The Evolution of Quantitative Analysis: What’s Next for Black-Box Trading Systems?

by Elaine Floyd, CFP®

Quantitative trading systems have evolved from simple stock screeners to sophisticated algorithmically based programs that can sift through billions of pieces of data, follow a complex series of rules bordering on artificial intelligence, identify miniscule pricing anomalies among securities, and execute trades in an orderly manner, all within a few thousandths of a second without human intervention. It almost seems old-fashioned to think an investor or money manager, no matter how smart or experienced he or she may be, can compete with computers in today’s markets.

One quant manager tells the story of how his system sent a "buy" signal for Amazon in October 2002. The manager thought the stock was overvalued, but he overrode his bias and bought the stock anyway. Amazon rose more than 200 percent over the next year. It is this kind of detached, disciplined, investment methodology, which forces smart trades -- when mere mortals would do the opposite -- that is causing people to wonder if quantitative analysis is replacing fundamental analysis as the preferred method of picking stocks.

At year-end 2006, approximately one-third of total equity trading volume in the U.S. was done through algorithmic trading, according to Boston-based Aite Group. By the end of 2010, Aite Group expects over half of all equity trading will be done through algorithmic trading. "The adoption of first-generation algorithms appears to be nearing its end in the U.S. market," the company said in a November 2006 release. "Instead, most brokers have moved on to develop more sophisticated algorithms that are capable of supporting portfolio trading, adapting to real-time changing market conditions, and seeking dark pools of liquidity." The next wave in algorithm development will incorporate the news as Dow Jones and Reuters begin to structure their feeds so they can be absorbed by quantitative models within milliseconds of release. Investors do not even need to know what is happening in the world when their money is being managed by computers.

The huge appeal of quantitative systems is that computers can do what humans cannot: recognize patterns and relationships that become apparent only through the analysis of massive amounts of data. These patterns can identify a particular company, or even a whole sector, that is underpriced relative to the rest of the market. Anomalies and pricing inefficiencies that a human being can only guess about using traditional tools can be identified with certainty by a properly-programmed computer. And it can do so with lightning speed. By the time an
individual could even begin to recognize a temporary pricing inefficiency much less act on it, a computer could spot the anomaly, buy a large block of stock -- a few hundred shares at a time so as not to disrupt the market -- capture the profit, liquidate the position, and be on to the next one while the human stock picker is still making up his mind.

In fact, this could be one of the dangers if quantitative trading strategies are undertaken on widespread basis. As more quants look at the same data and react to it in the same way, they threaten to squeeze arbitrage opportunities right out of the market. What they're left with is a system that works harder and harder to capture smaller and smaller profits. Eventually the profits become so miniscule that they fail to justify the trading costs. As programs become more sophisticated in anticipating and reacting to market events, the closer they get to becoming the market itself.

Another potential problem with quantitative trading strategies is that their algorithms may fail to account for unexpected events. While an unleveraged, highly reactive system may be able to deal with another 9/11 or subprime meltdown without sustaining too much damage, a highly leveraged fund that keeps kicking out trades because its algorithms told it to do so can generate huge losses before it can be stopped. Presumably the lessons of Long-Term Capital Management and some of the other hedge fund blow-ups have been factored into today's algorithms, but who knows what other surprises lurk around the corner?

These problems must be weighed against what is assuredly an advantage of quantitative systems - their disciplined approach to risk management. Many institutions embrace quantitative funds for their unemotional approach and detachment from human intervention. But quantitative funds have yet to make substantial inroads in the mutual fund industry, and comprise only about one half of one percent of the nearly $10 trillion mutual fund universe. Nor has the lack of human involvement translated into lower costs – quantitative funds have only slightly lower than average expense ratios. There are no quantitative funds among the most popular funds in the Advisor Perspectives universe.

For financial advisors the real issue is how to evaluate these "black-box" funds to determine if they are right for your clients. Most of them refuse to divulge the specifics of their models -- with good reason, since secretiveness is what gives a system its edge. But if you don't know how a fund expects to make its money -- or, more important, how it plans to control risk -- how can you make a judgment as to its suitability for your client? Some of the risks include under-diversification (i.e., a huge position in a single stock or sector) or the failure to adapt to changing market conditions (algorithms based on historical data may not work the same way again). "There are some pretty substantial misconceptions about
what these things can and cannot do." said Andrew Lo, director of the Massachusetts Institute of Technology Laboratory for Financial Engineering in a New York Times interview. "As with any black box, if you don't know why it works, you won't realize when it's stopped working. Even a broken watch is right twice a day."

The concept of quant funds, with their ability to process far more information far faster than any human is able to do, may have validity and may even be the future of investing. But the success of any particular quant fund will come down to the effectiveness of its algorithms going forward. One of the biggest challenges these funds face will be communicating their value to advisors and investors in a way that allows you to compare the different funds and make the appropriate choice.

Not so incidentally, if computers take on the heavy lifting of investing, "high-touch" services by advisors should be in great demand. Those who bring empathy to the client relationship and who coordinate complex tax and estate planning issues around personal and family goals add a form of value that no computer is capable of providing.

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