Sell-Side Algorithmic Offerings: Don’t Believe the Hype (at Least not Yet)

A Quick Review of the Anecdotal and Empirical Evidence to Date

Considering that one cannot pick up a trade magazine these days without being barraged by yet another entrant into the algorithmic trading space, we thought it might make sense to take a step back and examine what information has become available about the performance of algorithms to date. Ultimately, of course, it is this ability to measure the performance of algorithms that will determine if they can really live up to the hype. In order to take a few initial steps towards this goal of measurement, let us spend a moment on our own anecdotal experience and then a little more time examining some of the empirical evidence available (albeit limited).

In the first quarter of 2005, our upstairs trading desk established connectivity with one of the leading sell-side algorithmic providers. The purpose was twofold. First, since the whole world appeared to be going algo crazy, we thought it made sense to test them thoroughly on our desk before even considering rolling out an algorithmic offering to customers as a complement to our basic electronic direct market access (DMA) offering for situations in which clients view productivity, control and/or commission cost factors as favoring algorithms. This seemed to be a much better way of dipping our toe into the algo space rather than committing huge resources to develop a “me too” product to add to the dozens already out there. Second, we were genuinely interested in seeing if for certain customer-specified benchmark trades like VWAP, the performance of algos would be sufficiently similar to (or better than) our own trading desk capabilities so that the efficiency and/or performance gains would justify the additional commissions we would have to pay to the third party providers.

Our experience thus far has been mixed, although admittedly the number of trades we have done is far too small to be statistically significant. On the one hand, there is no doubt that algorithms have added to the trading desk’s productivity, allowing our traders to focus where they can add the most value by putting an appropriate order in an engine and merely babysitting/monitoring the order rather than pulling the trigger on each individual execution themselves. And at least one of our traders felt that, with respect to shorts in liquid listed names, using an algorithm was particularly useful (and in fact resulted in better executions) since it obviated the need to either have a broker stand in the crowd the whole time waiting for plus ticks or constant postings/cancellations of small electronic offers to hide our true interest (obviously with the new Reg SHO pilot that eliminates the need for a plus tick for the most liquid stocks, this added value is now diminished). On the other hand, the performance has been what we would probably characterize as just “OK”... on average, the algorithms have missed VWAP by about ¼ of a penny.

On average, the handful of orders we have executed through the algorithms have missed VWAP by about ¼ of a penny. This figure is consistent with the figures most of the algo providers have represented to us as their average VWAP miss (a range of $0.0025-$0.0035 has been most common). While this is by no means horrible performance, it is...
not the type of performance that would keep us in business as an execution-only boutique. While misses are inevitable and clients tolerate them (so long as the typical miss, or standard deviation, is not too great), meeting or beating VWAP on average is something our clients expect. As of now, algs seem unable to meet that test.

Unfortunately, objective, hard evidence about algorithmic performance that would be a lot more valuable than a few anecdotes regarding algorithmic trading experiences is quite scarce. Nevertheless, there a couple of noteworthy studies which have taken the first steps towards evaluating algorithmic trading empirically. Let’s take a look at each of them.

The Quantitative Services Group got the ball rolling in January of this year with the publication of a research study entitled “The Implementation Costs of Algorithmic Trading.” A press release summarizing its findings can be found at [http://www.qsg.com/main_news.asp?articleid=45](http://www.qsg.com/main_news.asp?articleid=45). Basically though, the study concluded that randomizing orders when pursuing a VWAP-benchmarked trade offered significant cost savings relative to using non-randomized placement of orders. The non-random algorithm incurred trading costs of 26 basis points, while the random technique had costs of only two basis points. While the fact that there is an advantage to randomizing orders probably comes as no surprise to any one, the extent of the advantage is surprising even to us, despite our continuous preaching about the advantages of pure agency brokerage and the dangers of front-running, information leakage and reverse engineering of algorithms by principals (see, e.g., [http://www.traderdaily.com/column3/index.html](http://www.traderdaily.com/column3/index.html)).

ITG attempted to take a giant step forward in March with the publication of a report entitled “The Cost of Algorithmic Trading: A First Look at Comparative Performance” by Ian Domowitz and Henry Yegerman. Rather than attempting to spend time summarizing the conclusions of the piece in our own words, here are some excerpts from a review of the report put out by Pensions & Investments back on March 21, 2005 called “Algorithmic trading saves money, report says”:

Algorithmic trading is eight basis points cheaper than other means of trading, a new report shows. When the difficulty of the trade is taken into account, that difference grows to 11 basis points. “Beyond any productivity enhancements that (institutions) might obtain in using model-based trading engines, algorithmic trading is a cost-effective technique,” Mr. Domowitz said in an interview. “The cost-effectiveness holds regardless of trade difficulty.” ...In fact, the ITG researchers found that algorithmic trading performance was consistent among the six brokers whose trading was analyzed — until order size increased; then it began to vary....”I think the message here is you have to shop carefully for algorithmic trading services,” Mr. Domowitz said. “The first reason is that it’s not just average outcome that’s important, it’s also certainty of outcome. In the aggregate, even though the average outcome seems close among vendors, the certainty of achieving that outcome is very different across providers.” ....The researchers measured algorithmic trading costs relative to two common institutional trading cost benchmarks: implementation shortfall and volume weighted average price, or VWAP. The results were similar. The two researchers found that the outperformance of algorithmic trading appeared to decrease as order sizes increased and approached the 10% of average daily volume level.

For those interested in reviewing the full report, especially in light of the intriguing conclusions, it is available on ITG’s web site at [http://www.itginc.com/research/whitepapers/domowitz/AlgorithmicTrading_2.24.2005.pdf](http://www.itginc.com/research/whitepapers/domowitz/AlgorithmicTrading_2.24.2005.pdf). Before we cast a critical lens on the report, we would like to acknowledge two things. First, as a firm, we are neither hostile to algorithms, nor strangers to them, already employing them in our smart-order routers and on our program trading desk and, as mentioned above, currently undertaking a lengthy evaluation of third party algorithmic providers. Second, whatever shortcomings we find, we applaud the efforts of this study to start the process of compiling the empirical evidence to measure if the performance of these algorithms actually lives up to the hype. While this ITG study is a good first step, it raises more questions than it answers due in part to the limitations of the empirical data, but also to some unjustifiable leaps in logic. Let us explain four of the shortcomings that are among the most troubling in terms of being able to draw any legitimate conclusions comparing algorithmic trading to more traditional forms of trading.
First, it’s only fair to point out the conflict-of-interest inherent in one of the leading algorithmic trading providers—ITG—issuing a report touting the superiority of algorithms. Despite the risk that the report may then be entirely self-serving, ITG’s reputation in the transaction cost analysis (TCA) arena does give the report some credibility. It is simply important to acknowledge the potential conflict and accordingly view the report a bit more critically than one might otherwise if a more obviously objective party wrote the report.

Second, the study uses VWAP and implementation shortfall to compare trading costs, but the data from the control group cannot be fairly measured against either of these benchmarks because the strategy used to execute the control group trades is generally unknown, according to Domowitz and Yegerman. As a broker, the benchmark which a client specifies is crucial to how we actually choose to execute an order. In fact, if we are being measured by implementation shortfall, trouncing VWAP may still mean that we have done a terrible job for the client. The alpha the client was trying to capture may have slipped away as we “successfully” pieced out the order all day. Similarly, the algorithmic trades should not be measured against anything other than VWAP since the “vast majority” of the algorithmic trades in the study followed a VWAP strategy according to the authors of the study. In other words, the measurements being used in the ITG study cannot be considered at all appropriate (and in fact make the results meaningless) until more information is known about the strategies behind the executions and a real apples-to-apples comparison of the results for each strategy can be made.

Third, and perhaps because the authors actually in some sense do recognize the above shortcoming (although oddly they choose to ignore it during the above analysis), with respect to performance relative to VWAP, the authors choose only to talk about the absolute performance of algorithms as opposed to comparing them with a control group executed by other means. While at first blush missing VWAP on average by only 2 basis points sounds like great performance, it’s over ¾ of a penny miss per share (based on the average priced S&P 500 stock of more than $40). Ironically, logic would say that if the passive strategies are on average missing VWAP by a couple of basis points as the study concludes, active strategies must on average be beating the VWAP because it’s a zero sum game— all trades together create the VWAP on the day! Also, as the authors note, algorithmic performance deteriorates substantially for larger order sizes, e.g., with costs and volatility of performance doubling when moving from less than 1% of average daily volume (ADV) trades to 5-10% ADV trades. Note that the average order size studied is only about 2500 shares, meaning that limited conclusions, if any, for institutional-sized orders can be drawn.

Fourth, the type of brokers completing the control group trades is also important, but is undisclosed in the report. It’s possible that any type of DMA, whether algorithmic or not, may be preferable to and score better than trading with certain categories of brokers. Bypassing or avoiding order exposure to brokers who may cause market impact from their own principal trading or information leakage/delays in execution from order shopping could possibly result in superior performance apart from any inherent benefits of the algorithms themselves.

In sum, the ITG study is a very valuable first step, but the questions raised are so overwhelming that one must conclude that only the surface has been scratched in terms of gathering and comparing empirical data on algorithmic trades to other types of trades. Combining the empirical evidence to date with the anecdotal evidence, it’s clear that a lot more digging needs to be done before any real conclusions can be drawn about the relative performance of algorithms.

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