-solutions/foreign-exchange

Nomura
nomura.com/nomuralive/algo/index.html

Nordea
nordeamarkets.com/products-services/fxalgo/

SEB
sebgroup.com/large-corporates-and-institutions/our-services/markets/foreign-exchange/e-fx

Societe Generale
cib.societegenerale.com/en/our-offering/global-markets/investment-and-risk-management-solutions/foreign-exchange/

UBS
about-neo.ubs.com/content/fxalgorithms

TECHNOLOGY & TCA PROVIDERS

BestX
bestx.co.uk/

BidFX
bidfx.com/solution/

Curex
curexgroup.com/

Deltix
deltixlab.com/products/algocompass/

FairXchange
fairxchange.co.uk/products

Flextrade
flextrade.com/buy-side/flextca/

Ideal Prediction
idealprediction.com/products/

ITG
itg.com/solutions/analytics/

Itiviti
itiviti.com/products-services/products/itiviti-fx/

360T
360t.com/trading-solutions/ems/

BOOK OF THE MONTH

Quantitative Trading: Algorithms, Analytics, Data, Models, Optimization

The first part of this book discusses institutions and mechanisms of algorithmic trading, market microstructure, high-frequency data and stylized facts, time and event aggregation, order book dynamics, trading strategies and algorithms, transaction costs, market impact and execution strategies, risk analysis, and management. The second part covers market impact models, network models, multi-asset trading, machine learning techniques, and nonlinear filtering. The third part discusses electronic market making, liquidity, systemic risk, recent developments and debates on the subject.

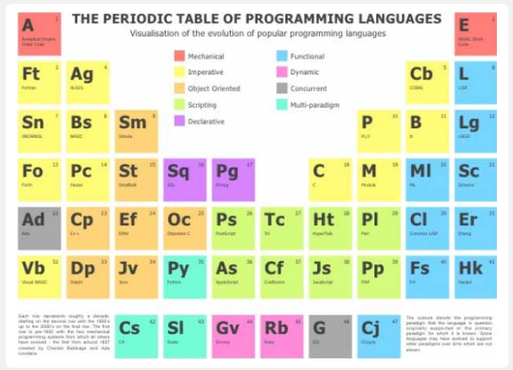
https://www.amazon.co.uk/Quantitative-Trading-Algorithms-Analytics-Optimization/dp/1498706487/ref=tmm_hrd_title_0?_encoding=UTF8&qid=&sr=

BLOG OF THE MONTH

Quantitative research & trading

Dr Jonathan Kinlay is the Head of Quantitative Trading at Systematic Strategies, LLC, a systematic hedge fund that deploys high frequency trading strategies using news-based algorithms. Dr Kinlay, was the founder and General Partner of the Caissa Capital hedge fund, whose volatility arbitrage strategies were developed by Dr Kinlay's investment research firm, Investment Analytics.

http://jonathankinlay.com/2018/10/algorithmic-trading/



FOR THE DIARY

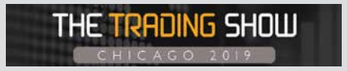
Workshops, Conferences and Events

TRADETECH FX USA 2019
13 - 15th February 2019 Miami Florida
tradetechfxus.wbresearch.com/

ALGO TRADING CONFERENCE 2018
Melbourne, Australia, December 2018
algotradingconference.com/

FX WEEK AUSTRALIA
27th March 2019, Sydney Australia
fxweekaustralia.com/

FIA BOCA
12th March 2019, Boca Raton, Florida USA
fia.org/events/boca-2019



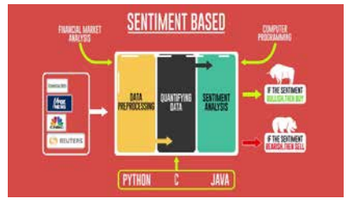
THE TRADING SHOW CHICAGO
8-9th May, 2019, Chicago, USA
terrapinn.com/conference/trading-show-chicago/

TRADERFORUM FX TRADING SUMMIT
30th-31st January 2019, Miami, USA
iimemberships.com/TraderForum/FX

VIDEO VAULT

TRADETECH FX BARCELONA 2018
youtube.com/watch?v=_29HGEHs0b4

BEST EXECUTION IN FX
youtube.com/watch?v=xOGCphpsTtg



ALGORITHMIC TRADING STRATEGIES
youtube.com/watch?v=4Ae2_i5nMxs

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