COVER STORY

Algos Get Serious

Nina Mehta

June 14, 2007 - Trading in New York Stock Exchange-listed securities is going electronic. Liquidity in Nasdaq and Big Board names is splintering. Message rates for market data are accelerating. All this has created fertile ground for developers and promoters of algorithms. Now, as these products become smarter and better at grabbing liquidity, traders are customizing and adapting algos to trade more like themselves.

"Customers are using new algorithms and custom algorithms more readily than they used to, and they're changing algos and suggesting new features more quickly now," says Mike Stewart, head of global cash equity trading at Merrill Lynch.

"They're also using algorithms over much shorter time periods to aggregate liquidity."

The Securities and Exchange Commission's Regulation NMS fueled electronic trading and ratcheted up the speed of trading. By protecting the top-of-book quotes at exchanges, Reg NMS also encourages brokers to manage the way they route to various markets and access liquidity.

This has fragmented liquidity. The NYSE and Nasdaq now compete with the reinvigorated regionals and aggressive ECNs like BATS and Direct Edge ECN. And in the run-up to Reg NMS's implementation, a new electronic world of non-displayed, or dark, liquidity was unleashed, claiming a growing share of equities volume.

16 Tentacles

Traders are turning to algos to pull together liquidity in a market where orders shift around between venues. "Accessing liquidity manually through direct market access will be a difficult task at best," says Michael Rosen, product manager at agency broker UNX Inc. "People will want to keep manual control on tough trades, but they can't do that for all trades. If they're in the wrong marketplace, they could miss liquidity." Smart order routing, which analyzes the distribution of liquidity and dictates how algorithms place and take orders from the markets at every moment, has become increasingly critical.

Dan Mathisson, head of Credit Suisse's advanced execution services group, the firm's suite of algorithmic products, notes that smart routing enables algos to do more than mimic traders. "Algos trade in a way people can't," he says. "They have 16 tentacles out in the market as feelers. They keep track of where executions are occurring, the [execution] quality of venues, and what the supply and demand curves look like for individual stocks."

Jim Leman, a managing director at Westwater Corp., a management and technology consulting firm focusing on financial services, points out that algos can absorb and adeptly deal with the waves of market data coming at them faster-and better-than people can. Algos can also "send out requests for

indications [of interest] or consume message data emanating from dark pools," he says. "That's like a vacancy sign going on and off that only algos can read. Otherwise, someone must go to those pools individually."

More Optimization

Unlike their predecessors, the current spate of sophisticated algorithms are not predetermined recipes for breaking block orders into pieces and executing those pieces, or "child orders," over the course of a few hours or a day based on historical trading patterns. In algo-speak, they are increasingly dynamic and "optimize" their trading strategies in real-time.

"One of the biggest changes is that static curves have been replaced by purely adaptive strategies," says Robert Almgren, head of quantitative strategies for equities at Banc of America Securities. The "curve" refers to the schedule that dictates how many shares the algorithm will trade at each moment over the duration of the trade. Optimizing that curve means recalculating the tradeoff between execution certainty and market impact at every point in time and adjusting the trading schedule accordingly.

Algos are getting wiser. "They're now smart enough to know what you're trying to achieve and how close you are to achieving it," says Richard Holway, CEO of Firefly Capital, which offers an execution management system. "They can respond to liquidity when they find it by quickly pulling orders from one execution venue, instantly generating smartly sized and priced orders, and routing them to where the liquidity currently exists."

Adaptive Algos

That shift in how algorithms operate reduces the market impact costs of algos. Another benefit of "adaptive," or dynamic, strategies that use real-time data rather than historical data, and that re-optimize as they go along, is that algos can be applied to mid- and small-cap stocks, for which liquidity is neither deep nor consistent.

Relying on historical volatility and average daily volume patterns can work for liquid stocks, but not for illiquid names. For those stocks, algos that don't-or can't-respond to changing market conditions risk leaking information about the transaction to others in the market.

Whatever the acceptance of some of these algos for less-liquid stocks, algorithmic usage is on the rise. Last November, research firm Aite Group estimated that sellside and buyside algorithmic volume in 2006 would be 33 percent of overall equities trading. By the end of 2010, Aite predicted, it would rise to 53 percent.

In the meantime, the presence of algorithms on the buyside has increased significantly. Last year, algorithmic trading represented 10 percent of the buyside's self-directed trading, double the percentage in 2005, according to a December report from research firm Financial Insights that Bank of America sponsored.

Algorithms were used by 71 percent of fund managers and 93 percent of hedge funds last year, up from 66 percent and 92 percent, respectively, in 2005, the report noted. Traders surveyed said the main benefits of algos were anonymity, ease of execution and cost reduction.

Other factors could spur algorithmic growth. "The number of shares traders are trading has only increased [in recent years]. This trend will continue and not die," says Andrew Silverman, head of U.S. electronic trading distribution at Morgan Stanley. "The people who'll be sitting in trading seats several years from now will be trading twice as much and more efficiently-and not through conventional means. Electronic trading will continue to be embraced."

User Customization

But while algos have become more responsive to existing market and liquidity conditions, they're still seen as tools-and traders want to control the tools they use. "We figure out what a trader might be trying to accomplish and then we optimize that, and the algo implements the best solution," says BofA's Almgren. "But even if you think the optimum is one thing, people may want to do something else."

Traders know what instructions and limits portfolio managers place on orders and their urgency level, says Westwater's Leman. "There's also historical precedent in how individual traders handle orders," he observes. "It's not easy to give that up."

When it comes to algorithms, traders usually want two things. They want algorithms whose execution logic they understand and that trade the way they want the algos to trade. And they want algorithms that do not soldier through their order exactly the same way they would execute another firm's order.

Hence the latest models of algos-across almost all providers-stress customization and user-defined parameters. The algos come with controls that let traders specify execution parameters. Traders want to select their urgency level and trading preferences, speed up or slow down trading under specified market conditions, and turn off venues if they're working an order in those markets. The ability to alter these specifications accommodates traders' desire not to be hemmed in or limited by algorithms' set strategies.

Some traders also just prefer having their own algorithms. Traders at Fifth Third Asset Management, for example, are working with Lehman Brothers to develop four customized algorithms. They often start orders with algos while they actively work the stock. Senior equity trader Dan Whitney says 25 to 30 percent of his desk's orders are now "touched" by algos, although algos usually do not finish executing an entire order. The desk has algos from three brokers on its desktop.

Junior Traders

Yet despite the gains made in algorithmic technology, algos play a subordinate role on many buyside desks. "We view them as junior traders," Whitney says. "We want to feel comfortable with them, and then when we're comfortable, we'll see what they can or can't do." Fifth Third Asset Management has $22 billion in assets.

Alfred Eskandar, director of block crossing platform Liquidnet's corporate strategy group and CEO of Miletus Trading, its algorithimic unit, notes that buysiders use algos more for efficiency than performance. "Reg NMS is pushing their hand that way, but buyside traders don't usually represent their entire order in an algo," he says.

One buysider at an asset manager with $150 billion describes algorithms strictly as "an outsource" on his desk. He uses algos only in limited circumstances. But with dark liquidity venues cropping up and drawing flow, he insists that algos "stitch together that liquidity"-a cry now heard in many quarters. That trader notes that less than 5 percent of his desk's global equities executions go through algos, and that number hasn't shifted over the last year. But he now uses the additional functionality and user-defined windows his brokers offer.

Indeed, many algorithm users now choose the type of flow they want to interact with, such as block or smaller flow, and the "amount of visibility they want to give orders," says Merrill's Stewart, referring to dark and displayed liquidity. "That makes electronic the kind of dialogue that was always part of the trading process."

Investment Technology Group's Tony Huck, head of algorithmic trading, adds that his firm can now wed aspects of algos that previously sought to accomplish different objectives. For example, ITG's portfolio algos now access dark liquidity, giving traders additional flexibility. The broker's customers can execute dollar- or sector-neutral portfolios primarily-or even exclusively-through dark liquidity sources.

The effort to customize algos for buyside traders has also led to new user-defined inputs calibrated to the investment strategy. Weeden & Co.'s Doug Rivelli notes that some of the firm's algos now enable inputs such as expected return and various risk factors. That allows algos to be customized to a portfolio manager's specific goals.

"This marries the stock selection process with the execution process and eliminates the need for a trader to make a subjective decision about what an 8 vs. a 6 level of aggressiveness means," Rivelli says. Quantitative managers have been open to using this methodology, he adds, while traditional managers have begun sampling it.

Fewer Branded Algos

Increased buyside familiarity with algos may shrink the menu of algos in the market-estimated at 300 or more. As buysiders use algos more actively, many of the largest algorithmic providers have ceased their rush to create and trademark new algorithms that can be used for distinct trading strategies. Instead, they're streamlining their algo offerings.

"We're working with the buyside to help them manage their flow by using some of the same algorithms in different ways, rather than using algo number 742 only for a certain strategy," says Jana Hale, global head of algorithmic trading at Goldman Sachs. Goldman is trying "to bucket" its algos into just a handful of categories. "We can do this," Hale says, "because the buyside is more sophisticated and is willing to adapt algos based on their needs, execution quality and performance analysis."

"There are too many algos out there," agrees BofA's Almgren. "We'll simplify ours so we'll have just two broad types, with all our algos being minor variations of those." The two types are Ambush, which tries to grab as much liquidity as it can in a matter of seconds or minutes, without necessarily seeking to finish an order, and Instinct, which is an adaptive version of the broker's arrival price strategy.

Almgren adds that BofA "may keep many discrete algos, but under the hood, they're similar. They will just have different parameters and urgency levels."

Some firms have stopped tallying the number of algos they have. Merrill Lynch's Jarrod Yuster, global head of electronic trading, says the number of algos his firm has is not a "germane data point." Merrill customers don't pick and choose among just the firm's branded algos. Clients instead use customized versions of algos that suit their needs.

"A client could have 10 traders, and each trader could have a different set of strategies on his desk based on the sector he's trading, whether it's convertible arbitrage, program trading or small caps," Yuster says. "One client could have 25 versions of four or five strategies."

Algos for Futures First

Algorithmic trading, born and bred in the U.S. cash equities markets, is now scoping out new turf. Most of the large bulge-bracket firms and agency brokers already have algorithmic offerings in Europe and, increasingly, Asia. Now, brokers and third-party algo providers are turning their attention to the next frontier: algos for financial futures and options trading.

ITG's Tony Huck says large asset managers' demand for algorithms that trade futures is stronger than demand for algos in the options area. "Futures trading is becoming a big percentage of their trading compared to cash equities, often 25 to 30 percent of their overall trading," he says.

Goldman Sachs already has 12 algos for futures available to customers-and just one for options.

"Everyone's going after this pretty hard," Huck says, referring to algorithmic competition among brokers. In his view, these efforts will eventually shift toward cross-asset-class algorithms that combine futures and equities, or options and the underlying securities.

Banc of America Securities' Robert Almgren also says his firm will come out with algos for futures before tackling the options market. There's less need for algos that trade options since most spreads are still a nickel, which enables liquidity to congregate at the bid or offer, he says.

Many brokers are waiting to gauge the results of the current penny-quotation pilot for options. If the pilot is rolled out or extended to more options classes that would prompt providers to launch algo strategies to scoop up liquidity as it disperses over a larger number of price points.

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