

## Trading Transforms

The evolution of the process of buying and selling financial assets has generated efficiencies, but also disruptions

**A**s technological advances in Wall Street trading gain momentum and acceptance in the marketplace, the implications are manifold.

First-moving prop traders and technology vendors thrive. Once-staid buy-and-hold firms actively recruit programmers and embrace cutting-edge technology. Theoretically at least, more efficient trading can lower companies' cost of capital and boost growth in the broader economy.

But the brave new world also has its downside. Bids and offers of pensions and other traditional buy-side managers go untouched or partly filled, stepped in front of by higher-frequency traders. The rapidity of the advances is drawing intense regulatory scrutiny. And as we saw on Thursday, May 6, in a still-not-fully-understood incident

that saw the Dow Jones Industrial Average plunge 998.5 points intraday, even the most advanced trading tools and methodology do not prevent market disruptions, and they may even be a cause.

Whether players applaud, lament, or are neutral regarding the newly drawn landscape, there is little doubt that the changes are here to stay. Traders' focus will remain on reducing friction, improving execution, and slimming trade times at the expense of rivals; when an advantage is lost, it will have to be recaptured.

"It's the gunslinger problem: everybody wants to be the faster gun, and there's always some guy who's going to get faster than the next guy," said Jerry Hanweck, chief executive officer of Hanweck Associates, which sells algorithmic trading software and other trading and risk-management products to investment firms. "So there's this

push for speed and this push for being faster and the push for being able to get your orders in the market quicker. And that's building on itself, as the message rates increase people need to be faster they push more messages out and the whole thing kind of snowballs on itself."

Algorithmic trading, computer-driven programs that buy or sell shares at a specified trigger point to limit losses or to seek profit, is now estimated to comprise 60 percent to 90 percent of market volume. An "algo" program can trade thousands of stocks in 1/1000 of a second or less, an execution speed that human traders cannot come close to matching.

Traditional money managers such as pension and mutual funds still derive alpha from security selection, and they do not need to be the fastest traders. But buy-side players do need to upgrade their trading processes and technology to at least keep up with traffic, and that requires significant investment and maintenance in systems and personnel.

"The challenge of trading is much greater, the complexity is greater," said Arun Kaul, principal of Hillsdale Investment Management in Toronto. "We have redoubled our efforts to just simply put more time and more energy into how we trade."

Computer-driven trading first gained prominence on Wall Street in the 1980s, and some observers blamed what was then known as "program trading" for the market crash of October 19, 1987. However, no firm causal link was ever proven, and academic research discredited the theory by noting that overseas markets without program trading also crashed, some more severely than the U.S.

Machines, of course, have become tremendously more powerful, and the attendant algorithms that drive trades are much more sophisticated compared with even a few years ago. The trend toward more advanced trading methodologies has always been up, but advances—and adoption rates—accelerated markedly in recent years, helping boost volume on the New York Stock Exchange by 163 percent between 2005 and 2009.

## Momentum Gains

And the momentum of recent years is feeding on itself. As algorithmic and other cutting-edge trading technology gain followers—and the credibility of a performance record—more players are willing to jump in. And as more players jump in, rivals feel compelled to upgrade their own trading technology and savvy to keep up.

"It took time for algo and quant trading strategies to gain acceptance among traditional money managers,

primarily because these strategies were not considered as mainstream as they are today," said Vassilis Vergotis, executive vice president and head of U.S. operations at futures and options exchange Eurex. "Algo trading is a fairly recent trend, just in the last four years or so."

"In the past, many hedge funds had to illustrate to their investors the potential returns of such strategies, using analysis or backtested data—in other words, how the algorithmic model would have performed," Vergotis said. "But right now, four to five years down the road, algorithmic trading has a longer track record. At Eurex we estimate about 25 to 30 percent of volumes in our benchmark products come from algorithmic traders."

An industry report showed that the 300 securities firms and hedge funds that specialized in rapid-fire algo trading generated \$21 billion in profit in 2008. Confidence was also shored up when algo trading held its own during the darkest market days of late 2008 and early 2009, faring at least as well overall as human-based trading strategies, with no high-profile breakdowns or blowups. In fact, it can be argued that buy-and-hold, the quintessential low-tech strategy, was the worst method to employ through the market swoon.

"Quant or high-frequency/algorithmic trading performed pretty well through the financial crisis, for both prop trading firms and quantitative hedge funds," Vergotis said. "These hedge funds' strategies were uncorrelated with the rest of the market and can be viewed as a separate asset class on its own."

Pension funds, mutual funds and insurance companies are buy-side institutions, whose mission can be broadly defined as managing money for the benefit of others. Generally speaking, such firms seek to add value for their clients via security selection and asset allocation, and portfolios are managed with a longer-term view.

Traders at these institutions are not morphing into high-frequency traders as a result of the newly reconfigured trading

**"It's the gunslinger problem: everybody wants to be the faster gun, and there's always some guy who's going to get faster than the next guy."**

**—Jerry Hanweck, chief executive officer, Hanweck Associates**



## trading transforms | continued

landscape, and firms are acting on the reality that standing pat will degrade the quality of trade executions and drag down performance.

“We are seeing increasing interest in strategy trading,” said Mike Rude, vice president of product development for Goldman Sachs’ electronic trading group, Americas. “Broadly, this means building your own algo and building your own black box, but not necessarily high-frequency trading.”

Eurex is seeing increased buy-side demand for some of its newest offerings related to trading technology.

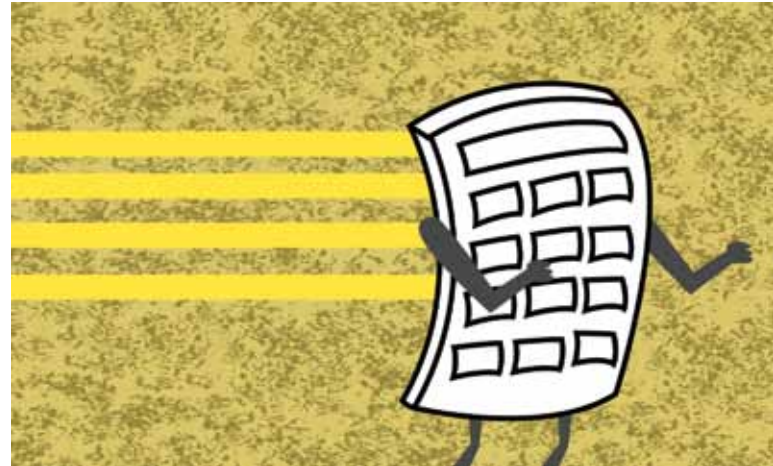
“From our perspective, the U.S. is the largest buy-side market, and algorithmic trading also has become a very important part of our business,” Vergotis told Markets Media. “We have introduced new technologies that support speed, low latency and risk management in order to meet the needs of this growing customer base.”

Vergotis noted that 60 to 70 percent of all orders entered through Eurex’s trading system are sent through its Enhanced Transaction Solution, an interface for high-frequency traders. “That is a good indication of the growth we have seen” in advanced trading methodologies, he said.

### Risk Management

As might be expected given the rapid advances in trading, managing the risks of the trading process has also become more challenging and complex.

“As a result of the financial crisis, risk management, particularly as it relates to counterparty risk, became quite an important element of the business of many buy-side firms,” Vergotis said. “Many of the firms that previously engaged in OTC derivatives trading are now



shifting toward platforms that offer central clearing of standardized listed contracts. We’ve also seen an increase in our volumes based on such trends.”

If it was not already there, the need for risk management took center stage on the afternoon of May 6, when the market suddenly and dramatically plunged in what some are calling the “flash crash.” While possible causes mentioned run the gamut from a “fat finger” error to an act of cyber-terrorism, U.S. Securities and Exchange Commission Chairman Mary Schapiro said on May 11 that the cause of the flash crash was unknown and it may be a long while until more is known.

Regulators were sifting through more than 17 million equity trades that took place around the 2 p.m. hour of the crash, and the complexity of the market added to the challenge. “The interconnections among markets and among equity securities and derivatives have grown immensely more complex over the past few years,” Schapiro testified at a Congressional hearing. “Orders in one stock directed to one market can now ricochet to other markets and trigger algorithmic executions in other stocks and derivatives in milliseconds.”

In the wake of the flash crash, too much attention was paid to the mechanics of trading, such as automation, scale, and speed, but not enough attention was paid to the strategies that are implemented using those trading mechanisms, according to Rajiv Sethi, professor of economics at Barnard College, Columbia University.

“Algorithms do what they are instructed to do, and markets movements result from the distribution of instructions rather than the technology used to implement them,” Sethi told Markets Media. “Technology is important but in an indirect way.”

Sethi categorized trading strategies as being of two distinct



“Quant or high-frequency/  
algorithmic trading  
performed pretty well  
through the financial crisis,  
for both prop trading firms  
and quantitative hedge  
funds.”

—Vassilis Vergotis, executive  
vice president and head of  
U.S. operations, Eurex

types: information augmenting, which is based on some form of fundamental analysis such as examination of balance sheets, growth potential, and risk, and ultimately feeds information to the market; and information extracting, which seeks to extract information from volume, prices, and other market data and use it to make profitable trades.

“A market dominated by information-augmenting strategies will tend to be stable and track information as it appears in the economy,” Sethi said. “But information-extracting strategies can be very profitable in stable markets as long as they react quickly and forcefully to new market data. Changes in technology have made rapid responses to market data feasible on a large scale, resulting in an increase in total market wealth that is invested on the basis of such strategies. The problem is that if too many people are using such strategies, there isn’t enough information getting into prices systematically, and technical strategies can start generating mutually amplifying responses to noise.”

### Technical Analysis Eyed

The May 6 flash crash may not have corrected itself as quickly if prices had initially risen rather than fallen, Sethi said. “It would have been harder to both detect the level of mispricing and to correct it; the risks of selling short in a rising market are well documented. I suspect that asset price bubbles begin with arbitrary upward movements of this kind.”

“What should pension funds and traditional buy-side investors do? For one thing, they should keep an eye on the extent of technical analysis in the market,” Sethi added. “This, to me, is a predictor of volatility. Beyond that, as long as a healthy share of one’s funds are invested on the basis of fundamentals, they should not be badly damaged in the long run. But there will definitely be periods in which this approach to investing will underperform technical strategies quite significantly.”

The New York Stock Exchange’s hybrid model, which combines computerized trading with human judgment, was effective in reining in the May 6 stock plunge, NYSE executives said, as a trading snafu on an all-electronic exchange would be more likely to get out of hand without a backstop of common sense.

Still, there is no shortage of critics in Washington who are using the flash crash as an opportunity to play to lingering populist anger at Wall Street. California Rep. Brad Sherman (D.) went as far as calling high-frequency traders “parasites” who deprive small investors of their rightful profits, and many institutional finance professionals agree with Schapiro’s characterization of the incident as “unacceptable.”

“The impact of technology on the equity markets (i.e. electronic trading) clearly needs to be tweaked with because when you have

**“Algorithms do what they are instructed to do, and markets movements result from the distribution of instructions rather than the technology used to implement them.”**

**—Rajiv Sethi, professor of economics at Barnard College, Columbia**

what took place (on May 6) happen...it has to shake confidence in Joe and Jane Public in terms of investing in the markets,” Jefferies analyst Jesse Litvak wrote in a May research note.

### Speed Rules... For Some

As one might expect, proprietary trading shops, whose bread and butter is trading, are at the vanguard of the evolution in trading technology and methodologies.

“To be successful in a proprietary trading firm you have to constantly adapt,” said Dino Verbrugge, who heads DV Trading in Toronto. “The issue with us is just constantly adapting to the environment in which we’re trading. It’s not good enough to have a good trading strategy — you also need to have top-of-the-line software.”

According to DV’s website, the firm’s “approach and specific trading skills are regularly adapted and refined to meet the needs of a trader confronted with the constantly evolving marketplace. Our strength lies in our ability to remain on the cutting edge.”

A big part of that cutting edge is speed: faster is better, and not-quite-the-fastest can be not good enough. As the race to zero continues to show legs, speeds are now measured in microseconds, or millionths of a second, rather than milliseconds, or thousandths of a second. “To compete efficiently you need speed, and in various market environments, if you are too slow your costs will be too high and your investment strategies will underperform,” said Craig Iseli, partner at Chicago-based prop shop SpiderRock Trading.

SpiderRock trades mostly options, using a delta neutral, volatility arbitrage strategy. “We have built a tech platform that basically does all our trading based on algorithms and mathematical models,” Iseli told Markets Media. “The edge is in our models and in our algorithms. We are not enabling people to trade, we are enabling machines to trade as efficiently as possible.”

“There are two things we think about: how efficiently do we trade and manage costs, and strategy,” Iseli continued. “Strategy is by far the primary thing that drives what we do. That’s where you make

## trading transforms | continued

money and where your alpha is. The efficiency part is, how do I efficiently enter and exit in this kind of market, how do I trade stock without giving away a half penny or penny, how do I trade options without giving away a dollar or two or three.”

While competing on trading performance can stave off underperformance, outperforming is a different story. “To compete on speed on a broad scale you have to invest a lot, and you’re competing against some really big firms,” Iseli said. “Those are the guys who are trying to make money on the efficiency part, say 2/10 of a cent on a stock via high-frequency. Speed is most important if your game is trying to capture that 2/10 cent.”

Advances in trading frequently start out in equity markets, which are the deepest and most liquid, before making their way into options and other derivative markets.

“A lot of traditional equity managers who never used options are starting to use options,” said Hanweck of Hanweck Associates, who was chief equity derivatives strategist for JPMorgan from 2000 to 2003. “In the equity world, people are very comfortable with algorithms. The typical buy-side asset manager is pretty comfortable with VWAPs and TWAPs, different kinds of order-routing algos, program trading, all the terms that go along with those things, including implementation shortfall. As those guys move into the options market they are bringing with them a lot of those techniques and methodologies.”

“On the other side you’ve got traditional options players who, for example, as more electronic exchanges come on board, guys who maybe traded on screens in the past are being pushed more toward trading in a programmatic fashion,” Hanweck continued. “A lot more products have come on the market, off-the-shelf products like Orc Liquidator and Actant and so forth, which let people pretty much plug and play options auto-quoting and algo trading in options. All that is pushing people to demand more out of their quant systems, which means they are demanding more out of their computer systems, their hardware, the different kinds of algorithms and so forth. You start to push the envelope on the technology.”

### Trader-PM Dynamic

National Basketball Association Hall of Fame coach Pat Riley once said that hard work guarantees nothing, but without it you don’t stand a chance. That same dynamic applies to buy-side managers trading at least as fast and smartly as everyone else: doing so will not put you at the top of your peer group, but failing to do so is a sure way to fall to the bottom.

It may take about 200 basis points, or 2 percentage points, of return in a year for a mutual fund manager to move up from around the median into the top quartile of peer rankings,

said Tim Mahoney, chief executive officer at New York-based BIDS Trading, an alternative trading system. “Trading alone cannot do that. It’s impossible to add 200 basis points just from trading,” Mahoney told Markets Media.

“The most successful buy-side model you can have is one where the investment process is inclusive of trading, and you recognize the importance of the various contributions inside of that,” Mahoney said. “It’s often hard to decompose it in such a way that you can be really specific, but...the relationship between a trader and a portfolio manager is incredibly important.”

“The goal of a trader, ultimately, is to minimize friction costs,” Mahoney added. “It’s all for the same purpose, which is how do I get the best return for my client. Trading can add to it by both minimizing friction costs and allowing them access to other goods and services to help them reach their goals. The only reason we all exist is to minimize those costs so that investors can maximize their returns.”

Rapid-fire trading and its attendant market dislocation can be jolting for veteran money managers, who are accustomed to having buy and sell orders go through seamlessly and sans hiccups.

“The biggest thing I and my traders have had to do is educate the portfolio managers on high-frequency trading,” said Darryl Noronha, head of equity trading at RBC Capital Management in Toronto. “And why when a PM looks at a quote and sees X (number of shares) bought or sold, why we couldn’t execute the whole order.”

It can be reasonably inferred that advanced trading is more than just a nuisance for buy-side managers. Given the aforementioned estimate of high-frequency traders’ profit in 2008 and assuming the

“To compete efficiently you need speed, and in various market environments, if you are too slow your costs will be too high and your investment strategies will underperform.”

—Craig Iseli, partner,  
SpiderRock Trading



## trading transforms | continued



“If we continue to pursue fragmentation, then don’t we need to slow down the flow to ensure some level of communication and coordination, in other words a re-centralization of certain key functions?”

—Arun Kaul, principal, Hillsdale Investment Management

market is a zero-sum game, \$21 billion came out of someone’s pockets that year.

### Recruitment Landscape

Aside from educating portfolio managers, the evolution of trading is also manifesting itself in recruiting and hiring, from entry-level candidates on up. Where an economics or finance degree was once a perfectly suitable background for an entry-level trading desk job, quantitative aptitude and technological savvy are increasingly prerequisites. “The whole concept of a trader is starting to converge,” said Emir Al-Rawi, managing director at IMC Financial Markets in Chicago. “A trader is a technologist or a risk manager.”

Al-Rawi said five years ago, IMC had 12 employees in its Chicago office, one of whom worked in technology. The office now has 120 employees, about half of whom work in technology.

“IMC is growing more focused in hiring people who have a computer science or computer engineering background,” Al-Rawi told Markets Media. “What I have told some juniors who I have spoken to at several different career fairs is that if you want to get into this business, you must have some programming skills as this is the direction that the business is taking.”

Indeed, a May 13 search of “trading” on eFinancialcareers.com showed head of algorithmic execution, high frequency C++ developer, and high-frequency and statistical arbitrage trader as jobs listed on just the first screen. Requirements included programming skills in C++, C#, Java, Delphi, and UNIX, as well as proficiency in Bayesian statistics, multi-period quadratic optimization, and state space modeling.

At one point during the flash crash of May 6, shares of pension-

fund mainstay Procter & Gamble plunged 37 percent, while consultancy Accenture fell from about \$40 to one cent, at least according to the screen. Both stocks quickly returned to near their prior-day close, erroneous trades were cancelled, and the broader market seemed to shake off the disruption, but there is no assurance that the next incident will also leave no lasting damage in its wake.

In the end, the most compelling storyline to the new trading landscape may be the interrelationship between market players. Can the highest-frequency traders coexist in the same market with a buy-side manager who is in the market perhaps a few times per week and just wants a seamless execution on his order to buy a stock that will be held for a year or two?

“So far the answer is yes,” Hillsdale’s Kaul said on April 15 at Markets Media’s Canadian Trading & Investing Summit in Toronto. “The risk is that as high-frequency keeps growing and velocity continues to rise, is it not going to have a detrimental impact on the secondary markets and their main purpose?”

“The markets still do function but you get a lot of ripples,” Kaul added that day. “As long as they’re ripples it should be OK, but as they start becoming waves, then you do run into bigger issues.”

### ‘Quite Scary’

Kaul updated his remarks after the flash crash. “We just had a big wave come through and no one seems too pleased,” Kaul wrote in a May 13 e-mail. “Almost a week still no one can diagnose with certainty what happened—that is quite scary.”

“I would add that marketplaces and exchanges must still maintain a utility (i.e. public good) component in order to ensure fair and equitable access to all,” Kaul wrote. “It seems to me that, the system will destabilize if the rules are for the benefit of participants whose main purpose has nothing to do with the original intent of secondary markets.”

Aside from the instability that lightning-fast, automated trading can potentially bring to the market, the proliferation of trading venues is another concern for buy-side managers.

“The greater the fragmentation, the less fair, equitable, transparent and stable the marketplace will become,” Kaul said. “If we continue to pursue fragmentation, then don’t we need to slow down the flow to ensure some level of communication and coordination, in other words a re-centralization of certain key functions, amongst venues so as to avoid further flash crashes? It may be true that we can only select two of the following three features: fragmentation, no speed limits, true price discovery.”