

ATP003, Toby Bayliss, Citi

Voices in Business presents, "The Algorithmic Trading Podcast" sponsored by Sybase. Show number 3.

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Announcer: Hello and welcome to the Algorithmic Trading Podcast, a series of interviews with leading practitioners and experts on Algorithmic Trading, brought to you by Voices in Business and sponsored and supported by Sybase. Today we bring you a conversation with Toby Bayliss, who is the head of the European Electronic Execution Sales Team at Citi.

Toby began his financial career at Nomura, before joining Citi nine years ago to be part of their newly formed global portfolio trading strategies team, where he worked on all aspects of portfolio construction, risk and execution analysis and trading strategies. In 2002 Toby moved across to the alternative execution sales team, responsible for marketing program trading, algorithmic trading, DMA and trading strategies, before assuming his current role in 2007.

Toby talks to Greg Grimer, editor of Voices in Business and Gavin Quinn, Business Development Manager for EMEA at Sybase. The conversation starts with Greg asking Toby about the ration of successful to unsuccessful algorithms.

Greg Grimer: How many of these algorithms do you find never actually translate into much of a profit, and how many of them are reusable once you have generated them? Can you take a sort of "per transaction" view with your own clients, or do you essentially just "suck it up" and what percentage don't work out?

Toby Bayliss: Of the algorithms that we develop?

Greg: Yes.

Toby: What you generally find is a lot of clients come to you with customized requests. And the way that we build their algorithms is we have a lot of parameters in there. And we don't necessarily offer all those parameters to our clients through their front-end systems.

An example of our closing strategy, capturing to close, which may seem like a very, very simple algorithm, has I think about 12 different parameters. Generally what you find is when a client comes to you asking for certain style of execution on the close; we pretty much have that already by giving them the right set of parameters.

And often, customization naturally means finding the optimum canned set of parameters for that particular client. That's what we generally do. It's actually fairly rare that you've

got to create a whole new trading strategy. If you have got the right suite of initial parameters set.

Greg: So what you are saying is that you got a very good toolbox at the moment, and, generally speaking, it's just a question of giving them the right tools to do the job, as they understand how to do it.

Toby: Yes, that's correct. To actually generate a whole new algorithm, the turnaround time is a lot longer than that.

Greg: Yes, and the cost as well.

Toby: Yes, and certainly the cost. There's a huge amount of testing. We can't just simply roll out an algorithm to a client and let them do the testing, because at the end of the day, if it starts performing very, very badly, we don't want to lose that client. It will end up costing us money, not the client money.

Greg: Where does the cost element come in with the testing? Is it people or is it processes? Or is it data?

Toby: It's generally people. That really is the time and the cost of generating these algorithms. To come up with a new algorithm probably takes a developer a month. So that's a month of man-hours, which is significant in itself.

Then you have a lot of testing involved and before we roll algorithms out to our clients, we roll them out to our cash desks and we roll them out to our program trading desks. And we like to have at least three or four weeks of flow through the algorithms, significant flow, before we are willing to give it straight on to a client.

If we have a cash desk and we find that it generally irons out most of the bugs and glitches, which there will be, regardless of how much back testing you do. You know, in an artificial environment it's never the same as putting it into the real market environment.

Generally, we can iron pretty much all of those bugs out in the first two or three weeks of testing.

Gavin Style: Right. Can you go through the process with regard to regression testing and back testing of how you try and impose the impact of the order that you would like to have done under those circumstances, because that's an area which I think confuses a lot of people?

Toby: It's exceptionally difficult to try and model other market participants and comprehend how the market would react with you taking liquidity from that market. One of the things that we do have, which is very beneficial to us, is we put in a lot of work into our actual forecasting trading impact, our impact cost model is, we believe, probably the best in the market.

It's something that we developed from our own trading data. We have a rolling three-month window of our own trading data, so we constantly are updating the parameters going into this impact model. It's global. It covers 50,000 securities. That obviously gives us huge head start, if you like, in coding something like an implementation short flow algorithm

We are forecasting what the impact is going to be every time we send a slice to the market. All looking at traders as a whole and sending that to the market and generating multiple trading times and the actual affect it will have in the market dynamics.

Gavin: And how do you build in changes in either velocity or volume or general different market conditions that can erupt? For example, an awful lot of algorithms seemed to break down, say, August of this year when volatility seemed to increase greatly. A lot of the Standard funds ran into some degree of difficulty around that period.

Most of those models have been developed in the period of historically low volatility and were seen to be a nice money making machine in and of themselves. Then a degree of increased volatility, in some cases, dramatically lower volumes, in some cases much increased volumes, velocity of order flow was being changed dramatically as well. A lot of the models didn't seem to be able to cope with this sudden change.

Toby: We have to be quite clear about what we mean by an algorithm, whether we are looking for an algorithm to generate performance or whether we're looking at an algorithm to carry out an execution in an optimal manner.

Gavin: Yes.

Toby: Now, you certainly can't forecast every single market condition. A lot of people that sometimes don't necessarily understand algorithms too well, often try to blame algorithms for adverse market movements and try and say, you have a big fall in the market, so that's been driven by algorithmic trading strategies or chasing each other.

In reality, if people are using algorithms correctly, they should always be applying the right parameter set. Certainly constraints of the most basic level on the price that they are executing at, they should certainly stop executing or start executing at a pre-defined price level. Say that algorithms are driving the market, it's the end traders that are driving the market, using the tools.

The tools allow them to do that much, much quicker. That is certainly true. But it's certainly not the algorithms that are driving the market performance. It's the way that people are using those algorithms.

Gavin: All right. So the algorithms are there. The variability, the volatility, etc., all those variables, they were then obliged to recalibrate for a different scenario?

Toby: Yes, this is true. We use historic data to calibrate our algorithms. What else do you use? That is your only option. The time window that we use for calibrating most of our algorithms is fairly short. Usually we're looking at five to ten days of data for calibrating our algorithms. And we also try to use some kind of forecasting as well in a lot of the strategies. So, in the very, very short term, something like a follow strategy, following it with volume. So, in a follow strategy, we're trying to get a certain percentage of volume going through the market.

In those types of strategies, we don't simply look at the volume that's been executed to assess that. We are also analyzing the depth of the order book. So we're analyzing what's actually sitting in the order book to try and forecast what liquidity is about to come up and which side of the order book that's likely to be on. So we're not constantly chasing the market, but we're actually participating when we should be and leaving orders residing in the order book.

So, in some of the strategies, they are sort of very, very short-term looking, in their view, and trying to take in other parameters rather than just looking at sort of the historical information as well.

Gavin: Do you see the desire for the historical information changing over time, in as much as different market conditions may wish to be studied at different times? I appreciate that you could always argue that history is never going to actually repeat itself in exactly the same way; the conditions of 5, 10, 20 years ago were just at that moment in time. But are there things that could be learnt from, say, thinner markets or more volatile markets?

Toby: Yeah. Certainly, in any back-testing environment, you need to be analyzing as many different types of market conditions as possible; and have as many different scenarios as possible for each of those markets. Will you capture everything? No, you probably won't. But you need to be confident that, in these extreme, sort of two standard deviation events, that you are ready and your algorithms are still robust enough that you get a satisfactory execution.

Gavin: So, should we discuss the differences you see in the market for algorithmic and, perhaps, quantitative analytics, with Europe, with its different regulatory regime and perhaps slower evolutionary path, or a different evolutionary path at any rate, with Asia and the Americas?

Toby: Certainly, we've seen huge changes in Europe in the last six months. Obviously, MiFID, on November 1st of this year, was a huge turning point in encouraging competition in the European markets. So far, that competition has been fairly limited, and actually, slightly slower than predicted to materialize.

At the moment, the only real competitor to the national exchanges is Chi-X, which is still only capturing not more than about a two percent market share in the names that it's got listed. Now, Chi-X, at the moment, is still only listing just over 200 securities in Europe.

Greg: How would that compare to, say, ITG or Liquidnet?

Toby: In the US?

Greg: In Europe.

Toby: In Europe? Well, ITG is “POSIT” in Europe, you're referring to, that does cover a much larger universe, as in market share. But in reality, example, POSIT is good in UK's mid-caps. In the rest of Europe, the liquidity is really pretty poor. So the actual level of fragmentation in Europe--away from the national exchanges and, obviously, internalization--is still very, very limited.

Now, we expect that to change with some of the new venues that are coming up, particularly the more broker-sponsored venues, with Turquoise. But that's still several months away from actually seeing any real trading activity.

In the US, it wasn't overnight. It probably took about three years, really, for RegNMS really to have its full effect. And you've seen a steady decline in the market share of the New York Stock Exchange. I think it went from levels of around 80 percent market share to its current levels of--depending on which benchmark you use--around 50 percent market share at the moment, the New York Stock Exchange. So it really was quite a steady decline.

Now, it takes time for investment banks like ourselves to build the right technology to deal with the fragmentation. I do think it's going to happen quicker in Europe than we have seen it happen in the US. In the US, people were starting from scratch. In Europe, we've got the benefit of that people have already built this technology in the US, they understand how to deal with fragmentation, how to find the best price, as MiFID defines it, across these multiple markets. So people are implementing that technology a lot quicker.

Also, one of the real key differences from Europe to the US is that best execution in Europe is still very much the responsibility of the brokers. In the US, a lot of the onus is placed on the exchanges. You've got the concept of the trade-through rules. If you trade outside of one of the seven exchanges in the US--so if you trade in one of the alternative venues, it's the responsibility of that trading venue to find you the best price in the market. They will actually re-route your order if there's a better price showing on one of the seven exchanges.

That concept doesn't exist in Europe, and so it's still very much the broker's responsibility to connect all the venues and route to all those venues in an optimal way. Now, a broker doesn't actually have to do that under MiFID. A broker defines its own concept of best execution, which is also very much a grey area.

The other issue is that every country that MiFID covers--and it covers 27 countries in the European economic area--defines their own concept of best execution as well. So, from

that respect, it's still a very, very grey area.

Now, most countries are following the UK regulator, the FSA, in their definition of best execution. But there is still nothing wrong in Europe with a broker routing only to the primary exchange. Now, for the moment, does that actually make that much different? Outside probably the top 50 stocks in Europe, it probably actually doesn't make any difference at all at the moment.

In those top 50 stocks, we are starting to see quite a significant performance difference. Primarily because something like Chi-X isn't constrained by the rules of the national exchanges. So, for example, tick size. The key differentiator, in my view, of Chi-X is the tick sizes. We've seen it happen in the US. With small tick sizes, it changes the whole market dynamic.

In Europe, we've had fairly large tick sizes, but Chi-X is now, in most stocks, quoting to three decimal places, where most national exchanges quote to two decimal places.

And that means that Chi-X is consistently pricing, in the blue chip names, a quarter of a penny or a tenth of a cent ahead of the national exchanges, which means, if you are smart order routing in the correct manner, you're going to Chi-X first. You're taking that 10,000 shares that's a tenth of a penny better first, before you're going to the national exchange. And that really is where they're seeing their market share.

And if you find if you actually trade optimally through a smart order router, you will actually route a quite significant percentage to Chi-X; if you're allowed to spread that order over a longer period. As much as 30 percent of your order flow is actually going to Chi-X.

Gavin: So it's got a natural advantage, which, over time, should see its...

Toby: At the moment, it has a natural advantage, and we still haven't seen the national exchanges really react. We have seen some of them drop their pricing structure, particularly for reporting OTC trades. They haven't really fought back, in my eyes. And it really depends on how these national exchanges fight back. If they do slash their prices, if they do change their tick sizes, then I think some of these new venues are really going to struggle.

Greg: You've mentioned that, from the perspective of the banks, they've got a track record to look at in the US.

Toby: Yeah.

Greg: What about in terms of the end users of these algorithms, the buy side or the funds or the corporates? Do you think the take-up will be bigger there, because they've seen US corporates use it? Or do you think there's a more conservative attitude to buying this type of..?

Toby: Well, they're relying on the brokers to produce the right technology. I don't know of any buy-side firm that's actually producing their own order-routing technology.

They're relying on the brokers at the moment to produce that technology for them. Will that change in the future? I'm not sure.

Greg: Is the demand do you think in Europe, say, now, as strong as the demand was in the U.S. in say late 2005?

Toby: Of all the clients that I've spoken to, and I've spoken to a lot in Europe, -- in the last four months I've probably spoken to about 200 different accounts in Europe, -- I've only come across one that doesn't actually want us to be sourcing liquidity in an optimal manner.

And that was only one fund within one institution that, for whatever reason was very skeptical about these new venues and wanted us still to trade on the primary exchange.

Now when it actually comes to monitoring that performance, it's very, very difficult for the underlying funds to really assess how much benefit they're gaining from this order-routing technology. When you speak to clients in the U.S., they've been dealing with the situation for years and still they find it difficult to evaluate the performance of this smart-order routing on their day-to-day business and finding out who's got the best smart-order route, which is even more complex.

The first phase is obviously to make sure that the brokers are actually connected to all the venues. They certainly can't be getting you the best price if they're not connected to the venues. And that may sound surprisingly simple, but in reality you'd find that a lot of people still aren't connecting to all of the right venues and routing in the right manner, and seeing what percentage of their flow has been routed to which particular venues, also very important to the clients in assessing their performance levels.

Beyond that, some of the trading systems, the EMS's, people like Trading Screen, for example, people like PortWare, a lot of them are building quite sophisticated information capture systems. So they're integrating the post-trading elements into the actual trading system which, for them, really is the most accurate measure of both evaluating the brokers but also evaluating the different trading venues that the brokers are executing on.

Seeing the time it takes to route the orders, seeing how those orders are routed, seeing how quickly they're coming back. They're capturing very, very accurate time-stamps, and independent time-stamps, because the time-stamps are exactly the same from every single broker, which is another difficulty in trying to assess and to compare one broker with another. There's no real defined benchmark for how you evaluate things like latency.

And the reality is most people's trading decisions aren't necessarily impacted by the millisecond of timing. And understanding how long it does actually take to route an order, there's so much myth and speculation in the market. You know, when you look at the exchanges quoting their latency numbers, they're quoting three or four milliseconds.

The reality is the round-trip time to hit those exchanges and get something back is probably ten times slower than what they're actually quoting. And then you add the latency of the brokers, and the connection from brokers to the clients. You start talking in the tens if not hundreds of milliseconds, depending on the trading venue.

So when people start talking about shaving a tenth of a millisecond off here and there, for most clients that doesn't make a difference. Unless they're a real high frequency stat-arb fund, that's when it really starts making a difference to your actual trading performance.

Greg: Do you think there might be a sort of tipping point, a point in Europe going forward where there could be a big change in this space for any reason? Are there things that you can see on the horizon that you could get a sudden pick-up or a change?

Toby: As in a pick-up in the new venues?

Greg: Yeah, a pick-up in the new venues or liquidity or the ability to place trades. The general growth of the market: do you think it will be gradual, or do you think there could be a watershed event that could change things?

Toby: I certainly think it's going to be fairly gradual over the next eighteen months or so, although in saying that there are still some quite significant watershed moments. Turquoise itself, Citigroup is part of Turquoise.

The backing behind Turquoise is so significant. I think initially there were eight investment banks. Even those first eight control 56% of flow across the European markets. Even if they start putting 10% of their flow through, still that's five percent of the European market going to this one particular venue.

There is going to be a big drive by the investment banks to force competition, because any cost in saving, and any cost saved in execution, is an extra penny earned for the investment banks.

Gavin: Yeah. Unless of course they're obliged to pass on some of that saving to their customers.

Toby: In reality we're purely customer-driven. I mean the incentive here doesn't really come from the regulators. It comes from our client base. Now, if our clients demand where we connect, then if we don't connect there they'll go and trade with someone else. And the fee structure is very, very important to our clients but is only one component in how we actually trade on their behalf.

What's also becoming more and more important is capital commitment. That's becoming a much more important part of our business. As markets change and their dynamics become much more like the U.S., the markets become much, much thinner, the order routes become thinner. Clients are looking for different ways to execute, not necessarily

on the exchanges. They want to execute here and now in size. Changing the market dynamics makes that much more difficult for the institutional investor.

Greg: Yeah.

Toby: And really the only way to do that going forward, if you want to get trade here and now, is capital commitment, and go through down the risk principal trading route.

Gavin: In essence when they ring you up and say, I've got 5% or 10% of a company to go at one price, one hit, what do you want to do?

Toby: Yeah. You can say, fine, we can trade that over the next four hours, five hours, five days, however long it needs to take, or do you want a principal price?

Gavin: Are you seeing more of that?

Toby: We've seen a significant up-tick in the last eighteen months. Principal trading now accounts for about 30% of all executions across our trading floor in Europe.

Gavin: And do you think that's also product of the lack of sophisticated block trading opportunities within Europe, in an electronic format?

Toby: I mean there are certainly less options. I guess you're referring to the U.S. in that there are so many venues where you can look for block trading in the U.S. I think the relationship between clients and brokers is actually quite different between Europe and the U.S. Certainly historically what we saw in the U.S. about three years ago was a real demise in the block trading business through your broker, partly because of the way that the clients were treating their brokers.

They would start off by going to these alternative venues, trying to find blocks. If they couldn't find the other side they would then start trading some DMA or algorithms, find they're having too much impact, and then go on to their brokers and look for capital commitment. Effectively front-running their own trades, so they'd remove all liquidity from the market and then sting the brokers with these fairly toxic positions.

In Europe, particularly in the U.K., capital commitment is a huge part of the relationship with brokers. It's much more of a two-way relationship where clients understand a lot more of how they have to pay for capital commitment. It does cost money, but they realize that they have to pay for that through agency business or through paying a higher price for it.

The other thing that we've got an improvement on which we didn't really have proper systems in the U.S. three or four years ago, and... I'm not just talking about Citigroup, I'm talking about all the major investment banks...the way that we evaluate our P&L on a per client basis is far more sophisticated. We know which client costs us money, and we know which clients make us money.

Whereas in the U.S., it was much more of a dark art, and the pricing was much more consistent, regardless of what client you were. You would find that there would be the same clients coming back asking capital every single time, and, every single time, we'd lose money. Now, we're aware of those clients, and we can target our resources in a slight more sophisticated manner.

Greg: Do you think, overall, this leads to the end-user client and the by-side client, having a closer relationship with brokers and banks? What's your feeling on where Algorithmic Trading is taking that relationship?

Toby: One of the big misconceptions of Algorithmic Trading is that it's a no-touch business, or a low-touch business, as some people refer to it. What we found is that relationship is becoming more important. The level of trust is more, and people still want the value added service. They still want the calls on their flow; they still want to speak to someone at the end of the phone. That person is just as important as they ever were, in getting in the business and keeping the business. The relationship is probably still the key differentiator. As algorithms, particularly as they become more commoditized in the way people trade...it still comes back to relationship.

Gavin: Should we allude to why equities are so popular for Algorithmic Trading, and, other asset classes, perhaps, have a way to go. And whether or not... especially when you are looking at the relationship between Futures, Options and foreign exchange, that are part in parcel of so many straight equity trades... in the wider sense of straight equity trades, why we haven't yet fully embraced some of these other asset classes, or derivatives thereof.

Toby: Certainly equities is... We like to think of it as the most advanced market. It's very transparent. A lot of the execution is done on exchange. One of things that MIFID has done is give us an indication of how much is being done off the exchange, in markets outside of the U.K. Now we are forced to trade report all of your transactions, whether they're done on or off of the exchange...pretty much all your transaction; they're are a few exceptions.

So we can see that about fifty percent of equity trading in the European market is actually done on exchange. As soon as you get people trading on exchange, it becomes much easier to regulate. Obviously regulation is a big part in pushing forward people's confidence in Algorithmic Trading. Also, it gives you the benchmarks which a lot of this Algorithmic Trading is put against. When you start looking at things like FX, FX is still pretty much purely OTC. Some people claim to have FX exchanges; we do, ourselves, as Citi under the Lava umbrella.

In reality, the majority of trading is still done in OTC manner. When you start looking at algorithms to actually carry out your FX, there's no real transparency or benchmarking, which instantly creates a certain level of skepticism of the products that you're actually offering; through some type of algorithm that's going to spread it over a certain period of time. Where as you're pretty much guaranteed best execution, if you go to a selection of

brokers and say, "What is my price here and now on a principle basis?" Then, you get your five or six quotes back, and you go with the best price. You've achieved best execution. That's their way of making that particular market transparent.

Gavin: With the Futures of Options market, generally speaking for most Future's contracts, you have but the one venue that has any degree of liquidity at any one time. It's not quite the same competitive environment that you would have with your smart order routing and equities. But there are still some aspects of that, in terms of how one might want to work an order over time. Do you have a view on how that is going and being developed?

Toby: For the moment, within Citi, we only offer direct market access for Future's. There is a demand for more algorithmic type strategies for Future's. From the client base that we see, the Equities client base, that's more in the portfolio level strategies. You do get a lot of trades where you're for example, unwinding Future's and rolling those positions into cash. There it's obviously beneficial to have one strategy that can be across multi-asset classes and, perhaps, still with the FX leg at the same time as well; if there is one.

The demand for the moment is still fairly limited. Generally, because Futures contracts are worth more, the numbers of slices you need to send to market aren't as many as you would need to send for normal equity trading over the day. Trading a Vodafone VWAP, over the day you could quite easily send out 2, 000 slices; whereas, trading at Future, if you're sending out 2, 000 Future slices, you're doing a pretty large trade, as a general rule. Those types of trades really aren't as common.

Greg: So you don't see people developing algorithms for order-working in this environment?

Toby: I think they will, but those algorithms will be developed so that you can liquidate your positions along side rolling into another asset class, like equities. So, if you know that you're spreading your equities trade over the full day, you can spread your Future's trade over the full day as well, in an automated way, and make sure that they remain cash neutral, for example.

Greg: One last question, last year I read in the Financial Times that, at this time last year, about seventy percent of equity orders were sent to Citi via FIX. Can you give us an idea of the growth we have seen in 2007, in terms of...

Toby: of how we receive our orders?

Greg: Yes, and the general pickup of these things like FIX.

Toby: To be honest, now there are very few clients who don't have some kind of FIX-enabled trading system. I don't know the exact percentage, but I would expect it to be significantly above eighty percent of the orders that we receive in house by FX. Generally the ones that we don't...You could probably argue that some large block trades

that we don't receive by FX are still done over the phone, but the reality is, once they're agreed, they probably still get sent in via FX to the trading system.

There are still a few smaller niche players that aren't FIX-enabled...

Greg: ...but that numbers getting smaller and smaller, all the time.

Toby: And the cost of implementing these trading systems is coming down, as well, with new entrance into the market. Bloomberg is about to have a new offering that is free, if you're a Bloomberg user. So, that instantly makes it a very, very competitive market.

Greg: OK, good. Thank you very much. Thank you for your time.

Announcer: That was an interview with Toby Bayliss, head of the European electronic execution sales team at Citi.

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