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Lessons from the Flash Crash for the Regulation of High-Frequency Traders

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Edgar Ortega Barrales

Abstract

Are equity markets vulnerable to a sudden collapse if the traders who account for about half of the volume have no regulatory obligations to stabilize prices? After the “Flash Crash” of May 6, 2010, policymakers have resoundingly answered this question in the affirmative. During the worst of the crash, some of the so-called high-frequency trading firms that dominate equity markets stopped trading and prices collapsed, momentarily wiping out almost \$1 trillion in market value. In response, the U.S. Securities and Exchange Commission is considering whether high-frequency trading firms should be required to act as the traders of last resort. This Note argues that the regulation under consideration would likely result in higher transaction costs without ensuring market liquidity or stability. This Note proposes instead that the largest high-frequency traders be subject to heightened regulatory oversight to ensure fair dealing.

KEYWORDS: Flash Crash, High-Frequency Traders, Regulation, Law, Business, Corporate, Equity, Markets, Traders, SEC, Securities and Exchange Commission

*An earlier version of this Note was the first place winner in the 2011 student writing competition sponsored by the Association of Securities and Exchange Commission Alumni, Inc., as well as the second place winner in the 2011 Mendes Hershman Student Writing Contest, sponsored by the American Bar Association Business Law Section. J.D. Candidate 2012, Fordham University School of Law; B.A. 1999, Amherst College. First and foremost, I am grateful to my wife Kate for her patience and support. I am indebted to Professor Richard Squire for his insights and helpful comments on earlier drafts, and to Professor James Jalil, Nick Baker and Eric Hess for their help in developing this Note.

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Are equity markets vulnerable to a sudden collapse if the traders who account for about half of the volume have no regulatory obligations to stabilize prices? After the “Flash Crash” of May 6, 2010, policymakers have resoundingly answered this question in the affirmative. During the worst of the crash, some of the so-called high-frequency trading firms that dominate equity markets stopped trading and prices collapsed, momentarily wiping out almost \$1 trillion in market value. In response, the U.S. Securities and Exchange Commission is considering whether high-frequency trading firms should be required to act as the traders of last resort. This Note argues that the regulation under consideration would likely result in higher transaction costs without ensuring market liquidity or stability. This Note proposes instead that the largest high-frequency traders be subject to heightened regulatory oversight to ensure fair dealing.

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INTRODUCTION

In twenty minutes on May 6, 2010, stock market investors lost about \$862 billion.¹ Fifteen minutes later, the market had surged back to recover almost all of its losses.² It was the worst intraday point drop on

1. See Nina Mehta, Lynn Thomasson & Paul M. Barrett, *One-Hour Computer Driven Crash Teaches Clarence Woods to Panic*, BLOOMBERG, May 20, 2010.

2. See *Hearing on the Stock Mkt. Plunge Before H. Fin. Servs. Subcomm. on Capital Mkts., Ins., & Gov't Sponsored Enters.*, 111th Cong. (May 11, 2010) [hereinafter *House Hearing*] (testimony of Mary L. Schapiro, Chairman, SEC).

record for the 114-year-old Dow Jones Industrial Average.³ Individual investors who sold their stock during the worst of the panic may have lost more than \$200 million relative to the closing price for the day.⁴ The so-called “Flash Crash” rattled investor confidence, sparking eight consecutive months of withdrawals from U.S. stock mutual funds for a total of almost \$90 billion.⁵ Regulators and investors alike concluded that equity markets had simply failed.⁶

Exchanges are supposed to reduce the cost of searching for the best price by establishing a venue where buyers and sellers meet and

3. See Tom Lauricella & Peter A. McKay, *Dow Takes 1,010.14-Point Trip—Biggest Point Fall, Before a Snapback; Glitch to Blame?*, WALL ST. J., May 7, 2010, at C1.

4. The figure represents “a very conservative estimate” of the losses that individual investors would have incurred if they sold their stock during the worst of the Flash Crash. See Mary L. Schapiro, Chairman, SEC, Remarks at the Economic Club of New York: Strengthening Our Equity Market Structure (Sept. 7, 2010) [hereinafter Schapiro, Strengthening Structure], available at http://sec.gov/news/speech/2010/spch_090710mls.htm. The plunge in stock prices starting at 2:30 p.m. triggered more than \$2 billion in individual investor stop-loss orders, which are orders that instruct a broker to sell a certain number of shares at the prevailing market value if the stock’s price drops below a specified threshold. See *id.* Most of those sales were executed at prices significantly below the closing price, reflecting a loss for the day.

5. See Graham Bowley, *The New Speed of Money, Reshaping Markets*, N.Y. TIMES, Jan. 2, 2011, at B1.

6. See STAFFS OF THE COMMODITY FUTURES & TRADING COMM’N, & THE SEC. & EXCH. COMM’N, PRELIMINARY FINDINGS REGARDING THE MARKET EVENTS OF MAY 6, 2010 (May 18, 2010) [hereinafter PRELIMINARY FINDINGS] (“The temporary nature of the decline in prices in the broader market may be indicative of a failure in liquidity.”); see also Bart Chilton, Comm’r, CFTC, Op-Ed., *Flash Crash Culprit*, MCCLATCHY-TRIB. NEWS SERVICE, Oct. 1, 2010, available at [http://m.southcoasttoday.com/apps/pbcs.dll/article?AID=/20101004/OPINION09/10040303/1/WAP06&template=wapart&m_section=\[10/28/2011%203:32:26%20PM\]](http://m.southcoasttoday.com/apps/pbcs.dll/article?AID=/20101004/OPINION09/10040303/1/WAP06&template=wapart&m_section=[10/28/2011%203:32:26%20PM]) (“The system simply failed.”); Schapiro, Strengthening Structure, *supra* note 4 (“May 6 was clearly a market failure, and it brought to the fore concerns about our equity market structure.”); Tom Lauricella & Scott Patterson, *Legacy of the ‘Flash Crash’: Enduring Worries of Repeat*, WALL ST. J., Aug. 6, 2010, at A1 (quoting John Bogle, founder of the Vanguard Group, as saying: “The whole system failed.”); Mehta, *supra* note 1 (quoting Matthew Andresen, the former head of Citadel Investment Group LLC’s market-making unit, as saying: “Whatever the cause of it . . . the failure mode was unacceptable.”). But see Michael Corkery, *Jim Simons on Flash Crash: High Frequency Traders Saved the Day*, DEAL JOURNAL BLOG, <http://blogs.wsj.com/deals/2010/09/13/jim-simons-on-flash-crash-high-frequency-traders-saved-the-day/> (Sept. 13, 2010, 4:13 PM) (quoting an interview in which Simons, founder of the hedge fund Renaissance Technologies LLC, said that markets “worked beautifully” compared with the 1987 Crash).

compete for trades.⁷ A single meeting place for traders helps develop prices that reflect the relevant information about the underlying economic value of a security.⁸ Yet when needed most on May 6, exchanges failed to provide liquidity at a fair price.⁹ More than 20,000 trades for some 300 securities were cancelled on May 6 because they were executed at “clearly erroneous” prices.¹⁰ Since May 6, there have also been periodic reports of similarly sudden breakdowns in the markets for certain securities.¹¹ Such extreme volatility hinders capital formation by raising the cost of equity capital for companies.¹² As noted by one executive of a company whose shares plummeted on May 6, events like the Flash Crash deter investments in otherwise strong

7. See LARRY HARRIS, *TRADING & EXCHANGES: MARKET MICROSTRUCTURE FOR PRACTITIONERS* 6 (2003).

8. See Eugene Fama, *Efficient Capital Markets: A Review of Theory and Empirical Work*, 25 J. FIN. 383, 383 (1970).

9. The notion of liquidity at a fair price is a hallmark of market regulation throughout the SEC’s history. See, e.g., SEC. & EXCH. COMM’N, *REPORT ON THE FEASIBILITY AND ADVISABILITY OF THE COMPLETE SEGREGATION OF THE FUNCTIONS OF DEALER AND BROKER* 98 (1936) [hereinafter *SEGREGATION STUDY*] (“Liquidity means convertibility into money, but the concept is not to be restricted merely to that quality. . . . [I]t connotes that the price at which conversion can be made is a price not out of line with that deemed appropriate for the commodity.”).

10. See STAFFS OF THE COMMODITY FUTURES & TRADING COMM’N, & THE SEC. & EXCH. COMM’N, *FINDINGS REGARDING THE MARKET EVENTS OF MAY 6, 2010*, at 6 (Sept. 30, 2010) [hereinafter *FINAL FINDINGS*].

11. See, e.g., Matt Kranz, *Mini Flash Crashes Still Worry Traders; A Year After Dow Drop Safeguards Remain an Issue*, U.S.A. TODAY, May 17, 2010, at B3 (citing five examples in 2011); Michelle Price, *Beware of The Mini Flash Crash*, FIN. NEWS, Jan. 11, 2011 (citing research identifying four examples); Graham Bowley, *The Flash Crash, in Miniature*, N.Y. TIMES, Nov. 9, 2010, at B1 (citing two examples). There have also been sudden price collapses and sharp reversals in currency and futures markets. See Carolyn Cui & Tom Lauricella, *Mini ‘Crashes’ Hit Commodity Trade*, WALL ST. J., May 6, 2011, at C1.

12. The volatility of a company’s stock relative to the rest of the market is a key factor in the Capital Asset Pricing Model, which is “the most well-accepted, conceptually pure, method for calculating the cost of equity.” WILLIAM ALLEN, REINIER KRAAKMAN & GUHAN SUBRAMANIAN, *COMMENTARIES AND CASES ON THE LAW OF BUSINESS ORGANIZATIONS* 128 (3d ed. 2009). The model is used to calculate the minimum rate of return an investor demands to hold a company’s stock. In general, an investor demands a higher return for taking the risk of holding a stock that is more volatile than the rest of the market. See generally JEFFREY C. HOOKE, *SECURITY ANALYSIS ON WALL STREET* 225 (1998) (discussing the Capital Asset Pricing Model).

businesses merely because their shares are vulnerable to a market malfunction.¹³

This Note analyzes some of the proposals aimed at preventing another Flash Crash in equity markets. In particular, it examines whether the Securities and Exchange Commission (the “SEC,” or the “Commission”) should require high-frequency trading firms (“HFTs”) to act as the buyers or sellers of last resort.¹⁴ This could entail two kinds of requirements: an affirmative obligation to stand continuously ready to buy and sell a stock, and a negative obligation to refrain from trading in certain circumstances. Currently, only market makers have such obligations.¹⁵

The Commission first suggested these obligations in January 2010, when it issued the Concept Release on Equity Market Structure with three dozen proposals to address issues arising from the growth of electronic trading.¹⁶ The SEC noted that although HFTs dominate equity trading, they can withdraw from the market at any moment since they are not subject to the same obligations as market makers.¹⁷ The SEC also stated that some HFT strategies fuel volatility and may even border on illegal manipulation.¹⁸ Public comments in response to the Concept Release focused on the SEC’s far-reaching proposals to regulate HFTs.¹⁹

13. See Pamela J. Craig, Chief Fin. Officer, Accenture Ltd., Statement Before the Joint CFTC-SEC Advisory Comm. on Emerging Regulatory Issues (Aug. 11, 2010), available at <http://sec.gov/comments/265-26/265-26-29.pdf>.

14. The CFTC and SEC define high-frequency trading firms as hedge funds or broker-dealers that trade for their own account, relying on high-speed computer systems to submit large numbers of orders. Although they pursue a variety of strategies, HFTs generally cancel orders shortly after submission. HFTs also tend to hold investments for very short time frames and finish the day with no economic risk, since they liquidate all positions or establish a hedge. See FINAL FINDINGS, *supra* note 10, at 45; PRELIMINARY FINDINGS, *supra* note 6, app. at A-11.

15. See *infra* Part I.A and B.

16. See Concept Release on Equity Market Structure, Exchange Act Release No. 61,358, 75 Fed. Reg. 3594 (Jan. 21, 2010) [hereinafter Concept Release].

17. *Id.* at 3608.

18. *Id.* at 3608-10.

19. The Concept Release followed a series of congressional inquiries into high-frequency trading in 2009. Starting in July, Sens. Charles Schumer and Ted Kaufman urged the SEC to prohibit practices they claimed benefit HFTs over individual investors. See Geoffrey Rogow, *Senator Seeks Broad SEC Market Study*, WALL ST. J., Aug. 24, 2010, at C3; Charles Duhigg, *Senator Wants Restrictions on High-Speed Trading*, N.Y. TIMES, July 25, 2009, at B6. In October, the Senate Subcommittee on Securities, Insurance and Investment held a hearing to examine whether HFTs had an

The Flash Crash greatly intensified the political pressure on the SEC to rein in HFTs.²⁰

Proponents of imposing market maker obligations on HFTs claim that they would stabilize the market in times of stress.²¹ The proponents also argue that a regime of quoting obligations would subject HFTs to the regulatory supervision they deserve as dominant players in equity markets.²² Critics, however, suggest that the obligations will likely result in higher transaction costs for investors.²³ The debate has now extended to U.S. futures markets and European equity markets as regulators grapple with increased activity by HFTs.²⁴

unfair advantage. As part of the Dodd-Frank Wall Street Reform and Consumer Protection Act, Congress again expressed its concerns by requiring the SEC to study the effect of HFTs in securities markets. *See* Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, § 967(a)(2)(D), 124 Stat. 1376 (2010).

20. *See, e.g.*, Edward E. Kaufman & Carl M. Levin, Op-Ed., *Preventing the Next Flash Crash*, N.Y. TIMES, May 6, 2011, at A27 (“The flash crash should have sounded an alarm. Unfortunately, the regulators are still asleep.”); Jesse Westbrook, Robert Schmidt & Frank Bass, *High-Frequency Traders Lobby, Donate to Head Off U.S. Rules*, BLOOMBERG, Nov. 9, 2010 (quoting Sen. Carl Levin as saying: “Those with powerful computers . . . who exploit our markets to the detriment of long-term investors and the real economy will not be able to do so without a battle from the Senate.”); Letter from Sen. Charles Schumer to Mary L. Schapiro, Chairman, SEC (Aug. 11, 2010) [hereinafter Schumer Letter], available at <http://www.schumer.senate.gov/record.cfm?id=327160&> (“The players in our markets have changed but our regulations have not kept pace.”); Letter from Sen. Ted Kaufman to Mary L. Schapiro, Chairman, SEC (Aug. 5, 2010) [hereinafter Kaufman Letter], available at <http://sec.gov/comments/s7-27-09/s72709-96.pdf> (“[T]he Commission . . . must end the current ‘wild west’ environment of ‘anything goes’ in the microsecond trading world.”).

21. *See, e.g.*, Schapiro, *Strengthening Structure*, *supra* note 4.

22. *See, e.g.*, Mary L. Schapiro, Chairman, SEC, Remarks Before the Security Traders Association (Sept. 22, 2010) [hereinafter Schapiro, Security Traders], available at <http://www.sec.gov/news/speech/2010/spch092210mls.htm> (“[H]igh frequency trading firms have a tremendous capacity to affect the stability and integrity of the equity markets. Currently, however, high frequency trading firms are subject to very little in the way of obligations . . . to refrain from exacerbating price volatility.”).

23. *See, e.g.*, Joint Letter from Liam Connell, Chief Exec. Officer, Allston Trading LLC, Richard B. Gorelick, Chief Exec. Officer, RGM Advisors LLC, Adam Nunes, President, HRT Financial LLC & Cameron Smith, Gen. Counsel, Quantlab Financial LLC, to Robert Cook, Dir., SEC Div. of Trading & Mkts. (Sept. 14, 2010) [hereinafter HFTs’ Letter], available at <http://www.sec.gov/comments/265-26/265-26-39.pdf>.

24. *See, e.g.*, Graham Bowley, *Clamping Down on Rapid Trades in Stock Market*, N.Y. TIMES, Oct. 8, 2011, at A1 (reporting on U.S. and European regulatory efforts to rein in HFTs); Jim Brunsten, *High-Frequency Trades May Face Tougher Regulation in EU Market-Abuse Rules*, BLOOMBERG, Sept. 13, 2011 (reporting that that the European

This Note argues that the SEC should refrain from imposing market maker obligations on HFTs. An affirmative obligation is unwarranted as a means to ensure market liquidity and would likely result in higher trading costs for investors. Imposing such duties would also raise questions of fairness, as these obligations have historically been accompanied with special privileges for market makers. Since the Flash Crash, regulators have taken meaningful steps to protect investors in situations of extraordinary volatility.²⁵ This Note argues that regulators should now focus on ensuring fair dealing by HFTs, instead of on market stability.

Compared with the prior commentary in legal journals, this Note is the first to analyze HFTs in the context of historical trading regulations that for a century have ensured that investors can trade almost whenever they want.²⁶ Part I of this Note traces the evolution of these rules, starting with specialists at the New York Stock Exchange, followed by market makers on the Nasdaq Stock Market. Part I concludes with a detailed analysis of the regulatory obligations and incentives that HFTs have to provide liquidity.

Part II provides an account of the Flash Crash and the SEC's remedial rulemaking since May 6, 2010. This Note differs with prior commentary in suggesting that the SEC has taken bold and effective

Commission is considering banning certain high-frequency strategies); Bart Chilton, Comm'r, CFTC, Speech to the American Soybean Association Legislative Forum: Caging the Financial Cheetahs (July 2, 2011), *available at* <http://www.cftc.gov/PressRoom/SpeechesTestimony/opachilton-50> (arguing that the CFTC should examine HFTs' trading strategies to curb market abuses and address "mini flash crashes" in markets such as silver and natural gas).

25. *See infra* Part II.B. The SEC has also implemented rules that aim to enhance its ability to police for improper trading and to analyze large-scale market disruptions like the Flash Crash. *See* Large Trader Reporting, Exchange Act Release No. 64,976, 76 Fed. Reg. 46,960, 46,963 (Aug. 3, 2011) (noting that the Large Trader obligations will allow the SEC to obtain trading information for HFTs and other significant market participants).

26. For a general overview of some of the regulatory concerns over high-frequency trading, see Tara Bhupathi, *Recent Development: Technology's Latest Market Manipulator? High Frequency Trading: The Strategies, Tools, Risks, and Responses*, 11 N.C. J.L. & TECH. 377, 385-97 (2010). For a comparison of the regulatory response in the U.S., Europe and Asia, see Mi Hyun Yoon, Comment: *Trading in a Flash: Implication of High-Frequency Trading for Securities Regulators Worldwide*, 24 EMORY INT'L L. REV. 913, 937-46 (2010).

steps to safeguard investors.²⁷ Part III is largely based on the comment letters that brokerages and investment firms submitted to the SEC in response to the Concept Release on Equity Market Structure. This Part analyzes three proposed regimes for quoting obligations and argues for an alternative approach focused on ensuring fair dealing by HFTs.

I. THE PLAYERS AND RULES ON MAY 5, 2010

The Flash Crash exposed a weakness in the current structure of equity markets: no one has a strong obligation to buy or sell shares in times of market stress. This section examines the obligations and incentives at work for the two types of traders who could provide such a backstop: market makers and HFTs.

In the 10 years leading up to the Flash Crash, exchange rulebooks had evolved to require very little from market makers. They were obliged to make regularly an offer to buy and sell shares, but the price of those bids and offers could be far removed from the prevailing market.²⁸ In essence, market makers were only nominally required to provide liquidity. Instead, exchanges came to rely on incentives of fractions of a cent to draw a steady stream of bids and offers from market makers, brokerages, and HFTs alike. This system of lax obligations on market makers and incentives available to all worked well enough to handle record volumes during the financial crisis of 2007-2008.²⁹ Yet, on May 6, 2010, it broke down.

This section proceeds in rough chronological order, looking at different regulatory efforts to ensure market liquidity—defined generally as providing buyers and sellers the opportunity to trade

27. See, e.g., Justin Sandler, *The Invisible Power of Machines; Revisiting the Proposed Flash Order Ban in the Wake of the Flash Crash*, 3 DUKE L. & TECH. REV. ¶¶ 28-32 (2011) (arguing that the SEC's measures have failed to address HFTs' unfair trading advantage over other investors); David M. Serritella, *Recent Development: High Speed Trading Begets High Speed Regulation: SEC to Flash Crash, Rash*, 2010 U. ILL. J.L. TECH. & POL'Y 433, 442-3 (arguing that the SEC should have conducted further research before adopting measures to halt trading in situations of extreme volatility).

28. See *infra* notes 122-126 and accompanying text.

29. See Concept Release, *supra* note 16, at 3611 ("The [SEC] notes that, from an operational standpoint, the equity markets performed well during the world-wide financial crisis in the Autumn of 2008 when volume and volatility spiked to record highs.").

whenever they want.³⁰ Part A focuses on NYSE specialist traders, the precursors to modern-day market makers. Part B examines market makers and suggests reasons why regulators consistently imposed weaker obligations on market makers than on specialists. Part C provides an overview of HFTs and their incentives to provide liquidity. Part D shows the extent to which exchange incentives, instead of regulatory obligations, ensure market liquidity today.

A. SPECIALISTS

Although specialists no longer play a role in equities trading, they represent an essential piece in the current debate over market makers and HFTs. Regulators have explicitly noted that principles behind the regulation of specialists may be applicable to HFTs.³¹ As the first class of traders required to risk their own capital for the sake of maintaining a stable market, specialists provide a helpful model.

1. *From Early Idlers to Specialists*

For at least the first 30 years of what is now the NYSE, investors had little expectation of liquidity. Trading volumes were so low before the 1820s that most brokers had to supplement their income by selling lotteries or groceries.³² Someone who only traded securities was considered “an idler or a fool.”³³ By 1830, however, a class of

30. HARRIS, *supra* note 7, at 32. This general definition glosses over three key characteristics of liquidity: the difference in price between bids to buy and offers to sell; the number of shares available for trading at the best bid or offer, which is commonly known as depth; and how quickly a change in prices attracts new bids and offers. See ROBERT A. SCHWARTZ & RETO FRANCONI, EQUITY MARKETS IN ACTION: THE FUNDAMENTALS OF LIQUIDITY, MARKET STRUCTURE & TRADING 60-61 (2004).

31. See Schapiro, Strengthening Structure, *supra* note 4 (“We should consider the relevance today of a basic premise of the old specialist obligations—that the professional trading firms with the best access to the markets . . . should be subject to obligations to trade in ways that support the stability and fairness of the markets.”); Concept Release, *supra* note 16, at 3607, 3610 (seeking comment on whether specialist obligations should apply to HFTs).

32. See ROBERT SOBEL, THE BIG BOARD: A HISTORY OF THE NEW YORK STOCK MARKET 36 (John Wiley & Sons 1965).

33. *Id.* at 25; see also Jerry W. Markham & Daniel J. Harty, *For Whom the Bell Tolls: The Demise of Exchange Trading Floors and the Growth of ECNs*, 33 IOWA J. CORP. L. 865, 869 (2008) (“Average trading volume in 1821 was 300 shares, rising to

professional traders had emerged, in part due to the speculative furor over railroad and canal company stocks.³⁴ Even then, an investor essentially had three options to trade: wait for the twice-daily auctions at the New York Stock & Exchange Board, with no guarantee that buyers or sellers would show;³⁵ search Broad and Hanover streets in lower Manhattan for a dealer, with no guarantee of a fair price;³⁶ or, get an invitation to the evening trading sessions at various New York hotels, where stocks traded into the night.³⁷

Investors developed a different expectation for liquidity by the 1860s. In 1863, traders organized the Open Board of Stock Brokers, which eschewed the daily auctions in favor of continuous trading. From 8:30 a.m. to 5 p.m., traders could meet at specified places in the “Long Room” to buy and sell specific securities.³⁸ The Open Board soon rivaled the then-recently renamed NYSE, and the two markets merged in 1869.³⁹ Within a year, the importance of the daily auctions waned as most volume was handled at the trading posts in the “Long Room.”⁴⁰ Traders who developed an expertise in a stock by hovering around a certain post became known as “specialists.”⁴¹ Now, an investor could avoid some of the sharp practices of the dealers on Broad and Hanover without having to wait for the twice-daily auctions.

1,300 shares a day in 1824 and then declining to an average of 100 shares per day in 1827.”).

34. SOBEL, *supra* note 32, at 40.

35. See CHARLES R. GEISST, WALL STREET: A HISTORY 30 (Oxford Univ. Press 1999) (noting that only 31 shares changed hands at the NYS&EB on March 6, 1830); SOBEL, *supra* note 32, at 44 (noting that even in 1836, at the height of speculation in railroad stocks, trading in some of the NYS&EB’s 98 listed stocks was “irregular”).

36. See SOBEL, *supra* note 32, at 40.

37. *Id.* at 60.

38. *Id.* at 77.

39. *Id.* at 85-86.

40. The auctions were discontinued in 1882. *Id.* at 86.

41. Wall Street lore traces the first specialty back to 1875, when a trader named Boyd broke his leg and remained seated at the post for shares of Western Union, focusing exclusively in that stock. See HARRIS, *supra* note 7, at 509 (citing ROBERT SHARP, THE LORE AND LEGENDS OF WALL STREET 139 (Dow Jones-Irwin 1989)). *But see* SEC. & EXCH. COMM’N, REPORT OF SPECIAL STUDY OF THE SECURITIES MARKETS OF THE SECURITIES AND EXCHANGE COMMISSION pt. 2, 61 (1963) [hereinafter SPECIAL STUDY] (tracing the origin of specialists to the NYSE’s adoption of continuous trading in 1869, although the exact time is unknown).

Specialists were subject to some manner of regulation at least as early as 1910.⁴² The regulation arose because specialists had inherently conflicting roles.⁴³ Specialists served three functions: maintaining, for a particular stock, the book of all pending orders, which they used to pair off buyers and sellers;⁴⁴ acting as a broker for other brokers who entrusted them with a customer's order; and trading for their own account.⁴⁵ This combination enabled a specialist to use his knowledge of pending orders to execute profitable trades at the expense of customer orders.⁴⁶ For example, a specialist could, upon receiving a large order to buy a stock, step ahead of that order and purchase the stock for his own account first.⁴⁷ As a result, the specialist would stand to profit when the execution of the large order pushed up the price of the stock.⁴⁸ One recent SEC chairman bluntly described the "built-in advantage" of specialists in the following way: "It's like being in a card game in which only one of the players gets to see everyone else's hand. Specialists exploit that advantage."⁴⁹ Protecting investors from such abuses has been a central preoccupation of the SEC since its founding.

42. See George T. Simon & Kathryn M. Trkla, *The Regulation of Specialists and Implications for the Future*, 61 BUS. LAW. 217, 230 (2005) (noting that in 1910 the NYSE barred specialists from trading for their own account against a customer's order without the customer's prior consent).

43. See *id.* at 230-31.

44. See BIRL E. SHULTZ, *THE SECURITIES MARKET AND HOW IT WORKS* 119-28 (Harper & Bros. Publishers 1942) (showing samples of a specialist's order book for a security).

45. See HARRIS, *supra* note 7, at 496-514; LOUIS LOSS, JOEL SELIGMAN & TROY A. PAREDES, *SECURITIES REGULATION* vol. 5, 514 (4th ed. 2010) (both noting that specialists served as auctioneer, broker, and dealer).

46. Prior to the Exchange Act, there was "ample evidence" of specialists' manipulative trading. SEGREGATION STUDY, *supra* note 9, at 86.

47. See, e.g., *United States v. Bongiorno*, No. 05 Cr. 390, 2006 U.S. Dist. LEXIS 24830, at *6 (S.D.N.Y. May 1, 2006) (describing charges against seven specialists for trading ahead of investors during the period January 1999 through April 2003).

48. *Id.*

49. ARTHUR LEVITT & PAULA DWYER, *TAKE ON THE STREET: HOW TO FIGHT FOR YOUR FINANCIAL FUTURE* 191 (Vintage Books 2002).

2. *Stringent Curbs and Affirmative Obligations*

Congressional hearings leading up to the Securities Exchange Act of 1934⁵⁰ dwelled on allegations that specialists exploited their knowledge of the order book to trade for their own accounts.⁵¹ The initial draft of the Exchange Act prohibited specialists from trading for their own accounts altogether.⁵² The final Exchange Act was only a little more forgiving. Congress instructed the newly founded SEC to establish rules that would limit a specialist's trading for his own account to situations where it was "reasonably necessary to permit him to maintain a fair and orderly market."⁵³ This provision, the SEC explained in 1936, subjected a specialist to "stringent control" and allowed him "only sufficient latitude in his personal trading" to engage in those activities that provide "a useful service to the market."⁵⁴

These restrictions show that the Exchange Act was premised on the idea that fair dealing was more important than liquidity. Congress and the SEC imposed a negative obligation precisely because it would crimp specialist trading.⁵⁵ Indeed, the SEC explicitly interpreted Section 11(b) of the Exchange Act to require that *each* trade be justified as necessary to maintain an orderly market.⁵⁶ This construction, known as the Saperstein Interpretation, is noteworthy since it was adopted despite SEC findings a year earlier that specialists helped mitigate price swings

50. Securities Exchange Act of 1934, as amended, 15 U.S.C. §§ 78a-78nn (2006) [hereinafter Exchange Act].

51. See Simon & Trkla, *supra* note 42, at 232-238 (describing the findings of congressional reports); JOEL SELIGMAN, THE TRANSFORMATION OF WALL STREET 74 (3d ed. 2003) [hereinafter SELIGMAN, TRANSFORMATION] ("Throughout the Pecora Hearings, allegations were made repeatedly that specialists . . . exploited their knowledge of the specialist books in trading for their own accounts.").

52. See SELIGMAN, TRANSFORMATION, *supra* note 51, at 86.

53. Pub. L. No. 73- 291, §11 (b), 48 Stat. 881 (1934) (codified as amended at 15 U.S.C. § 78k (2006)). Although the SEC never adopted such rules, it pushed the exchanges to amend their rulebooks. See SEGREGATION STUDY, *supra* note 9, at 60-64 (describing 16 exchange rules that were originally formulated by the SEC).

54. SEGREGATION STUDY, *supra* note 9, at 63.

55. See *id.* at 101 ("[O]veremphasis upon liquidity in our stock markets is fraught with grave dangers to our economic system; . . . a certain amount of speculative activity contributes to liquidity, but an excessive amount may precipitate results which militate against . . . stability.").

56. See Exchange Act Release No. 1117, 1937 SEC LEXIS 357 (Mar. 30, 1937) [hereinafter Saperstein Interpretation].

and played a pivotal role in providing liquidity in less active stocks.⁵⁷ Despite the benefits of specialists' dealing, SEC regulation was at first solely an obligation to refrain from trading.

The SEC only formally came to recognize specialists' affirmative obligation to trade in 1964, with the adoption of Rule 11b-1.⁵⁸ The rule mandates specialists to "assist in the maintenance, so far as practicable, of a fair and orderly market," among other requirements.⁵⁹ At first, the rule only applied to the NYSE and the American Stock Exchange, leaving exempt the eight other smaller exchanges in operation at the time.⁶⁰ Whereas the Saperstein Interpretation imposed a restriction out of concern for trading abuses, Rule 11b-1 conscripted specialists to maintain an orderly market by requiring them to risk their own capital as the price for their otherwise privileged position.

The SEC justified the shift on three factors. First, specialists now effectively enjoyed a monopoly compared to 1933, when a third of NYSE-listed stocks had more than one specialist.⁶¹ In the past, specialists vied for business from brokers by standing ready to trade at all times and providing competitive prices.⁶² Without competition,

57. See SEGREGATION STUDY, *supra* note 9, at 41-42. The interpretation is named after its author David Saperstein, then-director of the Division of Markets and Trading. The Segregation Study—written by Saperstein as well—also found that exchange rules adopted in 1934 had curbed abusive trading by specialists. *Id.* at 86.

58. See Simon & Trkla, *supra* note 42, at 298-300 (describing the history of Rule 11b-1).

59. 17 C.F.R. § 240.11b-1(a)(2)(ii) (2011).

60. See Regulation of Specialists, Exchange Act Release No. 7465, 29 Fed. Reg. 15,862, 15,863 (Nov. 26, 1964). In 1981, the SEC applied the rule to the exempt markets, but only for trading in the few stocks that were listed at those markets. See Final Rules on Regulation of Specialists, Exchange Act Release No. 17,574, 46 Fed. Reg. 15,134 (Mar. 4, 1981). Rule 11b-1 is, therefore, of limited applicability to exchanges other than the NYSE and Amex.

61. See Notice of Proposed Rule Making Related to Securities Specialists, Exchange Act Release No. 7432, 29 Fed. Reg. 13,777, 13,777 (Oct. 6, 1964) ("The absence of competing specialists makes an effective system of regulation and surveillance particularly important."); SEC. & EXCH. COMM'N, REPORT ON THE PRACTICE OF PREFERENCING PURSUANT TO SECTION 510(C) OF THE NAT'L SEC. MARKET IMPROVEMENT ACT OF 1996 pt. I.A.1a (1997).

62. See *id.*; SPECIAL STUDY, *supra* note 41, pt. 2 at 62 ("[T]he cornerstone of the conventional argument that the specialist has an economic incentive to deal for his own account is that, by providing a liquid market and preventing unreasonable price fluctuations, the specialist will be favored with increased commission business.").

however, specialists had fewer incentives to provide aggressive quotes.⁶³ The lack of competition allowed them to trade profitably for their own account 87.9% of the time.⁶⁴

Second, specialist trading had come to exhibit none of the salutary qualities identified in prior SEC studies.⁶⁵ By the time Rule 11b-1 was adopted, specialists used most of their capital to trade only active issues.⁶⁶ For inactive stocks, specialists often posted only nominal quotes with prices far away from the prevailing market.⁶⁷ To address this, the SEC forced the NYSE to amend its rulebook to require that quotes be “reasonable.”⁶⁸

Third, it had become clear that the Saperstein Interpretation was inadequate to foster market stability.⁶⁹ The Interpretation generally allowed specialists to trade in two situations: if it would minimize temporary disparities between supply and demand for a stock; or if it would promote price continuity, meaning that it would reduce the difference in price between successive transactions.⁷⁰ Prior to 1964, the NYSE deemed that a specialist had fulfilled his obligation if he had responded to an imbalance with successively priced quotes, each for a small number of shares.⁷¹ The problem with this approach was illustrated during the Market Break of 1962, when the Dow average had what at the time was its second-worst point drop in one day.⁷² During the Market Break, the small trades that specialists provided under their price continuity obligations failed to absorb the wave of orders to sell.⁷³ As a result of Rule 11b-1, the NYSE amended its rulebook to require

63. SPECIAL STUDY, *supra* note 41, pt. 2 at 87.

64. *Id.* at 83.

65. *See id.* at 61-64.

66. *Id.*

67. *Id.* at 86-87.

68. Notice of Proposed Rule Making Related to Securities Specialists, Exchange Act Release No. 7432, 29 Fed. Reg. 13,777, 13,778 (Oct. 6, 1964). The SEC characterized the NYSE’s various rule amendments proposed concurrent with the adoption of Rule 11b-1 as an “integrated regulatory program.” *Id.* at 13,777.

69. *See* SPECIAL STUDY, *supra* note 41, pt. 2 at 163.

70. *See* Saperstein Interpretation, *supra* note 56, at *4.

71. *See* Notice of Proposed Rule Making Related to Securities Specialists, *supra* note 68, at 13,778.

72. *See generally* SPECIAL STUDY, *supra* note 41, pt. 2 at 110-65 (evaluating specialists performance during the Market Break).

73. *See id.* at 164 (“During the May 1962 market-break, specialists as a group did not have a significant stabilizing effect on the market . . .”).

that specialists provide quotes for a reasonable number of shares.⁷⁴ In essence, the NYSE was required to add quote size as a third element to the Saperstein conception of an orderly market, which was originally based on small imbalances and price continuity.⁷⁵

With Rule 11b-1, the SEC moved specialist regulation beyond its original proscriptive stance. In the 1930s, regulators had assumed that specialists would provide liquidity to earn a profit, and instead focused on protecting investors from abusive practices. In contrast, Rule 11b-1 was predicated on the recognition that the incentives of specialists were skewed by their monopoly in a stock, which allowed them to earn a consistent profit without taking on much risk.⁷⁶ In exchange for this privileged position, Rule 11b-1 imposed on specialists an obligation to maintain a stable and orderly market.⁷⁷

This broad principle behind Rule 11b-1 informs current calls to regulate HFTs. For example, SEC Chairman Mary Schapiro has suggested that since HFTs have “the best access” to the market, they should also be required to trade in a way that fosters market stability.⁷⁸ I examine whether the analogy between specialists and HFTs is appropriate in Part C, after first reviewing regulations for market makers, the successors to specialists in providing liquidity.

74. See Notice of Proposed Rule Making Related to Securities Specialists, *supra* note 68, at 13,778.

75. Quote size is sometimes referred to as market depth. See, e.g., Van der Moolen Specialists USA, Exchange Act Release No. 49,502, 2004 WL 626564, at *2 (Mar. 30, 2004) (“An orderly market is characterized by regular reliable operations, with price continuity and depth in which price movements are accompanied by appropriate volume, and unreasonable price variations between sales are avoided.”).

76. See SPECIAL STUDY, *supra* note 41, pt. 2 at 126. In justifying the quote depth requirement, the SEC noted:

There is no doubt that by providing depth in both good markets and bad, the specialist is more likely to . . . increase his risk. However, the business of the specialist is not an unrewarding one. A responsibility to provide continuity with depth is the reasonable concomitant to the many privileges specialists enjoy.

Id.

77. *Id.* at 127-28 (“[T]he privileges enjoyed by the specialist are compatible with the statutory scheme only if his duties to the public investor are not terminable at will but continue reasonably through good markets and bad, through profitable and unprofitable periods.”).

78. See Schapiro, Strengthening Structure, *supra* note 4.

B. MARKET MAKERS

The SEC recently observed that HFTs have largely replaced specialists and market makers as liquidity providers, but without the same regulatory obligations.⁷⁹ Although correct, the statement suggests a misleadingly simple regulatory response, namely to impose the traditional market maker obligations on the HFTs who now perform that function. The difficulty is that market makers historically have had only a minimal duty to assist in maintaining a stable market.

This section provides a historical overview of the development of market maker regulation. From the 1930s and to this day, the SEC has imposed significantly looser obligations on market makers than on specialists. The SEC has consistently reasoned that there is a smaller need for stringent regulation because market makers lack the special privileges of specialists. As a result, market makers have never been required to inject their trading interest to help damp price swings. Indeed, by May 5, 2010, market makers were hardly required to stand always ready to trade. Thus, extending the market maker obligations in force on May 5 to HFTs would be insufficient to safeguard liquidity in times of market stress.

1. Market Makers Before and After Nasdaq

In general, market makers are firms that announce their willingness to both buy and sell a security for their own account by regularly providing quotes.⁸⁰ Starting in 1911 and continuing through the 1960s, market makers submitted their quotes to the National Quotation Bureau, a private company that published a daily booklet known simply as “The Sheets” with quotes from 1000 to 1300 firms.⁸¹ The Sheets were the only comprehensive source of information on prices for securities traded in the over-the-counter market.⁸² In the SEC’s opinion, market makers

79. See *Hearing Examining the Causes and Lessons of May 6 Before the S. Subcomm. on Sec., Ins., & Inv.*, 111th Cong. (May 20, 2010) [hereinafter *Senate Hearing*] (testimony of Mary L. Schapiro, Chairman, SEC); *House Hearing*, *supra* note 2 (testimony of Mary L. Schapiro, Chairman, SEC); Concept Release, *supra* note 16, at 3607-8.

80. HARRIS, *supra* note 7, at 280; SCHWARTZ & FRANCONI, *supra* note 30, at 15.

81. CHRIS WELLS, *THE LAST DAYS OF THE CLUB* 284-85 (E.P. Dutton & Co. 1975).

82. See generally SPECIAL STUDY, *supra* note 41, pt. 2 at 546-57 (providing the first systematic overview of the over-the-counter market and the role of market

played a “particularly important” role in this setting because they risked their own capital to provide liquidity in securities that might otherwise trade infrequently, particularly in times of market stress.⁸³ Through the 1960s, market makers had broad discretion over which securities they quoted and the prices of those quotes.⁸⁴

In 1971, the National Association of Securities Dealers (“NASD”)⁸⁵ displaced The Sheets with its own electronic service to collect and disseminate quotes. The NASD, which regulated the OTC market, initially aimed to police against fraudulent quotes.⁸⁶ The immediate effect, however, was to fuel a rise in trading volume since the NASD’s Automated Quotation service (“Nasdaq”) provided more timely quotes than The Sheets.⁸⁷ Prices also became more competitive as easier access to quotes made market makers more responsive.⁸⁸

The NASD eventually used its control of the quotation service to impose, in effect, affirmative obligations on market makers. The Nasdaq required market makers to maintain quotes to both buy and sell a security at a price that was “reasonably related to the market.”⁸⁹ In addition, the bid price to buy a stock had to be within a certain range of the price of the offer to sell.⁹⁰ Although the range was quite wide by

makers). In 1935, OTC volume represented 14% of trading on all exchanges. By 1961, OTC volume had grown to about 61% of exchange volume. *See id.* at 547.

83. *See id.* at 554.

84. *Id.* at 563 (“Broker-dealers have complete freedom to commence or terminate making an over-the-counter market for any security, including any security listed on an exchange, for any reason and regardless of their relationship to the issue or the issuer.”).

85. In 2007, the NASD changed its name to the Financial Industry Regulatory Authority, Inc. (“FINRA”) as a result of its consolidation with the member firm regulation functions of the NYSE. *See* Order Approving Proposed Rule Change to the NASD By-Laws, Exchange Act Release No. 56,145, 72 Fed. Reg. 42,169 (Aug. 1, 2007).

86. The National Quotation Service had no authority over brokerages and took minimal steps to ensure the integrity of the published quotes. In 1963, the SEC found that The Sheets included “case after case” of quotations submitted with the purpose of manipulating prices. *See* SPECIAL STUDY, *supra* note 41, pt. 2 at 663–64.

87. *See* Simon & Trkla, *supra* note 42, at 306.

88. *Id.*

89. *See* Notice of Proposed Rule Change by NASD relating to Schedule D of the NASD By-Laws, Exchange Act Release No. 24,579, 52 Fed. Reg. 23,117 (June 17, 1987).

90. *Id.*

current standards, it represented a significant change from the 1960s, when the difference would often exceed 20%.⁹¹

In addition, with the 1975 Amendments to the Exchange Act,⁹² market makers were required to provide a “regular or continuous” quote.⁹³ Two years later, SEC Rule 11Ac1-1 required quotes to be “firm,” meaning that market makers had to stand willing to execute the trade at the quoted price or better.⁹⁴ Taken as a whole, the Nasdaq requirements and the 1975 Amendments meant that market makers had to stand ready to buy and sell a stock at a price reasonably related to the market at all times.

This affirmative obligation pales in comparison with that on specialists, who had a duty, on a trade-by-trade basis, to minimize order imbalances, provide price continuity, and submit quotes of a reasonable size.⁹⁵ Whereas specialists had an obligation to respond to conditions that would lead to sudden price swings, market makers had only a general responsibility to remain in the market.

The SEC has repeatedly justified the different regulatory regimes for specialists and market makers on the ground that the latter had no special privileges. Whereas specialists maintained the order book, market makers viewed quotes on equal terms with other broker-dealers.⁹⁶ While specialists enjoyed a monopoly, market makers had to

91. In 1961, the typical OTC stock had a price of \$3-\$10 and a spread in the range of 5% to 7.5%. However, stocks priced under \$3 had, on average, a spread of between 20% to 40%. By 1986, the maximum allowable spread on Nasdaq for a stock under \$3 could be as low as 8.4%. *See* SPECIAL STUDY, *supra* note 41, pt. 2 at 680; NASD, Notice to Members 86-55, Request for Comments on Proposed Revisions to Schedule D (July 30, 1986).

92. Securities Acts Amendments of 1975, Pub. L. 94-29, 89 Stat. 97 (1975) [hereinafter 1975 Amendments].

93. 15 U.S.C. § 78c(a)(38) (2006) (defining a market maker as any person who “holds himself out (by entering quotations in an inter-dealer communications system or otherwise) as being willing to buy and sell such security for his own account on a regular or continuous basis.”).

94. 17 C.F.R. § 240.11Ac1-1 (c)(2) (2011).

95. *See supra* notes 58-75 and accompanying text.

96. *See, e.g.*, Order Granting Accelerated Approval to NYSE Propose Rule Change that Would Phase Out Specialists, Exchange Act Release No. 58,845, 73 Fed. Reg. 64,379, 64,380 (Oct. 29, 2008) (eliminating specialists’ privileged “look” of incoming orders and creating market makers).

compete to trade their specialty stocks.⁹⁷ In the SEC's view, competition among market makers served as a deterrent for abusive practices and spurred market makers to provide better prices.⁹⁸ Stringent regulation was unnecessary since market makers who regularly failed to provide the best prices would lose business.⁹⁹ Thus, Rule 11b-1 did not apply to market makers, meaning they were not required to inject their trading interest to help damp price swings.

2. Intermediate Trading Obligations

As the OTC market grew to rival exchange trading in the 1980s, regulators adopted a more restrictive approach. Ultimately, market makers ended up with an intermediate set of obligations: more demanding than the pre-Nasdaq regime, but not as stringent as Rule 11b-1. This model most closely resembles the regulatory framework for market makers on U.S. stock exchanges today.¹⁰⁰

Increased investor participation on Nasdaq during the 1980s and 1990s made the SEC sensitive to market maker conflicts of interest. Firms were both trading for their own account and handling customer orders with few regulatory safeguards.¹⁰¹ Worse still, a 1994 investigation showed that market makers colluded to set artificially wide spreads for stocks.¹⁰²

As a result, the SEC imposed negative obligations on market makers in a series of rules adopted between 1994 and 1996. The first, known as the Manning Rule, bars market makers from trading ahead of

97. Even today, there must be at least three market makers for a security to be listed on Nasdaq. *See* Nasdaq R. 4310(c); NORMAN S. POSER & JAMES A. FANTO, *BROKER-DEALER LAW AND REGULATION* 3-36 (4th ed. 2010 & Supp. 2011).

98. *See* Adoption of Rule 19c-1 Governing Off-Board Trading by Members of National Securities Exchanges, Exchange Act Release No. 11,942, 41 Fed. Reg. 4,507, 4,512 (Jan. 30, 1976).

99. *See* SEC. & EXCH. COMM'N, REPORT PURSUANT TO SECTION 21(a) OF THE SECURITIES EXCHANGE ACT OF 1934 REGARDING THE NASD AND THE NASDAQ MARKET pt. IV.A (1996); *see also* SELIGMAN, *TRANSFORMATION*, *supra* note 51, at 488 (noting that, during the 1970s, the SEC came to believe that market maker competition was likely to provide better executions for investors than SEC regulation, or exchange regulation of specialists).

100. *See infra* Part I.D.

101. *See* REPORT REGARDING THE NASD AND THE NASDAQ MARKET, *supra* note 99, pt. VI.A.

102. *See id.* at pt. I (summarizing findings of the SEC's investigation).

certain customer orders.¹⁰³ The rule stemmed from a complaint against a brokerage firm by an investor named William Manning.¹⁰⁴ Manning had submitted a “limit order” that instructed the firm to sell a stock for a minimum price.¹⁰⁵ But when the sale opportunity presented itself, the broker instead sold shares from its own account, and was unable to execute Manning’s trade before the stock price fell.¹⁰⁶ The NASD held that the broker’s conduct was inconsistent with NASD rules of fair practice.¹⁰⁷ The NASD reasoned that the firm, as a fiduciary, was required to subordinate its interests to those of its customers, unless its self-interest was fully disclosed.¹⁰⁸

The SEC eventually extended this protection to *all* investor limit orders, not just those that a firm handled on behalf of its customers.¹⁰⁹ The SEC noted that federal securities laws afforded investors greater protections than the typical fiduciary relationship.¹¹⁰ In the SEC’s view, “a stricter duty may be imposed where, as here, the principals are investors and the agents control access to the trading markets.”¹¹¹ Accordingly, market makers have an obligation to refrain from executing a trade that would deprive investors of the opportunity to buy or sell a stock at their specified price.¹¹² In short, market markets have to yield to *all* investor limit orders.

The Order Handling Rules of 1996 went a step further in an effort to remedy the findings of the price-fixing investigation.¹¹³ Typically, market makers held customer orders for a few seconds while they

103. See NASD IM-2110-2(a) (superseded in September 2011 by FINRA R. 5320); Nasdaq R. IM-2110-2.

104. See *E.F. Hutton & Co.*, 49 S.E.C. 829, 1988 LEXIS 1398 (July 6, 1988).

105. A limit order instructs a broker to trade at the best price available, but only if it is no worse than a specified limit price. In contrast, a market order instructs the broker to trade at the best price available. HARRIS, *supra* note 7, at 11; *E.F. Hutton*, 49 S.E.C. at 830.

106. See *E.F. Hutton*, 49 S.E.C. at 830.

107. *Id.* at 835.

108. See *id.* at 836 (David S. Ruder, Chairman, SEC, concurring).

109. See Order Approving Proposed Rule Change Relating to Limit Order Protection on Nasdaq, Exchange Act Release No. 35,751, 60 Fed. Reg. 27,997, 28,001 (May 26, 1995).

110. See *id.* at 28,000.

111. *Id.*

112. *Id.*

113. 17 C.F.R. §§ 240.11Ac1-1, 11Ac1-4(b) (2011) (describing the requirements imposed on specialists and OTC market makers to publish bids or offers immediately).

assessed whether to execute the trade from their own inventory.¹¹⁴ If the trade would be unprofitable for the firm, it would publish the customer's order to other market makers who might complete it.¹¹⁵ The Order Handling Rules eliminated that valuable moment of consideration by requiring in some instances that market makers display customers' limit orders immediately upon receipt.¹¹⁶ In essence, a market maker lost the opportunity to trade with its customers unless it was already offering them a better price than the customers sought.¹¹⁷

In adopting the Order Handling Rules, the SEC aimed to introduce a new element of competition into Nasdaq. Market makers were now competing against investors' limit orders instead of only against other market makers, which reduced the chances of another price-fixing scandal.¹¹⁸ If in the 1960s, the SEC viewed market makers as important intermediaries for illiquid stocks, by the 1990s, the SEC recognized a need to restrict their dealings to protect investors.

The key point here, though, is that the SEC's approach was decidedly modest. Although the Manning and Order Handling Rules were originally aimed at narrowing the difference between specialists and market makers obligations,¹¹⁹ the SEC did not force market makers to abide by the strictures of the Saperstein Interpretation. Market makers were not required to limit their dealings to transactions that were necessary to provide price continuity, minimize imbalances, or create market depth.¹²⁰ Rather, they were largely allowed to trade so long as investors were not harmed.¹²¹

114. See Order Execution Obligations, Exchange Act Release No. 37,619A, 61 Fed. Reg. 48,290, 48,299 (Sept. 12, 1996).

115. *Id.* This practice, the SEC noted, "often results in inferior or missed executions" for customers. *Id.* at 48,295.

116. See *id.* at 48,302.

117. Customers' limit orders have to be displayed if the limit price is better or equal to the market maker's quote, or if the limit price is at the national best bid or offer and for a significantly larger number of shares than currently quoted. *Id.*

118. *Id.* at 48,295 ("Market makers will not only be competing amongst themselves, but also against customer limit orders represented in the quote. The Commission believes that this result will reduce the possibility of certain trading behavior on Nasdaq that was recently the subject of a Commission investigation.").

119. See Proposed SEC Rule Relating to Customer Limit Orders, Exchange Act Release No. 34,753, 59 Fed. Reg. 50,866, 50,866 (Oct. 6, 1994) (proposing that the Manning and Order Handling Rules apply to both specialists and market makers alike).

120. *But cf.* Saperstein Interpretation, *supra* note 56 ("[A] transaction cannot be deemed reasonably necessary for the maintenance of a fair and orderly market within

More importantly, the SEC allowed these minimal obligations to erode over the past 10 years. Starting in 2001, small regional exchanges revised their rulebooks to establish looser market maker obligations than those imposed by Nasdaq.¹²² Then in 2007, Nasdaq followed suit and scrapped the requirement that quotes be “reasonably related” to the prevailing market price.¹²³ Nasdaq argued that this rule change was necessary to put it on equal footing with rivals that merely required market makers to provide a “continuous” offer to buy and sell a stock without regard for price.¹²⁴ The SEC approved the change, noting that the Exchange Act demands nothing more.¹²⁵

This change essentially gutted market makers’ affirmative obligations. A rule adopted by another exchange shortly thereafter illustrates this point. The rule provided that market makers could fulfill their obligations with so-called stub quotes—i.e., offers to buy shares at \$0.01 and sell them for \$999,999.99.¹²⁶ With a quote so far removed from the prevailing price, a firm could effectively withdraw from the market. Worse still, as the Flash Crash would reveal, stub quotes left open the possibility of trades at prices that regulators would later come

the meaning of the rule if it is not reasonably calculated to contribute to the maintenance of price continuity and to the minimizing of the effects of temporary disparity between supply and demand.”).

121. *But cf. id.* (“[C]ompliance with the rule cannot be evidenced by a mere showing that a transaction by a specialist for his own account had no undesirable effect, or even no discernible effect, upon the market.”).

122. In 2001, the Pacific Stock Exchange scrapped its equities trading floor, eliminated specialists, and created a fully electronic trading facility. As part of those changes, the Pacific Exchange introduced market makers governed by what is now codified as NYSE Arca Rule 7.23, which requires they maintain a continuous two-sided quote without regard to price. *See Order Approving Proposed PCX Rule Change Concerning the Establishment of the Archipelago Exchange*, Exchange Act Release No. 44,983, 66 Fed. Reg. 55,225 (Nov. 1, 2001). The National Stock Exchange followed suit in 2006. *See Order Approving Proposed NSX Rule Change to Provide for a Price-Time Priority Market and Other Related Changes*, Exchange Act Release No. 54,391, 71 Fed. Reg. 52,836 (Sept. 7, 2006).

123. *Order Approving Proposed Change to Rule Governing the Relation of a Nasdaq Market Maker’s Quotations to the Prevailing Market*, Exchange Act Release No. 56,759, 72 Fed. Reg. 64,102 (Nov. 14, 2007).

124. *Id.* at 64,103.

125. *See id.* at 64,102.

126. *See Notice of Immediate Effectiveness of Proposed Amendment to Bats Rule 11.8*, Exchange Act Release No. 59,284, 74 Fed. Reg. 4990, 4991 (Jan. 28, 2009).

to view as “ridiculous.”¹²⁷ In any event, the fine for non-compliance with the quoting requirement was as low as \$100.¹²⁸

In sum, the regulatory pattern since the Exchange Act has been to impose less demanding obligations on market makers than on specialists. Market makers have had a limited duty to stand ready to trade and some significant restrictions on handling customer orders. However, they have never been obligated to risk their own capital to promote market stability. The suggestion that imposing market maker obligations on HFTs would help prevent another Flash Crash misunderstands this long-standing framework.

C. HIGH-FREQUENCY TRADERS

In the most general terms, HFTs are firms that, while risking their own capital, use high-speed computer systems to buy and sell stocks quickly and in high volumes.¹²⁹ Although they represent only 2% of the 20,000 firms that trade stocks, they nonetheless dominate U.S. equity markets.¹³⁰ HFTs buy and sell a stock within seconds,¹³¹ and account for about half of daily volume.¹³² Their influence on the market is magnified

127. Gregg E. Berman, Senior Advisor, Div. of Trading & Mkts., Speech by SEC Staff: Market Participants and the May 6 Flash Crash (Oct. 13, 2010), *available at* <http://www.sec.gov/news/speech/2010/spch101310geb.htm>.

128. *See, e.g.*, Bats R. 8.15.01(e). At NYSE Arca, the fine could range from \$250 to \$1,000 depending on the number of prior offenses. Arca R. 10.12(g)(3). At the NSX the fine could range from \$500 to \$2,500, again depending on the number of prior offenses. NSX R. 8.15.01(a).

129. *See* FINAL FINDINGS, *supra* note 10, at 45; PRELIMINARY FINDINGS, *supra* note 6, app. at A-11.

130. *See* Concept Release, *supra* note 16, at 3606 (“By any measure, HFT is a dominant component of the current market structure and is likely to affect nearly all aspects of its performance.”); *see generally* LARRY TABB, ROBERT ITAI & ADAM SUSSMAN, U.S. EQUITY HIGH FREQUENCY TRADING: STRATEGIES, SIZING AND MARKET STRUCTURE (2009) (describing the firms’ characteristics and trading strategies).

131. *See, e.g.*, Julie Creswell, *Speedy Traders Make New Waves Far From Wall St.*, N.Y. TIMES, May 17, 2010, at A1 (noting that, in 2008, Tradebot Systems Inc. held positions for an average of 11 seconds).

132. The industry convention is to calculate volume for participants as a proportion of twice the actual number of shares that change hands. This gives credit to the buyer and the seller of each trade. The estimate, therefore, reflects that HFT firms represent one side of almost every trade. *See* Schapiro, *Security Traders*, *supra* note 22.

because they typically submit more than nine orders per trade.¹³³ They provide an offer to buy or sell shares whenever an investor wants to trade, even though they have none of the obligations of specialists or market makers. Instead, they voluntarily provide liquidity as a result of two features of current exchange regulation: Rule 611 of Regulation NMS and exchange rebates.¹³⁴

This section describes HFTs in detail and explains how these two features create powerful incentives for HFTs to provide liquidity. It also returns to the notion that HFTs should be regulated like market makers or like the specialists of old. Proponents of this idea argue that HFTs play a dominant role in the market with scant regulatory oversight.¹³⁵ Contrary to some commentators' contentions, however, the evidence suggests that the vast majority of HFTs are already SEC-regulated entities.

About 48% of the trading volume generated by HFTs comes from SEC-registered broker-dealers that trade exclusively with their own capital.¹³⁶ There are an estimated 100 to 300 of these so-called

133. See Jonathan Spicer & Herb Lash, *Who's Afraid of High-Frequency Trading?*, REUTERS, Dec. 2, 2009, available at <http://hft.thomsonreuters.com/2009/11/20/quiet-evolution-drawn-into-the-light/> (citing NYSE data that more than 90% of HFT orders are cancelled).

134. See *infra* Part I.C.1-2.

135. See, e.g., Letter from Kurt N. Schacht & Linda Rittenhouse, CFA Institute, to Elizabeth M. Murphy, Secretary, SEC (June 22, 2010) (noting that HFTs are "relatively unregulated" entities); Letter from Kimberly Unger, Exec. Dir., Sec. Traders Ass'n of New York, to Elizabeth M. Murphy, Secretary, SEC (Apr. 30, 2010) (noting that HFTs are unregulated); Matthew Phillips, *Fast, Loose, and Out of Control*, NEWSWEEK, May 31, 2010 (quoting Sen. Kaufman as saying: "We're dealing with something highly complex and completely unregulated.").

136. See Cristina McEachern Gibbs, *Breaking it Down: An Overview of High-Frequency Trading*, ADVANCED TRADING, Oct. 1, 2009, available at http://www.advancedtrading.com/algorithms/220300267?printer_friendly=this-page. This group includes broker-dealers specifically formed by a hedge fund to execute trades. See, e.g., Report for D.E. Shaw Securities LLC ("DESS"), the brokerage affiliate of the hedge fund D.E. Shaw & Co. LP, (Form X-17A-5-FOCUS) (Mar. 15, 2010), available at <http://sec.gov/Archives/edgar/vpr/10/9999999997-10-005433> (noting that DESS executes trades for D.E. Shaw affiliates without charging a commission).

proprietary trading firms.¹³⁷ Since they don't have customers, the Order Handling Rules do not apply.¹³⁸

An additional 46% of HFTs' volume comes from special units of approximately 20 large brokerages.¹³⁹ These brokerages have outside clients, but the HFT unit has been lawfully structured to trade only for the firm's account.¹⁴⁰ These arrangements may be affected by the so-called Volcker Rule, included in the Dodd-Frank Wall Street Reform and Consumer Protection Act enacted in July 2010.¹⁴¹ The Volcker rule, in part, prohibits banks and their affiliates from engaging in proprietary trading, unless it is in connection with underwriting, market-making or hedging activities.¹⁴²

The remaining 6% of HFTs' volume comes from roughly 20 hedge fund managers,¹⁴³ which oversee private pools of capital that by law

137. See McEachern Gibbs, *supra* note 136.

138. The Manning and Order Handling Rules cover only "customer" orders, meaning orders from non-broker-dealers. See 17 C.F.R. § 240.11Ac1-1(a)(26) (2011) ("The term customer means any person that is not a registered broker-dealer.").

139. See McEachern Gibbs, *supra* note 136. For example, Goldman Sachs Group Inc. is an NYSE designated market maker and also makes "many millions of dollars in annual profits" from high-frequency trading. See *United States v. Aleynikov*, No. 10 Cr. 96, 2010 U.S. Dist. LEXIS 92101, at *15 (S.D.N.Y. Sept. 3, 2010). The quantitative trading strategies of Morgan Stanley's Process Driven Trading unit are "the most successful . . . on Wall Street in terms of consistency, longevity, and profitability." SCOTT PATTERSON, *THE QUANTS: HOW A NEW BREED OF MATH WHIZZES CONQUERED WALL STREET AND NEARLY DESTROYED IT* 126 (Crown Bus. 2010).

140. Firms, for example, are required to establish information barriers between the HFT unit and the division handling customer orders. See FINRA Rules 3010, 2110, IM-2110-2, IM-2110-5.

141. See Pub. L. No. 111-203, § 619 (2010).

142. The exact contours of permissible activity under the Volcker Rule are subject to rulemaking by the SEC, the CFTC, the Federal Reserve, and the Financial Stability Oversight Council. See Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, § 619(b)(2)(A), 124 Stat. 1376 (2010). Regulators issued a draft rule in October 2011 and will collect comments from the public through at least January 2012. See Proposed Rule: Prohibitions and Restrictions on Proprietary Trading and Certain Interests in, and Relationships with, Hedge Funds and Private Equity Funds, Exchange Act Release No. 65,545, 76 Fed. Reg. 68,846 (Nov. 7, 2011). See generally Scott Patterson & Victoria McGrane, *Volcker Rule May Lose Its Bite*, WALL ST. J., Sept. 22, 2011, at C1 (reporting that regulators may permit banks to hedge the risk of their portfolios, which critics contend will weaken the proscriptions of the Volcker Rule).

143. See McEachern Gibbs, *supra* note 136.

have broad flexibility in their investment strategies.¹⁴⁴ This group only includes hedge fund managers that have not created their own broker-dealers and rely instead on third-party brokerages to access the exchanges.¹⁴⁵ This arrangement is somewhat rare among HFTs because connecting to a third-party brokerage may introduce a delay in processing orders.¹⁴⁶

The first two categories closely resemble market makers; indeed, a handful of HFTs are registered with exchanges to make markets in particular stocks. For example, GetCo LLC, which one commentator has characterized as “likely the world’s biggest HFT firm,”¹⁴⁷ was registered to make markets in 4 of the 11 stock exchanges operating in the U.S. as of June 2011.¹⁴⁸ Other HFTs including EWT LLC, Jane Street Capital LLC, Hudson River Trading LLC, and Virtu Financial LLC were among the 170 registered Nasdaq market makers in October 2010.¹⁴⁹ Similarly, Sun Trading LLC was registered to make markets in more than 4800

144. See Troy A. Paredes, *On The Decision to Regulate Hedge Funds: The SEC’s Regulatory Philosophy, Style, and Mission*, 2006 U. ILL. L. REV. 975, 976 (“Hedge funds have simply been structured in an open and aboveboard fashion to take advantage of the exclusions that Congress has seen fit to build into the securities law regime.”).

145. Typically, the funds pay brokerages for speedy access to the exchanges’ computer systems. Although technically not members of an exchange, the funds are still required to abide by exchange rules. See, e.g., Bats R. 11.3(b)(2)(C); EDGA R. 11.3(b)(2)(C); Nasdaq R. 4611(d)(2)(C); NYSE R. 123B.03(c)(2)(C). See generally Nina Mehta, *Gloves Off: Industry Fights Over Sponsored Access to Markets*, TRADERS MAG., Apr. 2009 (noting that about 15% of Nasdaq volume comes through such sponsored access arrangements).

146. See Proposed Rule on Risk Management Controls for Brokers or Dealers with Market Access, Exchange Act Release No. 61,379, 75 Fed. Reg. 4007, 4024 (Jan. 26, 2010) (estimating a delay of between 200 to 500 microseconds in processing orders due to risk management controls employed by some brokers).

147. Justin Schack & Joe Gawronski, Rosenblatt Securities Inc., *Trading Talk: An In-Depth Look at High-Frequency Trading* (Sept. 30, 2009), excerpt available at <http://hft.thomsonreuters.com/files/2009/11/Rosenblatt-HFTexcerpt4Reuters2.pdf>.

148. Letter from John A. McCarthy, Gen. Counsel, GetCo LLC, to Elizabeth M. Murphy, Secretary, SEC (June 24, 2011), available at http://www.getcolc.com/images/uploads/Volatility_Plan_Comment_Letter.pdf (listing exchange market maker registrations).

149. See Peter Chapman & James Ramage, *In Search of Market Makers*, TRADERS MAG., Nov. 2010 (listing examples of HFTs among Nasdaq’s 170 registered market makers in 2010). But see Nina Mehta, *NYSE Tweaks Pricing to Appeal to High Frequency Firms*, BLOOMBERG, Dec. 22, 2010 (reporting that Nasdaq had a total of 136 market makers in November 2010).

stocks as of October 2011.¹⁵⁰ At least for HFTs that are registered as market makers, there is significant regulatory supervision.¹⁵¹

In contrast, hedge fund HFTs are ineligible to become exchange members and thus never register as market makers.¹⁵² They are, therefore, unique in avoiding the regulatory burdens imposed on brokerages or market makers. The Dodd-Frank Act may narrow this gap somewhat by subjecting hedge fund managers with more than \$150 million in assets to regulatory examinations pursuant to the Investment Advisers Act of 1940.¹⁵³ Nevertheless, hedge fund managers have an important advantage over market makers because of the Manning and Order Handling Rules.¹⁵⁴ Hedge fund limit orders are protected under the Manning and Order Handling Rules, meaning that market makers must often yield to allow the hedge fund to trade at its specified price.¹⁵⁵

The simple point here is that the vast majority of HFTs are regulated by the SEC as broker-dealers. Only a small set of hedge fund HFTs enjoy less stringent oversight and capitalize on rules designed to protect investors from unfair market maker practices. I turn now to two key elements that spurred the growth of HFTs.

1. Rule 611 of Regulation NMS

HFTs came to prominence due to a regulatory regime that favored electronic trading. In adopting Regulation NMS (“Reg NMS”) in

150. See Sun Trading, Market Making Symbols, <http://www.suntradingllc.com/market-maker-symbols> (last visited Oct. 2, 2011).

151. See THOMAS LEE HAZEN, 5 TREATISE ON THE LAW OF SECURITIES REGULATION 319 (6th ed. 2009) (“[M]arket making activities are closely scrutinized by the SEC and FINRA.”).

152. See, e.g., Nasdaq R. 1002; NYSE R. 2(b) (both defining members as SEC-registered brokers or dealers).

153. The funds will be subject to periodic examinations and must report to the SEC, among other things, their trading practices and investment procedures. See Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203 § 404, 124 Stat. 1376 (2010).

154. See *supra* notes 103-118 and accompanying text.

155. The Manning and Order Handling Rules cover “customer” orders, meaning orders from non-broker-dealers. See 17 C.F.R. § 240.11Ac1-1(a)(26) (2011) (“The term customer means any person that is not a registered broker-dealer.”); NASD R. 0120(g) (“The term ‘customer’ shall not include a broker or dealer.”). Accordingly, hedge fund HFTs are covered by the rules, whereas a broker-dealer trading for its own account is not.

2005,¹⁵⁶ the SEC distinguished for the first time between automated and manual quotes.¹⁵⁷ The former are displayed electronically and are immediately actionable, while the latter are quotes uttered by a floor trader.¹⁵⁸ In the SEC's view, automated quotes provide investors some assurance that their order will be completed at the specified price.¹⁵⁹ In contrast, manual quotes are "maybe" quotations subject to a trader's determination of whether to honor them.¹⁶⁰ This view was likely informed by contemporaneous SEC investigations into improper trading by specialists at 27 firms, which resulted in \$359 million in fines and disgorgement of illegal profits.¹⁶¹

Reg NMS protects automated quotes. Rule 611 of Reg NMS requires that brokers and exchanges give priority to the electronic order that sets the best price, meaning the highest bid to buy or the lowest offer to sell.¹⁶² Brokers may ignore a manual quote, even if better priced.¹⁶³ The SEC hoped that Rule 611 would foster investor confidence by sidelining "maybe" manual quotes, which often resulted in a transaction at a price inferior to an investor's electronically displayed quote.¹⁶⁴ With greater protection, the SEC reasoned, investors would be less likely to hide their trading interest and more inclined to submit orders, creating a deeper and more stable market.¹⁶⁵

156. 17 C.F.R. §§ 242.600-242.612 (2011).

157. See Regulation NMS, Exchange Act Release No. 51,808, 70 Fed. Reg. 37,496, 37,501 (June 29, 2005) (noting that Rule 611 replaced regulations that did not distinguish between automated and manual quotations).

158. *Id.* at 37,527.

159. *Id.*

160. *Id.*

161. See Press Release, SEC, Settlement Reached With Five Specialist Firms for Violating Securities Laws and NYSE Regulations; Firms Will Pay More Than \$240 Million in Penalties and Disgorgement (Mar. 30, 2004); Press Release, SEC, Settlement Reached with Two Specialist Firms for Violating Securities Laws and NYSE Regulations (July 26, 2004); Press Release, SEC, SEC Charges 14 Firms for Improper Proprietary Trading (Mar. 4, 2009); *SEC v. Automated Trading Desk Specialists LLC*, SEC Litigation Release No. 20,922 (Mar. 4, 2009) (describing civil complaints against six firms).

162. 17 C.F.R. § 242.611 (2011).

163. Regulation NMS, *supra* note 157, at 37,504 ("Rule 611 does not require market participants to route orders to access manual quotations, which generally entail a much slower speed of response than automated quotations.").

164. *Id.* at 37,579.

165. *Id.* at 37,498.

The immediate consequence of Reg NMS was a significant expansion of electronic trading.¹⁶⁶ HFTs thrived as exchanges—notably the NYSE—overhauled their trading systems.¹⁶⁷ At the NYSE, automatic executions that did not require the intervention of specialists accounted for more than 80% of volume in 2007, compared with 11.4% in 2005.¹⁶⁸ Transactions were processed in less than a second instead of 10.¹⁶⁹ Many HFTs sought to trade even faster and placed their computers near the exchanges' servers to minimize the time it took for an order to travel between the two systems.¹⁷⁰ Many exchanges now provide co-location services, renting space in their data centers for fees starting at about \$5,000 per month.¹⁷¹

Reg NMS also enabled upstart markets to compete against entrenched incumbents.¹⁷² Rule 611 effectively forced brokerages to stop sending orders to floor brokers and instead submit them electronically to the exchange with the best price.¹⁷³ New markets made quick inroads by catering to HFTs and giving them incentives to set

166. See generally Daniel Mathisson, *Man v. Machine: The Regulatory Changes That Led to the Modern Market*, in CURRENT PERSPECTIVES ON MODERN EQUITY MARKETS 64-72 (Knight Capital Grp. Inc. ed. 2010) (describing the impact of Reg NMS); Markham & Harty, *supra* note 33, at 902-911 (describing the early rise of electronic trading).

167. See Aaron Lucchetti, *The NYSE: Faster (and Lonelier)*, WALL ST. J., Jan. 24, 2007, at C1 (noting that the overhaul was the biggest change to the way that stocks traded at the NYSE since its founding).

168. NYSE Group, Inc., Annual Report (Form 10-K), at 12 (Mar. 27, 2007); NYSE Group, Inc., Annual Report (Form 10-K), at 6 (Mar. 31, 2006).

169. See Terrence Hendershott & Pamela C. Moulton, *Automation, Speed and Stock Market Quality*, at 1 (Aug. 5, 2009), available at <http://ssrn.com/abstract=1159773>.

170. See Aaron Lucchetti, *Firms Seek Edge Through Speed as Computer Trading Expands*, WALL ST. J., Dec. 15, 2006, at A1 (describing competition among HFTs to reduce the time it takes to complete a trade to 0.02 seconds).

171. See *NYSE Price List 2011*, at 13, available at http://usequities.nyx.com/sites/usequities.nyx.com/files/nyse_price_list_2011.pdf (last visited Oct. 2, 2011); Nasdaq R. 7034 (both detailing charges for co-location services with prices for a single cabinet starting at \$5,000 plus installation fees and other costs).

172. See, e.g., Jeff Kearns & Edgar Ortega, *NYSE Trading Falls to 7-Year Low as U.S. Volume Rises*, BLOOMBERG, May 23, 2008 (quoting the Chief Executive Officer of NYSE Euronext as saying: “The bottom line is that it’s very easy to get started and compete with us. The barriers to entry for someone to get a license and compete with us are lower than they have ever been.”).

173. See Mathisson, *supra* note 166, at 64-67.

competitive prices.¹⁷⁴ The NYSE's market share of trading in its listed stocks plummeted to as low as 25.8% in December 2009 from 80% in January 2003.¹⁷⁵

To remain competitive, the NYSE eliminated specialists in 2008.¹⁷⁶ Having adapted to new technologies for more than 135 years, specialists were too constrained by Rule 11b-1 to compete after Reg NMS.¹⁷⁷ In 2007, specialists were either the buyer or the seller of shares representing 3.2% of total volume at the NYSE, down from 15.2% in 2001.¹⁷⁸ The exchange replaced specialists with so-called Designated Market Makers ("DMMs"), which had greater freedom to trade. Since DMMs no longer had special access to the order book, they were not bound by Rule 11b-1.¹⁷⁹

In sum, Rule 611 served as a catalyst for automated trading, a prerequisite for the growth of HFTs. It also placed a premium on speed, since setting the best price requires being the first to deliver an order.¹⁸⁰ Within two years of the implementation of Reg NMS, HFTs had come to dominate equity markets, and specialists had vanished.

174. See Graham Bowley, *Rivals Pose Threat to New York Stock Exchange*, N.Y. TIMES, Oct. 14, 2009, at A1; Edgar Ortega, *NYSE Loses Market Share and Nasdaq Isn't the Winner*, BLOOMBERG, June 24, 2009 (both discussing market share gains by Bats Trading Inc. and Direct Edge Holdings LLC).

175. JAMES J. ANGEL, LAWRENCE E. HARRIS & CHESTER S. SPATT, EQUITY TRADING IN THE 21ST CENTURY 5 (2010), available at <http://sec.gov/comments/s7-02-10/s70210-54.pdf>.

176. Order Granting Approval to Phase Out Specialists, *supra* note 96, at 64,380.

177. The NYSE was the last of the equity exchanges to eschew specialists. In 2006, as Reg NMS came into effect, the National and Chicago exchanges replaced their specialist systems with market makers. See Order Approving NSX Proposed Rule Changes to Provide For a Price-Time Priority Market, Exchange Act Release No. 54,391, 71 Fed. Reg. 52,836 (Sept 7, 2006); Order Approving Proposed CHX Rule Change to Implement a New Trading Model, Exchange Act Release No. 54,550, 71 Fed. Reg. 59,563 (Oct. 10, 2006).

178. NYSE Fact & Figures, Specialist Activity, available at http://www.nyxdata.com/nysedata/asp/factbook/viewer_edition.asp?mode=table&key=2964&category=3.

179. See Order Granting Approval to Phase Out Specialists, *supra* note 96, at 64,380.

180. See Concept Release, *supra* note 16, at 3610 ("Many proprietary firm strategies are highly dependent upon speed—speed of market data delivery . . . ; speed of decision processing . . . ; speed of access to trading center[s] . . . ; and speed of order execution and response by trading centers.").

2. Exchange Rebates

Rebates are a controversial yet crucial inducement that exchanges use to draw in business. Although rebates are available to any trader, this section shows how rebates are uniquely suited as an incentive for HFTs. In fact, rebates are the main mechanism through which exchanges ensure there is an offer to buy or sell a stock whenever an investor wants to trade.¹⁸¹

In general, stock exchange fee schedules involve collecting a fee from one party to a trade and making a smaller payment to the other party.¹⁸² The payment is meant to reward the party who first took the risk of displaying its interest in trading at a certain price. The fee is paid by the party who benefited from the certainty of finding a willing buyer or seller already in the market. Although exchanges have used rebates since at least 1990 as a way to attract business,¹⁸³ rebates are particularly well suited as an incentive for HFTs.

HFTs execute thousands of trades a day with the hope of earning a small profit by predicting price movements in a stock over short time intervals.¹⁸⁴ One popular strategy involves buying after a price declines, or selling after a price increases, with the expectation that the price trend

181. See *supra* notes 122-128 and accompanying text for a discussion on the weakening of market maker obligations.

182. Fee schedules are complex and vary widely among exchanges. For the sake of clarity, I limit the discussion here to the general outlines of what has come to be known as the maker-taker pricing model. In December 2010, there were four exchanges, executing about 7% of daily volume, that used a different model than the one described here. These exchanges charged a fee to the party who first submitted an order, and paid a rebate to the party who responded second. See Nina Mehta, *NYSE Tweaks Pricing to Appeal to High Frequency Firms*, BLOOMBERG, Dec. 21, 2010 (describing fee schedules for the Bats BYX, CBSX, EDGA, Nasdaq BX exchanges). As of October 2011, only three exchanges maintained a so-called inverted fee schedule, with a collective market share of about 4.8%. See Bats BYX Fee Schedule, available at <http://batstrading.com/FeeSchedule/> (last visited Oct. 2, 2011); CBSX Fees Schedule, available at <http://www.cboe.com/publish/cbsxfeeschedule/cbsxfeeschedule.pdf> (last visited Oct. 2, 2011); Nasdaq BX R. 7018.

183. See, e.g., Notice of Immediate Effectiveness of Proposed Rule Change by the Amex Relating to Fees, Exchange Act Release No. 28,794, 56 Fed. Reg. 2964 (Jan. 25, 1991); Notice of Immediate Effectiveness of Proposed Rule Change by the Phlx Relating to Fees, Exchange Act Release No. 28,212, 55 Fed. Reg. 30,065 (July 24, 1990).

184. See Concept Release, *supra* note 16, at 3607-10 (discussing different HFT trading strategies).

will reverse.¹⁸⁵ HFTs might also engage in arbitrage strategies that seek to capitalize on price discrepancies between related markets; or they might develop strategies for anticipating large orders from other traders in hopes of profiting from the price movement that typically occurs when a large order is executed.¹⁸⁶

In any case, HFTs make an average profit of about \$0.001 per share, so the typical rebate of \$0.002 is significant.¹⁸⁷ If an HFT systematically earns rebates, the benefits quickly add up.¹⁸⁸ Indeed, one commentator estimates that exchanges paid \$3.7 billion to HFTs in rebates in 2009.¹⁸⁹ As a reference, HFT profits on trading stocks, options, futures, and currencies were an estimated \$8 billion in 2008 and \$7.2 billion in 2009.¹⁹⁰ Profits from equities alone may range from \$2 billion to \$4.1 billion.¹⁹¹ In 2010, as volatility subsided and trading volumes fell, overall profits for HFTs dropped to about \$5.7 billion.¹⁹² Although these are general estimates without rigorous validation, they suggest that rebates are a major source of profits for HFTs.

185. See Jonathan A. Brogaard, *The Activity of High Frequency Traders*, at 14 (Dec. 8, 2011), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1938769 (analyzing the activity of HFT firms on Nasdaq and Bats and noting that some appear to use a price-reversal strategy).

186. See Concept Release, *supra* note 16, at 3608-09.

187. See Kambiz Foroohar, *Speed Geeks*, BLOOMBERG MKTS., Oct. 6, 2010, available at <http://www.bloomberg.com/news/2010-10-06/speed-geeks.html> (reporting HFTs earn between 0.1 cent and 0.2 cent per share); Letter from Manoj Narang, Chief Exec. Officer, Tradeworx Inc., to Elizabeth M. Murphy, Secretary, SEC (Apr., 21, 2010) [hereinafter Narang Letter], available at <http://www.sec.gov/comments/s7-02-10/s70210-129.pdf> (estimating HFTs earn about 0.1 cent per share); Brogaard, *supra* note 185, at 16 (estimating profits of between 0.03 and 0.07 cent per \$100 traded).

188. See, e.g., Bats Exchange, Rapid Rebate, http://batstrading.com/resources/features/bats_exchange_rapid_rebate.pdf (discussing weekly rebate checks for exchange members who earn more than \$50,000 in monthly rebates).

189. Schack & Gawronski, *supra* note 147.

190. See Foroohar, *supra* note 187 (reporting estimated profits for 2009); TABB ET AL., *supra* note 130 (estimating profits for 2008).

191. See Brogaard, *supra* note 185, at 17-18 (estimating annual profits of between \$4.1 billion to \$2.8 billion); Narang Letter, *supra* note 187 (estimating annual profits of about \$2 billion).

192. See Graham Bowley, *Fast Traders, in Spotlight, Battle Rules*, N.Y. TIMES, July 18, 2011, at A1 (reporting estimated profits for 2010 and 2009 combined). In 2010, average daily consolidated trading volume fell 13.2% to 8.5 billion shares from 9.8 billion a year earlier, according to NYSE data. See Historical NYSE Euronext Volume, http://www.nyse.com/attachment/Historical_Volume.xls.

In theory, both parties to a trade can benefit from rebates. For example, imagine that stock XYZ is offered for sale at \$10.02, but bids to buy are only as high as \$10.00. Then, Firm A submits a bid to buy at \$10.01, relying on the Rule 611 assurance that its order will be protected because it sets the best price. That bid draws a willing seller. As a result, Firm A gets the XYZ stock and the rebate. The seller receives a penny more for the shares than the previous best bid, and in return pays the exchange fee. Two exchanges recently tried to foster this sort of mutually beneficial dynamic by introducing special rebates for traders who submit orders that set a new national best bid or offer.¹⁹³

In practice, however, rebates have long been criticized as unfair and conducive to improper conduct.¹⁹⁴ With the increased trading by HFTs, the complaints have grown louder. Critics contend that rebates unfairly force one party to a trade to shoulder the full cost of its execution.¹⁹⁵ They claim that investors are “paying a toll” to HFTs since their transaction fees go to fund rebates.¹⁹⁶

Rebates might also induce a brokerage to handle customer orders in a way that runs counter to its obligation to get the best trade for customers.¹⁹⁷ Exchanges pay the rebate to the brokerage, instead of to the stock owner who ultimately initiated the trade. Critics argue that

193. The Bats Y-Exchange started the program in April 2011, followed three months later by the Bats Exchange. *See* Notice of Filing and Immediate Effectiveness of Proposed Rule Change Related to Fees for Use of Bats Exchange, Exchange Act Release No. 64,847, 76 Fed. Reg. 41,546, 41,547 (July 14, 2011); Notice of Filing and Immediate Effectiveness of Proposed Rule Change Related to Fees for Use of Bats Y-Exchange, Exchange Act Release No. 64,429, 76 Fed. Reg. 27,694, 27,695 (May 12, 2011).

194. *See, e.g.*, Proposed Rule on Payment for Order Flow, Exchange Act Release No. 33,026, 58 Fed. Reg. 52,934, 52,938-40 (Oct. 13, 1993) (describing criticisms of payment for order flow, including exchange rebates).

195. *See* Letter from Ann Vlcek, Managing Dir., Sec. Indus. & Fin. Mkts. Ass'n (“SIFMA”), to Elizabeth M. Murphy, Secretary, SEC (Apr. 29, 2010) [hereinafter SIFMA Letter I] (“A high rebate often implies a higher taker charge, which is in turn paid by long-term investors either directly, or indirectly through increased costs on their executing broker-dealers that, ultimately, are passed through to them.”).

196. *See* Letter from executives at Se. Asset Mgmt. Inc. to Elizabeth M. Murphy, Secretary, SEC, at 4-6 (Apr. 28, 2010).

197. Whereas Rule 611 requires exchanges to execute trades at the best price, brokers owe a duty to their clients of best execution and must consider other relevant factors in addition to price, such as the speed of execution and the difficulty of executing an order in a particular market. *See* *Newton v. Merrill, Lynch, Pierce, Fenner & Smith, Inc.*, 135 F.3d 266, 270 n. 2 (3d Cir. 1998).

rebates create a “perverse incentive” for brokers to send orders to the exchange that will pay the most, even if this could result in an unfavorable trade for the customer.¹⁹⁸

In addition, critics fault rebates for providing an incentive to execute transactions with little economic value.¹⁹⁹ They claim that HFTs that instantly buy and sell shares at the same price solely to collect the two rebates are merely standing in between natural buyers and sellers who would have otherwise traded with each other.²⁰⁰ Worse still, rebates distort prices. Critics argue that since quotes reflect only the price of a stock, they understate the actual economic value of the trade to the party who received the rebate, and overstate the value to the party who paid the exchange fee.²⁰¹

The SEC has tried to address these criticisms over the past 15 years. Under Reg NMS, the SEC capped exchange fees at \$0.003 per share for stocks priced above \$1.²⁰² In the SEC’s view, the cap ensured

198. See, e.g., Letter from Se. Asset Mgmt., *supra* note 196; ANGEL, HARRIS & SPATT, *supra* note 175, at 43.

199. This has led some commentators to conclude that high-frequency trading is mere noise in the market. See, e.g., Jonathan Spicer, *Globally, the Flash Crash is No Flash in the Pan*, REUTERS, Oct. 15, 2010, available at <http://www.reuters.com/assets/print?aid=USTRE69E1Q520101015> (quoting Nobel laureate Joseph Stiglitz, who is a member of the joint CFTC-SEC advisory panel studying the implications of the Flash Crash, as saying: “[A] number of us are coming to the view that this high-frequency trading has negative social value They’re playing games. They’re trying to extract information from informed traders, people who are doing the research.”); Paul Krugman, Op-Ed., *Rewarding Bad Actors*, N.Y. TIMES, Aug. 2, 2009, at A21, available at http://www.nytimes.com/2009/08/03/opinion/03krugman.html?_r=0 (describing high-frequency trading as “worthless if not destructive from a social point of view”). See generally Andrei Shleifer & Lawrence H. Summers, *The Noise Trader Approach to Finance*, 4 J. ECON. PERSP. 19, 22 (Spring 1990) (distinguishing between arbitrageurs and noise traders who irrationally respond to factors that have no effect on a stock’s fundamental value based on expected future cash flows).

200. See Kaufman Letter, *supra* note 20 (“Such strategies are of little value to the market place and should be eliminated where possible.”); Letter from Karrie McMillan, Gen. Counsel, Inv. Co. Inst. (“ICI”), to Elizabeth M. Murphy, Secretary, SEC (Apr. 21, 2010) [hereinafter ICI Letter] (“[I]t is unclear what benefits liquidity rebates provide to investors.”).

201. See Kaufman Letter, *supra* note 20; SIFMA Letter I, *supra* note 195; Letter from Greg Tuser & Matthew Lavicka, Managing Dirs., Goldman Sachs Grp. Inc., to Elizabeth M. Murphy, Secretary, SEC (June 25, 2010) [hereinafter Goldman Sachs Letter].

202. See 17 C.F.R. § 242.610(c) (2011).

that exchange fees would not impose an unfair burden on investors.²⁰³ Moreover, the cap was low enough to assure investors that “prices are, within a limited range, true prices.”²⁰⁴ Importantly, the SEC considered and rejected a proposal to cap fees at \$0.001 per share on the ground that it would be too disruptive for business practices at the exchanges.²⁰⁵ Such a cap would represent a greater challenge now than in 2005, because rebates have gained wider acceptance among stock and options exchanges.

The SEC also tackled the issue of a broker’s conflicts of interest with a set of disclosure requirements. Under Rule 10b-10, a brokerage must disclose to customers with each trade confirmation whether it received any payment for routing the order to a particular exchange.²⁰⁶ Rule 11Ac1-3 requires brokers to inform investors regularly about their policies regarding the receipt of any exchange rebates.²⁰⁷ In adopting the rules, the SEC noted that disclosure was an adequate means to resolve the conflicts of interest since investors were unlikely to be harmed by a broker submitting an order to an exchange where there would be a meaningful opportunity to get a better price.²⁰⁸

SEC rulemaking should, therefore, focus on whether the cap-and-disclose approach has become ineffective in addressing conflicts of interest. Since Reg NMS, exchange rebates have become more widespread, so perhaps the sheer amount paid in rebates is cause for new rules. An equally important factor to consider, however, is that rebates are a powerful incentive for HFTs to provide liquidity.

D. THE RULES ON MAY 5, 2010

Prior to the Flash Crash, the majority of exchanges required no more of market makers than the statutory minimum, namely that they provide a continuous offer to buy and sell shares without regard for price.²⁰⁹ The NYSE was the noteworthy exception, since its DMMs

203. See Regulation NMS, *supra* note 157, at 37,502.

204. *Id.*

205. *Id.*

206. 17 C.F.R. § 240.10b-10 (2011).

207. *Id.* § 240.11Ac1-3.

208. Final Rule on Payment for Order Flow, Exchange Act Release No. 34,902, 59 Fed. Reg. 55,006, 55,012 (Nov. 2, 1994).

209. See Bats R. 11.8(a)(1); Nasdaq R. 4613(a)(1); Nasdaq BX R. 4613(a)(1); NSX R. 11.8(a)(1); NYSE Arca R. 7.23(a)(1).

retained aspects of the specialists' regulatory framework. This section contrasts the two regimes to illustrate the tradeoffs that regulators should consider in developing new regulation. Imposing robust affirmative obligations would likely require granting equally meaningful privileges.²¹⁰

Exchanges that executed 46% of daily volume during April 2010 imposed only minimal affirmative obligations.²¹¹ Direct Edge ECN LLC, an electronic market that was not yet an SEC-registered exchange, executed another 10.9% even though it had no market makers.²¹² At these markets, rebates and the Rule 611 protection for electronically displayed limit orders were the main mechanisms to ensure liquidity.

To be sure, the rulebooks at these markets included a nod to Rule 11b-1 by requiring market makers to "assist in the maintenance, insofar as reasonably practicable, of fair and orderly markets."²¹³ Yet none of the exchanges included the particularized provisions that the SEC required the NYSE to adopt in the wake of Rule 11b-1 regarding price continuity, order imbalances, and market depth.²¹⁴ In fact, by 2008, these exchanges allowed market makers to fulfill their obligations with stub quotes at prices far removed from the market.²¹⁵

In contrast, the NYSE had retained by May 2010 aspects of the old specialist obligations. NYSE Rule 104 provided that DMMs must

210. Lawrence E. Harris, the SEC's chief economist from 2002 to 2004, crisply summed up the problem as follows: "Efforts to compel dealers to offer more liquidity must somehow increase their profits or lower their perceived risk. Otherwise the dealers will simply quit." Onnig H. Dombalagian, *Demythologizing the Stock Exchange: Reconciling Self-Regulation and the National Market System*, 39 U. RICH. L. REV. 1069, 1110, n. 197 (quoting Lawrence E. Harris, *Liquidity, Trading Rules, and Electronic Trading Systems*, in MONOGRAPH SERIES IN FINANCE AND ECONOMICS 1990-4, at 8 (1991)).

211. In April 2010, Nasdaq had a market share of 18.3%; NYSE Arca was at 13.7%; Bats was at 9.5%; Nasdaq BX was at 3.9%; and the NSX had 0.5%. The market share figures are based on Bats data available at http://www.batstrading.com/market_summary/.

212. See generally Direct Edge, About Direct Edge, <http://www.directedge.com/About.aspx> (providing a brief history of the company). Direct Edge, which now operates the EDGA and EDGX exchanges, implemented a market maker program in January 2012. See Direct Edge Regulatory Notice #12-01, available at <http://www.directedge.com/About/Announcements/ViewNewsletterDetail.aspx?NewsletterID=577>.

213. See Bats R. 11.8(a); Nasdaq R. 4613(a); Nasdaq BX R. 4613(a); NSX R. 11.8(a); NYSE Arca R. 7.23(a).

214. See *supra* notes 58-75 and accompanying text.

215. See *supra* notes 122-128 and accompanying text.

minimize the effects of temporary discrepancies between supply and demand for a stock, and maintain price continuity with reasonable depth.²¹⁶ Moreover, DMMs were required to submit quotes at the national best bid or offer for 10% of the day if the security traded more than 1 million shares a day, or 15% if daily volume was lower.²¹⁷ For a regular six-and-a-half-hour trading day, that amounted to a 39-minute obligation for high-volume stocks, and just short of an hour for stocks with lower volume. The NYSE encouraged compliance by paying DMMs a rebate at least 85% higher than that paid to regular members.²¹⁸

DMMs had other privileges beyond higher rebates.²¹⁹ The NYSE's seven DMMs had the exclusive right to trade a security for their own accounts on parity with other brokerages.²²⁰ This allowed DMMs to participate in a trade even if they were not the first to establish the best price. For example, imagine that Firm A offered to buy 200 shares of XYZ for \$10.00. An instant later, the DMM offered to buy 100 shares at the same price. When the exchange received an order to sell 200 shares, only a portion of the trade would go to Firm A, while the DMM would receive the remainder.²²¹

In contrast, nearly all other exchanges operated (and continue to operate) under a rule that allocates trades on a strict price-time priority, meaning that orders are ranked first by price, and then by arrival time, to determine the sequence of execution.²²² Under price-time priority, the 200 shares would go solely to Firm A. This scheme rewards the first

216. See NYSE R. 104(f)(ii). The NYSE also incentivizes DMMs to post quotes that are at least 15% of the average size of the bids or offers for any given security. See *NYSE, Price List 2011*, available at http://www.nyse.com/pdfs/nyse_equities_price_list.pdf.

217. See NYSE R. 104(a)(1)(A).

218. DMMs can earn a rebate of 0.35 cent per 100 shares for low-volume stocks, and 0.25 cent per 100 shares for high-volume stocks. Regular members can earn a rebate of 0.13 cent per 100 shares. See *NYSE Price List 2011*, available at http://www.nyse.com/pdfs/nyse_equities_pricelist.pdf.

219. The Bats Exchange, the Chicago Stock Exchange (CHX), the Nasdaq Stock Market, and the National Stock Exchange (NSX) provide no regulatory privileges to market makers. See Bats R. 11.5-11.8; CHX Article 16; Nasdaq R. 4600-4631; NSX R. 11.5-11.8.

220. See NYSE R. 72(c).

221. The exact allocation of shares may vary depending on circumstances established by prior trades. This example is based on NYSE R. 72(c)(viii)(A)-(C).

222. See Bats R. 11.12; CHX Article 20, R. 8(b); Nasdaq R. 4757; NSX R. 11.14; NYSE Arca R. 7.36.

trader who narrows the spread between offers to buy and sell a stock, whereas the NYSE rules make speed less important for DMMs.

The two regimes illustrate the tradeoffs between obligations and fairness. Imposing heightened affirmative obligations like those of NYSE Rule 104 would likely require granting offsetting privileges to a handful of firms. On the other hand, a regime like Nasdaq that relies on rebates to draw in liquidity might be fair insofar as the rebates are available to all traders on equal terms, but then the system is vulnerable to a sudden shock like that on May 6.

II. THE FLASH CRASH AND REGULATORY RESPONSES

A. MAY 6, 2010

For the first part of the day on May 6, 2010, equity trading was mostly unremarkable. Volatility caused by concern that Greece would default on its debt was relatively confined to the currency and debt markets.²²³ If Wall Street had closed at 2 p.m.,²²⁴ the Dow average's 1.6% decline would not have even ranked among the five biggest daily losses for the year.²²⁵ The final two hours of stock trading, however, were unprecedented.

Starting at 2:30 p.m., the selloff accelerated as a mutual fund company tried to hedge its stock portfolio by selling \$4.1 billion worth of futures contracts tied to the Standard & Poor's 500 Index.²²⁶ That order was so large that it depleted the outstanding orders to buy the contract, causing a rapid drop in its price and in the prices of the underlying stocks.²²⁷ By 2:42 p.m., the Dow had lost 3.9% for the day.²²⁸

From 2:42 p.m. to 2:45 p.m., the Dow plunged 5.5%.²²⁹ Shares of Procter & Gamble Co., which posted the biggest decline among stocks

223. See, e.g., Stephen Bernard, *Mixed Economic News Fails to Revive Stock Market*, ASSOCIATED PRESS (May 6, 2010, 2:20 PM); Rita Nazareth, *U.S. Stocks Retreat as European Debt Concern Offsets Bernanke*, BLOOMBERG (May 6, 2010, 12:34 PM).

224. All times are EDT, in accordance with the SEC-CFTC reports on the Flash Crash.

225. Trading information included in this section that is not directly attributed is based on Bloomberg data on file with author.

226. FINAL FINDINGS, *supra* note 10, at 2.

227. *Id.* at 3.

228. *House Hearing*, *supra* note 2 (testimony of Mary L. Schapiro, Chairman, SEC).

229. *Id.* at app. A.

in the Dow, tumbled 36% from their 2:40 p.m. price.²³⁰ Many smaller companies fared worse; some 320 stocks lost more than half their market value between 2:40 p.m. and 3 p.m.²³¹ Shares of the consulting firm Accenture Plc plunged in seven seconds from \$30 to 1 cent.²³² The avalanche of orders strained the systems of two major exchanges, resulting in delays for processing and reporting trades.²³³ At its worst, the Dow lost 9.2%, or 1010 points, from the prior day's close—the benchmark's largest intraday drop since it was created in 1896.²³⁴

The sudden price drop triggered automatic alerts for many HFTs.²³⁵ Their systems are often programmed to pause trading if the risk of incurring losses exceeds a specified threshold.²³⁶ Thus, two of the 12 largest HFTs decided to pull out of the market at about 2:47 p.m., four others curtailed their trading for a short period, and the remaining six chose to resume trading.²³⁷ The HFTs that remained in the market significantly increased their trading activity and were “aggressive sellers” as the decline in the Dow worsened.²³⁸

The rebound, beginning at 2:48 p.m., was just as startling. In about eight minutes, the Dow recouped all its losses. Procter & Gamble shares bounced back in a minute.²³⁹ Accenture shares jumped from 1 cent to

230. PRELIMINARY FINDINGS, *supra* note 6, at 21.

231. *Id.* at 16 (citing examples). Some of these transactions were later voided as clearly erroneous trades. In total, the exchanges voided 20,761 trades executed between 2:40 p.m. and 3 p.m. *Id.* at 31.

232. *Id.* at 35.

233. See FINAL FINDINGS, *supra* note 10, at 75-79 (detailing delays in order processing at NYSE Arca and delays in the dissemination of market data from the NYSE).

234. Lauricella & McKay, *supra* note 3.

235. See FINAL FINDINGS, *supra* note 10, at 4-5.

236. See *id.* at 36.

237. See *id.* at 45; see also Scott Patterson, *Did Shutdowns Make Plunge Worse?*, WALL ST. J., May 7, 2010, at C1 (reporting that Tradebot Systems Inc., which accounts for about 5% of daily volume, stopped trading); Julie Creswell, *Speedy New Traders Make Waves Far From Wall St.*, N.Y. TIMES, May 17, 2010, at A1 (reporting that Tradeworx Inc., which trades about 80 million shares a day, pulled out of the market).

238. FINAL FINDINGS, *supra* note 10, at 45-48. A portion of this selling could be attributable to HFTs buying futures contracts on the S&P 500 Index and selling stocks to lock in a profit from the arbitrage. *Id.* at 47.

239. See PRELIMINARY FINDINGS, *supra* note 6, at 51.

\$39 in four seconds, and closed for the day at \$41.09.²⁴⁰ The Dow closed 0.7% above its 2:42 p.m. level.²⁴¹

Regulators scrambled to determine the root cause of the sudden plunge and swift recovery. The SEC and the Commodity Futures Trading Commission promised to review trading and make public any recommendations deemed appropriate to protect investors.²⁴² Members of Congress immediately zeroed in on electronic trading and urged safeguards to prevent such extreme volatility.²⁴³ By the evening of May 6, a subcommittee of the House Financial Services Committee had scheduled a hearing with the heads of both agencies.²⁴⁴

At the hearing, CFTC Chairman Gary Gensler said the agency was reviewing whether HFTs enjoy unfair advantages.²⁴⁵ SEC Chairman Schapiro believed the Flash Crash exposed deficiencies at the core of the Commission's policy objective of creating fair and orderly markets.²⁴⁶ The episode crystallized the SEC's concern that HFTs could destabilize the market.²⁴⁷

240. *Id.* at 35.

241. *See Senate Hearing, supra* note 79 (testimony of Mary L. Schapiro, Chairman, SEC).

242. Press Release, Statement from SEC & CFTC (May 6, 2010), *available at* <http://sec.gov/news/press/2010/2010-72.htm>.

243. *See* Letter from Sen. Charles Schumer to Mary L. Schapiro, Chairman, SEC, Gary Gensler, Chairman, CFTC, and the heads of seven exchanges (May 10, 2010), *available at* <http://sec.gov/comments/265-26/265-26-9.pdf>; Joint Letter from Sen. Kaufman & Sen. Mark Warner to Sen. Christopher Dodd, Chairman, Senate Comm. on Banking, Housing, & Urban Affairs (May 7, 2010), *available at* <http://green.lib.udel.edu/webarchives/kaufman.senate.gov/imo/media/doc/5-7-10%20Letter%20to%20Chairman%20Dodd.pdf> (“We are concerned that as markets rely on and trust such a high percentage of the capital management of the market to black-box trading systems that systemic problems may be created.”). For his part, Sen. Dodd urged the SEC to “step up very quickly” to explain the causes of the Crash. *See* Alison Vekshin, *Senator Dodd Says Market Plunge Illustrates Need for Financial Overhaul*, BLOOMBERG, May 10, 2010.

244. Press Release, Rep. Paul E. Kanjorski, Kanjorski Announces Capital Markets Subcommittee Hearing (May 6, 2010).

245. PRELIMINARY FINDINGS, *supra* note 6, at 8 (describing the CFTC's planned response to the Flash Crash).

246. *See House Hearing, supra* note 2 (testimony of Mary L. Schapiro, Chairman, SEC) (“The sudden evaporation of meaningful prices for many major exchange-listed stocks in the middle of a trading day is unacceptable and clearly contrary to the vital policy objective of maintaining fair and orderly financial markets.”).

247. *See* Schapiro, *Strengthening Structure, supra* note 4 (“[T]he stocks with broken trades on May 6 highlight the fact that the order book liquidity in those stocks

Although the agencies have identified multiple factors that led to the Flash Crash, only two pertain directly to equity market makers.²⁴⁸ First, some market makers nominally satisfied their regulatory obligations by posting bids and offers at unrealistically low prices.²⁴⁹ Stub quotes, for example, were responsible for the 1-cent trades in shares of Accenture.²⁵⁰ Second, the withdrawal of some HFTs from the market exacerbated the “severe mismatch”²⁵¹ between offers and bids and led to a “liquidity crisis.”²⁵² In response, the SEC affirmed its willingness to consider imposing some sort of quoting obligation on HFTs.²⁵³ Before analyzing different proposals in Part III, the following section reviews the SEC’s remedial rulemaking since May 6.

B. RULEMAKING AFTER MAY 6, 2010

The SEC’s initial focus was on aberrant trades and stub quotes, or as Chairman Schapiro once noted, on addressing the symptoms of the crash, not the root cause.²⁵⁴ This section analyzes the three major areas of rulemaking in direct response to the Flash Crash and argues that the SEC has implemented meaningful safeguards for situations of extreme volatility.

completely disappeared Where were the high frequency trading firms that typically dominate liquidity provision in those stocks?”); Concept Release, *supra* note 16, at 3608 (discussing the possibility that liquidity would “disappear when most needed by long-term investors and other market participants”).

248. The SEC noted that it plans to review the reliability of market data, the disparate trading rules between futures exchanges and securities markets, as well as the use of automated trading tools to execute large trades. *See* FINAL FINDINGS, *supra* note 10, at 6-8.

249. PRELIMINARY FINDINGS, *supra* note 6, at 5.

250. *Id.* at 34.

251. *Id.* at 2; *see also* FINAL FINDINGS, *supra* note 10, at 35-39.

252. *See* FINAL FINDINGS, *supra* note 10, at 4.

253. *See* Schapiro, Strengthening Structure, *supra* note 4; PRELIMINARY FINDINGS, *supra* note 6, at 7.

254. *See* Memorandum from Jennifer B. McHugh, Counsel to SEC Chairman, regarding a meeting with representatives of the Financial Services Forum (Oct. 6, 2010), *available at* <http://sec.gov/comments/4-606/4606-2806.pdf> (noting a talking point for Chairman Schapiro that stated: “The devastating impact of May 6 on the psyche of American investors really required that we take immediate steps to address the symptoms even before we clearly understood what the disease was.”).

1. Clearly Erroneous Trades

The Flash Crash revealed shortcomings in the exchanges' procedures to cancel aberrant trades. Generally, traders may contest a transaction within 30 minutes of execution if the price was so far removed from the prevailing market that it could only have been the result of an error.²⁵⁵ Since 2009, the exchanges have used uniform thresholds to determine these so-called clearly erroneous trades, ensuring a speedy resolution of contested transactions in a consistent manner. Nonetheless, under the exchanges' uniform rules, officials had discretion to cancel trades in situations of "extraordinary market conditions."²⁵⁶ Thus, on May 6, 2010, exchange officials were faced with hundreds of claims arising from unprecedented market conditions and no clear standard for how to address them. Ultimately, officials determined that trades completed at prices 60% above or below the immediately preceding transactions would be cancelled.²⁵⁷ As a result, 20,761 trades were cancelled, compared with a daily average of about 118 in the month prior.²⁵⁸

In the wake of the Flash Crash, exchange officials came to believe that the uniform rules' ambiguity for what constituted "extraordinary market conditions" may have added an element of uncertainty on May 6.²⁵⁹ The exchanges' spur-of-the-moment decision was also widely criticized as arbitrary.²⁶⁰ In June 2010, the exchanges proposed an

255. See, e.g., Nasdaq R. 11890; NYSE R. 128.

256. See, e.g., Notice of Filing of a Proposed Rule Change Governing Clearly Erroneous Executions, Exchange Act Release No. 62,886, 75 Fed. Reg. 36,732, 36,734 (June 28, 2010) (noting that, in cases of "extraordinary market conditions," exchanges had "broad discretion" to deviate from the uniform rules' numerical guidelines).

257. See PRELIMINARY FINDINGS, *supra* note 6, at 29.

258. *Id.* at 29-30.

259. See Order Granting Approval of Proposed Rule Changes Relating to Clearly Erroneous Transactions, Exchange Act Release No. 62,886, 75 Fed. Reg. 56,613, 56,614 (Sept. 16, 2010). *But see* FINAL FINDINGS, *supra* note 10, at 36 (noting that the uncertainty stemmed not from traders questioning whether the trades would be canceled, but from the belief that they would indeed get canceled).

260. See, e.g., DAVE CLIFF & LINDA NORTHROP, U.K. DEP'T OF BUS., INNOVATION & SKILLS, THE GLOBAL FINANCIAL MARKETS: AN ULTRA-LARGE-SCALE SYSTEMS PERSPECTIVE (2010), available at <http://www.bis.gov.uk/assets/bispartners/foresight/docs/computer-trading/11-1223-dr4-global-financial-markets-systems-perspective.pdf> ("[T]he means by which trades were selected for busting was argued by many to be arbitrary, after-the-fact rule-making. Some traders who had lost large amounts of money did not have their trades busted; some who had made handsome profits found

amendment to specifically address events of widespread errors.²⁶¹ Drafted in consultation with the SEC, the amendment left no room for discretion in extraordinary situations and established as a threshold a 30% change in price.²⁶² If there were another Flash Crash, investors would now have a clear indication of which trades would stand and which would be cancelled as “clearly erroneous.”

2. Circuit Breakers and Trade Limits

Within a week of the Flash Crash, the SEC was working to implement circuit breakers for individual stocks that experience rapid price swings. The SEC brokered a pact among exchanges to pause trading in stocks included in the S&P 500 Index whose price rose or fell 10% or more within five minutes.²⁶³ The pause would give traders five minutes to replenish the book with new orders. The goal was to bolster investor confidence by limiting short-term volatility.²⁶⁴ Thus far, however, the circuit breakers generally have been triggered by single trades that were subsequently canceled as clearly erroneous.²⁶⁵

their gains taken away.”); Peter Chapman, *Traders Digest the ‘Clearly Erroneous’*, TRADERS MAG., Sept. 2010, available at http://www.tradersmagazine.com/issues/23_314/traders-clearly-erroneous-trades-flash-crash-finra-sifma-sec-106329-1.html

261. See Order Granting Approval of Proposed Rule Changes Relating to Clearly Erroneous Transactions, Exchange Act Release No. 62,886, 75 Fed. Reg. 56,613, 56,613 (Sept. 16, 2010).

262. The rules require exchanges to cancel trades resulting from events that spark executions in more than 20 securities within a period of 5 minutes at prices that are 30% away from the reference price. See *id.* at 56,617.

263. See Order Granting Accelerated Approval to Proposed Rule Changes Relating to Trading Pauses Due to Extraordinary Market Volatility, Exchange Act Release No. 62,252, 75 Fed. Reg. 34,186, 34,188 (June 6, 2010); Jonathan Spicer & Rachele Younglai, *SEC Still Probing Market Plunge, But Reforms Coming*, REUTERS, May 11, 2010, available at <http://www.reuters.com/assets/print?aid=USTRE6495TX20100511> (“Under pressure from the SEC and the Obama administration, the exchanges have had to reconcile most of their differences and come up with ways to address their disparate trading systems.”).

264. See Press Release, SEC, SEC to Publish for Public Comment Stock-by-Stock Circuit Breaker Rule Proposals (May 18, 2010), available at <http://sec.gov/news/press/2010/2010-80.htm> (quoting Chairman Schapiro stating that the circuit breakers should “help to limit significant volatility” and “bolster investor protection”).

265. See Peter Chapman, *Nasdaq Targets ‘Nefarious’ Circuit Breaker Snafus*, TRADERS MAG. ONLINE NEWS, Sept. 3, 2010, <http://www.tradersmagazine.com>

According to some critics, this shows that the circuit breakers needlessly halt trading when a stock does not exhibit the extreme volatility that the rule was meant to address.²⁶⁶ Critics also fault the circuit breakers for failing to prevent aberrant trades from occurring in the first place.²⁶⁷

The SEC has been ambivalent about the effectiveness of the circuit breakers, simultaneously expanding the program to cover more securities while working to develop an alternative safeguard. Within three weeks of the initial implementation of the circuit breakers, the Commission sought to more than double the number of securities covered by the program to 1344 securities.²⁶⁸ In June 2011, the SEC further expanded the circuit breakers to cover all the other U.S.-listed stocks—primarily some 6000 companies with smaller capitalizations.²⁶⁹ To account for the more volatile trading of these smaller companies, the halt trigger was set at 30% for those with stocks priced over \$1 and 50% for those priced under \$1.²⁷⁰

All along, however, the SEC has worked on replacing the circuit breakers with so-called trading limits that would preclude executions outside a certain price range, without necessarily halting trading

/news/nasdaq-halts-circuit-breakers-106299-1.html?pg=2; Jonathan Spicer, *Analysis: New Circuit Breakers Trip, Stumble on Problems*, REUTERS, July 2, 2010, available at <http://www.reuters.com/assets/print?aid=USTRE66149H20100702>. But see Bill Alpert & Lisa Stryjewski, *Hitting the Switch on New Circuit Breakers*, BARRON'S, Aug. 13, 2011, at 18 (citing two examples of stocks that triggered the circuit breakers after reporting quarterly results that disappointed investors).

266. See, e.g., Letter from David Cushing, Dir. of Trading, Wellington Capital Mgmt. Co., to Elizabeth M. Murphy, Secretary, SEC (July 19, 2010), available at <http://sec.gov/comments/sr-bats-2010-016/bats2010016-2.pdf>.

267. See, e.g., Letter from Ann Vlcek, Managing Dir., SIFMA, to Elizabeth M. Murphy, Secretary, SEC (July 26, 2010), available at <http://sec.gov/comments/sr-bats-2010-016/bats2010016-8.pdf>.

268. See Press Release, SEC, SEC to Publish for Public Comment Proposed Rules Expanding Stock-by-Stock Circuit Breakers (June 30, 2010), available at <http://www.sec.gov/news/press/2010/2010-117.htm>. The SEC approved the expansion in September, covering all companies in the Russell 1000 Index plus 344 exchange-traded funds. See Order Approving Proposed Rule Changes Relating to Trading Pauses Due to Extraordinary Market Volatility, Exchange Act Release No. 62,884, 75 Fed. Reg. 56,618 (Sept. 16, 2010).

269. See Order Approving Proposed Rule Change Relating Expand Trading Pauses to All NMS Stocks, Exchange Act Release No. 64,735, 76 Fed. Reg. 38,243 (June 29, 2011).

270. See NYSE R. 80C(a)(ii), (iii).

altogether.²⁷¹ To some commentators, trading limits represent a solution to the problem of aberrant trades.²⁷² As proposed in April 2011, all stock exchanges would have to implement policies and procedures reasonably designed to prevent executions outside of a certain price range, which would likely eliminate almost all “clearly erroneous” transactions.²⁷³

In fact, the trading limit proposal goes further than the circuit breakers to prevent extreme volatility. Under the trading limit proposal, the allowable price range for transactions would be 5% for the largest 1000 companies and 290 ETFs, compared with 10% under the circuit breakers.²⁷⁴ For shares of smaller companies trading above \$1, the limit range would be 10%, compared with 30% under the circuit breakers.²⁷⁵ Notably, the range in each plan is calculated using a different reference point. Under the trading limit proposal, the range is generally calculated based on the average price of the stock in the preceding five minutes.²⁷⁶ In contrast, the circuit breaker thresholds are set at the lowest- and highest-priced trades in the preceding five minutes.²⁷⁷ As a result of the different reference point and narrower range, the proposed trading limits likely will be more restrictive than the circuit breakers.

Nonetheless, the limit proposal is designed to avoid unnecessary trading halts. Under the proposal, any best bid or offer for a security that was suddenly outside of the allowable range would trigger a so-called limit state for that security.²⁷⁸ The triggering quote would be flagged and disseminated to all market participants to draw interest from potential counterparties.²⁷⁹ Trading would continue as normal provided that, within 15 seconds, the triggering quote was either cancelled or executed

271. See Kristina Peterson & Jacob Bunge, ‘Limit’ Proposal is Gaining Favor Over Circuit Breakers, WALL ST. J., Sept. 24, 2010, at C5.

272. See, e.g., Letter from Gus Sauter, Chief Inv. Officer, Vanguard Grp., to Elizabeth Murphy, Secretary, SEC (June 22, 2011), available at <http://sec.gov/comments/4-631/4631-4.pdf> (“We believe that a structure that prevents erroneous trades is better than a structure in which an error by one market participant can halt trading for all participants.”).

273. See Notice of Filing of a National Market System Plan to Address Extraordinary Market Volatility, Exchange Act Release No. 64,547, 76 Fed. Reg. 31,647, 31,647 (June 1, 2011) [hereinafter Trading Limit Proposal].

274. See *id.* at 31,653.

275. See *id.*

276. See *id.* at 31,651.

277. See NYSE R. 80C(c).

278. See Trading Limit Proposal, *supra* note 273, at 31,652.

279. See *id.*

in full as a result of new counterparty interest.²⁸⁰ If, after 15 seconds, neither event occurred, trading would be halted for five minutes.²⁸¹ Simply put, the limit proposal is designed so that a trader's mistaken order or a fleeting lack of market liquidity is unlikely to result in a trading halt. Some commentators say this mechanism will be less disruptive than the circuit breakers.²⁸²

With the limit proposal, the SEC hopes to strengthen safeguards against market volatility while avoiding unwarranted trading interruptions.²⁸³ While the proposal has many supporters,²⁸⁴ the SEC has delayed its approval.²⁸⁵ Some commentators have criticized the plan for being so complex that it is likely to frustrate individual investors.²⁸⁶

280. *See id.*

281. *See id.*

282. *See, e.g.*, Letter from Ann L. Vlcek, Managing Dir., SIFMA, to Elizabeth M. Murphy, Secretary, SEC (June 22, 2011), *available at* <http://sec.gov/comments/4-631/4631-10.pdf> (noting that, in the "vast majority" of cases, trading will be resumed within 5 seconds).

283. *See* Press Release, SEC, SEC Announces Filing of Limit Up-Limit Down Proposal to Address Extraordinary Market Volatility (Apr. 5, 2011) (quoting Chairman Schapiro as saying: "Upgrading our trading parameters will help our markets retain the confidence of investors and companies.").

284. *See* James Armstrong, *Experts Embrace Limit Up/Limit Down*, TRADERS MAG. ONLINE NEWS, Sept. 23, 2011, <http://www.tradersmagazine.com/news/limit-sec-sifma-109436-1.html>; Peter Chapman, *Thumbs Up for Limit Up/Limit Down, but Concerns Remain (Part II)*, TRADERS MAG. ONLINE NEWS, July 22, 2011, <http://www.tradersmagazine.com/news/sec-limit-up-limit-down-flash-crash-107883-1.html?pg=1> (both reporting that traders generally support the plan with some minor amendments).

285. The SEC currently plans to decide on the proposal by Nov. 28, 2011. *See* Notice of Designation of a Longer Period for Commission Action on the National Market System Plan to Address Extraordinary Market Volatility, 76 Fed. Reg. 61,121, 61,122 (Oct. 3, 2011). The plan was originally scheduled to replace the circuit breakers by Aug. 11, 2011. *See* Notice of Immediate Effectiveness of Proposed Rule to Extend Until January 31, 2012 the Pilot for Trading Pauses in Individual Securities Due to Extraordinary Market Volatility, Exchange Act Release No. 65,090, 76 Fed. Reg. 50,790 (Aug. 16, 2011).

286. *See, e.g.*, Letters to Elizabeth M. Murphy, Secretary, SEC, from Leonard J. Amoroso, Gen. Counsel, Knight Capital Grp. Inc. (June 22, 2011), *available at* <http://sec.gov/comments/4-631/4631-9.pdf> (arguing that the plan could actually erode confidence in the markets as individual investors try to execute trades during a Limit State without fully understanding the plan); Sal Arnuk, Joe Saluzzi & Paul Zajac, Themis Trading LLC (June 22, 2011), *available at* <http://sec.gov/comments/4-631/4631-18.pdf> (arguing that the calculation of the price bands should be as simple as possible to enhance investor confidence).

Others suggest that the 15-second limit state is too short for most investors to respond and instead caters to HFTs with high-speed trading systems.²⁸⁷ Neither the exchanges nor the SEC have indicated if the proposed plan will be altered to address these concerns. For now, trading limits are unlikely to be fully implemented across all stocks before September 2012.²⁸⁸

To further complicate matters, the SEC is also considering amending the market-wide circuit breaker that traces its roots to the 1987 Stock Market Crash.²⁸⁹ As currently codified in NYSE Rule 80B, the market-wide circuit breaker halts trading in all U.S.-listed stocks for at least 30 minutes if, before 2:30 p.m. Eastern Standard Time, the Dow average drops about 10% or more from the previous day's close.²⁹⁰ Before an amendment in 1998, the rule set the trigger price range at approximately 4%.²⁹¹ In approving the 1998 amendment widening the price range, the Commission stated that the market-wide circuit breaker should only be triggered in extreme circumstances, such as "those rare

287. See, e.g., Letters to Elizabeth M. Murphy, Secretary, SEC, from Peter J. Driscoll, a former chairman of the Sec. Traders Ass'n, (June 17, 2011), available at <http://sec.gov/comments/4-631/4631-2.pdf> ("This extremely short non-executable quote condition period would allow only the fastest of trading participants to participate, providing them another advantage over more traditional participants."); Karrie McMillan, Gen. Counsel, Inv. Co. Ins. (June 22, 2011), available at <http://sec.gov/comments/4-631/4631-5.pdf> (suggesting that the period be extended to 30 seconds because the plan, as proposed, fails to give "most investors" sufficient time to respond to a limit state).

288. As proposed, the limit plan would be implemented in two phases over the course of 10 months. The first phase, covering shares of the largest companies, would be implemented four months after approval. The second phase would be implemented six months later. If the SEC approves the plan as proposed by the end of November, full implementation would not be completed until September 2012. See Trading Limit Proposal, *supra* note 273, at 31,648.

289. See Press Release, SEC to Publish for Public Comment Updated Market-Wide Circuit Breaker Proposals to Address Extraordinary Market Volatility (Sept. 27, 2011), available at <http://www.sec.gov/news/press/2011/2011-190.htm>.

290. See NYSE R. 80B(a). The other exchanges have rules that merely reference the NYSE's Rule. See, e.g., Nasdaq R. 4121.

291. Technically, under the old NYSE 80B Rule, the market-wide circuit breaker was triggered if the Dow average fell 350 points from the previous day's close, which represented about 4% of the 8000-point level of the Dow average when the threshold was set in April 1998. See Order Granting Approval to Modifications to the Market-Wide Circuit Breaker Provisions, Exchange Act Release No. 39,846, 63 Fed. Reg. 18,477, 18,479 (Apr. 15, 1998).

occasions when the market decline is of historic proportions and, as a result, the markets and supporting technology face broad disorder.”²⁹² The 10% range set in 1998 has never been triggered.²⁹³

By contrast, the SEC is now considering a plan that would effectively narrow the trigger price range. Under the plan, trading in all stocks would be halted for 15 minutes if the S&P 500 Index fell 7% from the previous day’s close.²⁹⁴ The proposed circuit breaker would be in effect until 3:25 p.m. to provide protection for a longer part of the trading session than the current rule.²⁹⁵ In proposing the amendment, the NYSE noted that the Flash Crash showed that the old trigger price range was too wide.²⁹⁶

Yet the plan represents more than a recalibration of the size of the decline that would qualify as “historic proportions.” In light of the Commission’s rulemaking with regard to single-stock circuit breakers and the trading limit proposal, the plan is emblematic of the SEC’s willingness to slow down, if not halt, trading. For single stocks, under the circuit breakers or the trading limit proposal, the pauses come at the first sign of trouble. For the market overall, the new plan would have halted trading as many as eight times during the worst of the 2008 financial crisis,²⁹⁷ including on some less notable days when the market’s drop was attributed to monthly government reports indicating that the economy had suddenly slowed.²⁹⁸

292. *Id.*

293. *See* Notice of Proposed Rule Change Amending Exchange Rule 80B to Revise the Current Methodology For Determining When to Halt Trading, Exchange Act Release No. 65,427, 76 Fed. Reg. 61,457, 61,458 (Oct. 4, 2011).

294. *See id.*

295. Extending the period in which the circuit breaker is in effect can be very powerful. Under the current rule, after 2:30 p.m., the Dow average has to drop 20% to trigger a trading halt. In contrast, under the proposal, a halt would be triggered with a 7% decline in the S&P 500 Index prior to 3:26 p.m. *Id.*

296. *See id.*

297. The S&P 500 Index had an intra-day drop of more than 7% from the previous day’s close on eight occasions, according to Bloomberg data on file with author. The data does not indicate when the index reached its low for the day and it is therefore possible that the drop would have come too late to trigger a trading halt.

298. *See, e.g.,* Lynn Thomasson, *U.S. Stocks Drop, Ending 5-Day Rally; GE, JPMorgan Shares Fall*, BLOOMBERG, Dec. 1, 2008 (attributing drop to a report showing that manufacturing contracted at the fastest pace in 26 years); Elizabeth Stanton, *U.S. Stocks Tumble, S&P 500 Drops to Lowest Level Since 2003*, BLOOMBERG, Oct. 22, 2008 (attributing drop to concern of a worsening global economic slump as oil prices tumbled).

3. Market Makers' Stub Quotes

Finally, the SEC pushed the exchanges to ban market makers' use of stub quotes. Market makers are now required to maintain quotes that are within a certain percentage of the national best bid or offer.²⁹⁹ For large-company stocks, the percentage is generally set at 9.5%.³⁰⁰ For small company stocks, the threshold is 29.5%.³⁰¹ Put differently, the ranges are set just marginally narrower than those used for the single-stock circuit breakers.

The elimination of stub quotes represents the SEC's first effort to revamp market makers' affirmative obligations, after their substantial erosion in the past 10 years.³⁰² The SEC took a markedly modest approach, however. The exchanges were not forced to resurrect the old Nasdaq requirement that prices be "reasonably related to the prevailing market." Nor did they require market makers to provide quotes at the best bid or offer a certain percent of the time, which was reportedly under consideration at one point.³⁰³ Neither does the new rule require market makers to minimize order imbalances or provide price continuity, as NYSE Rule 104 demands.³⁰⁴ In fact, the new quoting obligations do not even ensure against "clearly erroneous" trades.³⁰⁵

299. See Order Granting Accelerated Approval to Proposed Rule Changes to Enhance Quotation Standards for Market Makers, Exchange Act Release No. 63,255, 75 Fed. Reg. 69,484 (Nov. 12, 2010).

300. See Bats R. 11.8(d)(2)(E); Nasdaq R. 4613(a)(2)(E); Nasdaq BX R. 4613(a)(2)(E); NSX R. 11.8(a)(1)(B)(v); NYSE Arca R. 7.23(a)(1)(B)(iv); NYSE R. 104(a)(1)(B)(iv).

301. See Bats R. 11.8(d)(2)(E); Nasdaq R. 4613(a)(2)(E); Nasdaq BX R. 4613(a)(2)(E); NSX R. 11.8(a)(1)(B)(v); NYSE Arca R. 7.23(a)(1)(B)(iv); NYSE R. 104(a)(1)(B)(iv).

302. See *supra* notes 122-128 and accompanying text.

303. See James Ramage, *With Stub Quote Elimination, New Sticks and Carrots an Issue for Market Makers*, TRADERS MAG. ONLINE NEWS, July 14, 2010, <http://www.tradersmagazine.com/news/stub-quote-market-maker-sec-finra-circuit-breaker-106073-1.html?zkPrintable=true> (reporting other elements considered). It seems the SEC settled for the lowest common denominator among exchanges since Nasdaq decided to provide its market makers a system to facilitate compliance with the rule that automatically updates quotes to a tighter range of 4%. See Order Granting Approval to Enhance Quotation Standards, *supra* note 299, at 69,485.

304. See *supra* notes 216-7 and accompanying text.

305. At most, market makers are required to maintain a quote within a 9.5% range from a security's lowest- and highest-priced trade in the preceding five minutes. By

Notwithstanding the shortcomings of the new quoting rules, the SEC's remedial measures taken as a whole provide significant safeguards against extreme volatility. If the circuit breakers had been in place on May 6, 2010, the worst of the declines in shares of Procter & Gamble could have been avoided, along with the steepest losses in another three of the Dow's 30 stocks.³⁰⁶ Trading in many widely held stocks such as Apple Inc., Amazon.com Inc., Costco Wholesale Corp., and Philip Morris International Inc. would have likely been halted because their prices fell more than 60% between 2:40 p.m. and 3 p.m.³⁰⁷ Trading in shares of another 37 companies in the S&P 500 Index might have been halted as well, since they fell more than 15% from their opening price.³⁰⁸ Although only a rough guide, the data suggest that the single-stock circuit breakers could have prevented some of the more dramatic declines on May 6.

By interrupting trading, the single-stock circuit breakers provide investors with a clear notice of the lack of liquidity in a given security. This can help traders and investors make informed decisions on whether to continue trading during times of market stress. The interruptions also avoid triggering stop-loss orders, which are commonly used by retail investors. Stop-loss orders instruct a broker to sell certain shares at the prevailing market value if the stock's price drops below a specified threshold. In the Flash Crash, this type of order resulted in about \$200 million in losses for retail investors once the market recovered.³⁰⁹

Nevertheless, the trading limit proposal would likely to be more effective than the single-stock circuit breakers since the permissible range of prices under the limit proposal would be more restrictive.

contrast, a move of as little as 3% from the preceding trade can be deemed a clearly erroneous trade. *Compare* Nasdaq R. 4613(a) *with* Nasdaq R. 11890(c).

306. See PRELIMINARY FINDINGS, *supra* note 6, at 21. Procter & Gamble, 3M Co., Hewlett-Packard Co., and General Electric Co. all fell more than 10% between 2:40 p.m. and 2:47 p.m. *Id.*

307. See PRELIMINARY FINDINGS, *supra* note 6, at 49.

308. The estimate is based on Bloomberg data on file with the author. Among the largest companies in the group are Avon Products Inc., Dow Chemical Corp., and Ford Motor Co., according to Bloomberg data. The data here excludes the clearly erroneous trades that were subsequently voided, because such trades are almost immediately expunged from the consolidated market data provided by the exchanges. As a result, the data here understates the number of stocks that might have been halted. See generally Alpert & Stryjewski, *supra* note 265 (reporting on the difficulty of testing the efficacy of the circuit breakers using historical data).

309. See *supra* note 4 and accompanying text.

Based on May 6, 2010, data that exclude the most egregious pricing anomalies, the proposed limits would have been triggered 143 times for stocks in the Russell 1000 Index and 535 times for the market overall.³¹⁰ This probably would have resulted in trading halts for an estimated 439 stocks.³¹¹ The data suggests that the proposed limits would provide a clear alert to investors about the generalized lack of liquidity.

In any case, the proposed market-wide circuit breaker would have halted trading for 15 minutes. The halt would have provided the exchanges' systems a needed respite from the surge in volume. The halt would have also avoided the worst of the panic on May 6—although it might also have precluded the quick recovery starting at 2:48 p.m. While it is impossible to determine the exact effect of all these different safeguards, it is clear that if there were another Flash Crash, it would be slower and, for many stocks at least, less extreme.

One line of criticism might fault the reforms for addressing merely the symptoms, instead of fostering market stability. Nonetheless, given that no two market crashes will be alike, mitigating the impact of extreme volatility seems worthwhile. The next section considers whether proposals from regulators and market participants could go further and foster a more resilient market.

III. TOWARD A NEW MARKET (MAKER)

A. PROPOSALS FOR HEIGHTENED MARKET MAKER OBLIGATIONS

Three general proposals to amend market maker rules emerge from regulators' remarks and the more than 340 comment letters filed with the SEC since January 2010, when the SEC published its Concept Release announcing a broad review of trading regulation.³¹² As

310. See Alpert & Stryjewski, *supra* note 265.

311. *Id.*

312. See generally *Comments on Concept Release on Equity Market Structure*, <http://sec.gov/comments/s7-02-10/s70210.shtml> (last visited Nov. 3, 2011) (listing 230 letters); *Comments on: Joint CFTC-SEC Advisory Committee on Emerging Regulatory Issues*, <http://sec.gov/comments/265-26/265-26.shtml> (last visited Nov. 3, 2011) (listing 57 letters). In addition, the SEC received 58 comment letters to the three remedial reforms discussed in the proceeding section. See generally *Comments on NYSE Rulemaking*, File No. SR-NYSE-2010-49, File No. SR-NYSE-2010-49, <http://www.sec.gov/comments/sr-nyse-2010-49/nyse201049.shtml> (last visited Nov. 3, 2011) (listing 21 letters); File No. SR-NYSE-2010-47, <http://www.sec.gov/comments/sr-nyse-2010-47/>

explained in detail below, Proposal 1 would extend market maker obligations to HFTs on the ground that they enjoy an unfair advantage over other investors. Proposal 2 would significantly increase quoting obligations on market makers to ensure market stability. Proposal 3 would slow trading and limit rebates to rein in predatory tactics by HFTs.

As characterized here, these proposals are merely heuristic composites based on the comment letters and do not represent concrete plans that the SEC could adopt in whole. The point is to illustrate how certain proposals risk unwelcome results. In general, this paper argues that the proposals would likely raise transaction costs for investors without providing a meaningful safeguard against extraordinary volatility. I suggest an alternative approach in Part C that avoids these pitfalls.

1. Proposal 1: Requiring All HFTs to Register as Market Makers

In her public remarks since the Flash Crash, SEC Chairman Schapiro has outlined a general plan that would impose affirmative and negative obligations on HFTs.³¹³ The animating principle, which she has called “a basic premise” behind exchange regulation, is that “professional trading firms with the best access to the markets . . . should be subject to obligations to trade in ways that support the stability and fairness of the markets.”³¹⁴ Although her remarks do not specify what “best access” would mean, the SEC’s Concept Release suggests the term could be construed to mean access to an exchange through the use of co-location services, which give users a split-second advantage over non-users.³¹⁵

This proposal would break with the common framework of market maker regulation by imposing obligations based on the use of a popular exchange service.³¹⁶ Under prior regimes, such obligations typically

47/nyse201047.shtml (last visited Nov. 3, 2011) (listing eight letters); File No. SR-NYSE-2010-39, <http://www.sec.gov/comments/sr-nyse-2010-39/nyse201039.shtml> (last visited Nov. 3, 2011) (listing 29 letters).

313. The SEC has yet to issue a concrete proposal, although it convened a roundtable in June 2010 to discuss the topic.

314. Schapiro, *Strengthening Structure*, *supra* note 4.

315. *See* Concept Release, *supra* note 16, at 3610-11.

316. In 2010, the NYSE built a \$250 million, 400,000-square-foot facility to house its data servers and accommodate customer demand for co-location services. The sheer

applied only to firms that voluntarily registered as market makers with an exchange.³¹⁷ In contrast, Proposal 1 would force any firm that trades for its own account and uses co-location to be subject to the obligations of market makers.

Under this proposal, HFTs would be under a general mandate to provide liquidity in times of market stress.³¹⁸ Such an obligation is of a piece with the Exchange Act's requirement that market makers provide a "regular or continuous" quotation to buy and sell a stock.³¹⁹ Chairman Schapiro would go a step further, however, with a mandate to provide price continuity, meaning that HFTs would be required to risk their capital to minimize, as far as reasonably practicable, the difference in price between successive trades.³²⁰ This traces back to the Saperstein Interpretation and has only previously applied to NYSE specialists, and now to DMMs.³²¹

In addition, HFTs would have a negative obligation to refrain from "trading in ways that would exacerbate price moves—such as aggressively taking out bids during a price decline and thereby driving prices even lower."³²² Stated differently, exchanges would be able to restrict the use of certain trading tactics when market prices have climbed or dropped more than a specified percentage.

size of the facility—almost big enough to fit seven football fields—illustrates the widespread use of co-location. *See* Tour of the NYSE Mahwah Facility, REUTERS, <http://hft.thomsonreuters.com/2009/11/20/tour-of-the-nyses-mahwah-facility/> (last visited Nov. 6, 2011).

317. *See, e.g.*, Bats R. 11.7 (providing that members *may* register as market makers) (emphasis added); CBSX R. 50.3 (defining market makers as a firm that *agrees* to fulfill certain obligations) (emphasis added); NYSE Arca R. 7.22(e) (providing that a firm may *voluntarily withdraw* its registration as a market maker with a one-day notice) (emphasis added).

318. *See* Schapiro, Strengthening Structure, *supra* note 4 ("The issue . . . is whether the firms that effectively act as market makers during normal times should have any obligation to support the market in reasonable ways in tough times.").

319. *See* 15 U.S.C. § 78c(a)(38) (2006).

320. *See* Schapiro, Security Traders, *supra* note 22 ("[H]igh frequency trading firms are subject to very little in the way of obligations either to protect that stability by promoting reasonable price continuity in tough times, or to refrain from exacerbating price volatility.").

321. *See supra* notes 56, 70-75, 216-7 and accompanying text.

322. Schapiro, Strengthening Structure, *supra* note 4.

2. *Proposal 2: Encouraging HFTs to Register
as Market Makers Through Greater Privileges*

The second proposal is based largely on suggestions made to the SEC by five of the largest market makers and two influential senators.³²³ These commentators correctly note that most exchanges establish only minimal obligations on market makers, and they argue that heightened obligations would bolster investor confidence.³²⁴

Under this proposal, market makers would have to maintain offers to buy and sell a stock at levels that meet various price and size thresholds.³²⁵ In particular, market makers would have to (a) quote at the best price a certain percentage of the time; (b) submit quotes at prices within a certain percentage from the national best bid or offer;³²⁶ (c) quote with a minimum size and at multiple prices; and (d) make markets in a minimum number of stocks.³²⁷ Market makers would also have to meet higher capital requirements, since they would be required to take on greater trading risks in order to comply with these four elements.³²⁸

323. See generally Letter from Sen. Carl Levin to Elizabeth M. Murphy, Secretary, SEC (Apr. 8, 2011) [hereinafter Levin Letter], available at <http://sec.gov/comments/265-26/265-26.shtml>; Joint Letter from John A. McCarthy, Gen. Counsel, Getco LLC, Christopher R. Concannon, Partner, Virtu Fin. LLC & Leonard J. Amoruso, Gen. Counsel, Knight Capital Grp. Inc., to Robert Cook, Dir., SEC Div. of Trading & Mkts. (July 9, 2010) [hereinafter Market Makers' Letter], available at <http://sesc.gov/comments/s7-02-10/s70210.shtml>; Thomas Peterffy, Chairman, Interactive Brokers Grp. Inc., Comments Before the Joint CFTC-SEC Advisory Comm. on Emerging Regulatory Issues (June 22, 2010), available at <http://sec.gov/comments/265-26/265-26.shtml>; Goldman Sachs Letter, *supra* note 201; Schumer Letter, *supra* note 20.

324. See Market Makers' Letter, *supra* note 323.

325. *Id.*

326. As an alternative, some commentators have proposed resurrecting the old Nasdaq standard for quotes to be "reasonably related to the market," discussed in Part I.B.1. Presumably, the range for permissible quotes would be similar to the price ranges used for the clearly erroneous rules, instead of the wider range used in the elimination of stub quotes. See RECOMMENDATIONS REGARDING REGULATORY RESPONSES TO THE MARKET EVENTS OF MAY 6, 2010, JOINT CFTC-SEC ADVISORY COMM. ON EMERGING REGULATORY ISSUES 9 (2011); see also *supra* Parts II.B.1 and 3 for discussions of the clearly erroneous rules and the elimination of stub quotes.

327. Sen. Schumer's recommendations included points (a)-(c). However, he would require a firm that makes a market in more than 25 stocks to register as a market maker with an exchange. See Schumer Letter, *supra* note 20.

328. See Market Makers' Letter, *supra* note 323.

Unlike Proposal 1, this plan would not require HFTs to register as market makers. Rather, the proposal implies that some firms would be willing to comply with these obligations in return for an appropriate set of benefits.³²⁹ Although the proposal is not specific, these could take the form of higher rebates or lower fees, exemptions from certain prohibitions on executing short sales,³³⁰ or even benefits in the priority of trade execution, as DMMs at the NYSE now enjoy.³³¹ Proponents of Proposal 2, in essence, urge the SEC to devise a new mix of incentives and obligations to ensure market makers continue to provide liquidity in times of market stress.³³²

3. *Proposal 3: Slow Down Markets and Give Rebates to Investors*

Finally, Proposal 3 emerges mostly from institutional and retail investor complaints about HFTs and exchange rebate policies. In the opinions of these investors, HFTs provide flickering quotes that are either too fleeting to be useful for an institution trying to gauge supply and demand for a stock,³³³ or are frustrating for the retail investor who is

329. *Id.* (noting that the heightened obligations should be accompanied by “appropriate economic and market structure benefits”); Ramage, *supra* note 303 (quoting Leonard Amoruso, general counsel of Knight Capital Group, as saying: “If you require market makers to have a maximum quoted spread . . . you are asking them to take on additional risk and liability. . . . It’s hard to have that conversation without having a parallel conversation related to benefits.”).

330. For example, market makers have greater flexibility to effect short sales, which are sales of borrowed shares with the obligation to deliver the loan within a certain period of time. *See* 17 C.F.R. § 242.203(b)(2)(iii) (2011) (exempting market maker from locate requirement); *id.* § 242.204(a)(3) (granting market makers two more days than regular traders to deliver the borrowed shares).

331. *See supra* notes 216-22 and accompanying text.

332. *See, e.g.,* Levin Letter, *supra* note 323 (“The SEC and CFTC should work together with their regulated entities to develop potential incentives for firms to stay in the markets during times of peak stress.”); JOINT CFTC-SEC ADVISORY COMM. ON EMERGING REGULATORY ISSUES, *supra* note 326 (“[T]he Commission should consider encouraging, through incentives or regulation, persons who regularly implement market [sic] maker strategies to maintain best buy and sell quotations which are ‘reasonably related to the market.’”).

333. *See, e.g.,* Kevin Cronin, Global Head of Equity Trading, Invesco Ltd., Statement Before SEC Market Structure Roundtable (June 2, 2010), *available at* <http://www.sec.gov/comments/4-602/4602-11.pdf> (“We are concerned that much of the order flow from these types of orders only provide ‘noise’ to the markets and can

unable to execute a trade at the displayed price.³³⁴ More importantly, these investors claim that HFTs prey upon them by detecting their orders and quickly trading ahead of them.³³⁵

Instead of a strict regime of affirmative or negative obligations, these commentators argue that markets should be restructured to facilitate trading by institutions and retail investors.³³⁶ In particular, these commentators urge the SEC to require that orders stay in effect for a minimum period.³³⁷ Although this requirement would apply to all market participants, it would have the biggest impact on HFTs, who would be forced to abandon their rapid-fire trading strategies. According to proponents, the benefit would be greater protection for institutional and retail investors against HFTs' predatory strategies.³³⁸

In addition, multiple commentators urge the SEC to reexamine rebate policies.³³⁹ Most of these commentators stop short of calling for a lower cap on the fees used to fund rebates, let alone a ban on rebates.³⁴⁰ Instead, a common proposal is for brokerages to pass on the rebates they receive to customers.³⁴¹ In theory, this change would mitigate conflicts

provide a confusing and disjointed indication of the current [national best bid or offer].”).

334. See, e.g., Joint Letter from Christopher Nagy, Managing Dir., John S. Markle, Gen. Counsel, TD Ameritrade Holding Corp., to Elizabeth M. Murphy, Secretary, SEC (Apr. 21, 2010) [hereinafter TD Ameritrade Letter], available at <http://sec.gov/comments/s7-02-10/s70210-124.pdf> (“[T]he rapid order placement and high cancellation rates have only exacerbated flickering quotations, which undermine retail investor confidence in the execution quality they obtain.”).

335. See, e.g., Joint Letter from Sal L. Arnuk & Joseph Saluzzi, Founders, Themis Trading LLC, to Elizabeth M. Murphy, Secretary, SEC (Apr. 21, 2010) <http://sec.gov/comments/s7-02-10/s70210-131.pdf> (“HFT firms . . . detect [signs of a large order] and interposition themselves with the help of their lightning fast technology . . .”); see also Concept Release, *supra* note 16, at 3608 (discussing “parasitic” order anticipation strategies).

336. See, e.g., Letter from Se. Asset Mgmt., *supra* note 196 (“Current market structure is flawed because unfair structural advantages permit short-term professional traders to insert themselves between long-term buyers and sellers.”).

337. See *id.* (urging a 1 second duration); TD Ameritrade Letter, *supra* note 334.

338. See, e.g., Cronin, *supra* note 333 (discussing the use of pinging strategies to detect large orders).

339. See, e.g., SIFMA Letter I, *supra* note 195; ICI Letter, *supra* note 200.

340. See, e.g., ICI Letter, *supra* note 200 (“The Institute does not recommend that liquidity rebates be prohibited at this time, as more should be learned about the effects of this practice.”).

341. See, e.g., Goldman Sachs Letter, *supra* note 201; Letter from Se. Asset Mgmt., *supra* note 196.

of interest between brokers and their clients. In practice, however, it would likely cause exchanges to reconsider their use of rebates in ways that, as discussed below, are likely to undermine the intent of Proposal 3.

B. EVALUATION OF THE THREE PROPOSALS

The Exchange Act establishes a range of policy considerations to guide the Commission's rulemaking, including protecting investors and the public interest, promoting fair competition, and fostering efficient markets and capital formation.³⁴² These considerations are often in tension with each other, making it difficult to evaluate a proposed rule.³⁴³ To simplify the analysis, I consider the three proposals through the prism of the Flash Crash. The guiding question is whether a proposal would foster an efficient market that provides investors an assurance of liquidity at a fair price. Not only is this question of a piece with the goals of the Exchange Act, but it goes to bedrock notions of an exchange as a central venue where buyers and sellers gather and compete to trade.³⁴⁴

Viewed in this light, the three proposals are ill-advised. Although each has merit, the proposals would likely either raise transaction costs or award a unique advantage to a specific segment of traders.

1. Proposal 1: Mandatory Registration for All HFTs Will Raise Transaction Costs

The first proposal favors market stability to the detriment of other goals established by the Exchange Act. It first conscripts any firm that uses co-location and trades for its own account as a market maker, and

342. See 15 U.S.C. § 77b(b) (2006) (mandating that the SEC consider, "in addition to the protection of investors, whether the action will promote efficiency, competition, and capital formation.").

343. The SEC has frequently noted the difficulty of reconciling the Exchange Act's multiple policy goals. See, e.g., Concept Release, *supra* note 16, at 3579 (citing Concept Release on Fragmentation, Exchange Act Release No. 42,450, 65 Fed. Reg. 10,577, 10,580 (Feb. 28, 2000)).

344. See *supra* notes 7-9 and accompanying text; HARRIS, *supra* note 7, at 5-6 ("Trading is a search problem. Buyers must find sellers, and sellers must find buyers. Every trader wants to trade at a good price. . . . Exchanges . . . design markets to minimize the search costs of trading.").

then redefines market maker obligations to focus on minimizing price swings. For the first time, market makers would be required to provide price continuity and to refrain from trading in ways that exacerbate volatility. With dozens more firms required to risk their capital to damp volatility, the proposal aims to foster market stability and buttress investor confidence.³⁴⁵

The proposal, however, would likely result in significant costs or distortions to competition. First, there is the possibility that some HFTs will find substitutes to avoid triggering the obligations. After all, even the current voluntary market maker programs with minimal obligations are not popular. The ranks at Nasdaq have shrunk to 170 from 300 in 2007, and no more than 20 market makers are registered on any of the other four exchanges that disclose their rosters.³⁴⁶ The risk is that HFTs would shift away from the exchanges' co-location services and instead use unregulated third-party services. A similar problem arises with a senator's recommendation that HFTs be required to register if they make markets in more than 25 stocks.³⁴⁷ In that case, HFTs would shift their trading to other markets to avoid triggering the requirement, particularly given the stringent obligations of Proposal 1. As a result, liquidity on stock exchanges might actually decrease as HFTs withdraw from the market altogether.³⁴⁸

345. See Schapiro, Strengthening Structure, *supra* note 4 (noting that the goal of imposing market maker obligations on HFTs is to promote investor confidence in the integrity and stability of the markets).

346. See Chapman & Ramage, *supra* note 149. As of October 2011, Amex had 4 registered market makers; the CBSX had 5; the NYSE had 7 DMMs; and NYSE Arca had 19. See generally CBSX, Trading Permits, DPM/RMMs FAQs, <http://www.cbsx.com/membership/FAQ.aspx> (last visited Jan. 14, 2012); NYSE Equities Membership Types, <http://usequities.nyx.com/membership/nyse-equities/types> (listing Amex and NYSE DMMs) (last visited Jan. 14, 2012); NYSE Arca Equities Membership Types, <http://usequities.nyx.com/membership/nyse-arca-equities/types> (last visited Jan. 14, 2012).

347. See Schumer Letter, *supra* note 20.

348. SEC Commissioner Troy A. Paredes alluded to this scenario during a speech in September 2010 with the following remarks:

It would be unfortunate for investors if, as a result of burdening a wide swath of liquidity providers with new obligations, the quality of our markets actually deteriorated during the overwhelming majority of trading days when liquidity would be plentiful in the absence of expanded market maker obligations.

Troy A. Paredes, Comm'r, SEC, Remarks at the Security Traders Association 77th Annual Conference and Business Meeting (Sept. 24, 2010), available at <http://sec.gov/news/speech/2010/spch092410tap.htm>.

Second, the HFTs that do accept the obligations will seek to offset the costs of compliance. One likely scenario, given HFTs' clout with the exchanges as major providers of order flow, is that HFTs would push for higher rebates. Alternatively, HFTs might seek larger trading profits by submitting buy and sell orders that are further apart in price. Ultimately, investors bear the cost, either through higher trading fees to fund rebates or through wider spreads. As SEC Commissioner Troy Paredes has noted, these are costs that investors would have to pay daily, even when liquidity might otherwise be plentiful.³⁴⁹

Another difficulty with this proposal is that it relies on a flawed analogy between specialists and HFTs. As noted in Part I.A, specialists used to maintain the book of pending orders to buy and sell a stock, and were therefore aware of shifts in demand and supply before other traders.³⁵⁰ Specialists were also in a position to capitalize upon that information immediately. Drawing an implicit analogy with specialists, the SEC has noted that HFTs have an advantage over investors because they can afford high-speed computer systems, data feeds that provide trade information faster than the SEC-regulated consolidated quotation feed, and co-location services that allow almost instantaneous executions.³⁵¹

Nonetheless, specialists had their privileges by dint of exchange rules, whereas HFTs acquired their advantages by paying for exchange services that, under Section 6 of the Exchange Act, have to be made available to the public on non-discriminatory terms.³⁵² The SEC has repeatedly approved the exchanges' plans to sell data feeds and co-location services after ensuring that they do not confer an unfair advantage.³⁵³ These reviews of exchange products and services are the

349. *See id.* ("During periods of stability, the value of subjecting high frequency traders to market maker obligations is not self-evident.").

350. *See supra* notes 44-49 and accompanying text.

351. *See* Concept Release, *supra* note 16, at 3606-11.

352. *See* 15 U.S.C. § 78f(b)(4)-(5) (2006) (requiring exchanges to provide services in a manner that is not unfairly discriminatory, and requiring fees to be allocated in an equitable and reasonable manner).

353. *See, e.g.,* Order Approving Proposed Rule Change Relating to NYSE Arca Data, Exchange Act Release No. 59,039, 73 Fed. Reg. 74,770 (Dec. 9, 2008) ("The Commission . . . believes that the existence of significant competition [for the sale of market data] provides a substantial basis for finding that the terms of an exchange's fee proposal are equitable, fair, reasonable, and not unreasonably or unfairly discriminatory."); Order Approving a Proposed NYSE Rule Change to Reflect Fees Charged for Co-Location Services, Exchange Act Release No. 62,960, 75 Fed. Reg.

proper forum for the Commission to address any perceived unfairness. By addressing them indirectly through HFT regulation, the Commission risks increasing transaction costs for investors.

2. *Proposal 2: Greater Privileges Create Unfair Advantages*

The second proposal would greatly increase market maker obligations at the risk of needlessly awarding special privileges for a class of traders. Under the plan, market makers would have to submit sizable quotes at the best price for a certain amount of time. They would also have to make markets in a minimum number of stocks and hold more capital to ensure that they can provide liquidity during times of stress. In return, they would receive commensurate economic or regulatory benefits.

There are two main lines of criticism for this proposal. First, the privileges needed to offset the stringent obligations are likely to raise transaction costs for investors.³⁵⁴ Second, Proposal 2 is inconsistent with other policy goals established by the Exchange Act, in particular the requirement that the SEC promote fair competition among brokerages and among exchanges.³⁵⁵

The first line of criticism is very similar to objections raised to Proposal 1, discussed above. As with Proposal 1, investors would ultimately bear the costs of market makers' new obligations and privileges in the form of higher trading fees or wider spreads. Critics also caution against providing softer, non-monetary benefits such as

59,310, 59,311 (Sept. 27, 2010) (“[T]he Commission believes that [the services] . . . are not unfairly discriminatory because NYSE makes the co-location services uniformly available to all Users who voluntarily request them and pay the fees as detailed in the proposal.”).

354. See, e.g., Paredes, *supra* note 348.

355. Section 11A of the Exchange Act states in relevant part:

It is in the public interest and appropriate for the protection of investors and the maintenance of fair and orderly markets to assure . . . fair competition among brokers and dealers, among exchange markets, and between exchange markets and markets other than exchange markets.

15 U.S.C. § 78k-1(a)(1)(C)(ii) (2006); see also 15 U.S.C. § 78c(f) (2010) (requiring the SEC to consider whether its rules are necessary and appropriate for the public interest and to promote efficiency, capital formation, and competition).

exemptions from certain trading restrictions.³⁵⁶ They contend that those privileges often lead to abuses³⁵⁷ and degrade competition.³⁵⁸

The issue is whether these costs are justified by the potential benefit of having a more stable market. Many commentators note that equity markets are sufficiently liquid to handle events like the financial crisis of 2007-2008.³⁵⁹ In light of the liquidity already present in equity markets, increasing incentives for market makers as Proposal 2 suggests seems unwarranted.

The costs would also be unjustified if Proposal 2 were akin to an insurance policy that required upfront payments for protection against a sudden catastrophic event in the future. Many commentators note that virtually no combination of privileges or obligations would ensure that market makers remain in the market in times of extreme volatility.³⁶⁰

356. See, e.g., HFTs' Letter, *supra* note 23.

357. Peter Chapman, *Exchanges Balk at Forcing Market Maker Obligations on HFTs*, TRADERS MAG. ONLINE NEWS, Oct. 29, 2010, available at <http://www.trader-smagazine.com/news/high-frequency-trading-market-maker-nyse-nasdaq-106601-1.html> (quoting the CEO of Nasdaq OMX Group Inc. as saying: "As we know from the past, where there are privileges, bad things can happen to markets.").

358. See HFTs' Letter, *supra* note 23; Donna Kardos Yeslavich & Kristina Peterson, *Keeping Traders in the Market Could Prove Challenging*, WSJ.COM, Sept. 27, 2010, available at <http://online.wsj.com/article/SB10001424052748704523604575512110316790130.html> (quoting the CEO of an HFT as saying: "What it really would do is pick winners between certain classes of market participants. . . . It would provide benefits to some but hurt competition overall.").

359. See, e.g., Letter from Eric W. Hess, Gen. Counsel, Direct Edge Holdings LLC, to Elizabeth M. Murphy, Secretary, SEC (Apr. 28, 2010) ("[E]quities markets performed admirably during the recent financial crisis, and are operating at record levels of efficiency . . ."); Letter from Eric Swanson, Gen. Counsel, Bats Exch. Inc., to Elizabeth M. Murphy, Secretary, SEC (Apr. 21, 2010) ("[T]he equity markets remained open, liquid, transparent and efficient day in and day out during one of the most stressful periods in the history of our capital markets."); ANGEL, HARRIS, & SPATT, *supra* note 175, at 40 ("[E]quity trading systems handled the extreme volatility and volumes without system problems. Their performance stands in sharp contrast to the system problems experienced during the Crash of 1987.").

360. See Hal Weitzman, *Need for Consistent Market Structure to Avoid 'Flash Crash'*, FIN. TIMES, Nov. 4, 2010 (quoting the head two exchanges saying that market makers will avoid their obligations in a sharply falling market); Steve Wunsch, *Market Maker Obligations for High-Frequency Traders Are Not the Answer*, ADVANCED TRADING, Oct. 19, 2010 (noting that even a regime that ensures compliance 90% of the time would allow market makers to withdraw for an event of the same duration as the Flash Crash); Paredes, *supra* note 348 (questioning whether any set of obligations would keep a firm providing liquidity from withdrawing from the market because of

Firms would rather pay the fine of as much as \$2,500 for shirking their obligations, than risk insolvency.³⁶¹ As one commentator put it, Proposal 2 will make trading more expensive every second of every day, without achieving any meaningful protection in times of extraordinary volatility.³⁶²

The second objection to Proposal 2 is that it invites the SEC to make an unwarranted intervention in the competitive struggle between market makers and HFTs. Market makers claim that they are at a disadvantage because HFTs are subject to fewer regulatory obligations and are free to withdraw from the market at any time.³⁶³ From the market makers' point of view, Proposal 2 would restore some balance by providing them with regulatory or economic benefits. On the other hand, HFTs argue that Proposal 2 would provide a subsidy to market makers and inhibit competition.³⁶⁴

Prior to the Flash Crash, the exchanges accommodated the two sides. Thus, the NYSE established a robust regime of obligations and privileges for DMMs, while other exchanges, including the NYSE's sister Arca market, operated with a regime of no privileges and minimal obligations.³⁶⁵ Thus, market makers and HFTs were able to voluntarily assume or avoid regulatory obligations by registering with the exchange of their choice.

By adopting Proposal 2, the SEC would short-circuit this competitive balance. It would foreclose exchange competition and limit the choices for market makers and HFTs. This would be inconsistent with the Exchange Act's mandate that the SEC promote competition among brokerages and among exchanges.³⁶⁶ Historically, the SEC has fulfilled this mandate by setting only minimum requirements for market maker regulation, instead of optimal targets. For example, although Rule 11b-1 was adopted in response to the 1962 Market Break, the SEC

extraordinary market volatility); HFTs' Letter, *supra* note 23 ("None of the proposed market maker obligations would force market makers to . . . buy in the face of overwhelming selling."); Market Makers' Letter, *supra* note 323 (noting that no market maker rules could have prevented the Flash Crash).

361. See *supra* note 128 and accompanying text.

362. Michael A. Mendelson, Principal, AQR Capital Mgmt. LLC, Statement Before the Joint CFTC-SEC Advisory Comm. on Emerging Regulatory Issues (Aug. 11, 2010).

363. See, e.g., Goldman Sachs Letter, *supra* note 201.

364. See, e.g., HFTs' Letter, *supra* note 23.

365. See *supra* Part I.D.

366. 15 U.S.C. § 78k-1(a)(1)(C)(ii) (2006).

allowed room for competition by exempting eight of the ten exchanges operating at the time.³⁶⁷ By adopting Proposal 2, the SEC would significantly reduce the exchanges' ability to provide competing regulatory regimes for market makers and HFTs.

3. *Proposal 3: Slower Markets Will Reduce Liquidity*

In the name of investor protection, Proposal 3 would likely result in higher trading costs and reduce liquidity. This proposal would slow down markets by establishing minimum quote duration periods and would require brokerages to pass on rebates to their customers. Although at first these changes would seem to benefit investors, this section argues that Proposal 3 would likely make it more expensive for investors to trade and award HFTs with greater benefits.

Proposal 3 aims to ensure fair dealings and deter fraud—core tenets of the Exchange Act³⁶⁸—by eradicating flickering quotes. A minimum quote duration period would certainly make it easier for investors to determine the best price. It would also ensure that quotes reflect bona fide trading interests, which would be a welcome result given that recent disciplinary actions suggest that brokerages can use fleeting quotes to manipulate prices. In one recent case, a firm placed a low bid to buy a stock, and then placed multiple, sizable sell orders to create the false impression of selling pressure on the stock.³⁶⁹ As soon as the firm lured an investor into trading at the “illegitimately” low bid, it canceled the

367. See *supra* note 60 and accompanying text. See generally Simon & Trkla, *supra* note 42, at 298-300 (describing the history that led to the adoption of Rule 11b-1).

368. See 15 U.S.C. § 78b (2006) (stating that the Exchange Act is required because securities transactions are effected with a national public interest which makes it necessary to “insure the maintenance of fair and honest markets in such transactions”); *Dura Pharms., Inc. v. Broudo*, 544 U.S. 336, 345 (2005) (“The securities statutes seek to maintain public confidence in the marketplace. They do so by deterring fraud”) (citing *United States v. O’Hagan*, 521 U.S. 642, 658 (1997) & *Randall v. Loftsgaarden*, 478 U.S. 647, 664 (1986)); *Basic Inc. v. Levinson*, 485 U.S. 224, 230 (1988) (“The 1934 Act was designed to protect investors against manipulation of stock prices.”); *Merrill Lynch, Pierce, Fenner & Smith, Inc. v. Ware*, 414 U.S. 117, 130 (1973) (stating that the congressional aim in exchange regulation is to “insure fair dealing and to protect investors from harmful or unfair trading practices.”).

369. See Press Release, FINRA Sanctions Trillium Brokerage Services LLC, Director of Trading, Chief Compliance Officer, and Nine Traders \$2.26 Million for Illicit Equities Trading Strategy (Sept. 13, 2010), available at <http://www.finra.org/Newsroom/NewsReleases/2010/P121951>.

sell orders.³⁷⁰ The strategy, repeated some 46,000 times over the course of three months, generated a profit of approximately \$576,000.³⁷¹ Proposal 3 would make it harder to pull off such gambits, which regulators suggest are widespread.³⁷²

Nevertheless, a minimum quote duration period would also reduce the frequency of trading. This has long been regarded as a fundamental variable of trading costs: the less frequent the trading, the higher the costs.³⁷³ Put more concretely, market makers and HFTs would experience greater risk when submitting an order because they would be unable to adjust it quickly in response to new information.³⁷⁴ They would compensate for this added risk by widening the spread between their offers to buy and sell shares.

Alternatively, HFTs might submit their orders to off-exchange trading venues that do not disseminate quotes to the public.³⁷⁵ In these

370. *Id.*

371. FINRA, Letter of Acceptance, Waiver, and Consent Regarding Trillium Brokerage Services LLC (Aug. 5, 2010), available at <http://www.finra.org/web/groups/industry/@ip/@enf/@ad/documents/industry/p122044.pdf>.

372. Three of the six HFT strategies described in the SEC's Concept Release could involve manipulative or 'parasitic' trading. See Concept Release, *supra* note 16, at 3607-10; see also Sarah N. Lynch & Jonathan Spicer, *Regulators Seek Trading Secrets*, REUTERS, Sept. 1, 2011, available at <http://www.reuters.com/article/2011/09/01/us-financial-regulation-algos-idUSTRE7806J420110901> (reporting that the SEC and FINRA are examining HFTs computer code and trading strategies because, in the words of a FINRA executive vice president, "there is something that is troubling us in the marketplace"); Jonathan Spicer, *U.S. Market Manipulation a 'High Priority' for FINRA*, REUTERS, Oct. 19, 2010, available at <http://www.reuters.com/assets/print?aid=USN1916467720101019> (reporting that FINRA will bring more market manipulation cases focused on high-frequency strategies).

373. See Harold Demsetz, *The Costs of Transacting*, 82 Q. J. OF ECON. 33, 41 (1968) ("The fundamental force working to reduce the spread is the time rate of transactions.").

374. See Letters to Elizabeth M. Murphy, Secretary, SEC, from Suhas Daftuar, Managing Dir., Hudson River Trading LLC (Apr. 30, 2010) ("The ability to adjust or cancel orders leads to lower spreads; market participants are more willing to enter aggressive orders if they can cancel or adjust them in the event that market conditions change."); Steve Gaston, Chief Compliance Officer, IMC Fin. (Apr. 21, 2010) ("[A] firm's exposure when the market moves is measured by the length of time that it takes to react and update its quotes. Introducing a minimum requirement on the duration of quotes would immediately increase systemic risk for liquidity providers.").

375. These "Dark Pools" accounted for 12.1% of volume in September 2010, up from about 7.9% a year earlier. See Nina Mehta, *Dark Pool U.S. Market Share Rose in September, Rosenblatt Says*, BLOOMBERG, Nov. 8, 2010; Concept Release, *supra* note 16, at 3598.

“dark” venues, the risk of exposing an offer is lower since it is not displayed to the marketplace. The difficulty here, as the SEC has repeatedly noted, is that the public display of orders is an important means of assuring competitive prices.³⁷⁶ In this case, the ultimate result again would be higher trading costs for investors.

More generally, quote duration rules would erode the benefits of Reg NMS, which resulted in narrower bid-ask spreads and deeper markets.³⁷⁷ As exchanges automated in response to Reg NMS, HFTs were able to submit more aggressive prices because the risk of holding securities declined with faster trading.³⁷⁸ Depth increased as traders submitted limit orders to multiple exchanges since traders were assured by Rule 611 that they would receive an execution at the best price against the next willing buyer or seller.³⁷⁹ The SEC should be cautious in adopting rules that risk eroding the verifiable and real benefits achieved through Reg NMS.

Proposal 3 could also lead to counterproductive changes in the use of rebates. A requirement that brokerages pass on rebates to their customers would concentrate rebates in the hands of investors and HFTs. For investors, the payments are likely to be marginal since they trade infrequently. On the other hand, rebates represent an important source of earnings for HFTs.³⁸⁰

376. See, e.g., Proposed Rule on Non-Public Trading Interest, Exchange Act Rel. No. 60,997, 74 Fed. Reg. 61,208 (Nov. 23, 2009) (“In general, the Commission has sought over the years to promote the public display of trading interest by attempting to provide positive incentives for display, but has never sought to prohibit trading venues from offering dark liquidity services to investors.”).

377. See ANGEL, HARRIS & SPATT, *supra* note 175, at 10-15; Letter from Gus Sauter, Chief Investment Officer, Vanguard Grp. Inc., to Elizabeth M. Murphy, Secretary, SEC (Apr. 21, 2010), available at <http://sec.gov/comments/s7-02-10/s70210-122.pdf> (noting that transaction costs for long-term investors have declined by 0.5% in the past decade); Peter Chapman, *Reg NMS is a Winner, SEC Says*, TRADERS MAG., Mar. 2008, available at http://www.tradersmagazine.com/issues/20_278/100330-1.html?zkPrintable=true.

378. See Demsetz, *supra* note 373 (“The greater the frequency of transacting, the lower will be the cost of waiting in a trading queue . . . and, therefore, the lower will be the spreads that traders are willing to submit to preempt positions in the trading queue.”).

379. See ANGEL, HARRIS & SPATT, *supra* 175, at 14; see also *supra* notes 156-65 and accompanying text (discussing Rule 611 as an incentive for firms to send quotes to multiple venues).

380. See *supra* notes 184-92 and accompanying text.

Since competition among the 13 equity exchanges pushes them to maximize order flow, the exchanges are likely to reduce rebate payments to investors and shift them toward HFTs, where the payments have proven to draw business. The exchanges could do this by raising their volume thresholds for preferential pricing, a practice that the SEC has consistently approved.³⁸¹ This aspect of Proposal 3, therefore, would likely give HFTs a greater trading advantage relative to other investors.

In summary, although Proposal 3 aims to increase investor protection and reduce the advantages that HFTs enjoy over institutional investors, it would likely result in higher transaction costs, a reduction in market depth, and a less equitable distribution of transaction fees.

C. AN ALTERNATIVE APPROACH

An alternative strategy would aim to regulate HFTs outside the context of market maker obligations. This strategy is premised on the idea that HFTs already provide sufficient liquidity without a regime of special duties and privileges. In fact, HFTs have turned out to be a relatively steady source of liquidity through the recent financial crisis and again during the Flash Crash, with limited exceptions.³⁸² There is, however, a need to assure investors that HFTs trade on fair terms.

This alternative approach can be encapsulated in three general propositions. First, the SEC should let the exchanges compete to develop their own regulatory regimes for market makers. Exchanges are in a better position to gauge the proper balance of trading obligations and incentives, since they actively monitor the execution quality of their own markets. Letting exchanges compete is more likely to result in rules that foster liquidity, without raising transaction costs for investors. Accordingly, the SEC should refrain from adopting market maker rules like those contained in Proposals 1 and 2.

381. See Regulation NMS, *supra* note 157, at 37540 (“Fees with volume-based discounts or fees that are reasonably based on the cost of providing a service will be permitted, so long as they do not vary based on the non-member status of a person obtaining indirect access to quotations.”).

382. See *supra* notes 235-238 and accompanying text; see also Nina Mehta, *Traders Say No Signs of Liquidity Withdrawal as Stocks Fall the Most Since 2008*, BLOOMBERG, Aug. 8, 2011 (reporting that traders saw no generalized liquidity failures after Standard & Poor’s cut its rating on U.S. government debt); Nina Mehta, *High-Frequency Firms Tripled Trades in Stock Rout, Wedbush Says*, BLOOMBERG, Aug. 12, 2011 (reporting that HFTs increased their activity as equity markets tumbled in the wake of S&P’s downgrade of U.S. government debt).

Second, the SEC should require that users of the exchanges' collocation services register as broker-dealers. This would bring the full spectrum of HFTs under SEC oversight, by forcing hedge fund HFTs to create broker-dealers that would handle their trades.³⁸³ The affiliate would, of course, be subject to the regulatory requirements of all broker-dealers, including the obligation to retain for five years trading records and all correspondence made or received in its course of business.³⁸⁴ The affiliate would have to meet net capital requirements,³⁸⁵ file monthly financial reports,³⁸⁶ and be subject to SEC inspections.³⁸⁷ These requirements would go some way toward addressing concerns that HFTs are subject to few regulatory obligations and have an unfair advantage over other market participants.

Third, the SEC should consider requiring the largest HFTs to register with an exchange as market makers. The goal would not be to ensure liquidity, but rather to identify large traders that should abide by rules of fair dealing given their market dominance. The specific rule might provide, for example, that any dealer that holds itself out as regularly willing to buy and sell more than 1000 securities must register with an exchange as a market maker.

To be sure, some HFTs are likely to avoid triggering this obligation by limiting their trading to 999 securities. The high threshold, however, does not raise the same issues as Proposal 1, which could cause HFTs to withdraw from the equity market altogether. In fact, the high threshold would make the obligations relatively less burdensome because they would only affect HFTs with sufficient scale to shoulder the added regulatory costs.

Under this approach, registration would provide a helpful focus for regulatory surveillance, given that billions of orders shuttle across Wall Street daily. Registration would become a seal of assurance instead of a means of requiring firms to risk their own capital to stabilize the market. Mandatory registration for the largest HFTs would address some of the concerns motivating Proposal 3 and would be wholly consistent with the Exchange Act's mandate to protect investors.

383. See *supra* notes 136-155 and accompanying text.

384. 17 C.F.R. §§ 240.17a-1, 17a-3 (2011). See generally LOSS & SELIGMAN, *supra* note 45, at 851-861 (describing substantive broker-dealer regulation).

385. See 17 C.F.R. § 240.15c3-1 (2011).

386. See *id.* § 240.17a-5.

387. See 15 U.S.C. § 78q(a)(1) (2010).

CONCLUSION

The Flash Crash greatly intensified pressure on the SEC to grapple with the complex role that HFTs play in the market. Unfortunately, the Flash Crash also makes certain counterproductive proposals very appealing. The temptation is to devise rules that directly ensure market stability under the theory that it is better to be safe than sorry.

Until now, the SEC has wisely focused on systemic safeguards that essentially stop trading under situations of extreme volatility. Going the further step, however, of regulating HFTs by imposing heightened market maker obligations would be ill-advised. Encouraging liquidity through special obligations and privileges would only aggravate investor perception of an unfair market. The costs and consequences of such a move argue for an alternative approach. The SEC should focus on assuring investors that HFTs provide liquidity on fair terms. A focus on fair dealing can inspire investor confidence and encourage liquidity.