

3-1-2017

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### Recommended Citation

Benvegna, Anthony B. (2017) "A Guiding Light to a More Efficient Market: Why High-Frequency Trading is Not a Flash in the Dark," *Journal of International Business and Law*. Vol. 16: Iss. 2, Article 11.

Available at: <https://scholarlycommons.law.hofstra.edu/jibl/vol16/iss2/11>

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## A GUIDING LIGHT TO A MORE EFFICIENT MARKET: WHY HIGH-FREQUENCY TRADING IS NOT A FLASH IN THE DARK

By Anthony B. Benvegna\*

### I. INTRODUCTION

As evidenced throughout history, the insatiable desire for cutting edge technology, compounded by the ideals indoctrinated into a capitalist society, propel a near continuous stream of evolving technology.<sup>1</sup> These technological advancements have played more than a minor role in shaping the securities industry. Most recently, computers and their dominant rise to power forever changed the securities industry, effectively ending the days of the open-outcry.<sup>2</sup> There are no more robust, domineering traders wearing banker-collared shirts barking out buy and sell orders across the trading floors. The voices of these boisterous traders have been replaced by the silent hum of computers, conducting voluminous trades at milliseconds, surpassing the abilities of any human. A number of these computers are far more advanced than their counterparts and harness the power to exact massive amounts of trades at lightning fast speeds.

The aforementioned trading technique is known as high-frequency trading, the use of “proprietary algorithms” for computerized trading.<sup>3</sup> These algorithms are programmed by high-frequency traders to partake in either execution or algorithmic trading.<sup>4</sup> Execution trading is used when a trader wants to move a large order for the best possible price.<sup>5</sup> In order

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\*J.D., Maurice A. Deane School of Law at Hofstra University, 2017. I would like to thank my family and friends for their love and support throughout this process. I would also like to thank the staff of the Journal of International Business and Law for this opportunity. This note is dedicated to Rev. Timothy Brown, S.J. for introducing me to this topic and for whom this note would not exist without.

<sup>1</sup> Dag Spicer, *Tools of the Trade: An Historical Look at Technology and Commerce*, COMPUTER HISTORY MUSEUM (Oct. 6, 2015), <http://www.computerhistory.org/atc/m/tools-of-the-trade-an-historical-look-at-technology-and-commerce>. Ancient cultures used clay tokens to represent and quantify commodities such as livestock and ore. *Id.* These tokens were a key part of trading, serving as legal proof of transactions. *Id.* One of the first uses of the telescope was to observe the name of a cargo ship entering port and, based off of the ship's name, what commodity it was transporting. *Id.* The observer would then determine how heavily laden the ship was by how low it rode the water. *Id.* The observer could then take an educated guess as to the quantity of the commodity the ship was carrying to port and place a buy or sell order before anyone else. *Id.* The creation of the telegraph made couriers obsolete and those rich enough to afford a telegraph were provided a significant commercial advantage, speed over their competition. *Id.* A modified version of the telegraph, which used alphabetic characters as opposed to Morse Code, was created specifically for stockbrokers and provided them with access to recent price information without having to be physically present at an exchange. *Id.* The creation of the “Big Board,” a large board that published stock prices in the middle of an exchange, marked the beginning of the recently outdated “open outcry” system of trading. *Id.*

<sup>2</sup> *Open Outcry*, INVESTOPEdia, <http://www.investopedia.com/terms/o/openoutcry.asp> (last visited Feb. 17, 2017). An antiquated means of communication on a trading floor whereby traders would converse through a mixture of verbal bids, offers, and hand signals to convey trading information. *Id.*

<sup>3</sup> *High Frequency Trading (HFT)*, NASDAQ, <http://www.nasdaq.com/investing/glossary/h/high-frequency-trading> (last visited Nov. 16, 2016).

<sup>4</sup> *Id.*

<sup>5</sup> *Id.*

to do so the algorithm will break down the order into smaller parts and execute trades at different times.<sup>6</sup> Algorithmic trading is used to scour the market for smaller trading opportunities.<sup>7</sup>

This note will argue that high-frequency trading is neither bad for our markets nor an inherently predatory trading practice, and therefore, the Securities Exchange Commission (“SEC”) should publish an informative release to repair the bad reputation surrounding high-frequency trading. Such a release should focus on both defining high-frequency trading and substantiating the SEC’s stance on it. This regulation should not be promulgated in a way to hamstring high-frequency traders, but rather as a way to bless them as a substantial market force and set define boundaries between acceptable and unacceptable trading techniques.

It is not to say that high-frequency trading cannot be used maliciously by market participants, as it can also have an adverse effect on our markets. At its core the issue lies where it always has, with the need to regulate market participants as opposed to turning high-frequency trading into a scapegoat.

Part II will offer a background into high-frequency trading by defining its most common trading practices as well as discussing the technological arms race that led to its current technological and historical condition. This section will explain who participates in high-frequency trading and to what extent. Further, Part II will also explain why high-frequency trading is good for the market and will examine what happens when market participants abuse high-frequency trading. This will be done by examining the Flash Crash of 2010 and its effect on the market.

Part III will discuss the current state of the law pertaining to high-frequency trading as well as examine the SEC’s stance on the issue. This section will examine how the government currently regulates alternative trading systems (dark pools) under Regulation ATS and Regulation NMS.

Part IV will investigate the Barclays saga, a series of lawsuits brought against various alternative trading systems, mainly Barclays’ alternative trading system, alleging fraudulent activity, which has implicitly stigmatized high-frequency trading and alternative trading systems. This section will utilize research conducted by the international community in regards to high-frequency trading as a way to counter the argument that high-frequency trading is malevolent. Further, this section will discuss how the European Union, the United Kingdom and Japan regulate high-frequency trading.

Finally, Part V will propose that the SEC should publish an informative release or regulation defining both high-frequency trading and the SEC’s stance towards high-frequency trading, as it would reassure investor security and market stability by setting forth allowable conduct for high-frequency traders and promulgating relevant guidelines.

## II. BACKGROUND

### A. High-Frequency Trading

Although there is no universal or legal definition of high-frequency trading<sup>8</sup> the term refers to supercomputers transacting a series of trades of securities at an “extremely low

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<sup>6</sup> *Id.*

<sup>7</sup> *Id.*

latency,” as in mere milliseconds,<sup>9</sup> which accounts for approximately fifty-five percent of all trading volume in U.S. equity markets.<sup>10</sup> These traders employ either passive or aggressive trading strategies to amass large profits by conducting thousands of trades a day.<sup>11</sup> Arbitrage trading<sup>12</sup> is one such example of a passive trading strategy where traders seek to “arbitrage small price differences” in stocks across various exchanges as a result of “infinitesimal time differences.”<sup>13</sup> This practice is more commonly referred to as flash trading, given the fact that high-frequency trading firms receive a flash of information about buy and sell orders before everyone else.<sup>14</sup>

Aggressive trading strategies, such as spoofing and order anticipation, have more policy concerns. Spoofing is to make a bid or an offer for a security and then cancel it before the trade can go through, tricking the market into believing in a false sense of investor demand, thereby altering the behavior of other market participants and eventually profiting from it.<sup>15</sup> High-frequency traders will ping, send out small exploratory trade offers to detect the existence of larger orders from other investors, and provide themselves with invaluable knowledge of “hidden large investor liquidity.”<sup>16</sup> This technique is known as order anticipation, and is parallel to electronic front-running.<sup>17</sup>

Front-running is a tactic used by traders to interject themselves between a person’s stock order and their desired purchase price by leapfrogging their order and buying the stock before that person, who is usually a client of the firm.<sup>18</sup> Front-running is not facially illegal, however, it becomes illegal when a trader trades upon “information not available to the public.”<sup>19</sup> The two predominant forms of front-running are conventional and high-frequency front-running.<sup>20</sup> Conventional front-running happens after a trader hears of the imminent execution of a client’s large purchase order and purchases a share of the stock for himself before the client’s order is placed.<sup>21</sup> Once the client’s order is executed the stock price rises

<sup>8</sup> See RENA S. MILLER & GARY SHORTER, CONG. RESEARCH SERV., HIGH FREQUENCY TRADING: OVERVIEW OF RECENT DEVELOPMENTS (2016), <https://fas.org/sgp/crs/misc/R44443.pdf>.

<sup>9</sup> *Id.* at 1.

<sup>10</sup> *Id.* at 1 (citing Austin Gerig, *High-Frequency Trading Synchronizes Prices in Financial Markets* 1 (SEC, Div. of Econ. and Risk Analysis, Working Paper, Jan. 15, 2015), <https://www.sec.gov/dera/staff-papers/working-papers/dera-wp-hft-synchronizes.html>).

<sup>11</sup> *Id.* at 3.

<sup>12</sup> *Arbitrage*, INVESTOPEDIA, <http://www.investopedia.com/terms/a/arbitrage.asp> (last visited Apr. 14, 2017). Arbitrage is “the simultaneous purchase and sale” of the same security to make a profit off of price difference due to “market inefficiencies.” *Id.*

<sup>13</sup> MILLER & SHORTER, *supra* note 8, at 4.

<sup>14</sup> Elvis Picardo, CFA, *You’d Better Know Your High-Frequency Trading Terminology*, INVESTOPEDIA (Oct. 6, 2015), <http://www.investopedia.com/articles/active-trading/042414/you-d-better-know-your-highfrequency-trading-terminology.asp>.

<sup>15</sup> See John D. Arnold, *Spoofers Keep Markets Honest*, BLOOMBERG (Jan. 23, 2015, 9:00 AM), <https://www.bloomberg.com/view/articles/2015-01-23/high-frequency-trading-spoofers-and-front-running>.

<sup>16</sup> MILLER & SHORTER, *supra* note 8, at 5; see also Picardo, *supra* note 14.

<sup>17</sup> MILLER & SHORTER, *supra* note 8, at 5.

<sup>18</sup> *Front Running: CNBC Explains*, CNBC (Apr. 2, 2014, 2:13 PM), <http://www.cnbc.com/2014/04/02/front-running-cnbc-explains.html>.

<sup>19</sup> *Id.*

<sup>20</sup> *Id.*

<sup>21</sup> *Id.*

and the trader “pockets the difference between the new price and what he paid.”<sup>22</sup> High-frequency front-running is when a high-frequency trader uses an algorithm to detect orders from other traders and then jump in front of their trade.<sup>23</sup> Like conventional front-running, the result of this is that the other person buys at a higher price and the trader profits off of the difference.<sup>24</sup> The legal and ethical distinction between the two is that in the first form, the trader is arguably “violating [his] client’s trust and... acting on privileged information” while in the second form the trader is acting on public information, accessible to everyone with the right technology.<sup>25</sup>

## B. Who High-Frequency Trades?

According to Michael Lewis, the leading critic of high-frequency trading<sup>26</sup> and author of *Flash Boys: A Wall Street Revolt*,<sup>27</sup> only the extremely wealthy may access and benefit from high-frequency trading.<sup>28</sup> Perhaps Mr. Lewis’ finger pointing was correct in the late 2000s, however his argument is now obsolete. Now more than ever it is evident that high-frequency trading is a substantial part of our marketplace with more than just a handful of extremely wealthy individuals utilizing it. As of 2011, high-frequency trading accounted for approximately sixty to seventy percent of United States trading volume.<sup>29</sup> Some argue this number reached as high as seventy-five percent of all U.S. trading in 2016.<sup>30</sup>

High-frequency traders are predominately proprietary traders<sup>31</sup> as opposed to those who trade on an agency basis.<sup>32</sup> Proprietary trading firms, such as Getco (now KCG),

<sup>22</sup> *Id.*

<sup>23</sup> *Id.*

<sup>24</sup> *Id.*

<sup>25</sup> *Do High Frequency Traders Front-Run The Market By Using Their Speed Advantage?*, FORBES (Apr. 3, 2014, 1:41 PM), <http://www.forbes.com/sites/quora/2014/04/03/do-high-frequency-traders-front-run-the-market-by-using-their-speed-advantage/#4aeaf1b036e2>.

<sup>26</sup> Kamal Ahmed, *The Market is Rigged* – Michael Lewis, BBC (Apr. 10, 2015), <http://www.bbc.com/news/business-32246655>. One of Michael Lewis’ more famous proclamations is that “the market is rigged,” the motif of his book, *Flash Boys: A Wall Street Revolt*. *Id.*

<sup>27</sup> *FBI Investigating High-Speed Trading Outfits*, CNBC (Mar. 31, 2014), <http://www.cnbc.com/2014/03/31/fbi-investigating-high-frequency-trading.html>. The day after *Flash Boys: A Wall Street Revolt* was published the Federal Bureau of Investigation launched an investigation into high-frequency trading. See Johnathon Weil, *FBI Hops on Michael Lewis Bandwagon*, BLOOMBERGVIEW (Apr. 1, 2014), <https://www.bloomberg.com/view/articles/2014-04-01/weil-on-finance-fbi-hops-on-michael-lewis-bandwagon>.

<sup>28</sup> MICHAEL LEWIS, *FLASH BOYS: A WALL STREET REVOLT* 19 (Michael Lewis ed., 2014). The eight-hundred and twenty-seven-mile cable stretching from Chicago to the western shores of the Hudson river in New Jersey “was more valuable the fewer people that had access to it.” *Id.* at 19. The goal of Spread, the owner of the cable, was to create a private space within the public markets, “accessible only to those willing to pay the tens of millions of dollars in entry fees.” *Id.* at 19. When approached to purchase a spot on the cable for over ten million dollars, one such “big Wall Street firm” boss posed a single question to Spread, “Can you double the price?” *Id.* at 22.

<sup>29</sup> Michael Chlistalla, *High-Frequency Trading: Better Than Its Reputation?*, 9 DEUTSCHE BANK (Mar. 8, 2011), [https://www.dbresearch.com/PROD/DBR\\_INTERNET\\_DE-PROD/PROD000000000270960.pdf](https://www.dbresearch.com/PROD/DBR_INTERNET_DE-PROD/PROD000000000270960.pdf).

<sup>30</sup> *College Kids are Now High Frequency Trading From Dorm Rooms*, FORTUNE (Jan. 28, 2016), <http://fortune.com/2016/01/28/college-kids-are-now-high-frequency-trading-from-dorm-rooms>.

<sup>31</sup> Chlistalla, *supra* note 29. Proprietary traders are those who trade for their own accounts. *Id.*

Optiver, and Tradebot, make up forty-eight percent of high-frequency traders, followed by multi-service broker-dealers, such as Goldman Sachs, and Citigroup, who make up forty-six percent, and hedge-funds, such as Citadel Securities LLC, and Renaissance Technologies, who account for the remaining six percent.<sup>33</sup> Various other high-frequency trading firms include KCG, the result of the merger between Getco and Knight Capitol,<sup>34</sup> Sun Trading, Jump Trading LLC, Virtu Financial, XR Trading, and Hudson River Trading.<sup>35</sup>

High-frequency traders also participate in the U.S. Treasury market and foreign currency markets. High regulation has deterred Wall Street banks from “making markets in U.S. government bonds,” and as a direct result, high-frequency traders have stepped in to fill the void.<sup>36</sup> In regards to foreign currency markets, banks stepped back from their active participation in “foreign-exchange sales and trading headcount” after a recent scandal resulting in about ten-billion dollars of fines for “currency price-rigging.”<sup>37</sup> Yet again high-frequency traders, such as Citadel, Virtu, Jump, Global Trading Systems LLC, and KCG, were there to fill the vacuum left behind by the major banks.<sup>38</sup>

There are even college students participating in high-frequency trading and profiting from such ventures.<sup>39</sup> Quantopian, an algorithmic investing website, hosted a competition challenging its participants to write trading programs, the winner of which would win one-hundred-thousand dollars.<sup>40</sup> A university student from Texas won the competition, boasting a one and a half percent portfolio increase “against an eight percent slump in the S&P 500 equity index.”<sup>41</sup>

### C. The Race to “Latency Zero”<sup>42</sup>

In an industry where milliseconds might as well be an eternity the ever-growing need for faster and faster technology pushes financial professionals to the brink. Recently, firms such as Metamko L.P. have developed “switches,” devices that take four nanoseconds

<sup>32</sup> *Id.*

<sup>33</sup> *Id.*

<sup>34</sup> *Id.*

<sup>35</sup> Paul Clarke, *Want a Job in High Frequency Trading? Here Are the Pay and Job Prospects at 15 Key Firms*, FINANCIAL CAREERS (Oct. 20, 2016), <http://news.efinancialcareers.com/us-en/199934/want-job-high-frequency-trading-pay-career-prospects-15-key-firms>.

<sup>36</sup> Matt Turner, *High-Speed Traders Now Dominate the Most Important Market in the World, and it is Freaking Some People Out*, BUS. INSIDER (Apr. 25, 2016, 12:48 PM), <http://www.businessinsider.com/hft-firms-in-us-treasury-market-2016-4>.

<sup>37</sup> Lananh Nguyen, *High Frequency Traders Elbow Their Way Into the Currency Markets*, BLOOMBERG (Oct. 7, 2016, 10:41 AM), <https://www.bloomberg.com/news/articles/2016-09-12/fastest-guys-in-stocks-are-becoming-a-force-in-currency-markets>.

<sup>38</sup> *Id.*

<sup>39</sup> Chlistalla, *supra* note 29.

<sup>40</sup> *Id.*

<sup>41</sup> *Id.*

<sup>42</sup> *Zero Latency*, BUS. DICTIONARY, <http://www.businessdictionary.com/definition/zero-latency.html> (last visited Apr. 21, 2017). Latency zero is the “situation or state in the development of information technology infrastructure where no time is lost in exchange of information from one interface to another, or where the system responds instantly to an input of information.” *Id.*

(four billionths of a second) to relay a message, used by high-frequency trading firms.<sup>43</sup> This technology operates several times faster than that which is currently implemented by many high-frequency traders.<sup>44</sup>

Currently, around half of the high-frequency traders in the United State use this technology<sup>45</sup>

However, these advantages, like all technology, are only viable for so long and are soon replaced by the next best thing.<sup>46</sup> In order to be competitive, firms always require the newest and fastest technology available, especially “when... talking about latencies in nanoseconds and microseconds” where “a millisecond is an eternity.”<sup>47</sup> High-frequency traders are pioneers of this so-called “hardware acceleration” and continuously push the envelope towards lower latency.<sup>48</sup>

Latency is the “time that elapses from the moment a signal is sent to its receipt,” which is determined by the distance it needs to travel.<sup>49</sup> High-frequency traders strive for the lowest latency possible so as to receive information faster than their competition.<sup>50</sup> Low-latency is achieved through co-location<sup>51</sup> and/or the use of high-tech fiber optic cables, therefore the co-locator will always hold the advantage over a firm located several miles away because their point of presence provides them access to some of the lowest latency possible.<sup>52</sup>

#### D. Why High-Frequency Trading is Good

In late 2016, Mark Cuban, billionaire and “Shark Tank” investor, broadcasted his disdain for high-frequency trading on Twitter by questioning whether “[the average investor] think[s] the stock market is safer today than it was ten years ago.”<sup>53</sup> The simple answer to his question: certainly. Perhaps his grudge towards the SEC has swayed his opinion on the subject matter, regardless, he is unnecessarily casting doubt upon a stable system.<sup>54</sup> Since the

<sup>43</sup> Vera Sprothen, *Trading Tech Accelerates Towards Speed of Light*, WALL ST. J. (Aug. 8, 2016, 10:27 PM), <http://www.wsj.com/articles/trading-tech-accelerates-toward-speed-of-light-1470559173>.

<sup>44</sup> *Id.*

<sup>45</sup> *Id.*

<sup>46</sup> See generally Mitchell Hall, *Inside Wall Street's High-Frequency Trading Technology Arms Race*, PC MAGAZINE (Sept. 25, 2013), <http://www.pcmag.com/article2/0,2817,2424495,00.asp>.

<sup>47</sup> *Id.*

<sup>48</sup> *Id.*

<sup>49</sup> Picardo, *supra* note 14.

<sup>50</sup> *Id.*

<sup>51</sup> *Id.* Co-location is when high-frequency traders house their computers on the same premises as an exchange's computer servers. *Id.* Exchanges charge co-locaters several million dollars for this service. *Id.* Due to the high demand for co-location and in an effort to make more money, many exchanges have expanded their data centers. *Id.* For example, the New York Stock Exchange's old data center was 46,000 square feet while their new data center in Mahwah, New Jersey is 398,000 square feet. *Id.*

<sup>52</sup> *Id.*

<sup>53</sup> Jacob Pramuk, *Mark Cuban Unleashes on High-Frequency Trading*, CNBC (Oct. 16, 2015, 2:56 PM), <http://www.cnbc.com/2015/10/16/mark-cuban-unleashes-on-high-frequency-trading.html>.

<sup>54</sup> *SEC v. Cuban*, 620 F.3d 551, 552 (2010). The SEC brought suit against Mark Cuban alleging he violated §17(a) of the Securities Act of 1933, §10b of the Securities Exchange Act of 1934, and Rule 10b-5 for breaching his duty to abstain from trading in Mamma.com stock, which the SEC argued amounted to insider trading. *Id.* at 552.

creation of the first stock markets there have always been traders seeking to get an edge over their competition and anticipate their next move, by no means is it tied to the rise of high-frequency trading.<sup>55</sup>

Due to its novelty, the overall understanding of high-frequency trading and its benefits have only recently come to light.<sup>56</sup> Academic critics have attributed high-frequency trading to reduced trading costs and improved market depth and stability.<sup>57</sup> An analysis of the orders and executions made on NASDAQ prove high-frequency trading improves the quality of the market by narrowing bid-ask spreads<sup>58</sup> and reducing short-term swings.<sup>59</sup> Further, the large amount of trades executed by high-frequency traders increases market liquidity and enhances order flow.<sup>60</sup>

There are two major ways high-frequency traders add liquidity to the marketplace. First, they do this by acting as market-makers,<sup>61</sup> by placing limit orders on both sides of the spectrum, and by simultaneously providing liquidity to traders seeking to trade.<sup>62</sup> Exchanges operating a maker-taker model<sup>63</sup> for “subsidizing the provision of stock liquidity” compensate traders who place limit orders with rebates when their order is executed for contributing liquidity to the stock.<sup>64</sup> Most high-frequency traders strategize to capture as many rebates as possible.<sup>65</sup> Even when traders earn the bid-ask spread by buying at bid and selling at ask they profit through the liquidity rebates.<sup>66</sup> Market-makers need to update their quotes constantly in order to keep up with price changes or they otherwise risk losing money.<sup>67</sup> Their high-speed

<sup>55</sup> Jeff Cox, *Why High-Speed Trade Doesn't Really Matter to You*, CNBC (Apr. 2, 2014, 1:52 PM), <http://www.cnbc.com/2014/04/02/why-high-speed-trade-doesnt-really-matter-to-you.html>.

<sup>56</sup> *Id.*

<sup>57</sup> Camila Russo, *Wall Street's Speed Demons Are Heroes*, BLOOMBERG (Oct. 26, 2016, 4:00 AM), <http://www.bloomberg.com/news/articles/2016-10-26/ignore-the-anti-hft-crowd-wall-street-s-speed-demons-are-heroes>.

<sup>58</sup> See *Bid-Ask Spread*, INVESTOPEDIA, <http://www.investopedia.com/terms/b/bid-askspread.asp>. The bid-ask spread is the difference between the lowest price a seller is asking and the highest price a buyer is willing to pay. See also Glenn Curtis, *Don't Get Burned by the Bid-Ask Spread*, FORBES (Apr. 12, 2008), [https://www.forbes.com/2008/04/12/bid-ask-spread-pf-education-in\\_gc\\_0412investopedia\\_inl.html](https://www.forbes.com/2008/04/12/bid-ask-spread-pf-education-in_gc_0412investopedia_inl.html).

<sup>59</sup> Russo, *supra* note 57.

<sup>60</sup> Prableen Bajpai, *How the Retail Investor Profits from High Frequency Trading*, INVESTOPEDIA (Sept. 17, 2014, 8:01 PM), <http://www.investopedia.com/articles/active-trading/091714/how-retail-investor-profits-high-frequency-trading.asp>.

<sup>61</sup> *Market Maker*, SEC (Mar. 17, 2000), <https://www.sec.gov/fast-answers/answersmktmakerhtm.html>. A market-maker is a firm, which buys and sells stocks “on a regular and continuous basis at a publicly quoted price.” *Id.*

<sup>62</sup> Prableen Bajpai, *Is Liquidity Improved By High Frequency Trading (HFT)?*, INVESTOPEDIA (May 5, 2015, 5:20 PM), <http://www.investopedia.com/articles/active-trading/050515/liquidity-improved-high-frequency-trading-hft.asp>.

<sup>63</sup> Andrew Bloomenthal, *What Maker-Taker Fees Mean to You*, INVESTOPEDIA, <http://www.investopedia.com/articles/active-trading/042414/what-maker-taker-fees-mean-to-you.asp> (last visited Apr. 4, 2017). The maker-taker model is a rebate pricing system, which offers rebates to market-makers, those who provide liquidity to the market, while charging those who take liquidity from the market as a way to “facilitate trading.” *Id.*

<sup>64</sup> Picardo, *supra* note 14.

<sup>65</sup> *Id.*

<sup>66</sup> Bajpai, *supra* note 62.

<sup>67</sup> *Id.*

capabilities allow them to keep a steady stream of accurate quotes.<sup>68</sup> This results in the narrowing of bid-ask spreads and the frequent as well as accurate updating of stock prices, which reduces the cost of trading.<sup>69</sup> Further, this promotes market efficiency because “the prices quickly and accurately reflect all relevant and available market information.”<sup>70</sup> High-frequency trading algorithms are programmed to detect abnormally high or low prices and the way they respond to this naturally “pushes the prices back towards equilibrium.”<sup>71</sup>

Second, high-frequency traders add liquidity to the market because they are able to trade across many platforms for many products, classes, and assets in a cost efficient manner throughout the day.<sup>72</sup> This flexibility allows traders to change their strategy as the day progresses. If one market is not favorable to what they are trading or one asset class is doing poorly they can switch up their strategy, providing liquidity to the market through diversification.<sup>73</sup>

### E. “The Flash Crash”

On May 6, 2010, a series of unsettling economic and political news caused unusually high volatility levels in the marketplace.<sup>74</sup> Hours later the markets nosedived ten percent, however, recovering back to normal by the end of the day.<sup>75</sup> The plunge was caused by a high-frequency trading algorithm gone astray that began trading futures at an unusually rapid rate and creating a “negative feedback loop.”<sup>76</sup>

At first the high-frequency trading firms helped to absorb the sell pressure by buying “e-mini contracts.”<sup>77</sup> Within ten minutes their disposition switched and they began to aggressively sell in order to protect their long term positions.<sup>78</sup> The sell algorithms responded to this demand by upping the rate at which “[they] fed orders into the market, creating a feedback loop.”<sup>79</sup>

The high-frequency trading firms began a game of hot-potato.<sup>80</sup> They were selling, buying, and reselling e-mini contracts to each other, creating vast trade volume with little to no net buying.<sup>81</sup> The effects of this wide scale game of hot-potato rippled across the

<sup>68</sup> *Id.*

<sup>69</sup> Bajpai, *supra* note 60.

<sup>70</sup> *Id.*

<sup>71</sup> Michelle Price, *High-Frequency Trading Shown to Have Positive Impact*, WALL ST. J. (Aug. 17, 2011), <http://www.wsj.com/articles/SB10001424053111903392904576512250007216020>.

<sup>72</sup> Bruno Navarro, *High-Frequency Trading Benefits Investors: Advocate*, CNBC (April 2, 2014, 2:46 PM), <http://www.cnbc.com/2014/04/02/high-frequency-trading-benefits-investors-advocate.html>.

<sup>73</sup> *Id.*

<sup>74</sup> *What Caused the Flash Crash?*, ECONOMIST (Oct. 1, 2010, 6:42 PM), [http://www.economist.com/blogs/newsbook/2010/10/what\\_caused\\_flash\\_crash](http://www.economist.com/blogs/newsbook/2010/10/what_caused_flash_crash).

<sup>75</sup> *Id.*

<sup>76</sup> *Id.*

<sup>77</sup> *Id.* E-minis are “future contracts that track the S&P 500 stock market index,” which are known for their volatility, yet are also loved by “day traders” for their manageability. *Id.*

<sup>78</sup> *Id.*

<sup>79</sup> *Id.*

<sup>80</sup> *Id.*

<sup>81</sup> *Id.*

marketplace, scaring away traditional investors and halting high-frequency traders in their tracks.<sup>82</sup> While some market-makers attempted to make money off this, many other traders withdrew from trading, causing a liquidity crunch.<sup>83</sup> During this moment of crisis, the algorithms and machines neither “fe[lt] obligated to step in” nor attempted to aid the market by providing liquidity when it was most needed.<sup>84</sup> Rather, they abided by their programming and halted all trading.<sup>85</sup> This inherent difference between man and machine is what allowed the flash-crash to occur.<sup>86</sup>

In an attempt to quell any future “flash crashes” from occurring, the SEC created the “limit up-limit down” mechanism, which prevents trading in stocks when prices move past certain price ranges.<sup>87</sup> The “band is set as a percentage level above and below a stock’s average price in the preceding five-minute window.”<sup>88</sup> The limit is set at five percent for stocks that are heavily traded while all others are set at ten percent.<sup>89</sup>

### III. CURRENT STATUS UNDER THE LAW

#### A. Agency Regulation

##### 1. Regulation ATS

In 1998 the SEC introduced Regulation ATS as a way “to protect investors and to resolve any concerns” dealing with alternative trading systems.<sup>90</sup> In order to achieve its goal, Regulation ATS requires alternative trading systems to keep a strict record as well as “intensive reporting on issues such as transparency once the [alternative trading] system reaches more than five percent of the trading volume for any given security.”<sup>91</sup> Regulations ATS defines an alternative trading system as:

“any organization, association, person, group of persons, or system: That constitutes, maintains, or provides a market place or facilities for bringing together purchasers and sellers of securities or for otherwise performing with respect to securities the functions commonly performed by a stock exchange within the meaning of § 240.3b-16 of this chapter; and that does not: set rules governing the conduct of subscribers other than the conduct of such subscribers’ trading on such organization, association, person,

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<sup>82</sup> *Id.* High-frequency trading algorithms are programmed to halt all trading once prices dip below certain thresholds. *Id.*

<sup>83</sup> *Id.*

<sup>84</sup> Matt Egan, *Flash Crash: Could It Happen Again?*, CNN (May 6, 2014, 3:58 PM), <http://money.cnn.com/2014/05/06/investing/flash-crash-anniversary>.

<sup>85</sup> *Id.*

<sup>86</sup> *Id.*

<sup>87</sup> *Id.*

<sup>88</sup> *Id.*

<sup>89</sup> *Id.*

<sup>90</sup> *Alternative Trading Systems – ATS*, INVESTOPEDIA, <http://www.investopedia.com/terms/a/alternative-trading-system.asp>.

<sup>91</sup> *Id.*

group of persons, or system; or discipline subscribers other than by exclusion from trading.”<sup>92</sup>

An alternative trading system must comply with the requirements put forth in Regulation ATS, unless the alternative trading system is:

“registered as an exchange... is exempt... from registration as an exchange based on the limited volume of transactions effected [on the alternative trading system]... is operated by a national securities association... is registered as a broker-dealer.. or is a bank... or limits its securities activities to... government securities... or is exempted... by the Commission.”<sup>93</sup>

These requirements include “a record of subscribers to such alternative trading system,” “daily summaries of trading in the alternative trading system,” and “time-sequenced records of order information in the alternative trading system.”<sup>94</sup> In addition to all of the other recordkeeping requirements of the Securities Exchange Act of 1934, Regulation ATS requires governed alternative trading systems to preserve “in an easily accessible place,” a slew of additional records, including notices provided to subscribers, “standards for access to trading,” and correspondence papers for three years and all partnership or corporation articles, and books for the lifetime of the entity.<sup>95</sup> At the request of the SEC, an alternative trading system must furnish “promptly upon request legible, true, and complete copies of those records that are required to be preserved under this section.”<sup>96</sup>

## 2. Regulation NMS

Congress came together in 1975 to amend the Securities and Exchange Act of 1934 and expand the authority of the SEC.<sup>97</sup> This amendment provided the SEC the power to “facilitate the establishment of a national market system for securities, (“NMS”), to link securities markets nation-wide” so as to “distribute market data economically and equally and to promote fair competition among all market participants.”<sup>98</sup> The SEC was given five factors to guide the establishment of the NMS: “(1) efficiency; (2) fair competition; (3) availability of market data; (4) practicability of order execution in the best market; and (5) the opportunity for an investor’s order to be executed directly, that is, without the participation of a dealer.”<sup>99</sup> Through the SEC’s efforts, “the NMS grew to encompass the securities of over five thousand companies with a collective U.S. market capitalization of more than fourteen trillion dollars.”<sup>100</sup> Currently, NMS stocks are traded across at least one of the nine

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<sup>92</sup> Definitions, 17 C.F.R. §242.300 (2017).

<sup>93</sup> Requirements for Alternative Trading Systems, 17 C.F.R. § 242.301 (2017).

<sup>94</sup> See generally Recordkeeping Requirements for Alternative Trading Systems, 17 C.F.R. § 242.302 (2017).

<sup>95</sup> Record Preservation Requirements for Alternative Trading Systems, 17 C.F.R. § 242.303 (2017).

<sup>96</sup> *Id.*

<sup>97</sup> *NetCoalition v. SEC*, 615 F.3d 525, 528 (D.C. Cir. 2010).

<sup>98</sup> *Id.* at 528 (quoting *Bradford Nat’l Clearing Corp. v. SEC*, 590 F.2d 1085, 1094 (D.C. Cir. 1978)).

<sup>99</sup> *Id.* at 528.

<sup>100</sup> *Id.* at 528.

participating national exchanges<sup>101</sup> “as well as at non-exchange trading sites like alternative trading systems,” “electronic communication networks,” and “market-making securities dealers.”<sup>102</sup>

The most innovative aspect of the NMS is its consolidation of market data from all of these exchanges into “core” market data available to all investors.<sup>103</sup> Regulation NMS requires each exchange “to report last sales and the current best bid and offer to... central data processors for consolidation” so that every investor can obtain core market data “for each NMS security.”<sup>104</sup> This information is then provided to broker-dealers and data vendors to provide investors with a “reliable source of information for the best prices in NMS stocks,” including “real-time access to the best quotations and most recent trades.”<sup>105</sup>

Under Regulation NMS’ order protection rule, trading centers must prevent trade-throughs “of protected quotations in NMS stocks” not subject to exceptions.<sup>106</sup> Trade-throughs are trades executed at prices below “protected quotations.”<sup>107</sup> Further, Regulation NMS demands “fair and non-discriminatory access to quotations,” “a limit on access fees” so as to harmonize “pricing of quotations across different trading centers,” and that SROs “prohibit their members from engaging in a pattern or practice of displaying quotations that lock or cross protected quotations.”<sup>108</sup>

## B. The Securities and Exchange Commission’s View

The SEC, through public statements made by Chair Mary Jo White, during her tenure, adopted a philosophy of procrastination when it came to high-frequency trading. At the June 2014, Global Exchange and Brokerage Conference in New York, Chair White acknowledged that the nature of trading has transformed due to the dominance of algorithmic trading in equity markets.<sup>109</sup> Chair White produced empirical evidence proving that investors are doing better in today’s algorithmic marketplace as opposed to yesterday’s manual marketplace.<sup>110</sup> However, she acknowledged that this heightened state of the market comes at a cost, heightened volatility.<sup>111</sup> For institutional investors, high-frequency trading lowered the price of executing large block orders by ten percent between 2006 and 2013.<sup>112</sup> On the other hand, retail investors have been able to reap the rewards of narrower spreads between bid and ask prices.<sup>113</sup> Chair White believes that the above evidence that our “equity markets are strong and generally continue to serve well the interests of both retail and institutional

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<sup>101</sup> *Id.* at 528. These include the New York Stock Exchange, the NASDAQ Stock Market, and NYSE Arca. *Id.*

<sup>102</sup> *Id.* at 528-29.

<sup>103</sup> *Id.* at 529.

<sup>104</sup> *Id.* at 529.

<sup>105</sup> *Id.* at 529 (quoting Regulation NMS, 70 F.R. 37496 (2005)).

<sup>106</sup> Order Protection Rule, 17 C.F.R. 242.611 (2017).

<sup>107</sup> *Response to Frequently Asked Questions Concerning Rule 611 and Rule 610 of Regulation NMS*, SEC (Apr. 4, 2008), <https://www.sec.gov/divisions/marketreg/nmsfaq610-11.htm>.

<sup>108</sup> *Id.*

<sup>109</sup> Mary Jo White, Chair, SEC, *Enhancing Our Equity Market Structure* (June 5, 2014).

<sup>110</sup> *Id.*

<sup>111</sup> *Id.*

<sup>112</sup> *Id.*

<sup>113</sup> *Id.*

investors.”<sup>114</sup> The current market structure is not without issues of its own, according to the Chair.<sup>115</sup> This is because “many market structure rules and industry practices were developed with manual markets in mind.”<sup>116</sup> The main focus of any new regulations should concentrate on “the use of aggressive, destabilizing trading strategies in vulnerable market conditions, when they could most seriously exacerbate price volatility.”<sup>117</sup> Chair White concluded her discussion of high-frequency trading by putting forth two initiatives relating to algorithmic trading.<sup>118</sup> The first initiative was to “clarify the status of unregistered active proprietary traders” while the “second is to address disruptive trading practices that could exacerbate price volatility in vulnerable market conditions.”<sup>119</sup>

Two years later at the Annual Market Structure Conference in Washington, D.C., Chair White reflected on the two initiatives she put forth in her 2014 address regarding high-frequency trading. The data compiled as a result of these initiatives revealed that ten principal trading firms, acting as unregistered government securities dealers, were behind over fifty percent of the trading volume of ten year treasuries while not being subjected to regulation as broker-dealers.<sup>120</sup> Chair White pointed her finger at situations such as the above for the need to create further certainty about registration requirements and the distinction between a trader and a dealer.<sup>121</sup>

These initiatives also revealed how certain traders employ overly aggressive trading strategies during times of market vulnerability, which they induce, for their benefit.<sup>122</sup> She admitted that there is a possibility that high-frequency traders may partake in this strategy as well.<sup>123</sup> These troubling findings prove how it is hard to develop regulatory schemes to curb predatory trading practices without interfering with trading practices that are beneficial to “investors and market efficiency.”<sup>124</sup>

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<sup>114</sup> *Id.*

<sup>115</sup> *Id.*

<sup>116</sup> *Id.*

<sup>117</sup> *Id.*

<sup>118</sup> *Id.*

<sup>119</sup> *Id.*

<sup>120</sup> Mary Jo White, *Equity Market Structure in 2016 and for the Future* (Sept. 14, 2016), <https://corpgov.law.harvard.edu/2016/09/16/equity-market-structure-in-2016-and-for-the-future>.

<sup>121</sup> *Id.*

<sup>122</sup> *Id.* (discussing how principal trading firms and bank dealers work against the interest of investors by “account[ing] for nearly the entire imbalance in aggressive buy orders” leading to “sudden spike[s] in prices,” that the “surge in aggressive demand by these professional traders appears to have increased, rather than reduced, their exposure to the market in the direction of the price moves,” and that this type of trading tends to suggest “a destabilizing short-term trading strategy during a period of market weakness.”) *Id.*

<sup>123</sup> *Id.*

<sup>124</sup> *Id.*

#### IV. THE “BARCLAYS SAGA” AND INTERNATIONAL RESEARCH & REGULATION

##### A. The Barclays Saga

###### 1. Background

As of December 2015, Celent<sup>125</sup> ranked Barclay’s ATS third out of all major electronic order books for best price, third for best price overall, and first for best speed in designated market-makers.<sup>126</sup> Barclay’s numbers parallel prestigious exchanges, such as NASDAQ MC and BX, and IMC-Chicago, and tend to prove its high level of best execution.<sup>127</sup> The accolades do not stop there for Barclays as the company reeled in a cache of awards for its best execution in the past two years. The company’s resume includes Select ISA Provider of the Year and Best Execution Only Stockbroker by ADVFN International Financial Awards 2016, Best Execution Only Stockbroker by Share Awards 2015, and Best Execution Only Stockbroker by ADVFN International Financial Awards 2015.<sup>128</sup>

The duty of best execution requires broker-dealers to seek to obtain for their customers’ “orders [with] the most favorable terms reasonably available under the circumstances.”<sup>129</sup> Other factors that may take precedent over “immediate price and cost considerations” in their capacity to deliver optimal results include the “speed of execution, likelihood of execution and settlement, size and nature of order, market impact, and any other implicit transaction costs.”<sup>130</sup>

###### 2. *People v. Barclays Capital Inc.*

In January 2016, Barclays settled for \$70 million with the SEC and New York State Attorney General, Eric Schneiderman, for misleading their customers about how they handled their dark pool orders.<sup>131</sup> According to the complaint, Barclays falsified marketed “material purporting to show the extent and type of high-frequency trading in its dark pool . . . [as well

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<sup>125</sup> *Execution Quality in the NYSE Market*, CELENT (Dec. 2, 2015), <http://celent.com/reports/execution-quality-nyse-market-12>. Celent is an organization dedicated to analyzing and researching best execution quality in the NYSE market. *Id.* In order to determine best execution in the NYSE market, Celent analyzed “over thirty-seven billion orders over the period of July 1, 2015 to September 30, 2015” and then “measure[ed] and rank[ed] ninety market participants according to their execution speed and prices obtained for incoming orders.” *Id.*

<sup>126</sup> *Id.*

<sup>127</sup> *Id.*

<sup>128</sup> *Best Execution Only Stockbroker*, BARCLAYS, <https://www.barclaysstockbrokers.co.uk/Accounts/MarketMaster/pages/execution-only-broker.aspx> (last visited Apr. 23, 2017).

<sup>129</sup> *Zola v. TD Ameritrade, Inc.*, 2016 U.S. Dist. LEXIS 37803, at \*31-32 (D. Neb. Mar. 23, 2016) (quoting *Last Atlantis Capital LLC v. AGS Special Partners*, 749 F. Supp 2d. 828, 832 (N.D. Ill. 2010)).

<sup>130</sup> *Best Execution – How We Execute Client Orders*, BARCLAYS (Sept. 2015), <https://wealth.barclays.com/content/dam/bwpublic/global/documents/general/terms-and-conditions/best-execution-policy.pdf>.

<sup>131</sup> Keri Geiger & Sam Mamudi, *Barclays, Credit Suisse Agree to Dark Pools Settlements*, BLOOMBERG (Jan. 31, 2016, 10:46 PM), <https://www.bloomberg.com/news/articles/2016-01-31/barclays-credit-suisse-to-pay-154-3-million-in-dark-pool-deals>.

as] the percentage of aggressive high-frequency trading activity in its dark pool.”<sup>132</sup> Further, the complaint alleged Barclays “rout[ed] a disproportionately high percentage of client orders to its own dark pool” and “marketed its dark pool to institutional investors as offering protection from high-frequency traders” while “secretly [giving] high-frequency trading firms informational and other advantages over other clients trading in the dark pool.” In essence, Barclays designed its dark pool as a way for high-frequency traders to greatly profit based on their informational advantage of market movement within the dark pool and superior technology.<sup>133</sup>

Barclay’s dark pool, like most, is “unlit,”<sup>134</sup> and by design attracts only the “largest and most sophisticated securities traders.”<sup>135</sup> Dark pools are a form of alternative trading systems operating similarly to stock exchanges.<sup>136</sup> As their name suggests, dark pools are meant to be dark, and under federal securities regulations they are not required to “disclose trade data in real time.”<sup>137</sup> Highly sophisticated securities traders prefer dark pools because their large orders will not affect the market by moving prices before “the trade is fully executed.”<sup>138</sup> Hence the term dark, meaning the size and price of their orders are unknown to other participants.<sup>139</sup> In turn the other participants are unsure of when to adjust their prices accordingly.<sup>140</sup> This allows market participants to make a large purchase without revealing their hand to competitors who could push the stock price up.<sup>141</sup> Dark pools are subject to Regulation NMS as broker-dealers registered with the SEC and the Financial Industry Regulatory Authority.<sup>142</sup> The Barclay’s court found that the type of fraud alleged in this case was by “highly sophisticated financial experts” against “highly sophisticated financial experts.”<sup>143</sup> Therefore, materiality can’t “be viewed from the perspective of a layperson,” rather “the information must be something that a trader at an institutional investor would find to be material.”<sup>144</sup>

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<sup>132</sup> Complaint for Petitioner at 2-4, *People v. Barclays Capital, Inc.*, 1 N.Y.S.3d. 910, 912 (Sup. Ct., N.Y. 2015), [https://ag.ny.gov/pdfs/Barclays\\_complaint\\_as\\_filed\\_June\\_25\\_2014.pdf](https://ag.ny.gov/pdfs/Barclays_complaint_as_filed_June_25_2014.pdf).

<sup>133</sup> Sam Mamudi, *Dark Pools*, BLOOMBERG (Feb. 1, 2016, 5:30 PM), <https://www.bloomberg.com/quicktake/dark-pools>.

<sup>134</sup> *People v. Barclays Capital Inc.*, 1 N.Y.S.3d. 910, 912 (Sup. Ct., N.Y. 2015). Sophisticated investors prefer exchanges that are unlit as opposed to lit, where data regarding orders instantaneously goes public, because the market may turn against the investor using an algorithm to make a large order. *Id.* at 912. Such large orders often need to be broken down and made across multiple exchanges. *Id.* at 912. The market will react to the first processed order and move against the investor, making his orders to be placed across the other markets less profitable. *Id.* at 912.

<sup>135</sup> *Id.* at 912.

<sup>136</sup> D. Keith Ross, *10 Things People Don’t Get About Dark Pools: Ross*, CNBC (Feb. 2, 2013, 4:15 PM), <http://www.cnbc.com/id/100424690>.

<sup>137</sup> *Barclays Capital Inc.*, 1 N.Y.S.D. at 912.

<sup>138</sup> *Id.* at 912

<sup>139</sup> Ross, *supra* note 136.

<sup>140</sup> *Id.*

<sup>141</sup> Nathaniel Popper, *As Markets Heat Up, Trading Slips Into Shadows*, N.Y. TIMES (Mar. 31, 2013), <http://www.nytimes.com/2013/04/01/business/as-market-heats-up-trading-slips-into-shadows.html>.

<sup>142</sup> Ross, *supra* note 136.

<sup>143</sup> *Barclays Capital Inc.*, 1 N.Y.S.D. at 912.

<sup>144</sup> *Id.* at 912.

The Supreme Court of New York denied defendant's motion to dismiss Attorney General Schneiderman's original complaint "based on the inapplicability of the Martin Act."<sup>145</sup> Materiality<sup>146</sup> is "an essential element of a Martin Act claim," and as with common law fraud, immaterial representations effecting investment choices are not actionable.<sup>147</sup> Barclays attempted to persuade the Court that the scope of the Martin Act "is limited to misrepresentation[s] that impact an investor's decision to trade a particular security" to no avail.<sup>148</sup> Instead, the Court determined that the decision about where to execute a trade is an investment decision because "trading decisions can be inexorably linked to the venue in which the trade occurs" due to that venue's impact on "the profitability of a trade based on timing and counterparty."<sup>149</sup> The investors' decisions to trade on Barclay's alternative trading system was deemed to be an investment decision because these investors, made up of "mutual funds, pension funds, [and] retail investors trading from home," sought to trade on this alternative trading system to "minimize their exposure to [high-frequency trading]."<sup>150</sup> Barclay's offer of protection from high-frequency traders was a farce.

### 3. *In re Barclays Liquidity Cross & High-Frequency Trading Litigation*

Michael Lewis' book, *Flash Boys: A Wall Street Revolt*, incited a twenty-first century witch hunt against high-frequency traders and the alternative trading systems they operate on.<sup>151</sup> Within a handful of months of his story lining the shelves of bookstores around the country, various investors brought four different suits in the Southern District of New York against seven<sup>152</sup> different alternative trading systems "as well as Barclays PLC and Barclays Capital Inc.," claiming these exchanges violated the Securities Exchange Act of 1934.<sup>153</sup> These suits were consolidated in a multidistrict litigation,<sup>154</sup> *In re Barclays Liquidity Cross & High-Frequency Trading Litigation*. The various investors ("SDNY Plaintiffs") alleged that these Exchanges engaged in manipulative schemes in which they allowed high-frequency traders to exploit ordinary investors trading on their exchanges in return for the large amount of trading volume high-frequency traders conduct on their trading platforms.<sup>155</sup> SDNY Plaintiffs argued that the Exchanges, desperate for an increase in trading volume, and,

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<sup>145</sup> *Id.* at 912.

<sup>146</sup> *Id.* at 915 (quoting *People v. Bank of NY Mellon Corp.*, 977 N.Y.S.2d 668 at \*13). The test for materiality under New York law "is whether defendant's representations, taken together and in context, would have [misled] a reasonable investor about the nature of the investment." *Id.* at 915.

<sup>147</sup> *Id.* at 915.

<sup>148</sup> *Id.*

<sup>149</sup> *Id.* at 916.

<sup>150</sup> *Id.*

<sup>151</sup> *In re Barclays Liquidity Cross & High Frequency Trading Litig.*, 126 F. Supp. 3d 342, 347 (S.D.N.Y. 2015).

<sup>152</sup> *Id.* at 347. The seven stock exchanges were BATS Global Markets, Inc., Chicago Stock Exchange, Inc., Direct Edge ECN, LLC, the NASDAQ Stock Market LLC, NASDAQ OMX BX, Inc., New York Stock exchange, LLC, and NYSE Arca, Inc. *Id.* at 347.

<sup>153</sup> *Id.* at 347.

<sup>154</sup> *Multidistrict Litigation*, CORNELL, [https://www.law.cornell.edu/wex/multidistrict\\_litigation](https://www.law.cornell.edu/wex/multidistrict_litigation). Multidistrict litigation is a form of case management where overly complex civil cases "involving one or more common questions of fact" are consolidated to one federal district court. *Id.*

<sup>155</sup> *In re Barclays Liquidity Cross*, 126 F. Supp. 3d at 354.

thereby, higher profits, turned to high-frequency traders.<sup>156</sup> In exchange for their business, the Exchanges allegedly “offer[ed] products, such as proprietary feeds, and co-location” so as to “shave minute fractions of a second off the time it takes to receive and respond to information from the Exchanges.”<sup>157</sup> This offer catered directly to the wants and needs of high-frequency traders who flourish off of time reduction. In order to make the deal even sweeter, the Exchanges priced these services at “exorbitantly high rates” so that “they were worthwhile only for high-frequency trading firms” and were “thus de facto limited to those firms.”<sup>158</sup> SDNY Plaintiffs further alleged that these Exchanges kept all of this a secret from ordinary investors, who were also unaware of order types, which they allege, were designed to “allow the [high-frequency] traders to further exploit their speed advantage over ordinary investors.”<sup>159</sup>

The claims, ultimately dismissed by the court for failure to state a claim,<sup>160</sup> alleged a violation of Section 10(b) of the Exchange Act and Rule 10b-5.<sup>161</sup> The elements of a Rule 10b-5 cause of action are “manipulative acts,” “damages,” “caused by reliance on an assumption of an efficient market free of manipulation,” “scienter,”<sup>162</sup> “in connection with the purchase or sale of securities,” and “furthered by the defendant’s use of the mails or any facility of a national securities exchange.”<sup>163</sup> The Court held that SDNY Plaintiff’s argument, that the Exchange’s “co-location services and proprietary data feeds” amounted to a manipulative act<sup>164</sup> by the Exchanges failed.<sup>165</sup> In fact the Court found that rather than conceal or misrepresent the availability of such services the Exchanges did the exact opposite, making this information available to the public and having both services “publicly approved by the SEC.”<sup>166</sup> SDNY Plaintiffs’ theory of manipulation, that “proprietary data feeds and co-location services gave traders who paid a premium the ability to access (and act on) data more quickly than others,” “fail[ed] to explain how merely enabling a party to react more quickly to information can constitute a manipulative act” where the services are known to the public and readily available for any customer to use, provided they have the adequate funds.<sup>167</sup>

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<sup>156</sup> *Id.* at 354.

<sup>157</sup> *Id.*

<sup>158</sup> *Id.*

<sup>159</sup> *Id.*

<sup>160</sup> *Id.* at 360.

<sup>161</sup> *Id.* at 360 (quoting Manipulative and Deceptive Devices, 15 U.S.C. §78j(b) (LEXIS 2016)). Under Section 10(b) it is “unlawful ‘to use or employ, in connection with the purchase or sale of any security... any manipulative or deceptive device or contrivance in contravention of... rules and regulations’” “as the Commission may prescribe as necessary or appropriate in the public interest or for the protection of investors.” *Id.* at 360.

<sup>162</sup> *Scienter*, MERRIAM-WEBSTER DICTIONARY, <https://www.merriam-webster.com/legal/scienter>.

*Scienter* is defined as “knowledge of the nature of one’s act or omission or of the nature of something in one’s possession that is often a necessary element of an offense” but is also defined as “a mental state in fraud (as in securities fraud) that is characterized by an intent to deceive, manipulate, or defraud.” *Id.*

<sup>163</sup> *In re Barclays Liquidity Cross*, 126 F. Supp. 3d at 361.

<sup>164</sup> *Id.* at 361 (quoting *ATSI Commc’ns, Inc. v. Shaar Fund, Ltd.*, 493 F.3d 87, 100 (2d Cir. 2007)). A manipulative act “is... any act... that has such an ‘artificial’ effect on the price of a security.” *Id.* at 361.

<sup>165</sup> *Id.* at 361.

<sup>166</sup> *Id.*

<sup>167</sup> *Id.* at 362.

The Court then turned to SDNY Plaintiff's complaint against Barclays, which it once again found insufficient for failure to state a claim because SDNY Plaintiffs failed to "identify any manipulative acts on which they reasonably relied."<sup>168</sup> Barclays allegedly "perpetrated a manipulative or fraudulent scheme to exploit ordinary investors trading in its dark pool."<sup>169</sup> SDNY Plaintiffs argue that Barclays did so by providing high-frequency traders with "non-public information regarding transactions in the dark pool" as well as "undermining various protections for ordinary investors using its dark pool."<sup>170</sup> Due to the co-location services offered by Barclays, SDNY Plaintiffs believed that Barclays misrepresented the safety of its dark pool and put them in a position "trading on worse terms in the dark pool than they would have in a fair and unmanipulated market."<sup>171</sup>

Despite Barclay's liquidity profile override, the Court found that SDNY Plaintiffs' claim "failed to plead that Barclay's committed any manipulative acts."<sup>172</sup> Barclays allegedly turned off this override to give certain high-frequency trading firms a less aggressive appearance, thereby making them more attractive to trade with and so as to prevent investors from getting scared away.<sup>173</sup> However, SDNY Plaintiffs failed to "explain how the overrides themselves could have affected the price at which securities traded in the dark pool."<sup>174</sup> While these overrides mixed with the high-frequency traders' co-location and information on the "logic of the servers operating the dark pools" may have provided high-frequency traders with much greater capabilities than its competition, allowing them to trade at faster speeds, SDNY Plaintiffs yet again fail to proffer a reason how this could have "artificially affected the prices at which securities traded in the dark pool."<sup>175</sup> Further, SDNY Plaintiffs failed to allege reasonable reliance and were unable to invoke either the fraud-on-the-market presumption or the "*Affiliated Ute* presumption" because they could point to neither a statement that "affected the price at which they decided to trade" nor an omission of material information.<sup>176</sup>

SDNY Plaintiffs were not the only ones potentially harmed by Barclays. Great Pacific Securities ("Great Pacific") sued Barclays under California law alleging the tort of concealment,<sup>177</sup> and violation of California's False Advertising Law and Unfair Competition Law.<sup>178</sup> Great Pacific's concealment claim is based on Barclay's alleged failure "to disclose

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<sup>168</sup> *Id.* at 363.

<sup>169</sup> *Id.*

<sup>170</sup> *Id.* at 363.

<sup>171</sup> *Id.*

<sup>172</sup> *Id.* at 364.

<sup>173</sup> *Id.* at 363-64.

<sup>174</sup> *Id.* at 363-64.

<sup>175</sup> *Id.* at 365.

<sup>176</sup> *Id.*

<sup>177</sup> *Id.* at 367 (citing *Lovejoy v. AT&T Corp.*, 92 Cal. App. 4th 85, 96 (2001)). Under California law, a tort of concealment claim requires: "(1) the defendant must have concealed or suppressed a material fact; (2) the defendant must have been under a duty to disclose the fact to the plaintiff; (3) the defendant must have intentionally concealed or suppressed the fact with the intent to defraud the plaintiff; (4) the plaintiff must have been unaware of the fact and would not have acted as he did if he had known of the concealed or suppressed fact; and (5) as a result of the concealment or suppression of the fact, the plaintiff must have sustained damage." *Id.* at 367.

<sup>178</sup> *Id.* at 367.

the amount of aggressive trading in its dark pool,<sup>179</sup> that it was actively recruiting high-frequency trading firms to trade in its dark pool,<sup>180</sup> and the significant limitations<sup>181</sup> of Liquidity Profiling.”<sup>182</sup> Similarly to SDNY Plaintiff’s deficient complaint, the Court found that Great Pacific’s complaint failed to state a cause of action and granted the Defendants’ motion to dismiss.<sup>183</sup> However, the Court did grant Great Pacific four weeks to amend its second complaint so as to gather sufficient facts to establish a plausible claim.<sup>184</sup>

## B. The International Community’s Take on High-Frequency Trading

### 1. Background

The legality surrounding high-frequency trading and its alleged predatory nature is not only a domestic issue faced by broker-dealers, regulators, and investors in the United States, but also a matter for international concern. The very same questions and doubts regarding high-frequency trading domestically have been put to the test by members of the international community, including the European Union, the United Kingdom, and Japan. As evidenced below, opponents of high-frequency trading continuously fail to prove that it is inherently bad for the marketplace.

### 2. Research

Taken in conjunction, the Barclays Saga and *Flash Boys* beg the question of whether the United States, through the SEC or some other governmental agency, should dedicate further resources into researching and studying the effects of high-frequency trading. However, such an effort would be a waste of time while the international community already conducted a plethora of research into the topic.

In the United Kingdom, the Financial Conduct Authority (“FCA”) responded to public outcries claiming that high-frequency traders “can predict when orders are going to arrive at different trading venues and trade in advance of slower traders by exploiting their

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<sup>179</sup> *Id.* at 368-69. Great Pacific argued that Barclays failed to disclose the amount of aggressive trading in its dark pool because it distributed misleading promotional materials tending to show that aggressive trading made up only a small fraction of all trades and by not disclosing the true level of aggressive trading. *Id.* at 368-69. The Court found that Great Pacific could not establish why the promotional materials were misleading and that the lack of a set definition of aggressive trading makes it hard to quantify. *Id.* at 368-69.

<sup>180</sup> *Id.* at 370. Great Pacific failed to adequately plead reasonable reliance on Barclay’s alleged active recruitment of high-frequency traders to its dark pool. *Id.* at 370. Instead, the only argument Plaintiff could muster was that it would have acted differently if it had known said facts. *Id.* at 370. This argument failed to bridge the causal nexus between Barclay’s omission and Plaintiff’s market activity. *Id.* at 370.

<sup>181</sup> *Id.* at 371-72. Great Pacific’s final theory of concealment in regards to liquidity profiling also fails because of Plaintiff’s inability to adequately plead reasonable reliance. *Id.* at 371-72. Plaintiff argued that it relied on liquidity profiling when deciding when to trade in dark pools so as to avoid predatory traders. *Id.* at 372. However, this argument fails because Barclay’s was able to prove liquidity profiling was never intended to remove or limit predatory trading from dark pools. *Id.* at 372. The Court found that Great Pacific’s alleged reliance was unreasonable as a matter of law. *Id.* at 372.

<sup>182</sup> *Id.* at 367.

<sup>183</sup> *Id.* at 372.

<sup>184</sup> *Id.* at 375.

speed advantage,” by investigating whether this type of behavior occurs on a regular basis.<sup>185</sup> These critics infer that high-frequency traders profit without risk through the advantage of latency arbitrage.<sup>186</sup> The FCA concluded that there was no evidence that high-frequency traders systemically “exploit their small latency advantages to anticipate orders arriving in very quick succession at different trading venues from other market participants.”<sup>187</sup> According to the FCA, there is no way these traders “can see the true market” and jump in front of other market participants.<sup>188</sup> There is a strong correlation between their findings and the “physical characteristics of the UK market.”<sup>189</sup> In the United Kingdom, all trading platforms are located within a few miles of London, and each other, therefore communication between venues is extremely fast.<sup>190</sup> Order routing is harder to predict in the UK market compared to the United States due to regulatory structure.<sup>191</sup>

Despite finding that high-frequency traders are able to anticipate order flow over an extended amount of time, the FCA was not able to conclude whether this was due to anticipating order flow or the ability of these traders to react faster to new information.<sup>192</sup> Further, the FCA observed that the order flows of non-high-frequency traders are predictable.<sup>193</sup> The FCA explained how their findings do not apply to “the anticipatory behavior of society as a whole” because the effects of such behavior depend on the specifics of the order flow.<sup>194</sup> High-frequency traders, according to the FCA, are not the only market participants who “engage in [anticipatory] behavior.”<sup>195</sup>

The United Kingdom is not the only nation to vet high-frequency trading. The rising volume of high-frequency trading in Japan,<sup>196</sup> which accounted for approximately seventy percent of all orders placed at the Tokyo Stock Exchange in 2016, coerced the Japanese government to direct the Financial Services Agency (“FSA”), Japan’s equivalent to the United States’ Securities and Exchange Commission, to develop some sort of oversight

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<sup>185</sup> Matteo Aquilina & Carla Ysusi, *Occasional Paper No. 16: Are High-Frequency Traders Anticipating the Order Flow? Cross-venue Evidence From the UK Market*, FIN. CONDUCT AUTH. (Apr. 2016), <https://www.fca.org.uk/publications/occasional-papers/occasional-paper-no-16-are-high-frequency-traders-anticipating-order>.

<sup>186</sup> *Id.* at 3.

<sup>187</sup> *Id.* at 3.

<sup>188</sup> *Id.*

<sup>189</sup> *Id.*

<sup>190</sup> *Id.*

<sup>191</sup> Aquilina & Ysusi, *supra* note 185.

<sup>192</sup> *Id.*

<sup>193</sup> *Id.*

<sup>194</sup> *Id.*

<sup>195</sup> *Id.*

<sup>196</sup> Yuji Nakamura, *Humans Lose Out as Robots Take Tokyo Stock Exchange*, BLOOMBERG TECHNOLOGY (Mar. 4, 2015 11:56 PM), <https://www.bloomberg.com/news/articles/2015-03-05/robots-take-tokyo-as-high-frequency-equity-infiltration-hits-70>. Securities regulation in Japan and the United States is inherently different. *Id.* In Japan, more than ninety percent of all stock trading happens in one place, the Tokyo Stock Exchange. *Id.* In contrast, the United States stock market is highly fragmented with upwards of fifty different venues to trade on. *Id.* Absent from Japanese trading floors is the maker-taker system present in the United States. *Id.* Japanese exchanges do not operate the American fee and rebate system, which may misalign broker incentives and push them away from their client’s best interests. *Id.*

over these traders.<sup>197</sup> During a “working group” discussing high-frequency trading, the FSA explained that they believe “it is not appropriate to eliminate all algorithmic fast trading from the Japanese market as it includes the kind that contributes to smooth market transactions.”<sup>198</sup> A different working group discovered that “the ratio of make trading value in total [high-frequency trading] value is approximately sixty percent, making up the majority of overall trading value.”<sup>199</sup> Many of these orders were within “four ticks of the [best bid offer] when compared with conventional orders... were not executed immediately, and provided liquidity.”<sup>200</sup> The results of their research led the working group to conclude that high-frequency trading “provides liquidity to the market.”<sup>201</sup>

### 3. Regulation

In late April 2016, the European Union, through the European Commission’s adoption of MiFID II, took a crucial step forward in revamping the regulation of its financial markets by publishing a set of standards on high-frequency trading.<sup>202</sup> The publication defines high-frequency trading as “at least two messages per second with respect to any single financial instrument traded on a trading venue” and “at least four messages per second with respect to all financial instruments traded on a trading venue.”<sup>203</sup> This definition as well as the rest of MiFID II will not be effectuated until sometime in 2018.<sup>204</sup>

High-frequency trading firms, as defined under MiFID II, will be subject to new reporting requirements.<sup>205</sup> These requirements include storing the “details of their trading algorithms for at least five years and tagging outgoing trades with thirty-four fields of information.”<sup>206</sup> Further, any high-frequency trading firm who is a member of an exchange or trades on one “via a broker’s sponsored access model,” must be both licensed and authorized.<sup>207</sup>

Over in Japan, the FSA is currently working to create a registration system for high-frequency traders not unlike the one recently proposed in the European Union.<sup>208</sup> Under the proposed rule, every registered high-frequency trader will be given an identification number,

<sup>197</sup> Taiga Uranaka & Takahiko Wada, *Japan to Tighten Regulations on High-Frequency Traders*, REUTERS (Oct. 19, 2016, 1:25 AM), <http://www.reuters.com/article/japan-regulations-hft-idUSL4N1CPIY1>.

<sup>198</sup> *Id.*

<sup>199</sup> Go Hasaka, *Analysis of High-Frequency Trading at Tokyo Stock Exchange 27* (Tokyo Stock Exchange, JPX Working Paper Vol. 04, Mar. 2014).

<sup>200</sup> *Id.* at 27.

<sup>201</sup> *Id.*

<sup>202</sup> Julia-Ambra Verlaine, *High-Frequency Trading Standards Moves EU Market Revamp Forward*, BLOOMBERG (Apr. 25, 2016, 12:35 PM), <https://www.bloomberg.com/news/articles/2016-04-25/high-frequency-trading-standard-moves-eu-market-revamp-forward>. MiFID II stands for Markets in Financial Instruments Directive. *Id.*

<sup>203</sup> *Id.*

<sup>204</sup> *Id.* Proponents of MiFID II believe that the rules must be perfected before they are adopted, otherwise they may be undermined. *Id.*

<sup>205</sup> Tim Cave, *EU Regulators Agree on Definition of HFT*, FIN. NEWS (Apr. 28, 2016, 8:11 PM), <https://www.finlondon.com/articles/eu-regulators-agree-on-definition-of-hft-20160425>.

<sup>206</sup> *Id.*

<sup>207</sup> *Id.*

<sup>208</sup> *Japan Bourse Operator to Track High-Frequency Traders*, NIKKEI: ASIAN REV. (Nov. 22, 2016, 2:00 AM), <http://asia.nikkei.com/Markets/Tokyo-Market/Japan-bourse-operator-to-track-high-frequency-traders>.

which will be used to track their orders without having to overly rely on brokerages.<sup>209</sup> In order to enforce compliance, the proposed rule will ban brokerages from taking orders from unregistered high-frequency traders.<sup>210</sup> Further, brokerages will not be able to trade with high-frequency traders without a “proper risk management mechanism.”<sup>211</sup> This is to ensure that these traders are able to block any errant orders from processing and wreaking havoc across Japan’s exchanges.<sup>212</sup> The FSA proposed one final countermeasure to ensure market security. They will require high-frequency traders to keep detailed records of their transactions, which will enable the authorities to respond quickly and knowledgeably to any issues that might occur.<sup>213</sup>

Further, the Tokyo Stock Exchange charges a small fee on stock orders, regardless of whether they are executed; in order to curb ping-pong as well as rapid-fire posting and cancelling of buy and sell orders.<sup>214</sup> Critics of ping-pong in the United States argue that it destabilizes the market.<sup>215</sup> In Japan, the small fee acts a deterrent because it prevents high-frequency traders from sending out a “ton of orders.”<sup>216</sup>

Lastly, in September 2016, the FCA passed new regulations in the United Kingdom to “embed a culture of personal responsibility within the banking sector” by holding high-frequency trading firms accountable for any financial misconduct by their employees.<sup>217</sup> This rule is an attempt to improve “individual accountability” for those who carry out algorithmic and high-frequency trading.<sup>218</sup>

As made evident above, none of the stated countries promulgated regulations that would severely hinder high-frequency trading. Their research makes it clear that they do not view high-frequency trading as a threat to the marketplace and acknowledge that it is a key part to any economy. The United States would benefit from following the footsteps of the European Union and defining high-frequency trading. Once high-frequency trading is adequately defined, it will no longer be viewed as mysterious and unknown. Similarly, the United States would benefit from a proper risk management system, such as the one proposed in Japan, in order to prevent any future “flash crashes.”

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<sup>209</sup> *Id.*

<sup>210</sup> *Japan to Tighten Oversight of High-Frequency Trading*, NIKKEI: ASIAN REV. (Oct. 20, 2016, 12:17 AM), <http://asia.nikkei.com/Politics-Economy/Policy-Politics/Japan-to-tighten-oversight-of-high-frequency-trading>.

<sup>211</sup> *Id.*

<sup>212</sup> *Id.*

<sup>213</sup> *Id.*

<sup>214</sup> Nakamura, *supra* note 196.

<sup>215</sup> *Id.*

<sup>216</sup> *Id.*

<sup>217</sup> Chad Bray, *High Speed Traders in Britain Subject to New Accountability Rules*, N.Y. TIMES (Feb. 4, 2016), [http://www.nytimes.com/2016/02/05/business/dealbook/britain-financial-conduct-authority-rules.html?ref=collection%2Ftimestopic%2FHigh-Frequency%20Trading&action=click&contentCollection=timestopics&region=stream&module=stream\\_unit&version=latest&contentPlacement=1&pgtype=collection](http://www.nytimes.com/2016/02/05/business/dealbook/britain-financial-conduct-authority-rules.html?ref=collection%2Ftimestopic%2FHigh-Frequency%20Trading&action=click&contentCollection=timestopics&region=stream&module=stream_unit&version=latest&contentPlacement=1&pgtype=collection).

<sup>218</sup> Press Release, Fin. Conduct Auth., *FCA Confirms Accountability Rules For Wholesale Traders and Interim Rules on Regulatory References* (Apr. 19, 2016), <https://www.fca.org.uk/news/press-releases/fca-confirms-accountability-rules-wholesale-traders-and-interim-rules-regulatory>.

## V. CONCLUSION

The hour is upon the Securities and Exchange Commission to take an official stance on high-frequency trading. Since the 2014 publication of *Flash Boys: A Wall Street Revolt*, people have casted their doubts upon the integrity of the U.S. stock market, viewing it as a rigged game. Of course Michael Lewis is at fault for most of this doubt after having painted such a convoluted picture.<sup>219</sup> As he described it, high-frequency traders are members of an exclusive club, deriving its enormous value from its inherent exclusivity. Perhaps these points were once true, several years ago while he was writing *Flash Boys: A Wall Street Revolt*. However, the picture he painted of a premier country club made up of the biggest and wealthiest Wall Street players monopolizing high speed connectivity is no longer accurate. As previously put forth, around seventy percent of all U.S. market activity is conducted by high-frequency trading.<sup>220</sup> There is no feasible manner to remove such a massive pillar of our markets without a destructive end. Instead of fearing high-frequency trading as “a bane on market integrity,”<sup>221</sup> the time has come to fully embrace it. This is why the SEC must abide by its strategic objective to educate investors and publish an informative release detailing, discussing, and defining high-frequency trading.<sup>222</sup>

In its release, the SEC should enumerate the various benefits brought about by high-frequency trading, such as reduced trading costs, improved market depth and stability, narrower bid-ask spreads, added liquidity, and reduced short-term swings.<sup>223</sup> The SEC should discuss that while high-frequency trading is not inherently predatory, market participants may exploit its benefits at the cost of other investors.<sup>224</sup> Predatory practices are prevalent in the marketplace regardless.<sup>225</sup> Further, the SEC should clarify that high-frequency traders do not compete with the general public due to the inherent difference between trading and investing, rather that they compete against each other.<sup>226</sup>

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<sup>219</sup> LEWIS, *supra* note 28, at 31-32. In Chapter 2: Brad’s Problem, Michael Lewis discussed how Brad Katsuyama, a trader for the Royal Bank of Canada at the time, first realized something was wrong. *Id.* at 31. Brad explained that as he placed his order for Solelectron shares “the share price instantly moved” and that it was “almost as if the market read his mind” or “as if someone knew what he was trying to do and was reacting to his desire to sell before he had fully expressed it.” *Id.* at 31-32.

<sup>220</sup> *College Kids are Now High-Frequency Trading From Dorm Rooms*, *supra* note 30.

<sup>221</sup> Jeremy Schara, *Knowledge is Salvation: Informing Investors by Regulating Disclosures to Safeguard Best Execution*, 43 HOFSTRA L. REV. 1231, 1270 (2015). While I mostly concur with my colleague’s, Jeremy Schara’s, opinions regarding high-frequency trading, I believe that his solution is inadequate. *Id.* at 1270. He argues that more transparency and “an explicit obligation to market integrity” will “cement [high-frequency trading’s] place in the securities industry while simultaneously providing best execution.” *Id.* at 1270. First, high-frequency trading is already cemented as massive part of our markets. See *College Kids are Now High-Frequency Trading From Dorm Rooms*, *supra* note 30. Further, transparency and promises of market integrity fall short of effectiveness when the government is yet to define high-frequency trading. See generally Bajpai, *supra* note 60 (explaining that the SEC does not have a formal definition of high-frequency trading).

<sup>222</sup> See *Agency and Mission Information*, SEC (2013), <https://www.sec.gov/about/reports/sec-fy2015-agency-mission-information.pdf>; see also *What We Do*, SEC, <https://www.sec.gov/Article/whatwedo.html> (last visited May 16, 2017).

<sup>223</sup> See Russo, *supra* note 57; see also Bajpai, *supra* note 60.

<sup>224</sup> Navarro, *supra* note 72.

<sup>225</sup> *Id.*

<sup>226</sup> *Id.*

A GUIDING LIGHT TO A MORE EFFICIENT MARKET

Several months after the official publication of the informative release the SEC should press forth and promulgate an official rule defining, limiting and, most importantly, blessing high-frequency trading. At the very least, the SEC should take an approach similar to the one taken by the European Union, and define high-frequency trading. The lack of a definition further enhances the general public's view of high-frequency trading as the harbinger of the next financial collapse. Further, the official rule should lay the boundaries between allowable and unallowable conduct by high-frequency traders, preventing any other future "flash crashes" and restoring investor confidence in the marketplace.

High-frequency trading, including the activity of high-frequency traders in alternative trading systems, is not inherently bad. While over aggressiveness and predatory practices can and have led to near disastrous events, such as the "Flash Crash," the benefits of high-frequency trading, namely reduced trading costs, improved market depth and stability, added liquidity to the market, and narrowed bid-ask spreads, greatly outweigh such possibilities. Although high-frequency trading is an integral part of the marketplace, both at home and abroad, only time will prove its aggregate effects on the world's capital markets.

