

How Wall Street Learned to Stop Worrying & Love the Bomb

Illustration by Brian Cronin

(well, maybe not love, but tolerate)

Two years after the flash crash, hedge funds and other sophisticated investors have begun to appreciate the benefits of high frequency trading.

By Leah McGrath Goodman



A full two years after a trader,

during a quiet lunch hour, engaged the algorithm heard round the world, Wall Street is finally accepting the inevitable and necessary presence of high frequency traders. Parallel liquidity crises in both the stock and futures markets that culminated in the flash crash of May 6, 2010, were widely blamed on high frequency trading, yet most fund managers readily admit there's no turning back from price swings that are now nearing the speed of light.

"High frequency traders can do a lot more work for a lot less money," says Michael Mendelson, principal and portfolio manager at Greenwich, Connecticut-based AQR Capital Management, a \$52 billion asset manager that employs quantitative methods in most of its investment strategies. Mendelson, who headed up quantitative equity trading at Goldman Sachs Group before joining AQR in 2005, estimates that trading costs have dropped about 50 percent in the past decade as a result of the advent of high frequency trading. "Traders used to always pay away the bid-ask spread, and the market maker was paid an awful lot of money for that," he explains. "Now it's a race of both speed and sophistication, which means it's highly competitive."

Following the two-year anniversary of the flash crash, serious questions remain about what exactly happened, but regulators have made strides in tackling some of the thornier issues at hand, and Wall Street has learned to swiftly adapt. Hedge fund firms are refining their trading strategies, and exchanges are updating their rules to keep pace with a sprawling trading universe that's increasingly measured in microseconds (that is, one millionth of a second). The Securities and Exchange Commission and its counterpart for the derivatives industry, the Commodity Futures Trading Commission, have spent months meeting with top players on Wall Street, including Mendelson, about how to craft reforms that will ensure more-orderly markets and auditing trails without clipping the wings of those who trade at

breakneck speeds. The response so far? Cautiously optimistic.

"Most people are no longer saying, 'Oh my God, the entire market is being controlled by some robot in Weehawken, New Jersey,'" says Justin Schack, managing director at New York's Rosenblatt Securities, an agency-only brokerage firm that tracks the movements of high frequency traders both on- and off-exchange. "We've been following this for a long time, and my feeling is, we are unlikely to see any fundamental changes by Washington that will seriously affect high frequency trading."

Indeed, some traders suggest that one of the biggest challenges may be resisting the lure of the high frequency model — particularly its profits. "We're longer-term, value-oriented investors, and we base a lot of our decisions on research and fundamentals, whereas high frequency trading is the antithesis of that, so sometimes it can

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be hard to see them making all the money," says Karen Finerman, CEO and co-founder of New York hedge fund firm Metropolitan Capital Advisors. While some funds disparage the so-called value-agnostic presence of high frequency traders, whose capital movements are often triggered by market inefficiencies, price discrepancies or merely the momentum of other traders rather than market fundamentals, Finerman points out that such modes of attack predated high frequency trading, adding, "There are many ways to skin a cat."

High frequency traders are frequently confused with quantitative hedge funds and those employing complex trading algorithms as part of their market strategies. Though high frequency attributes can be found in certain algorithms or quantitative approaches, conflating these would be folly, says Chris Bartlett, managing director of high frequency trading firm Nobilis Capital in New York. "A high frequency trading strategy is simply a strategy you repeat a lot of times because you have a small edge," he says. "In a coin flip I think it takes at least 10,000 flips before you are guaranteed to make money."

Some high frequency strategies wouldn't make any money at all if not for their dizzyingly fast and repetitive nature, while other such strategies simply use speed to enhance results. High frequency trading shops can get by on as little as several million dollars of proprietary trading capital, unlike a hedge fund, says AQR's Mendelson, because returns can be generated in the blink of an eye, then reinvested hundreds of millions — or even billions — of times in a single day. "One has lots of capital and expertise; the other has expertise and requires very little capital," he says, comparing hedge fund and high frequency trading firms. Like many quantitative firms, AQR does not engage in high frequency trading but soaks up the liquidity high frequency traders provide when making a monster trade.

The power wielded by high frequency traders is wildly disproportionate to their numbers. Of the roughly 20,000 hedge funds, brokerages, mutual funds and assorted market participants that populate the U.S. equity-trading universe, only 2 percent comprise high frequency trading firms, according to New York-based market research and strategic advisory firm TABB Group. But for the past five years, high frequency traders have driven more than 50 percent of equity volumes (in Europe these trades have reached nearly 40 percent). In other words, when it comes to U.S. market activity, the tail is definitely wagging the dog.

This tectonic shift has changed the face

of capital markets, perhaps forever. Before 2008 the average trading volume of U.S. equities was relatively stable, typically far below 6 billion shares a day. But during the financial crisis and later in the flash crash, volumes more than doubled, to about 12 billion shares a day, and they have yet to return to precrisis levels despite tapering off, according to TABB Group. AQR's Mendelson reckons the change has been mostly beneficial, as he believes high frequency traders offer tighter spreads and greater liquidity to hedge funds and other market participants than did the trading floor market makers of decades past.

Not all hedge funds profess the same level of comfort. "We do know this: They're charging the market for every trade. Where does that money come from? Us," says Michael Masters, founder and head of \$200 million hedge fund firm Masters Capital Management in Atlanta. "They say they are providing all this liquidity. As far as I'm concerned, there was plenty of liquidity before they existed. They're making money, and they're picking us off, and we're all paying for it."

Studies of the effects of high frequency trading on the marketplace have been largely mixed (the ones that aren't corporate-sponsored, anyway). In late April a report by Brussels-based public interest advocacy group Finance Watch questioned whether high frequency traders tend to confuse volume with liquidity in casting themselves as market makers. "If speed is a prerequisite of tight spreads, then the prices quoted are not real prices, as the possibility to withdraw quotes without trading becomes a condition for HFTs for quoting prices," it said. Meanwhile, the Capital Markets Cooperative Research Center, a Sydney-based independent academic research organization, concluded last July that high frequency traders

"may actually play a role in decreasing excessive price volatility," restoring price equilibrium during times of extreme turbulence.

In 2011 the high frequency community raked in about \$4.8 billion, according to TABB Group. That number is likely to fall this year as volume and volatility — high frequency traders' bread and butter — decline across most markets after peaking during the financial crisis. As a result, high frequency trading firms must churn ever-higher volumes to reap the same returns.

Profits generated by high frequency traders fell significantly, to \$0.0005 to \$0.00075 a share, in 2011, compared with \$0.001 to \$0.0015 a share in 2008. This means that just to maintain their financial-crisis-era earnings, high frequency traders would need to at least double their volumes. Engineers are working overtime to slash latency speeds — the time it takes to execute a trade — from five microseconds to less than two microseconds. There is a hard limit to the speed of data, says Campbell

Rules of Engagement

Back in the 1990s the Securities and Exchange Commission had a humble ambition: to get Wall Street to time-stamp its trades. In case of audits, it did not want broker-dealers to merely indicate the date of a trade, but the hour, the minute and — preferably — the second.

Across Wall Street a hue and cry rose up. This would be too expensive, broker-dealers complained. The back- and front-office systems were not conjoined and were hopelessly arcane. Remedying the situation would cost a fortune. The SEC commenced its retreat.

In the wake of the May 6, 2010, flash crash, the SEC has no intention of folding so easily. By the end of this November, broker-dealers — many of them now high frequency traders — will finally need to time-stamp all trades as part of the SEC's Herculean effort to improve recordkeeping. Broker-dealers also will need to keep tabs on "large traders" — those conducting more than \$20 million of exchange-listed transactions a day or \$200 million a calendar month — via a unique identification number, in case the SEC requires an audit at a later date.

In conjunction with the Financial Industry Regulatory Author-

ity, the SEC seeks to establish a consolidated audit trail across equity markets and to create an as-yet-unfunded central data repository, so it will never again have to spend weeks collecting information from dozens of trading venues following a market meltdown, as it did with the flash crash. The SEC also plans to vote on a limit up/limit down pricing mechanism imposed under a pilot program in 2010. The new version seeks to refine circuit breakers on listed equities during periods of extraordinary market volatility so that they aren't triggered by, and may even prevent, erroneous trades. Rather than halting trading for a five-minute period following a 10 percent price move during the preceding five minutes, stocks will be halted after a 5 percent move, adhering to a specified price band set at a percentage level above and below the average price of that security over the preceding five minutes.

"I think you can avoid a lot of the risk of a future flash crash by implementing these systemwide circuit breakers," says Christopher Concannon, a partner at New York-based electronic trading firm Virtu Financial.

In addition, the SEC has banned certain types of outlier

prices, known as stub quotes, which led to some of the heaviest losses of the flash crash. Stub quotes were responsible for the execution of 20,000 trades across 300 securities at prices ranging from a fraction of a penny to as high as \$100,000, according to the SEC-Commodity Futures Trading Commission's joint report on the flash crash.

Among the more hot-button issues are calls for market speed limits and a transaction tax on high-traffic traders. High frequency traders oppose both on grounds that the measures could hurt their ability to provide tight spreads. There's also ongoing debate over the fairness of colocation, or trading systems that position themselves close to exchange servers and trade-matching engines to get their orders in faster than competing orders in the market. Donald Wilson, CEO of DRW Trading Group, a Chicago market-making firm that offers execution services both from the trading floor and via high frequency trading, says that many firms do not want or need colocation for their trading edge and that outlawing it would only create a lack of transparency as traders jostle for position.

"If colocation were banned, market participants would figure out how to get close to the matching engine anyway," Wilson adds. "They would buy the farm across the street and figure out ways to get their lines into the matching engine building." — L.M.G.

Harvey, a finance professor at Duke University. “As far as we know, in terms of laws of physics, it’s going to be the speed of light. That’s going to be the end. Everybody’s got fiber, and it’s definitely a race.”

The race started in 2000 with the official decimalization of the stock market, followed by the proliferation of electronic trading venues and the rise of automated trading across Wall Street, but few knew that high frequency trading had quietly burgeoned into a multibillion-dollar business before July 2009. That’s when federal authorities hunted down Sergey Aleynikov, a former computer programmer for Goldman Sachs accused of stealing top-secret, high-speed trading code that if misused could, according to Assistant U.S. Attorney Joseph Facciponti, “manipulate markets.”

Although Aleynikov’s conviction was overturned this year, his arrest stirred up public fears lingering from the credit crisis. In the following weeks high-profile battles erupted over high frequency trade secrets — including one in Chicago between hedge fund firms Citadel and Teza Technologies, which had planned to hire Aleynikov. In 2009, New York Senator Charles Schumer shot off a letter to SEC chairman Mary Schapiro demanding that she step up regulation of high frequency traders and threatening to act if she didn’t.

The icing on the cake came just months later with the flash crash, whose origins are still the subject of heated debate. Although a joint report by the SEC and the CFTC traced the genesis of the nearly 700-point drop in the Dow Jones Industrial Average to the \$4.1 billion sale of E-mini S&P 500 futures on the Chicago Mercantile Exchange by a mutual fund (Waddell & Reed of Overland Park, Kansas, left conspicuously unnamed in the report), questions rankle. For one, the algorithm used by Waddell’s executing trader at Barclays Capital was widely seen as passive, representing only 1.3 percent of the E-minis’ total volume of 5.7 million contracts that day. Further, government records show that regulators did not interview the Barclays team that carried out the trade until weeks after filing the flash crash report. A Freedom of Information Act request filed by Waddell seeking more information about the findings was denied.

According to the joint report, high fre-

quency traders played a role in the final seconds before the crash bottomed, exchanging more than 27,000 contracts but holding just 200 even as they dominated the market volume. “High-frequency traders began to quickly buy and then resell contracts to each other, generating a hot-potato volume effect as the same positions were rapidly passed back and forth,” the report said. Critics contend that regulators downplayed the havoc caused by high-speed traders and placed too much weight on the actions of one lone mutual fund whose continued sales throughout the market rebound just minutes later seemed to suggest that its trades could not have caused the crash.

From a structural standpoint the equity and derivatives markets are at opposite ends of the spectrum, with stocks trading across more than a dozen platforms and

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derivatives primarily changing hands at two major exchanges — the Chicago Mercantile Exchange and Atlanta’s IntercontinentalExchange. The upshot is that, in contrast to derivatives, liquidity among equities runs wide but not very deep. “Our firm is trading millions of shares a day, and the U.S. equity market is the most efficient asset class on the planet,” says Christopher Concannon, partner at New York-based Virtu Financial, a heavyweight electronic trading firm that, unlike many other high frequency outfits, stayed in the market and traded throughout the turmoil of the flash crash. “But we have 13 exchanges and 30 dark pools, and once you break through the top layers of liquidity, there’s not a whole lot underneath.” In the past, designated market makers on trading floors operated under strict rules to buy and sell through-

out any market mayhem, but the high frequency traders who have largely replaced them need not honor such obligations.

Blamed by many for the structural quirks that warped the markets in the first place, the SEC has rushed out a series of proposals, circuit breakers, auditing functions and various reforms aiming to rein in high frequency traders and their more disruptive algorithms (see sidebar, page 37). As savvy market regulations go, the efforts could not be called a surgical strike, but some of the early measures appear to have calmed the markets somewhat.

Challenging regulators’ core beliefs likely will be key to getting at the heart of how to oversee evolving high frequency trading strategies, says Eric Scott Hunsader, founder of Nanex, a Winnetka, Illinois, provider of streaming whole market data and the person who coined the term “quote stuffing” — the act of overwhelming markets with an unusual number of buy or sell orders. When the flash crash took place, Hunsader noticed a large number of “nonsense” quotes flooding the market, but he figured they were a fluke. Now he is used to seeing such patterns in the chaos.

“At first, we saw these high quote rates at only a couple exchanges, but now it’s on all of them,” he says. “So you will have a thousand prices in one second for one symbol and no trades.” The influx creates delays in trading of about ten microseconds, significantly longer than high frequency traders’ ability to capitalize on them, he says. “The more overloaded a machine is, the greater the delay — and if you’re causing a delay and controlling the environment, you can control parts of the market,” he explains. “Our goal is to try to get regulators to understand what is going on.” Hunsader’s work has already drawn the attention of both the SEC and the CFTC.

His concern: If a trader can target a vulnerable stock in a group of ticker symbols linked to the same trade-matching engine at an exchange, that trader can slow trading of the entire batch. In late April a thinly traded Nasdaq Stock Market-listed stock, PSS World Medical, set the record for being the most overquoted issue in a single second, with 47,138 hits. Just to put that in perspective, during the height of the flash crash, the highest number of quotes in

any one second for all Nasdaq stocks was 78,000. Hunsader, a software developer, suspects the “quote bomb” may have been targeting a more prized stock in the PSS lineup, spanning the symbols PC through SPZ, such as Qualcomm or Sirius XM Radio. “The best high frequency shops know exactly how these are batched, their bandwidth, how much they can handle and what can cause them to be overloaded,” he says.

With trading activity looking like it will only be getting faster and more furious, most hedge funds expect any remaining market infirmities to be vigorously tested. As part of this brave new world, Wall Street traders now expect regular flash crashes — or at least mini-flash crashes — to become grist for the gossip mill as the market adjusts to as many as tens of thousands of quotes in one stock in a single second. Indeed, as recently as April an erroneous trade entered by a Miami bro-

kerage hurled Mexico’s benchmark IPC Index into minicrash mode.

The expectation that public markets will continue to be the central battlefield for high frequency traders has led to an increase in traffic to private, lightly regulated, off-exchange trading venues known as dark pools, where investors and their brokers can anonymously exchange shares without advertising the prices at which they are willing to trade. In May, NYSE Euronext CEO Duncan Niederauer confirmed that off-exchange transactions make up more than 50 percent of trading in roughly 1,300 U.S.-listed securities. Not surprisingly, the ranks of high frequency traders in dark pools are similarly on the rise, seeking to home in on pockets of the market where the trades may be bigger, spreads wider and price moves sharper. Rosenblatt Securities estimates that dark pools represented more than 13 percent of

consolidated equity volume at the beginning of the year, marking a record high.

Though that hardly bodes well for nationwide price discovery, it seems to suit the hedge funds looking to trade far from the spotlight just fine (many are doing so already). With the trend away from public markets not expected to change any time soon, hedge funds may finally be able to fight fire with fire, says David Mechner, CEO of Pragma, a New York-based developer of trading algorithms that boast a built-in awareness of how high frequency traders approach both the dark pools and public markets.

“I am not a high frequency alarmist,” says Mechner, whose background is in neurobiology. “High frequency trading is something that came out of the current market structure. There was this real crescendo of anxiety for a while, and I think there’s still a great deal of controversy, but the pitch has died down.” **AR**