

April 1, 2014

The Newest Whipping Boy – High-Frequency Trading Tracking a Changing Marketplace

It's a media feeding frenzy! Michael Lewis' new book Flash Boys has created a stir among investors and regulators alike as they scramble to understand the ins and outs of high-frequency trading (HFT).

To make a long story short, HFT has been around for longer than 15 years. So, this is not a new phenomenon. High-frequency trading can be broadly defined as the use of computer algorithms to rapidly trade stocks.¹ Computers have replaced humans and have become the new trading specialists. The processing power of computers to match mathematical formulas with stock prices and immediately adjust to new information is mind-numbing. See the comparisons below to understand some of the major changes that have taken place in the last decade.

The Stock Exchange	
Then	Now
Human specialists or market makers	Computers and trading software
100+ firms who employed market makers	Fewer than 10 firms
In 1999 – tape ran at 1,000 quotes/second	In 2013 – tape ran at 2,000,000 quotes/second
More trading	Less trading (although many quotes)
Slow speed – more risk, less transparent	High speed – lower risk, more transparent
Larger bid-ask spread	Narrower bid-ask spread
Higher cost to investors	Lower cost to investors

There are positives and negatives about HFT. It is especially important not to put regulations into effect that might reduce the ease of trading, drying up market liquidity. That solution would be worse than the current problem.

There are three types of strategies high frequency firms employ. Primarily, and most often, HFT firms are simply using arbitrage and dealing to enhance liquidity across markets. Secondly, some HFT is structured to take advantage of news feeds and resulting changes in equity prices from fundamentals. Lastly, there are a handful of HFT firms whose strategy is to front-run other large proprietary traders (humans) or slower HFT traders. These are the firms who strive to obscure exactly what is happening with the trading situation so that they can make money on the fringes. These firms would likely be the ones under the greatest scrutiny by regulators as the regulators seek to “level the playing field.”

Generally speaking, the ability of computers to make trading cheaper and more efficient is the positive development for the market. Computers, when compared to humans, demonstrate the following superiorities. Computers

- have perfect attention spans,
- follow instructions exactly,
- do not allow emotion to cloud their judgment,
- can watch and learn from thousands of sources of information simultaneously,
- do not cheat, and
- cost less and require smaller offices.²

¹ Forbes: *High Frequency Trading: Is It a Dark Force Against Ordinary Human Traders and Investors?* Sept. 30, 2013

² Harris, Larry. www.cfapubs.org What to Do about High Frequency Trading. March/April 2013 Pub.

In the long run, however, it seems likely that only a couple of the fastest firms will survive this cutthroat business. This anti-competitive outcome could become a negative for the market, most likely driving transaction prices higher.

Another major drawback with computerized trading is that it can create and/or exacerbate systemic problems. An error in the algorithm(s) parameters used by any (or all) of the firms could cause a Flash Crash situation. If anyone with malicious intent were to obtain control of the order routing/generating system, they would be able to destabilize the market.

For the best of both worlds, the market needs to utilize both human and computer power. A balance of speed with safeguards should be utilized to provide the most efficient use of resources. The regulators must do their best to insure illegal behavior will not be obscured by all of the speed and activity in the market.

This discussion is merely the tip of the iceberg as the electronic market continues to evolve. The emotional debate about HFT rages on because people fear what they do not understand well. In spite of this, a market change that lowers costs and improves liquidity cannot be all bad!

- Rachel Wakefield, CFA

A HISTORY OF HIGH-FREQUENCY TRADING (HFT)

A Market Dominated by Machines

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17th Century

Rothschilds were able to arbitrage prices of the same security across country borders by using carrier pigeons to relay information before their competitors.²

1998

U.S. Securities and Exchange Commission (SEC) authorized electronic exchanges, paving the way for computerised High Frequency Trading (HFT) services that can execute trades **1,000 times faster** than a human.⁴



x 1,000

1602

Amsterdam Stock Exchange launches the world's first stock exchange.¹



1983

Bloomberg launches with \$30 million investment from Merrill Lynch to build first computerized system to provide real-time market data, financial calculations and analytics to Wall Street firms.³



2000

High-frequency trading accounted for fewer than **10%** of equity orders.⁶

2005

HFT makes up **35%** of equity trades in the US.



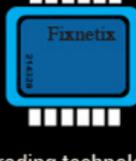
2010

HFT makes up **56%** of equity trades in the US.⁷



2011

Launch of Nano trading technology: a firm called Fixnetix developed a microchip that can execute trades in **nanoseconds** – equal to one billionth of a second.⁹



1 Nanosecond = 0.000000001 seconds

2012

Estimated that HFT is responsible for **70%** of all US equity trades.¹¹



2012

IT companies invest millions on HFT technology. One new computer chip built specifically for HFT prepare trades in .000000074 seconds; a proposed \$300 million transatlantic cable is being built just to shave **0.006 seconds** off transaction times between New York City and London.¹²

April 2nd 2013

SEC and CFTC announce restrictions on public company announcements through social media.¹⁴



April 23rd 2013

1:05pm: A false Tweet sent by the Associate Press hit by two explosions and causes widespread panic on Wall Street. The Dow Jones plummets **143 points** (1%) in 3 minutes from 14,699 to 14,555.¹⁶

September 18th 2013

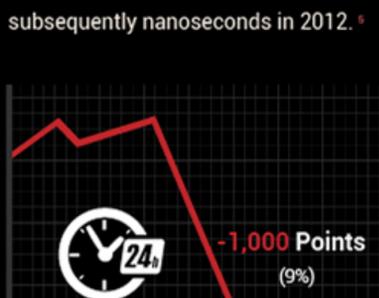
At 2pm, the Federal Reserve shocked the financial markets by announcing not to scale back its level of support to the economy. An estimated **\$600 million** in assets changed hands in the milliseconds before other traders in Chicago could learn of the news.¹⁸

2013

Economists continue to debate over the risks of HFT after the 2010 Flash Crash. Nobel Prize winning economist, Michael Spence, believes that HFT should be banned.²⁰

At the turn of the 21st Century

HFT trades had an execution time of several seconds, whereas by 2010 this had decreased to milli seconds, microseconds in 2010 and subsequently nanoseconds in 2012.⁶



2010 Flash Crash!

On May 6th 2010, a computer-driven sale worth \$4.1 billion triggered the May Flash Crash, where the **Dow Jones plummeted 1,000 Points** within a single trading day. Nearly \$1 trillion was wiped off the market value,⁸ as well as a drop of 600 Points within a 5-minute time frame, before recovering moments later. The SEC and CFTC largely blamed HFT firms for the crash.

SEPT 2012

Dataminr launches brand new service with \$30 million investment, which turns social media streams into actionable trading signals. Helps report the latest business news up to 54 mins faster than conventional news coverage.¹⁹



Dataminr

NOVEMBER 2012

FBI begins to look into social media as a form of securities fraud due to its instant impact on stock markets.¹³

April 4th 2013

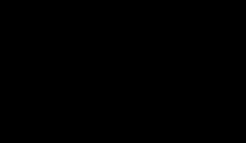
Bloomberg Terminals incorporates live Tweets into its economic data service. Bloomberg Social Velocity tracks abnormal spikes in chatter about specific companies.¹⁵

April 23rd 2013

A server farm situated in Washington DC can transmit **data at the speed of light** to New Jersey via superfast microwave transmission services.¹⁷

Sept 2013

Italy becomes first country to launch levy on HFT, charging a levy of **0.002%** on equity transactions lasting less than **0.5 seconds**.¹⁹



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¹ http://en.wikipedia.org/wiki/Amsterdam_Stock_Exchange

² http://en.wikipedia.org/wiki/High-frequency_trading

³ <http://www.fundinguniverse.com/company-histories/bloomberg-l-p-history/>

⁴ <http://www.investopedia.com/articles/06/globalelectronicmarket.asp>

⁵ Fundamentals of Technical Analysis and Algorithmic Trading, Algorithmic Trading (Automated Trading Systems) and High Frequency Finance by Saeed Ebrahimijam

⁶ http://en.wikipedia.org/wiki/High-frequency_trading

⁷ http://en.wikipedia.org/wiki/High-frequency_trading

⁸ <http://moneymorning.com/2013/05/08/a-look-back-at-the-flash-crash-of-2010-when-will-it-happen-again/>

⁹ <http://www.bbc.co.uk/news/business-15722530>

¹⁰ <http://www.minyanville.com/sectors/technology/articles/De-went-Capital-Markets-Johan-BlenGSV/12/6/2012/id/46352?page=full>

¹¹ <http://www.thebureauinvestigates.com/blog/2012/09/16/britain-opposes-meps-seeking-ban-on-high-frequency-trading/>

¹² <http://www.wired.com/wiredscience/2012/02/high-speed-trading/>

¹³ <http://www.reuters.com/article/2012/11/26/net-us-investment-summit-fbi-idUSBRE8APOEX20121126>

¹⁴ <http://www.sec.gov/News/PressRelease/Detail/PressRelease/1365171513574#Ukq8mmRATH->

¹⁵ http://dealbook.nytimes.com/2013/04/04/twitter-arrives-on-wall-street-via-bloomberg/?_r=0

¹⁶ <http://www.theguardian.com/business/2013/apr/23/ap-tweet-hack-wall-street-freefall>

¹⁷ <http://www.cnbc.com/id/100910912>

¹⁸ <http://www.businessinsider.com/traders-got-the-no-taper-news-early-2013-9>

¹⁹ <http://finance.yahoo.com/news/italy-launches-tax-high-frequency-071444701.html>

²⁰ <http://freakonomics.com/2011/03/28/should-high-frequency-trading-be-banned-one-nobel-winner-thinks-so/>