

REGULATING MERCHANTS OF LIQUIDITY: MARKET MAKING FROM CROWDED FLOORS TO HIGH-FREQUENCY TRADING

Stanislav Dolgopolov*

This Article develops a framework for analyzing the very existence of regulation of market makers and singles out such key factors as externalities in the market for liquidity, vulnerability of these market participants to certain trading strategies, and their own opportunism. This framework is explored through the evolution of the market making segment of the securities industry from crowded floors to high-frequency trading, and the regulatory outlook is analyzed from the standpoint of the current market structure crisis.

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INTRODUCTION

The market for liquidity, as any other market, is governed by the forces of supply and demand, and the business of providing liquidity by specialized entities known as market makers occupies a unique niche in the securities industry.¹ While market makers may also be crossing their own

* Regulatory Consultant, Decimus Capital Markets, LLC; J.D., University of Michigan; M.B.A., University of Chicago; B.S.B.A., Drake University; member of the North Carolina State Bar. The author thanks Haim Bodek, Vladislav Dolgopolov, Shayna Gordon, and Kate Im for their help, comments, and expertise.

1. Market makers are not uncommon in markets for asset classes other than securities, such as futures, commodities, and currencies, and the experiences of these markets are often relevant for securities markets. Unsurprisingly, markets for cryptocurrencies, a novel asset

clients' orders or playing a role in order-matching/auctioneering/price-setting mechanisms on trading venues, the essence of market making is to provide liquidity by committing capital. As keenly observed back in 1877 in connection with jobbers operating on the London Stock Exchange ("LSE"), the distinguishing feature of a market maker is being "pretty well always even."² However, a specific timeframe for this balancing process and a needed capital commitment may vary greatly, depending on a host of factors, such as the underlying business strategy, natural liquidity in the security in question, mandatory capital requirements and other regulatory constraints, and technological advances. Interestingly, Myron S. Scholes of the Black-Scholes fame characterized the business of providing liquidity as living off "omega," as opposed to "alpha" and "beta," the better known sources of return.³ The value provided by market makers in return for omega is no trifle. As pointed out many years ago, "Were it not for this intermediary class . . . the public would experience great delay and inconvenience in their sales or purchase of stock."⁴

class, and their derivatives are also seeing the emergence of market makers. *See, e.g.*, Francois Poupard, *Interview with Market Maker BitSpread*, BITCOIN VOX (Apr. 27, 2015, 11:12 AM), <http://bitcoinvox.com/article/1645/interview-with-market-maker-bitspread> [<https://perma.cc/45BY-9C6W>] (discussing the market making role played by BitSpread, a self-described "cryptocurrency investment management firm"); *HitBTC and the March of the Market Makers*, COINFINANCE (Sept. 15, 2014, 6:18 PM), <http://www.coinfinance.com/news/hitbtc-and-the-march-of-the-market-makers> [<https://perma.cc/DF3P-NZ9S>] (describing the emergence of market makers for such cryptocurrencies as Bitcoin, Litecoin, and Dogecoin and the practical advantages they provide to other market participants). Some cryptocurrency trading platforms are already offering special contracts for market makers that entail certain trading obligations bundled "with very attractive conditions [such as] cash incentives and rebate bonuses," as well as the access to "the best [application interface protocols]." *Market-Making on HitBTC*, HITBTC, <https://hitbtc.com/mm> [<https://perma.cc/FB2W-2475>] (last visited Feb. 15, 2016).

2. LONDON STOCK EXCHANGE COMMISSION, MINUTES OF EVIDENCE TAKEN BEFORE THE COMMISSIONERS, 1878, C. (2d series) 2157-I para. 2817, at 102 (U.K.) [hereinafter LSE COMMISSION, MINUTES OF EVIDENCE] (testimony of Lionel Louis Cohen, a dealer at the LSE). For pioneering academic contributions on market makers' inventory management, see Yakov Amihud & Haim Mendelson, *Dealership Market: Market-Making with Inventory*, 8 J. FIN. ECON. 31 (1980); James Bradfield, *A Formal Dynamic Model of Market Making*, 14 J. FIN. & QUANT. ANALYSIS 275 (1979); Mark B. Garman, *Market Microstructure*, 3 J. FIN. ECON. 257 (1976).

3. *See* Myron S. Scholes, *The Changing Price of Liquidity and Risk Transfer: Risk Management and Lessons from the Current Market Crisis 3–6* (Aug. 2008) (unpublished presentation) (on file with author), <http://www.eurobank.gr/Uploads/pdf/EurobankAthensFinalPresentation.pdf> [<https://perma.cc/HY6W-HGS9>] (defining alpha, beta, and omega and describing them as alternative sources of return).

4. HENRY KEYSER, *THE LAW RELATING TO TRANSACTIONS ON THE STOCK EXCHANGE* 23 (London, Henry Butterworth 1850); *see also* Lodewijk Petram, *The World's First Stock Exchange: How the Amsterdam Market for Dutch East India Company Shares Became a*

Market making is both restrained and enabled by regulation, which encompasses governmental and private ordering. Such regulation, which often has its own dark side of rent-seeking, anticompetitive behavior, and selective enforcement, may serve a variety of general or specific purposes, such as creating fair and orderly markets, protecting different types of market participants, or operating as a valuable signaling/commitment device. The applicable regulatory framework, as the totality of statutes, rules, enforcement actions, and case law, is established by a blend of governmental regulation and self-regulation, with the latter being set by trading venues themselves, with some of them acting as self-regulatory organizations, and other private regulators, such as the Financial Industry Regulatory Authority (“FINRA”). Indeed, providing a private regulatory regime for market makers in the form of a set of rules and their application — as a part of the underlying business model — is a dimension of competition among trading venues.⁵

Liquidity providers with special trading obligations and privileges, as creatures of the applicable regulatory regime, are commonly known as “designated market makers” (“DMMs”), and there may be several tiers of DMMs with varying features operating under different names on the same trading venue.⁶ Perhaps the most famous example of DMMs is the famed

Modern Securities Market, 1602-1700, at 38–40, 181 (2011) (Ph.D. dissertation, Univ. of Amsterdam) (on file with author), <http://dare.uva.nl/document/201694> [<https://perma.cc/5BWC-F6SL>] (analyzing the emergence of market makers in Amsterdam’s equities marketplace in the first half of the 17th century, describing services provided by these market participants, and noting that “[t]he standardization that was the result of [such] market-maker services brought transaction costs down.”).

5. See Letter from Andrew Bowley, Managing Dir., et al., Nomura Int’l plc, to Werner Bijkerk, Int’l Org. of Sec. Comm’ns 4 (Aug. 12, 2011), <http://www.iosco.org/library/pubdocs/pdf/IOSCOPD361.pdf> [<https://perma.cc/8KMY-HKZK>] [<https://perma.cc/2AUP-23TV>] (arguing that “[m]arket making regimes are part of the commercial DNA of competitive venues.”); Letter from Andrew Procter, Global Head of Gov’t & Regulatory Affairs, Deutsche Bank AG, to Werner Bijkerk, Int’l Org. of Sec. Comm’ns 6 (Aug. 12, 2011), <http://www.iosco.org/library/pubdocs/pdf/IOSCOPD361.pdf> [<https://perma.cc/2AUP-23TV>] (asserting that “[m]arket making is an area on which function venues compete and seek to differentiate themselves.”); see also Jos Schmitt, Chief Exec. Officer, Aequitas Innovations, Remarks Before the Economic Club of Canada: What Is Wrong with Canada’s Capital Markets? 20 (June 2, 2014) (transcript available from Aequitas Innovations, Inc.) (stating that a start-up trading venue would “provide issuers with the support of re-energized market makers”); *Patent Portfolio*, DEEP LIQUIDITY, <http://deepliquidity.com/patents.html> [<https://perma.cc/SWT6-NMRG>] (last visited Feb. 15, 2016) (describing a portfolio of order types, with some of them specifically oriented at market makers, for a start-up trading venue).

6. For a recent illustration of a potential multiplicity of tiers of market makers designed by individual trading venues, see Order Approving Proposed Rule Change by NASDAQ OMX BX, Inc. Relating to Directed Market Makers, Exchange Act Release No. 74,129, 80 Fed. Reg. 4954 (Jan. 23, 2015); Notice of Filing of a Proposed Rule Change by

institution of the “specialist” on the New York Stock Exchange (“NYSE”), which dates back to the nineteenth century,⁷ although specialists were recently renamed “designated market makers” and relieved of their agency and priority-yielding obligations with the NYSE’s restructuring of its trading architecture.⁸ While the exact timing of the transition of NYSE specialists from mere matching agents/“brokers’ brokers” to active dealers entrusted with agency responsibilities is not entirely clear,⁹ there is little doubt that committed principal trading became pivotal quite early. As remarked by an industry insider two decades before the passage of the federal securities statutes,

If it be urged that the specialist should not speculate, but should confine himself solely to executing the orders on his books, it may be answered that in such a case he would often be useless, for in many instances the orders on his books are insufficient in volume to establish a close market or anything approaching it. By reason of his speculations a market is created; without them it may not exist.¹⁰

By definition, the DMM category is narrower than the universe of market participants providing liquidity, and, accordingly, regulatory

NASDAQ OMX BX, Inc. Relating to Directed Market Makers, Exchange Act Release No. 73,784, 79 Fed. Reg. 73,930 (Dec. 8, 2014).

7. For a description of the birth of the specialist system as a means of transition from periodic auctions to continuous trading, see ROBERT SOBEL, *INSIDE WALL STREET: CONTINUITY AND CHANGE IN THE FINANCIAL DISTRICT 29–30* (1977).

8. For a description of the NYSE’s “New Market Model” phasing out the specialist system and the relevant comparisons between specialists and DMMs, see Order Approving a Proposed Rule Change To Create a New NYSE Market Model, Exchange Act Release No. 58,845, 73 Fed. Reg. 64,379 *passim* (Oct. 24, 2008).

9. As reflected upon by an industry insider during the New Deal era, by the end of the first decade of the twentieth century, “a trading specialist was more or less unknown,” but it had emerged during the following quarter century “from a natural demand.” *Stock Exchange Practices: Hearings Before the S. Comm. on Banking & Currency*, 73d Cong. pt. 15, at 6792 (1933–34) [hereinafter *1933–34 Senate Hearings on Stock Exchange Practices*] (testimony of Paul Adler, a specialist and a member of the NYSE). On the other hand, a government report from the described time period noted “the practice of specialists in buying and selling for their own account [that] often serves to create a market where otherwise one would not exist.” STATE OF N.Y., REPORT OF GOVERNOR HUGHES’ COMMITTEE ON SPECULATION IN SECURITIES AND COMMODITIES 10 (June 7, 1909). See also George T. Simon & Kathryn M. Trkla, *The Regulation of Specialists and Implications for the Future*, 61 BUS. LAW. 217, 223 (2005) (“The specialists were . . . permitted to trade for their own account, but the broker functions predominated through the early 1900s. Over time, though, the ‘dealer-specialist’ role grew in importance as floor brokers and commission houses came to expect the specialists to purchase and sell their specialty stocks for their own account in more thinly traded markets, to provide price continuity as well as timely trade execution.”).

10. W.C. VAN ANTWERP, *THE STOCK EXCHANGE FROM WITHIN* 280 (1913).

regimes for DMMs have more specificity than sets of rules explicitly or implicitly applicable to trading strategies with a market making substance.

The interdependence of regulation of market makers and the architecture of securities markets, including the very function of providing liquidity, can neither be ignored nor divorced from a forward-looking perspective on regulatory reform. The nature of liquidity in the current market structure may, by some accounts, appear puzzling,¹¹ and there are indications that several key regulatory changes connected to market makers have had a significant impact on different facets of liquidity.¹² Moreover, there may be a shadow of doubt about the economic feasibility of market making with meaningful trading obligations and privileges in today's fast, competitive, and fragmented trading process in many segments of securities markets.¹³ On the other hand, technology and electronic trading

11. See Gregg E. Berman, Assoc. Dir., Office of Analytics & Research, U.S. Sec. & Exch. Comm'n, What Drives the Complexity and Speed of Our Markets?: Remarks at the North American Trading Architecture Summit (Apr. 15, 2014), <http://www.sec.gov/News/Speech/Detail/Speech/1370541505819#.U0469Fc9Qel> [<https://perma.cc/AW44-N4M4>] (“[T]he data show that the *majority* of all of displayed quoting activities occur in the depth-of-book, away from the inside spread. But these quotes are only accessed a *minority* of the time by any market participants. . . [M]odern market structure has evolved to the point where liquidity takers, including buy-side participants, focus their trading efforts on nothing more than what's available at the [National Best Bid and Offer]. But that's not necessarily how market makers are posting their liquidity. I'm starting to wonder whether there is some fundamental mismatch between the nature of liquidity takers and liquidity makers.” (footnote omitted)).

12. See, e.g., Kee H. Chung & Chairat Chuwonganant, *Uncertainty, Market Structure, and Liquidity*, 113 J. FIN. ECON. 476, 478 (2014) (“[T]he uncertainty elasticity of liquidity . . . has increased dramatically around regulatory changes in the US markets that increased the role of public traders in liquidity provision, reduced the minimum allowable price variation, weakened the affirmative obligation of NASDAQ dealers, and abolished the specialist system on the NYSE.”); Yashar Heydari Barardehi et al., *Trading Costs and Priced Illiquidity in High Frequency Trading Markets* 33 (June 2, 2015) (unpublished manuscript) (on file with author), <http://ssrn.com/abstract=2615823> [<https://perma.cc/K32C-XMBX>] (“[T]he Reg[ulation] NMS reform and the advent of high frequency trading seem to have reduced the trading costs of stocks that were already more liquid, at the expense of less liquid stocks.”).

13. See, e.g., JOINT CFTC-SEC ADVISORY COMM. ON EMERGING REGULATORY ISSUES, SUMMARY REPORT, RECOMMENDATIONS REGARDING REGULATORY RESPONSES TO THE MARKET EVENTS OF MAY 6, 2010, at 10 (2011), <http://www.sec.gov/spotlight/sec-cftejointcommittee/021811-report.pdf> [<https://perma.cc/6WPP-GR59>] [hereinafter CFTC-SEC ADVISORY COMM., REGULATORY RESPONSES REPORT] (“The increased market competition and dramatic market fragmentation which has occurred subsequent to Regulation NMS, however, have effectively eliminated much of the profitability of the registered market maker function and therefore, eliminated the ability for the Exchanges to impose significant quoting or trading obligations.”); see also *Dark Pools, Flash Orders, High-Frequency Trading, and Other Market Structure Issues: Hearing Before the Subcomm. on Sec., Ins., & Inv. of the S. Comm. on Banking, Hous., & Urban Affairs*, 111th Cong. 85 (2009) [hereinafter *Senate Hearing on Dark Pools, Flash Orders, High-Frequency*

in particular, while in many instances enhancing the interaction of natural liquidity, have not made market makers obsolete.¹⁴

The existence of a true market making crisis is salient in the space covering smaller-cap stocks,¹⁵ but this crisis has also spread to larger-cap stocks and top-tier securities exchanges. As one important sign, the decrease in the value of the NYSE's DMM franchise, which was much coveted in the past, is staggering. For instance, Goldman Sachs recently sold its DMM unit with the allocation of over 600 symbols on the NYSE for around \$30 million.¹⁶ For the sake of comparison, Goldman Sachs paid

Trading, and Other Market Structure Issues] (prepared statement of Peter Driscoll, Chairman, Securities Traders Association) (“[Market makers] retained all of their obligations to the market . . . but the rewards for these obligations were cut dramatically. Traditional market making became unprofitable and most market making firms reduced their market making activity or bowed out of the business altogether.”).

14. See also ANDY HILL, INT’L CAPITAL MKTS. ASS’N, *THE CURRENT STATE AND FUTURE EVOLUTION OF THE EUROPEAN INVESTMENT GRADE CORPORATE BOND SECONDARY MARKET: PERSPECTIVES FROM THE MARKET* paras. 35–36, at 17 (Nov. 2014), http://www.icmagroup.org/assets/documents/Regulatory/Secondary-markets/The-state-of-the-European-investment-grade-corporate-bond-secondary-market_ICMA-SMPC_Report-251114-Final3.pdf [<https://perma.cc/X6VX-H99U>] (“As one [multilateral trading facility] explained, electronic platforms are merely the oil that greases the engine. They do not provide liquidity. For that, you still need market-makers who can make prices and take risk. Some participants, however, are more sanguine about the potential for electronic platforms to provide liquidity. This is essentially through the enhancement of ‘big-data’, and better cross-market (and participant) networking.”); Ian Domowitz, *Liquidity, Transaction Costs, and Reintermediation in Electronic Markets*, 22 J. FIN. SERVS. RES. 141, 151 (2002) (“Electronic market structure does not eliminate the market making function, for example, although it may change its character.”).

15. For a general discussion of the market making crisis for smaller-cap stocks and potential regulatory tools to address this problem, see Stanislav Dolgoplov, *Linking the Securities Market Structure and Capital Formation: Incentives for Market Makers?*, 16 U. PA. J. BUS. L. 1 *passim* (2013) [hereinafter Dolgoplov, *Linking the Securities Market Structure and Capital Formation*]. See also David Weild et al., *Making Stock Markets Work To Support Economic Growth: Implications for Governments, Regulators, Stock Exchanges, Corporate Issuers and Their Investors* 20 (Org. for Econ. Co-Operation & Dev., OECD Corporate Governance Paper No. 10, 2013), http://www.oecd-ilibrary.org/governance/making-stock-markets-work-to-support-economic-growth_5k43m4p6ccs3-en [<https://perma.cc/MDL4-Z2GU>] (“The erosion of aftermarket economics is most keenly felt at the small cap, less liquid end of the market, where active support from market makers and liquidity providers is crucial.”).

16. Bradley Hope & Justin Baer, *Dutch Firm To Buy Goldman Sachs NYSE Floor Trading Business*, WALL ST. J. (May 21, 2014, 8:39 PM), <http://online.wsj.com/news/articles/SB10001424052702303749904579576530862652294> [<https://perma.cc/9JDL-26US>]; see also Press Release, IMC Grp. & NYSE Euronext, *IMC Financial Markets To Become Designated Market Maker on the NYSE* (May 22, 2014, 6:30 AM), <http://www.businesswire.com/news/home/20140522005108/en/IMC-Financial-Markets-Designated-Market-Maker-NYSE> [<https://perma.cc/EZE9-AXFY>] (stating that “IMC will be the DMM for over 630 securities and approximately 400 operating companies, including many U.S. and international blue chip corporations”); Sam Mamudi & John

approximately \$6.5 billion for Spear, Leeds & Kellogg, one of the largest specialist firms on the NYSE, back in 2000.¹⁷ Moreover, this high-priced deal was not the only acquisition of a specialist firm by this investment bank, which at some point had the most significant market making presence on the Big Board.¹⁸ Another bit of news from the same camp is Virtu Financial's purchase of Cohen Capital Group's DMM unit with the allocation of 258 symbols on the NYSE and NYSE MKT for a paltry amount of \$3 million in 2011.¹⁹ On the other hand, the merger of GETCO and Knight Capital, with both of these firms operating as DMMs on the NYSE,²⁰ produced a much higher price tag, approximately \$1.4 billion, for the latter.²¹ However, it is likely that the primary attraction was Knight Capital's off-exchange market making franchise and long-term order flow relationships rather than its DMM status. Another shocking thought for the entire securities industry is that dedicated market making as such in the equities space *may* be hardly profitable.²²

Detrixhe, *Speed Traders Seize NYSE Floor as IMC Takes Goldman Post*, BLOOMBERG (Aug. 28, 2014, 12:01 AM), <http://www.bloomberg.com/news/2014-08-28/speed-traders-seize-nyse-floor-as-imc-takes-goldman-post.html> [https://perma.cc/8JG8-GCLB] (describing the completion of this transaction and characterizing the existing state of affairs as “the conquest of the NYSE floor by high-frequency trading firms”).

17. See Hope & Baer, *supra* note 16 (contrasting the price tags of these deals in the context of the evolution of securities markets); see also The Professor [Craig Pirrong], *Michael Lewis's HFT Book: More of a Dark Market Than a Lit One*, STREETWISE PROFESSOR (Apr. 2, 2014, 2:35 PM), <http://streetwiseprofessor.com/?p=8333> [https://perma.cc/VJT6-X22N] (“Why was the price [paid by Goldman Sachs] so high back in 2000? Because under the rules of the time, a monopoly specialist franchise on a near monopoly exchange generated substantial economic rents . . . Electronic trading, and the socialization of order flow and the resultant competition between execution venues, ruthlessly destroyed those rents.”).

18. See WILLIAM D. COHAN, *MONEY AND POWER: HOW GOLDMAN SACHS CAME TO RULE THE WORLD* 188, 421 (2010) (describing several acquisitions of specialist firms by Goldman Sachs that had made it “the largest market maker on both the New York Stock Exchange and American Stock Exchange”).

19. Virtu Fin., Inc., Registration Statement Under Securities Act of 1933 (Form S-1), at F-18 (Mar. 10, 2014).

20. See also Matthew Philips, *Knight Shows How To Lose \$440 Million in 30 Minutes*, BLOOMBERG (Aug. 2, 2012), <http://www.bloomberg.com/bw/articles/2012-08-02/knight-shows-how-to-lose-440-million-in-30-minutes> [https://perma.cc/T7ZT-EQ4M] (describing the computer glitch that led to Knight Capital's enormous losses on August 1, 2012 and immediately put into question its future as an independent firm).

21. For a description of the merger and its valuation, see Press Release, Knight Capital Grp., Inc. & GETCO Holding Co., Knight Capital Group and GETCO Holding Company Agree To Merge (Dec. 19, 2012), <http://www.prnewswire.com/news-releases/knight-capital-group-and-getco-holding-company-agree-to-merge-184079381.html> [https://perma.cc/5MSD-HQDZ].

22. See, e.g., *Roundtable on Equity Market Structure, Panel III: Market Making and Trading in the 21st Century* at 63:22-:34, THOMPSON REUTERS (July 28, 2014),

The strains on the model of dedicated liquidity provision by DMMs with clearly defined trading obligations and privileges can be counted among the ingredients of the broader market structure crisis, which is particularly evident in the equities space.²³ At the same time, this state of affairs exists in markets in other asset classes, often extends to other types of liquidity providers, and is not even necessarily U.S.-centric. As described by an official of an international group of securities regulators, “We have seen a ‘Houdini’ disappearance of market makers in general. . . . It’s a new frontier-type issue.”²⁴ In fact, several major players have pushed for strengthening the DMM model.²⁵ Indeed, liquidity in securities markets may be seen as a public good, which points to the importance of the role played by market makers.²⁶ Moreover, in one of the most comprehensive market structure overviews by the leadership of the U.S. Securities and

<http://insider.thomsonreuters.com/link.html?cn=uid470006&cid=1276928&shareToken=Mzo3ZDFiYW11ZS1hNzY1LTQ2MzctYmNhNC1jNGViMzgxOTVmNjE%3D&playerName=liveReutersNews> [https://perma.cc/S345-3LY2] [hereinafter *EMS Roundtable: Market Making and Trading in the 21st Century*] (remarks of Douglas Cifu, Chief Executive Officer, Virtu Financial) (a CEO of one of the leading market making firms, describing his company’s technology and infrastructure costs as “extraordinary” and stating that, “if we were just applying that cost against our U.S. equities business, I’m not sure . . . that we would be profitable”).

23. For an extended discussion of the market structure crisis, see HAIM BODEK & STANISLAV DOLGOPOLOV, *THE MARKET STRUCTURE CRISIS: ELECTRONIC STOCK MARKETS, HIGH FREQUENCY TRADING, AND DARK POOLS* (2015).

24. Huw Jones, *Regulators Concerned at Banks Scaling Back Market Making Commitments*, REUTERS (Dec. 9, 2014, 7:32 PM), <http://in.reuters.com/article/2014/12/09/us-markets-regulations-idINKBN0JN1HN20141209> [https://perma.cc/FLQ2-FXXS] (quoting David Wright, Secretary General of the International Organization of Securities Commissions).

25. See, e.g., *Computerized Trading: What Should the Rules of the Road Be?: Hearing Before the Subcomm. on Sec., Ins., & Inv. of the S. Comm. on Banking, Hous., & Urban Affairs*, 112th Cong. 47 (2013) [hereinafter *Senate Hearings on Computerized Trading*] (prepared statement of Chris Concannon, Partner and Executive Vice President, Virtu Financial, LLC) (arguing that “we need to increase obligated liquidity in our markets” and that “enhanced market maker obligations should be targeted where they are most needed and that is in our less liquid stocks”); *A Parting Thought*, MKT. STRUCTURE REV. (KCG Holdings, Inc., Jersey City, N.J.), 1st Q. 2014, at 8, 8–9, http://www.kcg.com/uploads/documents/233002_KCG_ES_MarketStructureNewsletterQ1-2014_08.pdf [https://perma.cc/UX82-9N46] (maintaining that “[i]ntermediaries, such as market makers, should be registered and subject to stricter quoting and trading obligations for when they trade directly with their customers and on public markets” and that such market participants “should be encouraged to enhance price discovery on public markets, which helps promote fair and orderly trading”).

26. See Letter from Brent Robertson, Dir., Trading, Beta Portfolio Mgmt., OMERS Capital Mkts., to Mkt. Regulation Branch, Ont. Sec. Comm’n 5 (Oct. 4, 2013), http://www.osc.gov.on.ca/documents/en/Marketplaces/com_20131004_aequitas_omers-capital.pdf [https://perma.cc/UKL9-RJV9] (“Since the benefits of proper market making will accrue to all investors, market making itself can be viewed as a type of public good.”).

Exchange Commission (“SEC”), it was asserted that one of the key priorities “should be to support the interests of the market participants that support our markets, such as registered dealers and market makers, because they are an indispensable part of an efficient and liquid market.”²⁷

The phenomenon of high-frequency trading (“HFT”) is of particular significance for regulatory reassessment and reform of market making, as new players, high-frequency traders (“HFTs”), are often seen as another iteration of market makers.²⁸ However, this multifaceted phenomenon does not always fit the traditional definition of market making, and perhaps many forms of HFT can be better analogized to older and more familiar practices of “floor trading” and “scalping.” In many instances, HFTs have played the role of informal liquidity providers, which raises the issue of their impact on other types of market makers. On the other hand, some HFTs are now assuming the role of DMMs and often supplanting integrated securities firms in the process.²⁹ Moreover, numerous issues raised by the phenomenon of HFT need to include a macroeconomic perspective. For instance, while addressing “potential liquidity risks” posed by the current market structure, the Financial Stability Oversight

27. Luis A. Aguilar, Comm’r, U.S. Sec. & Exch. Comm’n, U.S. Equity Market Structure: Making Our Markets Work Better for Investors (May 11, 2015), <http://www.sec.gov/news/statement/us-equity-market-structure.html> [<https://perma.cc/8KVX-WKKL>].

28. See, e.g., MICHAEL DURBIN, ALL ABOUT HIGH-FREQUENCY TRADING, at vi, 40 (2010) (arguing that “[t]he high-frequency trader evolved from the ranks of the traditional market-maker,” although noting that such market participants “must resort to more innovative, aggressive, and (some would say) predatory strategies than those of traditional market-makers”).

29. As an illustration, *not a single* firm serving as a NYSE specialist in 2006 would remain a NYSE designated market maker with the anticipated purchases of Barclays’ franchise by GTS, an HFT firm, and KCG’s franchise by Citadel, a more diversified firm that could still be classified as belonging to the HFT camp, with both of these deals announced in January 2016. See Press Release, Citadel Sec., Citadel Securities To Become #1 Designated Market Maker on NYSE (Feb. 5, 2016), <http://www.prnewswire.com/news-releases/citadel-securities-to-become-1-designated-market-maker-on-nyse-300215855.html> [<https://perma.cc/7J59-VGNG>]; Press Release, GTS, GTS To Become Designated Market Maker on the New York Stock Exchange (Jan. 26, 2016), <http://www.prnewswire.com/news-releases/gts-to-become-designated-market-maker-on-the-new-york-stock-exchange-300209592.html> [<https://perma.cc/QAE2-S845>]. Citadel and GTS would be in the company of two other HFT firms, IMC and Virtu Financial, and two “old school specialist” firms, Brendan Cryan and J. Streicher. In addition to Barclays’ looming departure, such integrated securities firms as Bank of America, Bear Wagner, which was owned by Bear Stearns, and Goldman Sachs have exited this business. See Notice of Filing of a Proposed Rule Change by New York Stock Exchange LLC Making Permanent the Rules of the New Market Model Pilot and the Supplemental Liquidity Providers Pilot, Exchange Act Release No. 75,153, 80 Fed. Reg. 34,717, 34,723–24 (June 11, 2015) (describing departures and other changes relating to firms that operate as DMMs on the NYSE).

Council made the following observation:

Across all markets that feature electronic trading, non-traditional liquidity providers engage exchanges and other electronic markets by rapidly submitting multiple bids and offers at different prices and sizes through automated systems. These orders are often cancelled and resubmitted at extremely fast speeds to avoid becoming stale, especially during volatile periods.³⁰

While there is no perfect taxonomy for factors behind the existence of regulation of market makers, this Article singles out such key — and sometimes overlapping — factors as externalities in the market for liquidity, vulnerability of these market participants to certain trading strategies, and their own opportunism. This framework is explored through the evolution of the market making segment of the securities industry from crowded floors to high-frequency trading, and the regulatory outlook is analyzed from the standpoint of the current market structure crisis. While firms that engage in market making may indeed wear multiple hats at the same time, with some of their other functions being unrelated or merely complementary, this framework retains its significance. Indeed, the function of providing liquidity may be intricately connected to other functions, often involving economies of scope and sometimes being unviable on the standalone basis.³¹ Furthermore, the presence of other functions may create conflicts of interest and thus lead to regulatory scrutiny or even pressure for mandatory segregation. As an illustration, the traditional approach to regulating the specialist system on securities exchanges was founded on the dual role of these market participants as

30. FIN. STABILITY OVERSIGHT COUNCIL, ANNUAL REPORT 107–08 (2015), <http://www.treasury.gov/initiatives/fsoc/studies-reports/Documents/2015%20FSOC%20Annual%20Report.pdf> [https://perma.cc/F8VB-4YXP].

31. For instance, one commentator posed the following question about the integrated model of market making on NASDAQ: “[W]hy [is] market making . . . typically bundled with brokerage, analyst coverage and underwriting in the same firm[?] . . . One possibility is that the information generated in one of these activities is valuable in the others . . .” Paul Schultz, *Who Makes Markets?*, 6 J. FIN. MKTS. 49, 72 (2003). Furthermore, market makers may be involved in the very process of creating a security, such as custom-made — and possibly opaque — synthetic collateralized debt obligations, which may raise additional issues. For instance, as observed in connection with a recent scandal involving the role played by Goldman Sachs in the ABACUS 2007-AC1 deal, “When the market maker becomes involved in the creation of inventory, not just obtaining it on the market, there are additional asymmetrical incentives that can distort the market-making function.” Robert B. Thompson, *Market Makers and Vampire Squid: Regulating Securities Markets After the Financial Meltdown*, 89 WASH. U. L. REV. 323, 342 (2011).

dealers and order-matching agents,³² and the recent evolution of securities markets has led to the “deagentization” of market makers, thereby dissolving the old paradigm.³³ Of course, market makers are also regulated as belonging to wider categories, such as broker-dealers or members of securities exchanges, and, in addition, they may be affected by broader regulatory shifts. Overall, the function of providing liquidity is impacted by a myriad of regulatory factors, with some of them having specific burdens or exceptions for markets makers and others having more general application. These factors, with some of them aimed at prudential regulation/systemic risk aspects, may address such areas as clearing and settlement procedures, capital requirements/leverage, inventory financing, market access, and short selling.³⁴

32. A historical slice of this approach, based at that time on self-regulation responsive to threats of government regulation, is evident from the series of congressional hearings leading to the adoption of the Securities Exchange Act of 1934. For extensive references to such self-regulation in one of these hearings, see *1933–34 Senate Hearings on Stock Exchange Practices*, *supra* note 9, *passim*. Also, as observed later, “During the New Deal, the propriety of specialists serving both as brokers, with their unique ability to anticipate price trends because of their physical presence on the exchange floor and possession of the specialists’ order books, and dealers . . . had been the single most controversial issue in exchange regulation.” JOEL SELIGMAN, *THE TRANSFORMATION OF WALL STREET: A HISTORY OF THE SECURITIES AND EXCHANGE COMMISSION AND MODERN CORPORATE FINANCE* 335–36 (3d ed. 2003). Furthermore, from 1932 to 1934, a time period characterized by widespread allegations of market manipulation, the NYSE took measures to prevent its specialists from participating in much-criticized trading pools in their specialty stocks or dealing in options on such stocks, and similar anti-manipulation measures directed at the NYSE’s membership in general were adopted as well. For a discussion of these measures, see S. COMM. ON BANKING & CURRENCY, *STOCK EXCHANGE PRACTICES*, S. REP. NO. 73-1455, at 47–50 (1934) [hereinafter S. COMM. ON BANKING & CURRENCY, *STOCK EXCHANGE PRACTICES*].

33. For a discussion of the process of deagentization and its implications, see Stanislav Dolgoplov, *Providing Liquidity in a High-Frequency World: Trading Obligations and Privileges of Market Makers and a Private Right of Action*, 7 *BROOK. J. CORP. FIN. & COM. L.* 303, 343–44 (2013) [hereinafter, Dolgoplov, *Providing Liquidity in a High-Frequency World*].

34. For a discussion of a host of regulatory measures in the context of their impact on market makers and liquidity, see PRICEWATERHOUSECOOPERS LLP, *GLOBAL FINANCIAL MARKETS LIQUIDITY STUDY* 35–50 (Aug. 2015), http://www.pwc.com/en_GX/gx/financial-services/publications/assets/global-financial-market-liquidity-study.pdf [<https://perma.cc/G8SD-PDC5>] [hereinafter PWC, *LIQUIDITY STUDY*]. As a recent illustration, several industry groups have expressed their concerns in connection with the Fundamental Review of Trading Book undertaken by the Bank for International Settlements, arguing that proposed regulatory measures “may lead to a substantial increase in overall capital requirements [which] would fundamentally alter the market making capacity of regulated entities, resulting in significant changes in market structures and secondary market liquidity.” Letter from Kenneth E. Bentsen, Jr., CEO, Global Fin. Mkts. Ass’n, Scott O’Malia, CEO, Int’l Swaps & Derivatives Ass’n, Inc., & Timothy D. Adams, CEO, Inst. of Int’l Fin., to Mario Draghi, Chairman, Grp. of Governors & Heads of Supervision, & Stefan Ingves, Chairman, Basel Comm. on Banking Supervision, Int’l Bank

I. CONSEQUENCES OF EXTERNALITIES IN THE MARKET FOR LIQUIDITY

The proposition that trading obligations of market makers have to be balanced with trading privileges, whether formal or informal, is common sense. However, the pivotal issue is whether this combination of obligations and privileges is needed at all, as contrasted to a free flow of capital into market making activities for a risk-adjusted return. However, a mere availability of capital for, or specialization in, providing liquidity does not guarantee a well-functioning market. Likewise, technological developments may not be sufficient. As it was asserted back in 1877 and is still true today, “[Y]ou cannot convert a non-current [i.e., inactive] market into a current market by any machinery which you can invent; if dealings are few and far between[,] you cannot make [market makers] ready.”³⁵ Moreover, illiquidity may create a self-reinforcing cycle with market makers minimizing or even abstaining from principal trading, given difficulties with managing inventories. With respect to very illiquid securities, market makers have traditionally preferred to play the role of matching agents,³⁶ and shifts from principal to agency trading have been documented in environments becoming more problematic to market makers.³⁷

for Settlements 2 (Oct. 30, 2015), [https://www2.isda.org/attachment/Nzk4OQ==/FRTB%20Letter%20to%20GHOS%20%2030%20October%20FINAL%20\(2\).pdf](https://www2.isda.org/attachment/Nzk4OQ==/FRTB%20Letter%20to%20GHOS%20%2030%20October%20FINAL%20(2).pdf) [<https://perma.cc/VQL3-MZL7>].

35. LSE COMMISSION, MINUTES OF EVIDENCE, *supra* note 2, para. 5186, at 206 (testimony of Thomas Wilde Powell, a broker at the LSE).

36. For instance, this phenomenon was discussed in the context of trading on the LSE in the nineteenth century. As one market participant observed, jobbers in “limited non-current stock profess to be dealers, but in a great many cases they are only brokers between brokers . . .” *Id.* para. 4555, at 178 (testimony of Frederick Banbury, a broker at the LSE).

37. The importance of this perspective is connected to several recent reforms. For instance, one commentator provided the following description of the impact of decimalization: “[B]y some estimates the margins on trading have declined by as much as 80%, creating fewer incentives for dealers and risk-takers to commit capital to support trading activities, thus prompting a greater migration toward an agency-brokerage model of matching buyers/sellers.” ERIK BANKS, DARK POOLS: OFF-EXCHANGE LIQUIDITY IN AN ERA OF HIGH FREQUENCY, PROGRAM AND AUTOMATED TRADING 15 (2d ed. 2014). Likewise, another source described the impact of MiFID II adopted in the European Union: “Bank capital rules and bank structural reform, while delivering increased systemic safety, result in increased cost for banks to warehouse risk on their balance sheet. This renders market making an increasingly unattractive business line for banks and has precipitated a wholesale shift from principal trading to an agency model.” BLACKROCK, FAIR AND EFFECTIVE MARKET REVIEW, at v (Jan. 22, 2015), <http://www.bankofengland.co.uk/markets/Documents/femr/br.pdf> [<https://perma.cc/6EWQ-WLQJ>].

Overall, the vision shared by many financial economists³⁸ of an egalitarian marketplace lacking participants with trading obligations and privileges has proven to be unrealized. Similar statements of insiders from the securities industry³⁹ also have to be taken with a grain of salt. Another perspective on this egalitarianism is represented by efforts to coopt other constituencies into market making. One repeated suggestion is that institutional investors themselves should play the role of market makers, given their perceived advantages, perhaps combined with some tweaks to the trading infrastructure.⁴⁰ Furthermore, some agency brokers offer and actively market to institutional investors algorithms that would allow them

38. See Fischer Black, *Toward a Fully Automated Stock Exchange* (pt. 2), FIN. ANALYSTS J., Nov.–Dec. 1971, at 24, 87 (“[With some changes relating to automation and order matching] there will be little need for dealers, market makers, or block positioners who maintain quotes for their own accounts. . . . There will be no need for a prohibition of market making; in an efficient market, market making will simply be unprofitable.”); Eugene F. Fama, *Efficient Capital Markets: A Review of Theory and Empirical Work*, 25 J. FIN. 383, 399 n.22 (1970) (“It does not seem technologically impossible to replace the entire [trading] floor . . . with a computer, fed by many remote consoles, that kept all the books now kept by specialist, that could easily make the entire book on any stock available to anybody (so that interested individuals could then compete to ‘make a market’ in a stock) and that carried out transactions automatically.”); Daniel R. Siegel, *The Competitive World of Electronic Trading*, in INNOVATION AND TECHNOLOGY IN THE MARKETS: A REORDERING OF THE WORLD’S CAPITAL MARKET SYSTEMS 3, 11 (Daniel R. Siegel ed., 1990) (“The most likely scenario is that by the year 2000 . . . [t]here will be no designated market-makers or other entities with special access to the market.”); Hans R. Stoll, *Reconsidering the Affirmative Obligation of Market Makers*, FIN. ANALYSTS J., Sept./Oct. 1998, at 72, 80 (“That an affirmative obligation reduces volatility or makes markets more efficient is not evident. . . . Markets will function well without an affirmative obligation. Market makers need no regulatory obligations and should not receive special privileges.”).

39. See, e.g., *Examining the Efficiency, Stability, and Integrity of the U.S. Capital Markets: J. Hearing Before the Subcomm. on Sec., Ins., & Inv. of the S. Comm. on Banking, Hous., & Urban Affairs and the Permanent Subcomm. on Investigations of the S. Comm. on Homeland Sec. & Governmental Affairs*, 111th Cong. 41 (2011) (remarks of Manoj Narang, Chief Executive Officer, Tradeworx, Inc.) (“I cannot think of any empirical evidence that market maker obligations actually matter in practice.”).

40. See, e.g., Paul Brakke, *Commentary on On the Existence of an Optimal Tick Size*, 10 REV. FUTURES MKTS. 75, 76 (1991) (“[W]hy couldn’t pension funds, for example, be the market-maker? They have very large inventories of assets and pretty much zero cost of inventory since they are already long in these assets. It seems to me that the pension funds are in a much better position on any given trade to take a position, and are much better capitalized than any market-maker on the floor. . . . The only thing missing is . . . the electronic hookup to a centralized exchange.”); Paul Reynolds, *Shining a Light on Fixed Income Dark Matter*, TABB FORUM (Sept. 12, 2014), <http://tabbforum.com/opinions/shining-a-light-on-dark-matter> [<https://perma.cc/89DF-RR3P>] (“Compared to the sell-side, the buy-side has an almost zero cost of capital. It has little or no leverage so does not need the same restrictions to protect the taxpayer from failure. As a result the buy-side can provide a far superior price for a large and illiquid order, given the opportunity to price it. Not surprisingly the buy-side lacks the market-maker infrastructure of the sell-side.”).

to serve as informal liquidity providers.⁴¹ However, an overall substantial impact of this type of market making, let alone a disintermediation of sell-side market makers, remains to be seen. While institutional investors may in fact benefit from sophisticated technological tools or regulatory or other market-wide changes that would encourage them to engage in liquidity-providing trading strategies, the very business model and practices of a typical institutional investor may be a substantial obstacle.⁴² Still, there is some evidence that certain groups of hedge funds have functioned as liquidity providers,⁴³ which is not surprising in light of their operational and

41. See John D'Antona Jr., *Instinet Helps MAKE Liquidity*, TRADERS MAG., Mar. 2014, 50, 50 (“The new algorithm, MAKE, is geared toward passive traders and gives them electronic access to the same type of advanced liquidity-providing tactics used by market makers. Using historical information, recent trading patterns and real-time market data, MAKE sizes and distributes child orders at multiple price levels and across destinations, controlling adverse and negative selection while reducing exposure to signaling, gaming and predatory techniques.”); Press Release, Inv. Tech. Grp., Inc., ITG Launches Smart Limit Algorithm (Feb. 26, 2014), <http://investor.itg.com/phoenix.zhtml?c=100516&p=irol-newsArticle&ID=1903736&highlight=> [<https://perma.cc/C8PQ-XKNF>] (“Smart Limit Algorithm [is] an innovative tool which helps institutional investors meet the challenge of trading passively in a highly competitive, fragmented market. [This algorithm] is built on ITG’s next-generation, low-latency trading infrastructure, providing powerful high-frequency trading technology to institutional investors. ITG Smart Limit Algorithm employs sophisticated logic to determine optimal order pricing, sizing and routing in order to balance spread capture opportunities and adverse selection risk.”).

42. See BANK OF INT’L SETTLEMENTS, 85TH ANNUAL REPORT: 1 APRIL 2014–31 MARCH 2015, at 39 (June 28, 2015), <https://www.bis.org/publ/arpdf/ar2015e.pdf> [<https://perma.cc/XE7Q-S6P2>] [hereinafter BIS, 85TH ANNUAL REPORT] (“[A]sset managers and institutional investors are less well placed to play an active market-making role at times of large order imbalances. They have little incentive to increase their liquidity buffers during good times to better reflect the liquidity risks of their bond holdings. And, precisely when order imbalances develop, asset managers may face redemptions by investors.”); Letter from Colm Kelleher, Managing Dir. & President, Institutional Sec., Morgan Stanley, to the Bank of Eng., HM Treasury & Fin. Conduct Auth. 6–7 (2015), <http://www.bankofengland.co.uk/markets/Documents/femr/ms.pdf> [<https://perma.cc/W8HU-89T9>] (“The market-making function undertaken by dealers cannot be performed in the same manner by buy-side participants, particularly in stressed markets, as they would be faced with significant conflict issues in performing a role (and absorbing risks) traditionally undertaken by sell-side participants (and would face the same capital and other constraints of sell-side participants if they markedly changed their structures or strategies).”). These observations were made in the context of fixed income markets, but they still have some relevance for other markets.

43. For empirical studies suggesting this result, see Petri Jylhä et al., *Do Hedge Funds Supply or Demand Liquidity?*, 18 REV. FIN. 1259 (2013); Francesco Franzoni & Alberto Plazzi, *What Constrains Liquidity Provision? Evidence from Hedge Fund Trades* (June 3, 2015) (unpublished manuscript) (on file with author), <http://ssrn.com/abstract=2239327> [<https://perma.cc/WE74-9AXT>]; Russell Jame, *Do Hedge Funds Create Value from Liquidity Provision?* (Aug. 2015) (unpublished manuscript) (on file with author), http://russelljame.com/hf_liquidity_provision_aug2015.pdf [<https://perma.cc/X4GK-FR8L>]; Mathias Kruttli, *Are Hedge Funds Smart Money? Liquidity Provision to Noninformational*

regulatory differences from traditional institutional investors.⁴⁴ On the other hand, the model of liquidity provision by hedge funds, as more fundamental and longer-term traders compared to traditional market makers and their modern permutations, may involve less liquid assets, have a different timeframe or capital capacity, or lack double-sided quotations.⁴⁵

The very existence of a balance of trading obligations and privileges may be explained through the lens of externalities in the market for liquidity. Framing this issue as an externality means finding the wedge between the socially optimal amount of liquidity and the profit-maximizing amount of liquidity for market makers, given their costs and benefits: “To the extent . . . that liquidity and efficiency are associated with positive externalities, the private benefit of market participants does not capture the full social benefit of an efficient and liquid market. In other words, market participants are not compensated for the wider benefits that their participation brings about.”⁴⁶ In an early discussion touching on this issue,

Traders (Dec. 28, 2014) (unpublished manuscript) (on file with author), <http://ssrn.com/abstract=2525989> [<https://perma.cc/69M6-DEV2>]. This involvement by hedge funds is even observed in the options space, which has traditionally been dominated by DMMs. See, e.g., *Hedge Funds Pump Liquidity into Options Markets*, MKTS. MEDIA (May 9, 2014), <http://marketsmedia.com/hedge-funds-pump-liquidity-options-markets/> [<https://perma.cc/YZR6-BCTW>] (“What we are seeing in recent years is the line between the pure market makers and liquidity takers is getting a little bit more blurred. People like us, a volatility trading firm, bring a lot of liquidity to the market. Even though we are coming in as a liquidity taker, more than half of our trades are providing liquidity. . . . It turns out that a quantitative volatility system interfacing with the intelligence of electronic execution and institutional liquidity providing is a pretty good combination, and we are seeing a very good and consistent outcome in the past three years.” (quoting Derek Wang, founder and CEO of Bell Curve Capital, a quantitative hedge fund)).

44. See, e.g., Jame, *supra* note 43, at 1 (“[C]ompared to other institutional investors, hedge funds generally have better liquidity management tools, such as lockups and share restrictions, which likely provide them with a comparative advantage in patient liquidity provision.”). For an illustration of much scarcer evidence of the role of liquidity providers played by some mutual funds at least during the pre-HFT era, see Zhi Da et al., *Impatient Trading, Liquidity Provision, and Stock Selection by Mutual Funds*, 24 REV. FIN. STUD. 675 (2011). A subsidiary issue is whether certain groups of retail investors provide liquidity on their own rather than through intermediated aggregation and how they are compensated for doing so. For empirical studies in this area, see Jean-Noel Barrot et al., *Are Retail Traders Compensated for Providing Liquidity?*, J. FIN. ECON. (forthcoming), <http://ssrn.com/abstract=2457051> [<https://perma.cc/FT83-M243>]; Eric K. Kelley & Paul C. Tetlock, *How Wise Are Crowds? Insights from Retail Orders and Stock Returns*, 68 J. FIN. 1229 (2013).

45. See, e.g., Jame, *supra* note 43, at 36 (suggesting that certain hedge funds “create significant short-term value from liquidity provision, but due to their relatively long holding periods, the impact of liquidity provision on the performance of their holdings is more modest”).

46. Evangelos Benos & Anne Wetherilt, *The Role of Designated Market Makers in the New Trading Landscape*, 52 BANK ENG. Q. BULL. 342, 344 (2012).

the SEC pointed to the perceived gap between private and social benefits of market making:

Since the potentialities for profit are greatest in the more active stocks, specialists' dealer activities tend to be concentrated in these stocks. Furthermore, the risks of acquiring an inventory are smallest in active stocks Responsible professional participation is needed most, however, in the least active stocks, where risks are greater and profit potentials are more limited.⁴⁷

Of course, a market maker is guided by profit motives, and a liquid security, while attracting more traders, is likely to boost the bottom line of this market participant.⁴⁸ In this sense, the benefits from liquidity are to some degree *internalized* by that market maker, but free-riding may take place as well. It follows that a subsidy may be required: "In general, liquidity provision represents a positive externality in that traders who commit capital to make markets are not fully compensated for their liquidity services. While the usual solution to this inefficiency is a Pigovian subsidy, the form that this payment should take is less clear."⁴⁹

There are two major approaches to explaining externalities in the market for liquidity discussed in the relevant academic literature, and these forces may be operating at the same time. The first approach focuses on the impact on issuers of securities. After all, even issuers that do not participate in secondary trading cannot be excluded from enjoying potential benefits of additional liquidity, which may affect operating decisions of such companies and hence the real economy.⁵⁰ Another explanation is

47. REPORT OF SPECIAL STUDY OF SECURITIES MARKETS OF THE SECURITIES AND EXCHANGE COMMISSION, H.R. DOC. NO. 88-95, pt. 2, ch. VI, at 162 (1963) [hereinafter SEC, SPECIAL STUDY OF SECURITIES MARKETS].

48. See, e.g., *1933-34 Senate Hearings on Stock Exchange Practices*, *supra* note 9, pt. 15, at 6809 (testimony of Raymond Sprague, a member of the NYSE and a specialist) ("I do not wish to put myself on record as being a public benefactor, but give me a selfish motive and I create a better market in my stocks so that people will invest or speculate in my stocks. In that way a man can buy or sell with knowledge that there will be a market that he can buy or sell in. . . . [T]o that extent it is an advantage to the investor just as well as it is for speculator, because when an investor seeks stocks for investment purposes the first thing he looks at is marketability, liquidity, how he is going to get out once he gets in.").

49. Kumar Venkataraman & Andrew C. Waisburd, *The Value of the Designated Market Maker*, 42 J. FIN. & QUANT. ANALYSIS 735, 755 (2007). Interestingly, several empirical studies suggested that the value of improvements in market liquidity may be a large multiple of the amount of subsidies provided to market makers. See Dolgoplov, *Linking the Securities Market Structure and Capital Formation*, *supra* note 15, at 5 n.11, 44 n.167 (discussing value-to-subsidy ratios produced by several empirical studies).

50. See, e.g., Kalman J. Cohen et al., *The Impact of Designated Market Makers on Security Prices*, 1 J. BANKING & FIN. 219, 237, 245 (1977) ("[Price] stabilization [by designated market makers] is a public good type external economy to investors [that] would be internalized in a free market where contracts between corporations and stabilizers are not

based on the trading process itself with respect to different types of actual or potential participants in this process,⁵¹ and this explanation is also consistent with an ultimate impact on issuers and the real economy. Moreover, aside from the focus on one security's trading process, liquidity externalities may extend to other securities.⁵²

The nature of externalities in the market for liquidity, embodied by a balance of trading obligations and privileges of market makers, implies a special regulatory status of these market participants. Such obligations and privileges may take a variety of forms with different degrees of formality and transparency. Over years, market makers have enjoyed a number of trading privileges, notably (i) time, place, and information-based advantages; (ii) inherent advantages built into trading venues' respective architectures, including technology-based and competition-insulating measures; (iii) discounts/subsidies offered by trading venues or issuers themselves; and (iv) order-allocation guarantees.⁵³ Likewise, trading obligations come in different shapes and sizes, such as (i) specific requirements for quotes/best price presence; (ii) constraints on certain

restricted.”).

51. See, e.g., Jennifer Huang & Jiang Wang, *Market Liquidity, Asset Prices, and Welfare*, 95 J. FIN. ECON. 107, 109 (2010) (“In our model, trading and liquidity provision generate externalities. A trader’s participation in the market also benefits his potential counterparties, and a market maker’s supply of liquidity helps all potential traders. . . [I]n general, market mechanism fails to properly internalize these externalities and thus leads to inefficient supply of liquidity in the market.”).

52. See COMM. ON THE GLOBAL FIN. SYS., BANK OF INT’L SETTLEMENTS, CGFS PAPER NO. 52, MARKET-MAKING AND PROPRIETARY TRADING: INDUSTRY TRENDS, DRIVERS AND POLICY IMPLICATIONS 37 (Nov. 2014), <http://www.bis.org/publ/cgfs52.pdf> [<https://perma.cc/CUS7-9NUZ>] [hereinafter BIS, MARKET-MAKING AND PROPRIETARY TRADING] (arguing that incentives for market makers “could support market activity and robustness and generate positive spillovers into other market segments”); see also Yakov Amihud et al., *Market Microstructure and Securities Values: Evidence from the Tel Aviv Stock Exchange*, 45 J. FIN. ECON. 365, 365 (1997) (finding “positive liquidity externalities (spillovers) across related stocks” attributed to an improved trading method); Giovanni Cespa & Thierry Foucault, *Learning from Prices, Liquidity Spillovers, and Market Segmentation 1* (Apr. 2011) (unpublished manuscript) (on file with author), http://www.lse.ac.uk/fmg/researchProgrammes/paulWoolleyCentre/events/4thAnnualConference/S5_TFoucault_Paper.pdf [<https://perma.cc/J8MZ-M38N>] (providing a theoretic model for liquidity spillovers and arguing that, “[a]s prices of less liquid securities convey less precise information, a drop in liquidity for one security raises the uncertainty for dealers in other securities, thereby affecting their liquidity”).

53. Addressing the importance of order flow-related information, one commentator observed that “[m]arket making can be profitable, because the market makers have an informational advantage.” Joseph E. Stiglitz, *Tapping the Brakes: Are Less Active Markets Safer and Better for the Economy?* 7 (Apr. 15, 2014) (unpublished manuscript) (on file with author), <http://www.frbatlanta.org/documents/news/conferences/14fmc/Stiglitz.pdf> [<https://perma.cc/8F84-TFTP>]. Yet, while such informational advantages have been common, this condition is not necessary for profitable market making.

trading activities; and (iii) support of less desirable securities/broader portfolios. Moreover, empirical research generally indicates that the existence of combined trading obligations and privileges applicable to market makers improves market quality,⁵⁴ which serves as an additional confirmation of the paradigm of liquidity externalities.

The existence of interacting, although not completely solidified, trading obligations and privileges was evident by the time of the birth of the federal securities statutes, as illustrated by complex rules and conventions governing NYSE specialists. While trading activities to provide liquidity were limited on paper to “the whim, caprice, or the will of the specialist,”⁵⁵ these market participants were described as having “[the] duty to their customers, who are commission houses, to sustain and keep as close a market as possible, sometimes to their great disadvantage.”⁵⁶ In other words, these trading obligations were informal and loosely defined, and the same was true of trading privileges, which were based on being at the hub of the trading process — adjusted for the existence of competing specialists at that time — and the knowledge of the order book.⁵⁷

Trading venues have often provided some protections to market makers or DMMs specifically, which could be seen as competition-insulating.⁵⁸ Overall, under the specialist system, the existence of one DMM per stock, although not the only viable model, perhaps made some sense in the context of that market participant’s role as a matching agent in a centralized auction, the existence of stock-allocation procedures, and the inherent competitive forces in that auction.⁵⁹ Furthermore, the existence of just one DMM per security probably makes it easier to be held accountable for meeting its trading obligations and being able to recoup benefits through its trading privileges, which also serves as a much better

54. Dolgoplov, *Linking the Securities Market Structure and Capital Formation*, *supra* note 15, at 5 & n.10.

55. *1933–34 Senate Hearings on Stock Exchange Practices*, *supra* note 9, pt. 15, at 6799 (question of Ferdinand Pecora, Counsel to the Committee on Banking and Currency).

56. *Id.* (testimony of Paul Adler, a specialist and a member of the NYSE).

57. The existence of informational advantages of specialists was a much debated issue during these hearings, with the importance of this issue being noted in a key congressional report. S. COMM. ON BANKING & CURRENCY, *STOCK EXCHANGE PRACTICES*, *supra* note 32, at 25–26.

58. For a discussion of formal economic models and other sources in support of the argument of why a monopoly-like franchise might be desirable in some circumstances, see Dolgoplov, *Linking the Securities Market Structure and Capital Formation*, *supra* note 15, at 35 & n.134.

59. For a comprehensive historical discussion of various forms of competition among specialists on several securities exchanges, including the NYSE, see U.S. SEC. & EXCH. COMM’N, *REPORT ON THE PRACTICE OF PREFERENCING* ch. I (1997), <http://www.sec.gov/news/studies/prefrep.htm> [<https://perma.cc/8T4J-LY26>].

explanation than, or a clarification of, the “natural monopoly” paradigm.⁶⁰ Yet another illustration of regulatory protection is the practice of off-board trading restrictions traditionally imposed on exchange members in the past, as this practice amounted to a boost to exchange specialists.⁶¹ Another similar measure, typically associated with the old structure of NASDAQ, is mandatory intermediation through dealers and hence the lack of direct interaction of investors’ orders.⁶² Interestingly, regulatory changes aimed to inject more competition by mandating direct interaction of orders may have unintentionally impacted the willingness of market makers to provide liquidity at least in some securities and decreased *overall* liquidity in such securities — despite the feasibility of additional participation.⁶³ Likewise, market makers may be aided by *governmental* restraints on potential competition. As an illustration, one historical phase created the situation in which floor traders on securities exchanges were reduced to mere ancillary market makers to specialists, with the latter possessing substantial institutional advantages over the former and thus dominating the trading process.⁶⁴ The SEC’s hostility to floor trading had played a major role in

60. For a discussion of the “natural monopoly” paradigm in market making, see Dolgoplov, *Linking the Securities Market Structure and Capital Formation*, *supra* note 15, at 35–36 & n.135; Dale Arthur Oesterle et al., *The New York Stock Exchange and Its Out Moded Specialist System: Can the Exchange Innovate to Survive?*, 17 J. CORP. L. 223, 295–300 (1992).

61. See, e.g., Off-Board Trading by Members of National Securities Exchanges, Exchange Act Release No. 11,942, 41 Fed. Reg. 4507, 4509, 4511 (Dec. 19, 1975) (“Because of exchange off-board trading rules, over-the-counter market makers are unable, as a practical matter, to compete effectively with exchange specialists in attracting these orders: competition between over-the-counter market makers and exchange specialists is distorted by the captive nature of agency orders represented by exchange members . . . [Furthermore, such rules] effectively prevent exchange members other than specialists from competing with specialists and over-the-counter market makers in the business of making two-sided, round lot markets in exchange-listed securities.”).

62. A similar practice of preventing broker-to-broker transactions was criticized in the context of trading on the LSE in the nineteenth century:

It has to be considered that the Stock Exchange has a sort of vested right in every bargain, and that the profits of the operation are not to be confined to the broker, but that if two brokers deal together there is a kind of wrong practiced upon the jobbers. LSE COMMISSION, MINUTES OF EVIDENCE, *supra* note 2, para. 3517, at 133 (testimony of Charles Branch, a former broker at the LSE).

63. See Dolgoplov, *Linking the Securities Market Structure and Capital Formation*, *supra* note 15, at 21–23 (discussing the adoption of the order handling rules by the SEC in 1996 and this measure’s impact on market makers).

64. See Seymour Smidt, *Trading Floor Practices on Futures and Securities Exchanges: Economics, Regulation, and Policy Issues*, in FUTURES MARKETS: REGULATORY ISSUES 49, 54 (Ann E. Peck ed., 1985) (“Exchanges regulated by the SEC generally exclude from the trading floor persons trading primarily for their own accounts unless it can be shown that they perform a market-making function. If they do, their floor trading is usually restricted to this market-making function.”); Jack Hirshleifer, *Reflections on the Role and*

this development,⁶⁵ which was enabled by the underlying statutory framework.⁶⁶ An unsurprising result was the strengthened position of exchange specialists at the expense of their potential competitors.

Another practice intertwined with the paradigm of liquidity externalities is the one of cross-subsidization. While cross-subsidization may merely reflect the nature of the integrated model of market making,⁶⁷ this practice is a potential tool for supporting the function of providing liquidity in a given security or enhancing liquidity in less desirable securities. Historically, cross-subsidization appears to have been practiced by some trading venues, although it might have been enforced indirectly and informally rather than explicitly. It appears that the principle of cross-subsidization had applied to NYSE specialists — the category including many non-integrated securities firms — with respect to different activities relating to the same stock and across different stocks. For instance, there is some evidence that the role of “a broker’s broker” played by specialists effectively subsidized their activities as dealers.⁶⁸ Moreover, it has been noted that the business model of specialists tended to be sensitive to

Functioning of the Organized Exchanges 10 (RAND Corp., Paper No. P-4666, 1971) (“The independent floor speculator competes with the specialist in providing market depth (the reverse of thin-ness). In recent years the former [traders] have largely disappeared, while a rising fraction of transactions . . . involve specialists as buyer[s] or seller[s].”). Of course, this policy had corresponded to an observation of an influential SEC study that floor traders could — and should — play “a highly useful function of ‘auxiliary specialists’.” SEC, SPECIAL STUDY OF SECURITIES MARKETS, *supra* note 46, pt. 2, ch. VI, at 241–42.

65. For an analysis of the SEC’s approach to floor trading and its critique, see Smidt, *supra* note 64, at 77–79. A critical approach to floor trading predates federal securities law and the birth of the SEC, and, traditionally, floor traders had been defended on the grounds that their transactions were “of great assistance in maintaining a continuous market [and] stabilizing prices.” J. EDWARD MEEKER, THE WORK OF THE STOCK EXCHANGE 101 (1922).

66. For several amendments relating to floor trading and the corresponding authority of the SEC see Securities Acts Amendments of 1975, Pub. L. No. 94-29, § 6, 89 Stat. 97, 110–11; Securities Exchange Act of 1934, Pub. L. No. 73-291, § 11, 48 Stat. 881, 891–92.

67. See, e.g., BIS, MARKET-MAKING AND PROPRIETARY TRADING, *supra* note 52, at 9 (“Market-making serves the customer relationship. An assessment of the profitability of market-making is thus based not only on the [profit and loss position] of the market-making units — as would be the case for proprietary trading — but also on any associated client business ([e.g.] underwriting, origination, asset management, prime brokerage) tied to the provision of market-making services. The importance of the customer franchise . . . can help explain why banks continue to provide market-making services even in less profitable markets and, to some extent, during times of elevated financial market volatility or stress.”).

68. See G. Keith Funston, Letter to the Editor, HARV. BUS. REV., Sept.–Oct. 1962, at 7, 10 (“An important factor in the specialist’s willingness to shoulder dealer risks, in order to help maintain orderly markets, is the knowledge that in the long run an orderly market will encourage commission business in which he may participate. Moreover, without such an incentive, specialists who had to rely solely on dealer profits would naturally step away from the market in times of stress, when they would be most needed.”).

changes in the commission structure,⁶⁹ and, similarly, this commission business was not necessarily priced competitively *on its own*.⁷⁰ Likewise, the NYSE's policy of allocation of stocks in bundled lots among its specialists encouraged them to enhance liquidity of less actively traded and hence less profitable names at the expense of profits in more popular names.⁷¹ In fact, as early as 1968, the NYSE linked the ability of specialists "to make effective markets in normally inactive stocks" and "the financial incentive arising from market-making in more active issues,"⁷² although the SEC was skeptical of the cross-subsidization argument on

69. See *Interaction Between Trading and Investment Decisions*, in COPING WITH INSTITUTIONAL ORDER FLOW 41, 49 (Robert A. Schwartz et al. eds., 2005) ("It seems to me the specialists used to earn their money by earning floor brokerage, by facilitating trading, and by making a fair and orderly market. We have taken them out of that business. Whether it is decimals or the market structure changes that have happened in the last 15 years, the specialists are now in a much more adversarial and proprietary trading model.") (remarks of Andrew Brooks, Vice President and Head of Equity Trading, T. Rowe Price Associates); Louis Margolis, *Before and After October 19: Structural Changes in U.S. Financial Markets*, in INNOVATION AND TECHNOLOGY IN THE MARKETS: A REORDERING OF THE WORLD'S CAPITAL MARKET SYSTEMS 59, 63–64 (Daniel R. Siegel ed., 1990) ("[E]xchange specialists had incentives to make bids and offers that would stabilize the market. At old commission levels [i.e., before the Mayday of May 1, 1975 that marked the end of the fixed brokerage commissions regime], they could afford to provide liquidity during periods of stress . . . [But] the specialist has seen a sharp drop in his floor brokerage."). The elimination of specialists' commissions on the NYSE, which was accompanied by a restructuring of their incentives, had taken place fairly recently. For a further description of the abolition of specialists' commissions and several other fees and the institution of a new revenue sharing program at that time, see Notice of Filing and Immediate Effectiveness of a Proposed Rule Change by New York Stock Exchange LLC To Prohibit Specialists from Charging Commissions on Transactions in Their Specialty Securities, Exchange Act Release No. 54,850, 71 Fed. Reg. 71,217 (Nov. 30, 2006).

70. See, e.g., RAYMOND VERNON, THE REGULATION OF STOCK EXCHANGE MEMBERS 91 (1941) ("With regard to the interrelationship between the broker and the dealer activities of specialists it must be realized that the cost of the present specialist system could not be justified alone by the brokerage duties which the specialist performs, since such duties could be performed less expensively by a machine or by a clerk.").

71. For a discussion of policy goals, social welfare, and relevant empirical evidence relating to cross-subsidization, see Dolgoplov, *Linking the Securities Market Structure and Capital Formation*, *supra* note 15, at 28–29. For instance, one empirical study suggested the existence of a direct relationship for different types of stocks: "Our results reveal that the profits of beneficiary stocks are lower when donor stocks are more frequently traded. This negative association is stronger when the beneficiary stocks are less actively traded. Less frequently traded stocks are more heavily subsidized when donor stocks have higher trading volumes." Roger D. Huang & Jerry W. Liu, *Do Individual NYSE Specialists Cross-Subsidize Illiquid Stocks?* 3 (Nov. 2003) (unpublished manuscript) (on file with author).

72. N.Y. STOCK EXCH., ECONOMIC EFFECTS OF NEGOTIATED COMMISSION RATES ON THE BROKERAGE INDUSTRY, THE MARKET FOR CORPORATE SECURITIES, AND THE INVESTING PUBLIC 24 (Aug. 1968).

some occasions.⁷³ Some commentators on the current market structure also recognized the significance of cross-subsidization:

Any market making program should be designed to recognise that the securities most attractive to market makers (high volume, low price securities) are in the least need of additional liquidity, and those most needing liquidity are also the least attractive to market makers. Market makers should be assigned obligations on a package of securities which include a small number of high volume securities and larger set of illiquid names.⁷⁴

There is some evidence that the phenomenon of cross-subsidization by DMMs still persists.⁷⁵ Indeed, some trading venues, including new ones, explicitly use this principle.⁷⁶ On the other hand, the feasible magnitude of cross-subsidization has diminished, given the competitive environment and the level of fragmentation of the trading process in liquid securities.⁷⁷

Yet another externality-related perspective relates to issuer-to-market maker compensation arrangements, which also may be formally set up by individual trading venues, as companies may benefit from enhanced liquidity via a net positive impact on their securities' prices and hence

73. See, e.g., Off-Board Trading by Members of National Securities Exchanges, Exchange Act Release No. 11,942, 41 Fed. Reg. 4507, 4509, 4518 (Dec. 19, 1975) (“With the respect to the argument that the quality of specialist market making in inactive securities is dependent on profits from market making in active securities (which will be diminished by increased competition in those securities [as a result of the anticipated abolition of restrictions on off-board by exchange members]), the Commission has not been able to ascertain that this cross-subsidy actually exists.”).

74. Letter from David Panko, Managing Dir., Automated Execution Grp., TD Sec., to Mkt. Regulation Branch, Ont. Sec. Comm'n 7 (Sept. 27, 2013), http://www.osc.gov.on.ca/documents/en/Marketplaces/com_20130927_aequitas_td-securities.pdf [<https://perma.cc/6TDS-J39L>].

75. See, e.g., Amber Anand & Kumar Venkataraman, *Market Conditions, Fragility and the Economics of Market Making*, J. FIN. ECON. (forthcoming) (manuscript at 25), <http://ssrn.com/abstract=2179259> [<https://perma.cc/YD9U-TCYL>] (“Results [from transactions in stocks on the Toronto Stock Exchange] support two types of cross subsidies in market making. First, the DMMs' risk-adjusted profits are higher in large stocks than small stocks, implying a cross-subsidy from large to small stocks. Second, higher profits in normal conditions subsidize the risk assumed in stressful conditions.”).

76. See, e.g., Press Release, Aequitas NEO Exch. Inc., Building a Liquidity Safety Net for Public Companies and Investment Products in Canada 1 (Mar. 19, 2015), http://aequitasinnovations.com/stagingsite/wp-content/uploads/sites/6/2015/08/NEO_DesignatedMarketMakers_PR_19mar15_FINAL.pdf [<https://perma.cc/VZ8J-5GH7>] (stating that DMMs on Aequitas NEO Exchange “are required to assume market-making responsibility for a number of assigned securities, with the appropriate balance of liquid and less-liquid securities”).

77. See Dolgoplov, *Linking the Securities Market Structure and Capital Formation*, *supra* note 15, at 30 (discussing changes that restrain cross-subsidization).

valuation, whether they actually participate in the trading process or not.⁷⁸ Indeed, issuers have some advantages in creating liquidity in the sense that they can potentially provide much greater subsidies than those provided by trading venues at the expense of participants in the trading process. In fact, issuer-to-market maker compensation arrangements have been popular in other countries, especially for smaller-cap stocks.⁷⁹ On the other hand, the U.S. prohibition on such arrangements largely remains in place, notably with respect to securities of operating companies,⁸⁰ and the SEC has relaxed this restriction only with respect to exchange-traded products, such as exchange-traded funds, under special programs administered and intermediated by several securities exchanges.⁸¹

Private regulatory regimes provided by trading venues also need to be compared to over-the-counter markets and less formal trading networks/platforms, which are commonly employed for such assets as fixed-income or mortgage-backed securities.⁸² Some advantages of market

78. See generally *id.* at 39–50.

79. See Notice of Filing of a Proposed Rule Change by NASDAQ Stock Market LLC To Establish the Market Quality Program, Exchange Act Release No. 66,765, 77 Fed. Reg. 22,042, 22,044 (Apr. 6, 2012) (“First North [a European subsidiary of NASDAQ] offers new or small public companies the benefits of listing on a public market and the potential for good markets through a paid for market making system.”); Letter from Amber Anand, Assoc. Professor of Fin., Whitman Sch. of Mgmt., Syracuse Univ., to Elizabeth M. Murphy, Sec’y, U.S. Sec. & Exch. Comm’n 2 (Apr. 29, 2012), <http://sec.gov/comments/sr-nasdaq-2012-043/nasdaq2012043-9.pdf> [<https://perma.cc/YMR5-NS2Q>] (“The combined evidence from other [countries] indicates that a paid market making program offers significant promise for improving the liquidity of the stocks of smaller firms.”).

80. See Dolgoplov, *Linking the Securities Market Structure and Capital Formation*, *supra* note 15, at 42–43 (noting the SEC’s reluctance to allow issuer-to-market maker compensation arrangements for operating companies despite other constituencies’ support for this measure).

81. For such programs currently approved by the SEC, see Order Approving a Proposed Rule Change by BATS Exchange, Inc. To Amend the Competitive Liquidity Provider Program, Exchange Act Release No. 72,692, 79 Fed. Reg. 44,908 (July 28, 2014); Order Approving a Proposed Rule Change by NYSE Arca, Inc. To Implement a One-Year Pilot Program for Issuers of Certain Exchange-Traded Products, Exchange Act Release No. 69,706, 78 Fed. Reg. 35,340 (June 6, 2013); Order Approving a Proposed Rule Change by NASDAQ Stock Market LLC To Establish the Market Quality Program, Exchange Act Release No. 69,195, 78 Fed. Reg. 18,393 (Mar. 20, 2013).

82. Many of these securities are inherently illiquid for a variety of reasons, in addition to a more obvious gravitation toward typically large denominations, which make them less suitable for major trading venues. See, e.g., Julie Segal, *The Bond Conundrum: A Plethora of Issues but Little Liquidity*, INST. INVESTOR (Feb. 3, 2015), <http://www.institutionalinvestor.com/article/3423957/asset-management-fixed-income/the-bond-conundrum-a-plethora-of-issues-but-little-liquidity.html> [<https://perma.cc/45ZR-MEX2>] (noting the presence of illiquidity in bond markets and citing a securities industry professional that one of the reasons lies in the difficulty of standardizing covenants that protect bondholders). For similar reasons, more modern trading mechanics have been

makers in such markets — in the absence of formal institutional advantages provided by a trading venue — may be embedded in the de facto monopoly role or based on the performance of multiple functions, such as providing additional services for an issuer or creating a specific security. Furthermore, another de facto advantage is represented by the opaque nature of some markets: “[I]n corporate bond markets, dealer banks were able and willing to provide liquidity to the secondary market, since a profit could be made from the opacity of bid-ask spreads — in the absence of price transparency.”⁸³ Accordingly, policy debates over the desirability of transparency need to balance between the openness of markets and incentives of market makers: “On one hand, a fairer, more transparent market could attract new traders. On the other hand, removing market opacity may dampen the incentives for dealer-banks to [bear] the risk of making markets and at the least, confer benefits only to a small group of investors.”⁸⁴ Another related — and game-changing — proposal for bond markets maintained that “brokers should be required to post their customer limit orders to an actionable electronically accessible order display

gaining ground rather slowly in fixed income markets. *See, e.g.*, BROOKINGS INST., ARE THERE STRUCTURAL ISSUES IN U.S. BOND MARKETS? 12 (Aug. 3, 2015), http://www.brookings.edu/~media/events/2015/08/03-bond-markets/20150803_bond_markets_transcript.pdf [<https://perma.cc/YZ3H-QH6B>] (remarks of Annette L. Nazareth, Partner, Davis Polk & Wardwell LLP) (“[N]otwithstanding the profound impact that technology has had on competition and intermediation in markets such as the equity and swaps markets, the fixed income markets, and particularly the corporate and municipal bond markets, remain largely manual and dealer centric, with a large number of separate CUSIPs, each with bespoke attributes. . . . [T]he number and complexity of the bond issues also make continuous auction-based electronic markets less attractive.”). For a discussion of the proposal to standardize the issuance of corporate bonds as a way of moving to a more automated trading environment and several downsides to standardization, see PWC, LIQUIDITY STUDY, *supra* note 34, at 112.

83. Rohini Tendulkar & Gigi Hancock, *Corporate Bond Markets: A Global Perspective* 55 (IOSCO Research Dep’t, Staff Working Paper No. SWP4/2014, 2014), <http://www.iosco.org/research/pdf/swp/SW4-Corporate-Bond-Markets-Vol-1-A-global-perspective.pdf> [<https://perma.cc/QR2V-LXA8>].

84. *Id.*; *see also* HILL, *supra* note 14, para. 32, at 16 (“[T]here is uniform recognition that if the market becomes too transparent, this will have a counterproductive impact on liquidity. This is a reflection of the fact that the European credit market is not homogenous, remains largely OTC, and is inherently illiquid.”). This perspective is particularly important in light of a potential regulatory move by the SEC in fixed-income securities. *See, e.g.*, Daniel M. Gallagher, Comm’r, U.S. Sec. & Exch. Comm’n, Remarks to the Georgetown University Center for Financial Markets and Policy Conference on Financial Markets Quality (Sept. 16, 2014), <http://www.sec.gov/News/Speech/Detail/Speech/1370542966151#.VB5QXRb4XQj> [<https://perma.cc/HJJ6-HCPT>] (“[T]he SEC, as the primary regulator of the fixed income markets for non-government instruments, can address the opacity of these markets by requiring greater price transparency. Additionally, we can address liquidity risks by facilitating electronic dealer-to-dealer and on-exchange transactions of these products.”).

facility,” and this proposal was accompanied by the following logic:

Dealers will lose profits and withdraw only if buy-side traders out-compete them. If so, the buy-side traders will be supplying liquidity and the markets will be no worse off, and certainly at least as liquid. But, the customers will be better off because they will obtain better prices on average. Transaction costs will be lower because buy-side traders will not be paying dealers for services that they can often provide to each other at lower cost.⁸⁵

Yet, without denying the presence of many inefficiencies in bond markets that may be addressed by such a display facility,⁸⁶ the adequacy of customer-driven interaction and unambiguously greater liquidity in all segments are not foregone conclusions.⁸⁷ More generally, it is not even a matter of old-school dealer networks versus electronic platforms: the issue is how new electronic platforms could be structured, by contrast to all-to-all classless fishbowls, in order to grant trading privileges to certain market participants in exchange for trading obligations. In other words, the design of such electronic platforms needs, *to some degree*, to replicate or

85. FIN. ECONOMIST ROUNDTABLE, STATEMENT ON THE STRUCTURE OF TRADING IN BOND MARKETS (May 11, 2015), <http://fic.wharton.upenn.edu/fic/Policy%20page/FERBondStatementwithIntro.5.11.15.pdf> [<https://perma.cc/244U-MMGU>].

86. One historical example relates to the relatively active market in fixed income instruments on the NYSE, which employed the “open outcry” and limit order book-like “bond cabinet” methods. There were no specialists, as orders were essentially matched by NYSE clerks, but transaction costs probably can be compared favorably to much later historical periods dominated by over-the-counter trading. For a discussion of the applicable trading process and empirical analysis of transaction costs, see Bruno Biais & Richard C. Green, *The Microstructure of the Bond Market in the 20th Century* 6–9, 29–30 (Aug. 29, 2007) (unpublished manuscript) (on file with author), <http://repository.cmu.edu/cgi/viewcontent.cgi?article=1133&context=tepper> [<https://perma.cc/UB87-CLQR>].

87. See also Sinead Cruise et al., *Middlemen the Key to Corporate Bond Market's Electric Dreams*, REUTERS (Nov. 10, 2015, 7:00 AM), <http://www.reuters.com/article/2015/11/10/corporatebonds-liquidity-idUSL1N13431Y20151110> [<https://perma.cc/MP4T-RGBA>] (noting a high failure rate among electronic platforms for bonds and asserting that “[p]latforms that have tried to bypass the broker-dealers and connect buyers and sellers directly have so far struggled to catch on, partly because of concerns over how confidential information would be handled”); Christopher Scott Mose, *The Siren Call of All-to-All for Corporate Bonds*, LINKEDIN PULSE (Oct. 8, 2015), <https://www.linkedin.com/pulse/siren-call-all-to-all-corporate-bonds-christopher-scott-mose> [<https://perma.cc/Z2MN-YSK8>] (arguing that “[t]he lack of uniformity, liquidity and infrequency of trading in the majority of corporate bonds limits or potentially inhibits the widespread adoption an order-driven market place . . . for the majority of institutional trading (except in the retail/odd-lot segment)” and that, “[w]ithout a ‘lit’ order book from which to import a multi-lateral best-bid and best-offer, most matching-platforms/crossing-networks will struggle to gain adoption due to an absence of reliable pre-trade price discovery, (except when surreptitiously seeded with dealer quotes)”).

compensate for traditional dealer advantages, and this perspective is particularly important for inherently less liquid markets, such as corporate debt and secondary private markets. Interestingly, two leading consulting firms proposed the following design for an electronic platform for corporate bonds:

First, the platform must enlist sell-side “specialists” (as the cash equities market has) to support price discovery and potentially sop up some of the buy or sell overhangs in assigned issues. Second, such systems should employ a call auction rather than a continuous-crossing format. . . . Within this construct, the specialists providing the winning quotes in a competitive bidding process (i.e., the highest bid and lowest offer) for a specific auction could be compensated through trade value-based markups or markdowns, with all trades crossed at the midpoint of the bid-ask spread.⁸⁸

Overall, the shifting balance of trading obligations and privileges of market makers will survive as a manifestation of externalities in the market for liquidity. Moreover, such externalities do not necessarily disappear with a growing level of natural liquidity, lower trading costs, and hence attractiveness of the security in question, although their magnitude and nature are likely to evolve.⁸⁹ Of course, critical viewpoints on the DMM model will persist as well. For instance, it is still not easy to dismiss the traditional assertion that “rules specifying market making standards have not been susceptible to objective or effective enforcement.”⁹⁰ On the other

88. MCKINSEY & CO. & GREENWICH ASSOCS., CORPORATE BOND E-TRADING: SAME GAME, NEW PLAYING FIELD 15 (Aug. 2013), <http://web.greenwich.com/greenwichcom-afzgt/pages/3601bee1f50be311aed602bf0a4d02bd.html> [<https://perma.cc/5JQW-32ER>]. In fact, at least one trading platform for corporate bonds “offers incentives to Designated Market Makers who meet their DMM obligations.” *Trading on Electronifie*, ELECTRONIFIE, <https://www.electronifie.com/trading> [<https://perma.cc/V6T6-XMJJ>] (last visited Feb. 28, 2016).

89. Interestingly, an advisory committee in the realm of futures and commodities held the view that “market maker structures should be *dismantled* once sufficient liquidity develops within a series/product,” but a qualified recommendation was provided: “If market maker structures are not dismantled after sufficient liquidity develops, then the quantity for which a market maker is held should be consistently proportionate to an appropriate liquidity criterion for as long as the market maker structure is then perpetuated.” MKT. ACCESS SUBCOMM., TECH. ADVISORY COMM., U.S. COMMODITY FUTURES TRADING COMM’N, BEST PRACTICES FOR ORGANIZED ELECTRONIC MARKETS 39 (Apr. 24, 2002) (footnote omitted), http://www.cftc.gov/ucm/groups/public/@aboutcftc/documents/file/tac_042402_bestpractices.pdf [<https://perma.cc/X89U-A7M4>] [hereinafter CFTC’s TECH. ADVISORY COMM., BEST PRACTICES FOR ORGANIZED ELECTRONIC MARKETS].

90. Off-Board Trading by Members of National Securities Exchanges, Exchange Act Release No. 11,942, 41 Fed. Reg. 4507, 4512 (Dec. 19, 1975); *see also* REPORT OF THE

hand, the level of quantification of both trading obligations and privileges of market makers has been increasing, and technological advancements in securities markets have probably played a large role in this process. Moreover, while the very existence of trading obligations and privileges should not be too controversial, a confidential treatment of such arrangements may generate a backlash. For instance, markets under the jurisdiction of the U.S. Commodity Futures Trading Commission (“CFTC”) offer a confirmed example of confidential rules relating to market making programs, a revelation triggering heated debates and even influencing litigation.⁹¹

II. MANAGING VULNERABILITY

The very nature of the business of market making with its exposure of trading interest, oftentimes framed in terms of specific trading obligations, makes these market participants vulnerable to certain trading strategies.⁹² This vulnerability of liquidity providers, whether formal or informal ones, largely overlaps with the concept of adverse selection, sometimes also referred to as the risk of “pick-off.” This concept does not have a universally accepted definition, as it may cover the gamut of scenarios

PRESIDENTIAL TASK FORCE ON MARKET MECHANISMS VI–8 (Jan. 1988) (arguing that “[the] lack of precision [such as] the maximum or minimum amounts of liquidity, depth and continuity required to be provided by a specialist . . . is understandable given the vague nature of the concept of a ‘fair and orderly market’”); Oesterle et al., *supra* note 60, at 281 (describing the specialist system on the NYSE in the early 1990s as characterized by “the continuous absence of meaningful standards for evaluating market-making activity”).

91. See Pam Martens, ‘Clandestine’ Conspiracy Documents Become Court Battleground in High Frequency Lawsuit, WALL ST. ON PARADE (June 5, 2014), <http://wallstreetonparade.com/2014/06/%E2%80%98clandestine%E2%80%99-conspiracy-documents-become-court-battleground-in-high-frequency-lawsuit> [https://perma.cc/E6KS-D8JS] (describing a class action lawsuit against the CME Group, which was partly based on allegations of “clandestine contracts” between the defendant and certain HFTs, and referencing specific requests of the CME Group to the CFTC to keep the details of several market maker incentive programs confidential). In fact, the CFTC is aiming to address this problem in its proposed rule. See Regulation Automated Trading, 80 Fed. Reg. 78,824, 78,942 (proposed Nov. 27, 2015) (to be codified at 17 C.F.R. §§40.25–.26) (mandating a greater level of transparency for market maker and trading incentive programs in the form of disclosure to the general public and regulators).

92. Of course, any regulatory restrictions on the ability of market makers to manage inventory position/engage in hedging would make these market participants more vulnerable to price changes more generally. As an illustration, one empirical study, confirming the popular wisdom, argued that certain restrictions on short-selling amidst the financial meltdown of 2008, which had a direct impact on options market makers, resulted in decreased liquidity. Robert Battalio & Paul Schultz, *Regulatory Uncertainty and Market Liquidity: The 2008 Short Sale Ban’s Impact on Equity Option Markets*, 66 J. FIN. 2013 (2011).

between the risk of entering into an unfavorable transaction with a counterparty with superior information and the risk of entering into an unfavorable transaction with a counterparty reacting to public information, with various interpretations of “superior” and “public.”⁹³ A leading market making firm recently described this concern as follows:

We may at times trade with others who have information that is more accurate or complete than the information we have, and as a result we may accumulate unfavorable positions preceding large price movements in a given instrument. Should the frequency or magnitude of these events increase, our losses would likely increase correspondingly, which could have a material adverse effect on our business, financial condition and results of operations.⁹⁴

In practice, rather than being consistently harmed by true insider trading, which is typically based on long-lived information, market makers are seriously disadvantaged by counterparties that — quite legally — trade “on short-lived information stemming from non-instantaneous dissemination of public announcements, advance knowledge of certain trading trends or incoming orders, or certain advantages in acquiring, processing, and aggregating public information.”⁹⁵ This problem may also be compounded by limited monitoring capabilities of a given market maker across different securities.⁹⁶ Furthermore, it is not even required that a

93. For a discussion of adverse selection as a source of harm to market makers in the context of different types of informed trading, see Stanislav Dolgoplov, *Insider Trading, Informed Trading, and Market Making: Liquidity of Securities Markets in the Zero-Sum Game*, 3 WM. & MARY BUS. L. REV. 1, 12–21 (2012) [hereinafter Dolgoplov, *Insider Trading, Informed Trading, and Market Making*]; Stanislav Dolgoplov, *The Maker-Taker Pricing Model and Its Impact on the Securities Market Structure: A Can of Worms for Securities Fraud?*, 8 VA. L. & BUS. REV. 231, 235–38 (2014) [hereinafter Dolgoplov, *The Maker-Take Pricing Model and Its Impact*].

94. Virtu Fin., Inc., Registration Statement Under Securities Act of 1933 (Form S-1), at 27 (Mar. 10, 2014).

95. Stanislav Dolgoplov, *Risks and Hedges of Providing Liquidity in Complex Securities: The Impact of Insider Trading on Options Market Makers*, 15 FORDHAM J. CORP. & FIN. L. 387, 397 (2010) [hereinafter Dolgoplov, *The Impact of Insider Trading on Options Market Makers*]; see also Dolgoplov, *Insider Trading, Informed Trading, and Market Making*, *supra* note 93, at 15 (“[M]arket makers are likely to be harmed by stale quotes caused by various institutional, regulatory, and other frictions.”).

96. As an illustration, one empirical study analyzed liquidity provided by individual specialists on the NYSE in their portfolio securities and concluded that “the specialist’s ability to provide liquidity for a particular stock is significantly affected by the attention requirements of other securities traded at the same location,” with adverse selection being one of the underlying factors. Shane A. Corwin & Jay F. Coughenour, *Limited Attention and the Allocation of Effort in Securities Trading*, 63 J. FIN. 3031, 3036, 3064 (2008). Of course, these results were obtained for a very different trading architecture compared to the NYSE today, and the study itself suggested that technological advancements “may relieve

market maker reacts slower to public information in revising/cancelling orders, as orders of that market maker and other market participants may be submitted at essentially the same time but still processed randomly.⁹⁷ A classic illustration of the impact of short-term trading on market makers is the past phenomenon of “SOES bandits” on NASDAQ and “RAES bandits” on the Chicago Board Options Exchange dating back to the 1980s, as these bandits’ trading strategy was based on exploiting stale quotes of market makers in an automated trading environment for small orders rather than using true inside information of any kind.⁹⁸ While the academic field of market microstructure, which often has assumed away key distinctions between different types of informed trading, may see recent developments in securities markets as something novel for the phenomenon of adverse selection, the current environment is not fundamentally different. For instance, as discussed by a leading academic,

[I]n the high frequency world, it is not clear that information-based trading necessarily relates to fundamental information. This is because the time dimension that affects high speed trading also affects market makers. . . . For example, markets and data providers now sell access to public information seconds (or even milliseconds) before it is seen by other traders [which] turns public information into private information and corresponds, albeit for a very short time, into the classic information-based trading of microstructure models.⁹⁹

Still, this example is not new compared to, for instance, the practice of

specialist capacity constraints and reduce the necessity to allocate effort across stocks.” *Id.* at 3064–65.

97. See Eric Budish et al., *The High-Frequency Trading Arms Race: Frequent Batch Auctions as a Market Design Response*, 130 Q.J. ECON. 1547, 1553–54 (2015) (discussing the random nature of processing of orders submitted at the same time and stating that “trading firms providing liquidity, even in an environment with only symmetric information and with no latency, still get sniped with high probability because of the rules of the continuous limit order book”).

98. For a discussion of this phenomenon on various trading venues, see Dolgoplov, *Insider Trading, Informed Trading, and Market Making*, *supra* note 93, at 15 & n.50. For a discussion of the National Association of Securities Dealers’ efforts to regulate SOES bandits out of existence, while maintaining the platform itself, see Mark Borrelli, *Market Making in the Electronic Age*, 32 LOY. U. CHI. L.J. 815, 865–66 (2001).

99. Maureen O’Hara, *High Frequency Market Microstructure*, 116 J. FIN. ECON. 257, 263 (2015); see also Andrew G. Haldane, Exec. Dir., Fin. Stability & Member of the Interim Fin. Policy Comm., Bank of Eng., Speech Before the Sixteenth World Congress of the International Economic Association 6 (July 8, 2011), <http://www.bankofengland.co.uk/publications/speeches/2011/speech509.pdf> [<https://perma.cc/YHK2-N8WT>] (“Adverse selection risk today has taken on a different shape. In a high-speed, co-located world, being informed means seeing and acting on market prices sooner than competitors.”).

“tape racing,” the scourge of options market makers back in the 1970s.¹⁰⁰

However, certain market makers may be substantially exposed to insider trading for specific reasons, as historically seen in options markets.¹⁰¹ Furthermore, options market makers are vulnerable to short-term trading that typically does not correspond to insider trading, and, for similar reasons, they are more vulnerable than their counterparts in equities markets. In fact, a greater level of exposure of options market makers to short-term trading¹⁰² has been cited as a reason for discrimination-based mechanisms, such as flash/step-up orders, in order to offer an additional layer of protection.¹⁰³ One up-to-date illustration would be losses of “completely helpless” options market makers believed to have been caused by a Twitter-based trading algorithm.¹⁰⁴

100. See Dolgoplov, *Insider Trading, Informed Trading, and Market Making*, *supra* note 93, at 16 & n.52 (describing specific complaints of options market makers about “tape racing”). An even earlier piece of evidence from the 1960s suggests that off-exchange market makers were harmed by “late tape” trading — “presumably by persons taking advantage of superior knowledge of prices on the floor of the exchange.” SEC, SPECIAL STUDY OF SECURITIES MARKETS, *supra* note 46, pt. 2, ch. VIII, at 900.

101. See generally Dolgoplov, *The Impact of Insider Trading on Options Market Makers*, *supra* note 95. Yet, as options markets, as well as underlying equities markets, become more liquid, the harm from insider trading is more dispersed among options traders and also transferred to traders in equities markets via hedging.

102. See, e.g., Letter from Michael J. Simon, Sec’y, Int’l Sec. Exch., to Elizabeth Murphy, Sec’y, U.S. Sec. & Exch. Comm’n 9 (Nov. 23, 2009), <http://www.sec.gov/comments/s7-21-09/s72109-83.pdf> [<https://perma.cc/CGH5-TTDF>] (“By providing liquidity to multiple series of options on the same underlying instrument options market makers expose themselves to much greater risk than their equities counterparts. Persons ‘sweeping’ liquidity in the options market can hit multiple quotations virtually simultaneously, requiring market makers to buy (or sell) a much higher dollar amount of securities than in the cash market.”).

103. See Letter from Thomas F. Price, Managing Dir., Equity Options Trading Comm., Sec. Indus. & Fin. Mkts. Ass’n, to Elizabeth M. Murphy, Sec’y, U.S. Sec. & Exch. Comm’n 3 (Dec. 1, 2009), <http://www.sec.gov/comments/s7-21-09/s72109-95.pdf> [<https://perma.cc/ERD6-SU8L>] (supporting the practice of flash orders and pointing to “the increased difficulty of updating quotations in multiple series of options on the same underlying security, increasing the risk that a trader may trade against a still-displayed stale price”); see also Letter from Anthony J. Saliba, Chief Exec. Officer, LiquidPoint, LLC, to Elizabeth Murphy, Sec’y, U.S. Sec. & Exch. Comm’n 4 (Dec. 8, 2009), <http://www.sec.gov/comments/s7-21-09/s72109-104.pdf> [<https://perma.cc/BS8T-XW89>] (stating that “[t]he use of the ‘flash order’ in the options market is significantly different from the equity market” and pointing out that “[t]he option markets flash marketable orders to exchange market makers with displayed quoting responsibilities”). Some commentators also favored an exclusive usage of flash orders by DMMs. See Letter from Anthony J. Saliba to Elizabeth Murphy, *supra*, at 3 n.5 (“If only registered market makers are given the ability to refresh their quotes, there is no worry of the kind of two-tiered market about which the Commission expresses concerns with respect to equity market. Nor can the high-frequency parasites benefit from option exchange ‘flash orders.’”).

104. Seth Stevenson, *The Wolf of Wall Tweet*, SLATE (Apr. 20, 2015),

Another form of vulnerability inherent in providing liquidity is transparency, which may be harmful in certain instances when a market maker has to reveal its transactions/position. While not necessarily related to *ex ante* informational asymmetry or *ex post* reaction speed, such disclosures may be information-creating events in themselves. Transparency may invite other market participants to engage in trading strategies adverse to market makers or create unfavorable price movements for the latter more generally.¹⁰⁵ This perspective, which is relevant for both organized and over-the-counter markets, involves countervailing objectives:

[P]olicymakers will need to balance the trade-off between promoting market transparency by disclosing dealer data and sustaining the willingness of market-makers to take on large positions in less liquid markets where inventory can only be run down over an extended period of time. Disseminating lagged and sufficiently aggregated data provides one option to achieving such a balance.¹⁰⁶

Furthermore, several empirical studies indicate that there are limits to mandatory transparency rules, as the ultimate impact on market quality may be ambiguous or even detrimental.¹⁰⁷ This perspective has to be

http://www.slate.com/articles/business/moneybox/2015/04/bot_makes_2_4_million_reading_twitter_meet_the_guy_it_cost_a_fortune.html [<https://perma.cc/K2TS-GKRW>].

105. The possibility of transparency's adverse impact on market makers, as well as the existence of competing interests, were clearly articulated in the context on trading on the LSE in the nineteenth century. See LSE COMMISSION, MINUTES OF EVIDENCE, *supra* note 2, para. 2641, at 96 (testimony of Robert Burt Marzetti, a jobber at the LSE) ("[If] a broker goes and records on the Board that he has sold stock at a certain price, it is very much to my prejudice as a jobber — it is one of the concessions to the public, but it is a grievance under which we labour to some extent.").

106. BIS, MARKET-MAKING AND PROPRIETARY TRADING, *supra* note 52, at 36; see also ISDA & SIFMA, BLOCK TRADE REPORTING FOR OVER-THE-COUNTER DERIVATIVES MARKETS 3–5, 8–9 (Jan. 18, 2011), <http://www.isda.org/speeches/pdf/Block-Trade-Reporting.pdf> [<https://perma.cc/8YML-27XQ>] (discussing vulnerability of market makers to transparency, such as the scenario of costlier hedging, and pointing to the example of the LSE, which "has set its size thresholds and reporting delay periods in a manner that enables dealers to offset risk during the reporting delay period"); see also Mary Jo White, Chairman, U.S. Sec. & Exch. Comm'n, Intermediation in the Modern Securities Markets: Putting Technology and Competition To Work for Investors: Remarks Before the Economic Club of New York (June 20, 2014), <http://www.sec.gov/News/Speech/Detail/Speech/1370542122012> [<https://perma.cc/38CZ-9DD6>] (stating that regulation needs "to strike the right balance of compelling the disclosure of meaningful pre-trade pricing information [in fixed income markets] without discouraging market participants from producing it because of concerns that it will compromise trading positions").

107. See Ananth Madhavan et al., *Should Securities Markets Be Transparent?*, 8 J. FIN. MKTS. 266 (2005) (analyzing transactions in stocks on the Toronto Stock Exchange in

balanced with the scenario of decreased liquidity as a result of anticompetitive behavior.¹⁰⁸

The existence of adverse selection, as manifested by its various forms, demands a solution from private regulatory regimes, given that no illegal insider trading is typically involved. Traditionally, trading venues have employed a variety of mechanisms to protect their market makers. Some trading venues even went as far as prohibiting computer-generated orders to offer this protection.¹⁰⁹ Yet another historical illustration is the creation of the “professional customer” category in options markets, which aimed at the dynamics of competition between market makers and certain proprietary trading firms.¹¹⁰ In pioneering this trend, the International

connection with the adoption of a computerized system to disseminate order information); Paul Asquith et al., *The Effects of Mandatory Transparency in Financial Market Design: Evidence from the Corporate Bond Market* (Nat’l Bureau Econ. Research, Working Paper No. 19,417, 2013), <http://www.nber.org/papers/w19417.pdf> [<https://perma.cc/W26C-AYT9>] (analyzing transactions in corporate bonds in connection with the introduction of TRACE, a reporting system mandated by FINRA). Interestingly, a related empirical study of transactions in stocks on the Toronto Stock Exchange suggested that “specialists and options market makers benefit the most from the strategic use of anonymity.” Carole Comerton-Forde et al., *Why Do Traders Choose to Trade Anonymously?*, 46 J. FIN. & QUANT. ANALYSIS 1025, 1027 (2011). One of the potential explanations considered by the study was that “market makers may trade aggressively when they have information about future price movements based on their knowledge of order flow, or when they have to adjust their inventory quickly.” *Id.* at 1040. However, the advantage based on advance knowledge of order flow traditionally enjoyed by market makers has been dissipated in many ways.

108. See, e.g., *In re Credit Default Swaps Antitrust Litig.*, No. 13md2476 (DLC), 2014 U.S. Dist. LEXIS 123784, at *11 (S.D.N.Y. Sept. 4, 2014) (containing the allegations that, “[b]y controlling real-time pricing data [in credit default swaps], Dealer-Defendants [acting as market makers] were able to maintain supracompetitive bid/ask spreads, even as increased liquidity and standardization should have driven those spreads down”).

109. See, e.g., Notice of Filing and Immediate Effectiveness of a Proposed Rule Change by Pacific Exchange, Inc. To Revise PCX Rule 6.88 To Eliminate the Prohibition on Computer Generated Orders, Exchange Act Release No. 51,608, 70 Fed. Reg. 22,738 (Apr. 26, 2005) (stating that the prohibition on computer-generated orders “was originally adopted because it was necessary to protect market makers” and that “[w]ith the development of the Exchange’s new electronic trading system . . . market makers have the ability to manage their exposure more quickly and efficiently, thereby obviating the need for this rule”).

110. For a description of the spread of this feature at several trading venues, see Notice of Filing and Immediate Effectiveness of a Proposed Rule Change by BATS Exchange, Inc. To Adopt a Definition of Professional and Require That All Professional Orders Be Appropriately Marked, Exchange Act Release No. 65,500, 75 Fed. Reg. 63,686, 63,687 & n.5 (Oct. 6, 2011). The conflict between market makers and professional customers on options exchanges is illustrated by *Last Atlantis Capital LLC v. Chicago Board Options Exchange Inc.*, 455 F. Supp. 2d 788 (N.D. Ill. 2006), in which the plaintiffs described themselves as “direct access customers implementing arbitrage trading strategies which attempt to take advantage of price discrepancies of options,” *id.* at 791. One commentator labeled this group of market participants “‘barnacle’ customer market makers of the options

Securities Exchange specifically pointed out that professional customers had been enjoying certain priorities vis-à-vis market makers and engaging in trading strategies characterized by “the entry of limit orders that join the best bid or offer and . . . a very high rate of orders that are cancelled.”¹¹¹ Likewise, another example is represented by dark pools’ efforts to monitor and censure aggressive/predatory trading,¹¹² and some dark pools in fact allow their users to provide liquidity by exposing two-sided trading interests.¹¹³ At the same time, this conduct may be practiced by users characterizing themselves as “market makers,”¹¹⁴ and such monitoring may be ineffective and even fraudulent, as illustrated by the recent enforcement action relating to Barclays’ dark pool.¹¹⁵

Another similar mechanism to address adverse selection gives market participants the “last look” feature to accept or reject proposed transactions against their own previously posted quotes/orders, which is common in foreign exchange markets and sometimes found in securities markets.¹¹⁶

industry.” HAIM BODEK, *THE PROBLEM OF HFT: COLLECTED WRITINGS ON HIGH FREQUENCY TRADING & STOCK MARKET STRUCTURE REFORM 7* (2013).

111. Notice of Filing of a Proposed Rule Change by International Stock Exchange, LLC Relating to Professional Account Holders, Exchange Act Release No. 57,254, 73 Fed. Reg. 7345, 7346 & nn.6 & 9 (Feb. 1, 2008). The exchange also observed that some of its member broker-dealers “provided their professional customers with multi-screened trading stations equipped with trading technology that allowed the trader to monitor and place orders on all six options exchanges simultaneously.” *Id.* at 7346 n.8.

112. See Peter Chapman, *Keeping Watch*, *TRADERS MAG.*, May 2012, at 20 (describing such measures taken by a range of dark pools).

113. See Sean Foley & Tālis J. Putniņš, *Should We Be Afraid of the Dark? Dark Trading and Market Quality*, *J. FIN. ECON.* (forthcoming) (manuscript at 9), <http://ssrn.com/abstract=2279719> [<https://perma.cc/XY5-XCKD>] (“[D]ark liquidity provision can be profitable in a two-sided dark market because a liquidity provider can earn a non-zero spread in the dark. In contrast, there is zero spread in a one-sided dark market by construction and therefore there is little incentive for market participants to act as dark liquidity providers without an alternative reason for wanting to trade.”).

114. Chapman, *supra* note 112, at 20.

115. See Barclays Capital Inc., Securities Act Release No. 10,010, Exchange Act Release No. 77,001, at 2–3 (Jan. 31, 2016) (settled proceeding), <https://www.sec.gov/litigation/admin/2016/33-10010.pdf> [<https://perma.cc/467P-W8NA>] (“Barclays made materially misleading statements and omitted to state certain material facts necessary to make statements made not misleading concerning [its] product feature called Liquidity Profiling, which Barclays described as a ‘powerful tool to proactively monitor [the dark pool]’ and as a ‘sophisticated surveillance framework that protects clients from predatory trading’ . . .”).

116. While definitely rarer, this feature is not unheard of on trading venues for equity, debt, and derivative instruments. See, e.g., MTS, *BONDVISION MTF MARKET RULES 1* (Jan. 13, 2014), <http://www.mtsmarkets.com/Documents/~media/MTS/Legal%20docs/Jan%202014/BondV%20ision%20MTF%20Rules%20English%20Effective%20as%20of%2013%2001%202014.pdf> [<https://perma.cc/W55T-X54V>] (describing the application of the last look feature to equity

The rationale behind this feature was described by an industry group as follows:

The right to exercise a last look may be to prevent arbitrage of prices by other proprietary or professional traders and therefore prevent the need for defensive pricing, rather than simply to avoid potentially unprofitable trades; firms with a right of last look may in fact choose to honour unprofitable trades with corporates and other genuine market users.¹¹⁷

In practice, the last look feature may be granted by electronic platforms only to certain players, namely, large banks, as a result of their economic leverage and the fact that their trading systems may be slower compared to those employed by more agile HFTs,¹¹⁸ and this selectivity resembles a DMM feature. More generally, the applicable “firm quote” regime, which may have both governmental and self-regulatory components, is important for addressing adverse selection.¹¹⁹

The emergence of retail liquidity programs offered by several securities exchanges also illustrates efforts to protect market makers from adverse selection, while allowing these exchanges to replicate some practices of off-exchange market makers, i.e., internalizers/wholesalers, reverse the process of off-exchange segmentation, and grab a bigger portion of order flow. This trend started with the approval of the programs for the NYSE and NYSE Amex (now NYSE MKT) that allowed “retail

and fixed income instruments); Letter from Enrico Bruni, Managing Dir., Tradeweb Eur. Ltd., to the HM Treasury, Bank of Eng. & Fin. Conduct Auth. app. at 6 (Jan. 30, 2015), <http://www.bankofengland.co.uk/markets/Documents/femr/tw.pdf> [<https://perma.cc/47FV-BRG2>] (stating that the last look feature is used in “fixed income and derivatives markets” in addition to foreign exchange markets).

117. BRITISH BANKERS’ ASS’N, THE FAIR AND EFFECTIVE MARKET REVIEW 8 (2015), <http://www.bankofengland.co.uk/markets/Documents/femr/bba.pdf> [<https://perma.cc/3BXC-FK3R>]; *see also* HM TREASURY, BANK OF ENG. & FIN. CONDUCT AUTH., FAIR AND EFFECTIVE MARKETS REVIEW: FINAL REPORT 31 (2015), <http://www.bankofengland.co.uk/markets/Documents/femrjun15.pdf> [<https://perma.cc/W6EF-WMAZ>] (“This practice was developed to provide protection against unanticipated market movements and predatory trading practices, while allowing market makers to maintain tight bid-offer spreads for their clients.”).

118. Donald MacKenzie, A Sociology of Algorithms: High-Frequency Trading and the Shaping of Markets 56–58 (June 2014) (unpublished manuscript) (on file with author), http://www.sps.ed.ac.uk/__data/assets/pdf_file/0004/156298/Algorithms25.pdf [<https://perma.cc/YR42-3T5Z>].

119. In addition, specific quotation methods may play a significant role; for instance, in the “request-for-quote” mode: “Showing a two-way market keeps the dealer honest, in that if his bid/ask spread is wide, that’s an indication that his profit margin is possibly too high and may signal the client to go elsewhere. Other markets . . . always required that the market maker quote a two-way price.” SIMON A. LACK, BONDS ARE NOT FOREVER: THE CRISIS FACING FIXED INCOME INVESTORS 7 (2013).

liquidity providers” to offer subpenny price improvement to retail orders through special order types,¹²⁰ and the universe of these market participants was limited to two categories of market makers, “designated market makers” and “supplemental liquidity providers.”¹²¹ The adverse selection rationale was specifically articulated by the exchanges,¹²² and the SEC also had a detailed discussion of this factor in its approval.¹²³ Other securities exchanges launched similar retail price improvement programs, but this functionality generally became available to all members rather than just market makers,¹²⁴ which suggests that capturing retail order flow — not providing an exclusive privilege for DMMs — was the dominant motive.

Other special order types have been introduced by trading venues in order to address the issue of adverse selection.¹²⁵ For example, the Market

120. Order Approving Proposed Rule Changes by New York Stock Exchange LLC and NYSE Amex LLC To Establish Retail Liquidity Programs on a Pilot Basis and Granting Exemptions Pursuant to Rule 612(c) of Regulation NMS, Exchange Act Release No. 67,347, 77 Fed. Reg. 40,673 (July 3, 2012).

121. *Id.* at 40,675.

122. See Letter from Janet McGinness, EVP & Corporate Sec’y, NYSE Euronext, Gen. Counsel, NYSE Mkts., to Robert Cook, Dir., Div. of Trading & Mkts., U.S. Sec. & Exch. Comm’n 8 (Apr. 11, 2012), <http://www.sec.gov/divisions/marketreg/mr-noaction/nyse-nyseamex-070312.pdf> [<https://perma.cc/9HPY-8ERL>] (“Among the market structure conundrums produced by the segmentation of retail order flow is that liquidity providers interacting with retail orders will not bid as aggressively for orders that do not originate with natural persons. The reason is plain: professional traders are more likely to be highly informed as to short term price movements than natural persons.”); see also *id.* at 9 (“[T]he Program represents a competitive response on the part of the Exchanges to bilateral internalization arrangements, and offers the potential of continued and beneficial competition in the retail execution segment.”).

123. See Order Approving Proposed Rule Changes by New York Stock Exchange LLC and NYSE Amex LLC To Establish Retail Liquidity Programs, 77 Fed. Reg. at 40,680 (“[L]iquidity providers are generally more inclined to offer price improvement to less informed retail orders than to more informed professional orders. . . . By creating additional competition for retail order flow, the Program is reasonably designed to attract retail order flow to the exchange environment, while helping to ensure that retail investors benefit from the better price that liquidity providers are willing to give their orders.”). The regulatory agency also cited several academic articles on the impact of informed trading on market makers and bid-ask spreads. *Id.* at 40,680 n.72.

124. For examples of price liquidity programs available to all members, see Order Approving a Proposed Rule Change by NASDAQ OMX BX, Inc. To Establish the Retail Price Improvement Program on a Pilot Basis, Exchange Act Release No. 73,702, 79 Fed. Reg. 72,049, 72,049 (Nov. 28, 2014); Order Approving a Proposed Rule Change by NASDAQ Stock Market LLC To Establish the Retail Price Improvement Program on a Pilot Basis, Exchange Act Release No. 68,937, 78 Fed. Reg. 12,397, 12,397 (Feb. 15, 2013); Order Approving a Proposed Rule Change by BATS Y-Exchange, Inc. To Adopt a Retail Price Improvement Program, Exchange Act Release No. 68,303, 77 Fed. Reg. 71,652, 71,653 (Nov. 27, 2012).

125. In fact, certain order types on a number of securities exchanges are available only to DMMs, and such orders often contain compliance-related features, as well as complex

Maker Price Improving Order proposed by BATS Exchange was recognized by the SEC as a way for “BATS Options market makers to provide better prices to less informed order flow that they otherwise would not be willing or able to provide if they had to make those prices available to all incoming order flow.”¹²⁶ While opposing this proposal, the competitor options exchanges similarly maintained that “only the directed market maker is able to enter prices secure in the knowledge that they are only at risk of being executed by select retail order flow at the non-displayed price.”¹²⁷ More generally, the existence of certain order types has been justified with a reference to the vulnerability of market making as such: “Without price sliding, market makers would need to cancel and replace their orders — as fast as possible — to retain priority in the queue. Price-slide orders typically help market makers be near the top of book — reducing the ‘technology arms race.’”¹²⁸

Overall, the issue of vulnerability of market makers, a persistent phenomenon in evolving securities markets, is an important component of regulation. In fact, this issue is often raised in connection with a range of proposals, including those not directly focused on market makers. For instance, the proposal to increase the tick size has been criticized on the grounds that “[w]idening spreads will also make the cost of reversion (getting picked off) even more costly,”¹²⁹ although this relationship may

functionalities that may potentially support advanced trading strategies. For instance, NASDAQ has the Price to Display Order, which is “designed to comply with Rule 610(d) under Regulation NMS by avoiding the display of [locking or crossing] quotations” and may be designated as an “intermarket sweep order,” and the Market Maker Peg Order, which is “designed to allow a Market Maker to maintain a continuous two-sided quotation at a displayed price that is compliant with the quotation requirements for Market Makers [preventing stub quotes],” with these order types set by subsections (b)(2) and (b)(7) of Rule 4702. *NASDAQ Stock Market Rules*, NASDAQ, INC., <http://nasdaq.cchwallstreet.com> [<https://perma.cc/H3SX-M5BR>] (follow “Rule 4000” hyperlink) (last visited Feb. 15, 2016).

126. Order Approving a Proposed Rule Change by BATS Exchange, Inc. To Create, on a Six-Month Pilot Basis, a Directed Order Program, Exchange Act Release No. 64,781, 76 Fed. Reg. 39,953, 39,957 (June 30, 2011). Shortly after the SEC’s approval, BATS eliminated this feature without ever implementing it. Notice of Filing and Immediate Effectiveness of a Proposed Rule Change by BATS Exchange, Inc. To Amend BATS Rules in Connection with the Elimination of a Directed Order Program for BATS Options, Exchange Act Release No. 64,957, 76 Fed. Reg. 45,636 (July 25, 2011).

127. Boston Options Exch. Grp. LLC et al., SR-BATS-2011-009, Securities Exchange Release No. 64781: Petition for Review, at 8 (July 15, 2011), <http://www.sec.gov/rules/sro/bats/2011/34-64781-petition.pdf> [<https://perma.cc/F77T-2BRR>].

128. PHIL MACKINTOSH, KCG HOLDINGS, INC., DEMYSTIFYING ORDER TYPES 13 (Sept. 2014), http://www.kcg.com/uploads/documents/KCG_Demystifying-Order-Types_092414.pdf [<https://perma.cc/HZP3-BZZC>].

129. Larry Tabb, TABB GRP., LLC, BACK TO THE FUTURE: WHY THE TICK PILOT HAS LITTLE CHANCE OF SPURRING PERMANENT CHANGE 8 (Dec. 2014),

work in the opposite direction as well.¹³⁰ Another consideration is that time, place, and information-based advantages provided to market makers play the dual role of serving as a subsidy amounting to profitable trading opportunities and a device diminishing the risk of being “picked-off.”

III. CONSTRAINING OPPORTUNISM

Being in the eye of the trading hurricane, market makers are often in the position to play the role of aggressive traders as consumers of liquidity rather than its providers, and they may be inclined to minimize their presence or even abstain from providing liquidity during turbulent times. These types of conduct, as well as other forms of “gaming,” are likely to be otherwise legal and are not necessarily packaged with other violations that may be committed by market makers, such as market manipulation,¹³¹ breaches of Chinese Walls,¹³² or even nondisclosure of market making activities.¹³³ More generally, opportunism may be seen as something antithetical to the mandate of maintaining and focusing on “fair and orderly” markets imposed on DMMs by federal regulation and trading venues’ rules, an obligation that repeatedly has come up in litigation and enforcement.¹³⁴ Likewise, the issue of market makers possibly gaming their trading privileges remains open. As posed by a prolific commentator,

How frequently do market making firms, armed to the teeth with an arsenal of regulatory privileges no one else has, turn

<http://www.scribd.com/doc/249645637/V12-068Tick-Pilot> [<https://perma.cc/A5H2-B6CT>].

130. See DURBIN, *supra* note 28, at 94 (“[W]hen spreads narrow to a penny or less, it’s that much easier for a small informational advantage by the well-informed trader to become a costly disadvantage to the less-informed market-maker.”).

131. See, e.g., SEC v. Diversified Corp. Consulting Grp., 378 F.3d 1219, 1222–23 (11th Cir. 2004) (providing an example of market manipulation).

132. See, e.g., Merrill Lynch, Pierce, Fenner & Smith, Inc., Exchange Act Release No. 63,760, 100 SEC Docket 957, 957–59 (Jan. 25, 2011) (settled proceeding) (providing an example of inappropriate sharing of confidential information relating to customer orders between different business units despite the requirement of internal barriers).

133. See, e.g., ITG Inc., Securities Act Release No. 9887, Exchange Act Release No. 75,672, at 8, 12–15 (Aug. 12, 2015) (settled proceeding), <http://www.sec.gov/litigation/admin/2015/33-9887.pdf> [<https://perma.cc/2GGJ-XW2P>] (providing an example of undisclosed de facto market making operations despite representations of agency-only trading).

134. See, e.g., *Spicer v. Chi. Bd. of Options Exch., Inc.*, 977 F.2d 255, 265 (7th Cir. 1992) (relating to Rule 8.7(a) of the Chicago Board Options Exchange); *United States v. Re*, 336 F.2d 306, 314–15 (2d Cir. 1964) (relating to section 11(b) of the Securities Exchange Act of 1934); *Cutner v. Fried*, 373 F. Supp. 4, 10 (S.D.N.Y. 1974) (relating to Rule 104 of the NYSE); *Fleet Specialist, Inc.*, Exchange Act Release No. 49,499, 82 SEC Docket 1895, 1898–99 (Mar. 30, 2004) (settled proceeding) (relating to section 11(b) of the Securities Exchange Act of 1934, Rule 11b-1 of the SEC, and Rule 104 of the NYSE).

aggressive, and what is the effect on prices when they do? What other trading strategies do market making firms deploy, and do they use their privileges – privileges intended only to help them provide liquidity to investors – when they deploy them?¹³⁵

Moreover, there are concerns about opportunism of informal liquidity providers, such as HFTs. Indeed, one complaint is that some of their trading strategies may “look as if they are testing the boundaries of liquidity provision *versus* market manipulation.”¹³⁶

While a trading strategy focused on market making cannot be solely “passive”/liquidity-adding, as such a trader would have to periodically rebalance inventory and otherwise manage risks by consuming liquidity,¹³⁷ certain forms of conduct may be addressed by regulatory restrictions on this balance. Moreover, constraints on opportunism may also serve as a signaling/commitment device for individual trading venues and their respective market makers. Traditionally, trading venues and other regulators have addressed various manifestations of opportunism by subjecting DMMs to “affirmative” obligations to stay in and maintain the market and “negative” obligations to refrain from certain trading activities. The latter category of obligations, while associated with the specialist system for an extended period of time, has diminished in importance with the NYSE’s overhaul of its market making system.¹³⁸ At the same time, the distinction between affirmative and negative obligations — or, for that matter, between market making and proprietary trading — is not

135. Letter from R.T. Leuchtkafer (pseud.) to Elizabeth M. Murphy, Sec’y, U.S. Sec. & Exch. Comm’n 4 (May 15, 2014), <http://www.sec.gov/comments/equity-market-structure-2013/equitymarketstructure2013-6.pdf> [<https://perma.cc/7PPM-H3WE>].

136. *Senate Hearing on Dark Pools, Flash Orders, High-Frequency Trading, and Other Market Structure Issues*, *supra* note 13, at 42 (remarks of Robert C. Gasser, President and Chief Executive Officer, Investment Technology Group).

137. This theme was recognized in one of the foundational works on market microstructure: “[T]he specialists must pursue a policy of relating their prices to their inventories in order to avoid failure: it cannot be the case that they simply respond to temporary fluctuations in demand and supply . . .” Garman, *supra* note 2, at 267.

138. See Order Approving a Proposed Rule Change by New York Stock Exchange LLC To Create a New NYSE Market Model, Exchange Act Release No. 58,845, 73 Fed. Reg. 64,379, 64,380 (Oct. 24, 2008) (stating that “designated market makers” would no longer be subject to “a specialist’s negative obligation not to trade for its own account unless reasonably necessary to the maintenance of a fair and orderly market,” as this measure would “give the DMM greater freedom to manage the trading risks associated with their reduced responsibilities to the NYSE market”); *see also id.* at 64,382 (“Given the real-time availability of market information and resultant increase in market transparency in today’s markets and the Exchange’s proposed elimination of the advance ‘look’ at incoming orders by the DMM, the Exchange believes that the imposition of a negative obligation on DMMs is unnecessary.”).

necessarily sharp.¹³⁹ Another regulatory tool, which could be seen as a form of negative obligations, has amounted to guiding trading activities of other market participants and even suppressing certain types of conduct, as illustrated by the SEC's approach to floor trading.¹⁴⁰ Indeed, decades ago, an influential SEC study perceived floor traders as opportunistic liquidity providers and asserted that "this added liquidity is of limited value," while giving the following rationales:

- (1) It vests largely in the active stocks rather than in the inactive stocks where it is most needed, (2) it tends to develop primarily on the buy side or the sell side in a manner that accentuates the imbalance of buyers and sellers, and (3) it disappears when it is needed most.¹⁴¹

Imposing a fiduciary standard of some kind on market makers in that specific capacity appears to be unworkable and less preferable to concrete standards for trading obligations set by individual trading venues, especially given a number of recent developments in securities markets, such as the diminishing — if not disappearing — agency function of market makers on trading venues.¹⁴² Even in the context of the NYSE specialist controversy that raised the issue of fiduciary duties,¹⁴³ those

139. For instance, distinguishing market making from proprietary trading more generally became one of the most contentious issues in the process of the inter-agency implementation of the Volcker Rule. *See* Prohibitions and Restrictions on Proprietary Trading and Certain Interests in, and Relationships with, Hedge Funds and Private Equity Funds, Bank Holding Company Release No. 1, 79 Fed. Reg. 5536 *passim* (Dec. 10, 2013) (to be codified at 15 C.F.R. pt. 255) (discussing the market making exemption and referencing various concerns about its definition and scope).

140. For additional details on this position taken by the SEC, *see supra* notes 64–65 and accompanying text.

141. SEC, SPECIAL STUDY OF SECURITIES MARKETS, *supra* note 46, pt. 2, ch. VI, at 220.

142. For a detailed discussion, see Stanislav Dolgoplov, *A Two-Sided Loyalty?: Exploring the Boundaries of Fiduciary Duties of Market Makers*, 12 U.C. DAVIS BUS. L.J. 31 *passim* (2011) [hereinafter Dolgoplov, *Exploring the Boundaries of Fiduciary Duties of Market Makers*] *See also* Order Approving a Proposed Rule Change by International Securities Exchange, LLC Relating to Professional Account Holders, Exchange Act Release No. 59,287, 74 Fed. Reg. 5694, 5698 (Jan. 23, 2009) ("A specialist's responsibility to a customer in his or her role as agent for the limit order book was based on common law notions of fiduciary duty and incorporated in the rules of some exchanges. As exchanges increasingly have implemented automated trading systems, however, the specialist's role in handling limit orders has diminished.").

143. For several cases brought against individuals serving as specialists that emphasized the significance of the fiduciary status, *see* *United States v. Finnerty*, 474 F. Supp. 2d 530 (S.D.N.Y. 2007); *United States v. Hunt*, No. 05 Cr. 395 (DAB), 2006 U.S. Dist. LEXIS 64887 (S.D.N.Y. Sept. 6, 2006).

market makers, while engaging in principal trading, had played a narrow role of matching agents charged with following mechanic procedures under the NYSE's rules rather than a broadly defined role of fiduciaries of public customers responsible for a much more complex and discretionary process of effecting best execution.¹⁴⁴ On the other hand, many market makers are subject to the order protection/trade-through rule of Regulation NMS,¹⁴⁵ which may be seen as a device constraining opportunism. In fact, the SEC expressed its concern in the adopting release that "many trade-throughs are dealer internalized trades."¹⁴⁶

Furthermore, market makers may play other roles in addition to the function of providing liquidity, and, saliently, the role of an agency broker is likely to impose some level of the fiduciary standard in connection with the duty of best execution.¹⁴⁷ This perspective is also important for off-exchange market makers, as some of them may be removed from ultimate customers by not directly serving as their agency brokers. Pursuant to the applicable order handling agreement with a customer-facing broker, some of these off-exchange market makers may in fact discharge agency functions in addition to trading in the principal capacity.¹⁴⁸ As a result, the

144. Historically, the SEC had taken the position that specialists should not be allowed to accept discretionary orders, such as "not-held" orders, although there had been some limited exceptions. For several illustrations of this position of the regulatory agency, see Order Exempting Options Specialists from Section 11(b) of the Securities Exchange Act of 1934 When Accepting Certain Types of Complex Orders, Exchange Act Release No. 47,319, 68 Fed. Reg. 7156 (Feb. 5, 2003); SEC, SPECIAL STUDY OF SECURITIES MARKETS, *supra* note 46, pt. 2, ch. VI, at 146-48.

145. See Regulation NMS, Exchange Act Release No. 51,808, 70 Fed. Reg. 37,496, 37,631 (June 9, 2005) (to be codified at Order Protection Rule, 17 C.F.R. § 240.611(a)) (establishing that this regulatory measure applies to "trading centers"); *id.* at 37,623 (to be codified at NMS Security Designation and Definitions, 17 C.F.R. § 240.600(b)(78)) (stating that the term "trading center" includes "an exchange market maker, an OTC market maker, or any other broker or dealer that executes orders internally by trading as principal or crossing orders as agent").

146. *Id.* at 37,532.

147. For a general discussion of implications of a market maker's dual role in connection with the fiduciary standard and the duty of best execution, see Dolgoplov, *Exploring the Boundaries of Fiduciary Duties of Market Makers*, *supra* note 142, *passim*. Moreover, a market maker may be bound by its own statements regarding "best execution," as it "is a defined, specific concept in the securities context." *Last Atlantis Capital LLC v. ASG Specialist Partners*, 749 F. Supp. 2d 828, 834 (N.D. Ill. 2010).

148. While such agreements are rarely in the public domain, one important illustration of the assumption of agency functions is the agreement between UBS, a leading securities firm, and Charles Schwab, a leading retail broker. See EQUITIES ORDER HANDLING AGREEMENT DATED AS OF OCTOBER 29, 2004 BY AND AMONG UBS SECURITIES LLC, SCHWAB CAPITAL MARKETS L.P., CHARLES SCHWAB & CO., INC., AND THE CHARLES SCHWAB CORPORATION *passim*, reproduced in The Charles Schwab Corp., Quarterly Report (Form 10-Q) Exh. 10.262 (Nov. 8, 2004) (making numerous references to agency functions of UBS without any specific mention of the applicability of the duty of best execution). For

standard of best execution may be applicable,¹⁴⁹ which is likely to be higher than the one established by the trade-through rule. In fact, one controversial issue is whether some off-exchange market makers are engaging in arbitrage between the consolidated and direct data feeds, which, if true, may raise the issue of violations of the duty of best execution — despite probably being acceptable under the trade-through rule and its exceptions.¹⁵⁰

Opportunism may be a flip side of various mechanisms aimed to limit market makers' vulnerability, which implies the need for careful regulatory crafting. For instance, the last look feature has been criticized as causing “[i]ncreased opportunities and incentives for market makers to delay a decision to observe market moves and profit from [them].”¹⁵¹ As similarly

some criticism of this deal as ultimately too advantageous to UBS, see MICHAEL LEWIS, *FLASH BOYS: A WALL STREET REVOLT* 180–81 (2014). Another agreement from this category explicitly states that the off-exchange market maker in question, as well as the retail broker, are subject to the duty of best execution. EQUITIES AND OPTIONS ORDER HANDLING AGREEMENT DATED AS OF NOVEMBER 29, 2007 BY AND AMONG E*TRADE FINANCIAL CORPORATION, E*TRADE SECURITIES LLC, AND CITADEL DERIVATIVES GROUP LLC § 2.3(a) & (h), reproduced in E*Trade Financial Corp., Annual Report (Form 10-K) Exh. 10.29, at 9–10 (Feb. 28, 2008).

149. Another requirement relating to the best execution standard is a FINRA rule, which probably covers the bulk of payment for order flow deals in the space occupied by off-exchange market makers: “The duty to provide best execution to customer orders received from other broker-dealers arises only when an order is routed from the broker-dealer to the member for the purpose of order handling and execution.” 5310. *Best Execution and Interpositioning*, FINRA, <http://www.finra.org/finramanual/rules/r5310> [<https://perma.cc/V3Y9-USCK>] (last visited Feb. 15, 2016).

150. See Eric Scott Hunsader, *Retail Trades Disadvantaged by Direct Feeds*, NANEX (July 31, 2014), <http://www.nanex.net/aqck2/4665.html> [<https://perma.cc/KM8K-GKSK>] (“While internalizers matching retail trades claim they use direct feeds for pricing, there is overwhelming evidence that retail customers, in fact, are getting prices based on the SIP (Securities Information Processor also known as the consolidated quote). It may be that internalizers making this claim mean that they are using direct feed pricing for themselves to buy and sell stock on exchanges, but they give customers prices based on the SIP. Perhaps the question to ask the internalizers paying for retail customer order flow: what prices are you assigning to retail customer trades?”); see also RICHARD REPETTO & MIKE ADAMS, SANDLER O’NEILL + PARTNERS, *A VIEW OF MARKET STRUCTURE FROM IEX 3* (Apr. 9, 2014), https://www.thefinancialengineer.net/wp-content/uploads/2014/04/IEX_ViewMarketStructure0414.pdf [<https://perma.cc/47N9-8676>] (“IEX believes the fact that large wholesale market makers are willing to pay for order flow is indicative of the profit these market makers garner from retail customer flow. And when asked about the 90% of price improvement realized on these retail trades the eBrokers 606 reports support, IEX believes that could be from ‘stale pricing’ from the SIP as well.”).

151. Letter from Joseph Hoffman, Dir., Equity Derivatives & Foreign Exch., & Jean-David Larson, Dir., Regulatory & Strategic Initiatives, Russell Invs., to H.M. Treasury, Bank of Eng. & Fin. Conduct Auth. 1 (Jan. 30, 2015), <http://www.bankofengland.co.uk/markets/Documents/femr/ri.pdf> [<https://perma.cc/HX4K-UHV8>].

described by another commentator,

Last Look was introduced to protect market makers from toxic clients [but this feature is abused by] holding the price for a period over which the client's interest will only be honoured should the market move in the price maker's interest, or if the price maker can effect a covering transaction.¹⁵²

Likewise, several affiliated industry groups with HFT ties provided the following critique: "Last look functionality is almost never specified in the rules and conditions applicable to trading on the relevant trading venue."¹⁵³ Moreover, a recent enforcement action penalized Barclays in connection with its electronic platform's last look feature.¹⁵⁴ On a related note, allegations of selective/discriminatory execution of orders by market makers and trading venues' assistance in this conduct, including violations of the applicable "firm quote" rules, have been a litigation subject matter,¹⁵⁵ and these allegations have some resemblance to the controversy surrounding the last look feature.

Another important aspect of regulatory restrictions on opportunism relates to trading obligations of market makers at times of market turbulence, and it is critical to recognize inherent constraints of this tool and its potentially ruinous consequences for these market participants. One pivotal illustration is the use of "stub quotes," a way of formalistic compliance with quoting obligations, during the Flash Crash of May 6, 2010, and this practice was subsequently banned by individual trading venues in coordination with the SEC.¹⁵⁶ In fact, one empirical study

152. The New Change FX Response to the Fair and Effective Markets Review's Consultation Paper 1 (n.d.), <http://www.bankofengland.co.uk/markets/Documents/femr/ncfx.pdf> [<https://perma.cc/N57P-ZWGV>].

153. Futures Indus. Ass'n, Futures Indus. Ass'n Eur. & FIA Eur. Principal Traders Ass'n, Reply Form for the ESMA MiFID II/MiFIR Discussion Paper 112 (May 22, 2014), http://www.foa.co.uk/admin/tiny_mce/jscripts/tiny_mce/plugins/filemanager/files/Regulation/MiFID/ESMA_MiFID2_DP_FIA_18283C5.pdf [<https://perma.cc/C3PU-BJS8>].

154. See Press Release, N.Y. Dep't of Fin. Servs., NYDFS Announces Barclays To Pay Additional \$150 Million Penalty, Terminate Employee for Automated, Electronic Foreign Exchange Trading Misconduct (Nov. 18, 2015), <http://www.dfs.ny.gov/about/press/pr1511181.htm> [<https://perma.cc/D4RR-GE3U>] (stating that "Barclays used [the] Last Look system to automatically reject client orders that would be unprofitable for the bank because of subsequent price swings during milliseconds-long latency . . . periods" and that it "did not seek to distinguish toxic order flow from instances in which prices merely happened to move in favor of the customer and against Barclays").

155. For several relevant cases, see *Last Atlantis Capital LLC v. AGS Specialist Partners*, 819 F. Supp. 2d 708, 711–12 (N.D. Ill. 2010); *Last Atlantis Capital LLC v. Chi. Bd. Options Exch., Inc.*, 455 F. Supp. 2d 788, 791–92, 801 (N.D. Ill. 2006); *Cathedral Trading, LLC v. Chi. Bd. Options Exch.*, 199 F. Supp. 2d 851, 856 (N.D. Ill. 2002).

156. For a description of the occurrence of stub quotes during the Flash Crash and the

suggested that these “restrictions on stub quoting, which increase dealers’ obligations to quote near the [National Best Bid and Offer], may benefit financial markets in that it encourages dealers to provide liquidity.”¹⁵⁷ In other words, given an apparent increase rather than a decrease in liquidity, this regulatory measure may have merely constrained opportunism of market makers instead of imposing persistent costs on them.

Overall, opportunism of both formal and informal market makers remains an important theme raising a host of regulatory implications, such as the utility of negative obligations or the imposition of strengthened or entirely new affirmative obligations. Interestingly, one empirical study pointed to the utility of a DMM regime for a marketplace that traditionally has lacked such market participants.¹⁵⁸ While analyzing the transition of futures markets from manual to electronic trading and singling out the factors of anonymity and shorter trading horizons, the conclusion was as follows: “[I]n sharp contrast to the erstwhile locals in futures pits, electronic market makers reduce their participation and their liquidity provision in periods or significantly high and persistent volatility, in periods of significantly high and persistent customer order imbalances, and in periods of significantly high and persistent bid ask spreads.”¹⁵⁹ The corresponding policy consideration was articulated: “[G]iven that electronic market-makers represent the irreversible and inevitable progression of technology, our results raise the question of whether exchanges and regulators should consider affirmative obligations for hitherto voluntary market makers.”¹⁶⁰

IV. THE PHENOMENON OF HIGH-FREQUENCY TRADING

HFTs have been both critiqued and defended on the basis of their

subsequent ban of this practice, see Dolgoplov, *Providing Liquidity in a High-Frequency World*, *supra* note 33, at 345–46. These events were preceded by NASDAQ’s decision to abolish the requirement, which was seen as made obsolete by “the regulatory changes, as well as the changes Nasdaq has made to the way its market operates,” that “a Nasdaq market maker’s quotations [must] be ‘reasonably related to the prevailing market.’” Order Approving a Proposed Rule Change by NASDAQ Stock Market LLC To Amend Its 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, 64,103 (Nov. 7, 2007).

157. Jared F. Egginton et al., *Dealers and Changing Obligations: The Case of Stub Quoting* 23 (June 26, 2014) (unpublished manuscript) (on file with author), <http://ssrn.com/abstract=2192703> [<https://perma.cc/V5ZN-UN3L>].

158. Vikas Raman et al., *Electronic Market Makers, Trader Anonymity and Market Fragility* (Dec 1, 2012) (unpublished manuscript) (on file with author), <http://ssrn.com/abstract=2445223> [<https://perma.cc/6BNM-R565>].

159. *Id.* at 8–9.

160. *Id.* at 24.

overall contribution to liquidity in securities markets, and this perspective drives a big chunk of regulatory debates on the complex phenomenon of HFT as a whole. It is also frequently featured in connection with holistic assessments of the current market structure. For instance, as asserted by one commentator,

[I]f you understand that liquidity provision is a benefit, and that 21st century technology can allow for liquidity provision at a lower cost than the old system, you start to understand that all this talk about market “rigging” is a bunch of red herring garbage. . . . HFT is a form of liquidity provision — that activity is a service — that has replaced an older, less efficient, more expensive form of liquidity provision (floor traders and market makers).¹⁶¹

Still, an opinion from the opposite camp is scalding: “Though ‘liquidity provider’ and ‘market maker’ are stripped of their former meaning in the equities markets, high frequency firms wear these designations as if they were a rented tux.”¹⁶² Indeed, in the context of HFT, there is a debate on the very meaning of “providing liquidity” in the sense whether only entering “passive” orders should count or entering “aggressive” orders should be viewed as another dimension.¹⁶³ In any

161. Justice “Jack” Litle, *Dumb Tourist: Michael Lewis “Flash Boys” Review*, MERCENARY TRADER (Apr. 2, 2014), <http://www.mercenarytrader.com/2014/04/dumb-tourist-michael-lewis-flash-boys-review/> [<https://perma.cc/2S9U-A28H>]; see also Cliff Asness et al., *High Frequency Hyperbole, Part Deux*, REALCLEARMARKETS (May 22, 2014), http://www.realclearmarkets.com/articles/2014/05/22/high_frequency_trading_hyperbole_part_deux_101072.html [<https://perma.cc/WUE3-W3E3>] (asserting that “HFTs are viciously competitive with each other and don’t enjoy monopolies like the specialists in the prior single-exchange market structure did” and “the relative speed advantage of market makers in the old days was actually far larger than it is today, even if all the speeds today are faster”).

162. Letter from R.T. Leuchtkafer (pseud.) to the Joint CFTC-SEC Advisory Comm. (Feb. 14, 2011), <http://www.sec.gov/comments/265-26/265-26-51.htm> [<https://perma.cc/25VK-3NEW>].

163. For a discussion of this debate, see Eric Scott Hunsader, *Adding Liquidity*, NANEX (rev. Dec. 12, 2013), <http://www.nanex.net/aqck2/4501.html> [<https://perma.cc/62KB-E8CN>]. Notably, this commentator made the following observation: “When a liquidity provider removes liquidity, they are no longer a liquidity provider: they are removing liquidity and competing with other investors who thought the liquidity providers would be providing liquidity.” *Id.* For a counterpoint that stresses that “a liquidity provider will both add to and also remove liquidity, sometimes evenly spread across their activities,” see Remco Lenterman, *Does a Liquidity Provider Also ‘Remove’ Liquidity?*, EPTA BLOG (Dec. 12, 2013, 10:30 PM), <https://epta.fia.org/articles/does-liquidity-provider-also-remove-liquidity> [<https://perma.cc/KP2C-XELQ>]. Once again, for the purpose of inventory management, a market maker cannot be entirely passive, but constraints on aggressive trading established by the applicable regulatory regime are critical.

instance, an analysis that “focuses on HFTs as liquidity providers”¹⁶⁴ is bound to be one-sided, if not ultimately leading to misguided policy recommendations. Even as characterized by an industry insider in his counter-criticism of the “rigged markets” viewpoint, “Market-makers are, by default, high-frequency traders. . . . However, many high-frequency traders are not market-makers.”¹⁶⁵

While the universe of trading strategies in HFT is not by any means homogenous, many of these strategies or at least some of their facets/phases amount to or at least resemble market making. Moreover, given the existing level of fragmentation, many HFTs could be thought of as market makers — or perhaps, quite frequently, as arbitrageurs — across numerous trading venues, as well as across different securities.¹⁶⁶ Some HFTs even characterize all of their principal trading activities as “market making,” although even the DMM status that they might possess on some trading venues does not guarantee this result.¹⁶⁷ Overall, it is hard to accept

164. Merritt B. Fox et al., *The New Stock Market: Sense and Nonsense*, 65 DUKE L.J. 191, 247 n.133 (2015).

165. PETER KOVAC, FLASH BOYS: NOT SO FAST: AN INSIDER’S PERSPECTIVE ON HIGH-FREQUENCY TRADING 15 (2014).

166. See CFTC-SEC ADVISORY COMM., REGULATORY RESPONSES REPORT, *supra* note 13, at 10 (“[HFTs] often engage in multi-market arbitrage activities that essentially result in liquidity provision to and across markets.”); O’Hara, *supra* note 99, at 259 (“HFT market making differs from traditional market making in that it is often implemented across and within markets, making it akin to statistical arbitrage. Conceptually, HFT market making uses historical correlation patterns in price ticks to move liquidity between securities or markets.”). Given the decentralized nature of the trading process and the role played by HFTs in displaying essentially the same trading interest on different trading venues, it is not surprising to observe, as described by one study, “heightened uncertainty about the overall available liquidity in the market,” and this study offered evidence from markets in government securities and related futures contracts in support of the view that “rapid depth reduction by low-latency liquidity providers contributes to the liquidity mirage.” Dobrislav Dobrev & Ernst Schaumburg, *The Liquidity Mirage*, LIBERTY ST. ECON. (Oct. 9, 2015, 7:00 AM), <http://libertystreeteconomics.newyorkfed.org/2015/10/the-liquidity-mirage.html> [https://perma.cc/68FB-8S4F]. Another perspective on the same issue is the phenomenon of high order cancellation rates by HFTs that may be engaged in providing liquidity, as the multiplicity of trading venues magnifies the need for cancellations necessitated by the nature of inventory management and the arrival of new information, as well as an increased “pick-off” risk. For a discussion of this perspective and a justification of high order cancellation rates in the form of the argument that “because it is a market maker, and its business is about getting the price right, and it is doing its best to get the price right,” see Matt Levine, *Why Do High-Frequency Traders Cancel So Many Orders?*, BLOOMBERG VIEW (Oct. 8, 2015, 6:06 PM), <http://www.bloombergview.com/articles/2015-10-08/why-do-high-frequency-traders-cancel-so-many-orders-> [https://perma.cc/E6LM-MDFP].

167. See Stanislav Dolgoplov, *High-Frequency Trading, Order Types, and the Evolution of the Securities Market Structure: One Whistleblower’s Consequences for Securities Regulation*, 2014 U. ILL. J.L. TECH. & POL’Y 145, 166 n.112 [hereinafter Dolgoplov, *High-Frequency Trading, Order Types, and the Evolution of the Securities*

the approach that HFT is naturally gravitating to market making, however technologically modernized, and automatically equating opportunistic liquidity provision to the DMM model fails for the same reason. Looking back to the events of the Flash Crash, one commentator made the following observation:

High-frequency market maker firms are not “passive liquidity providers,” as they long claimed. The phrase is absurd and obsolete. They are very active and aggressive traders, committing fratricide when it suits them, or withdrawing altogether from volatile markets. With inventory half-lives measured in seconds, when these market makers reach their risk thresholds and start liquidating inventory - without regard to time or price - they can easily stoke a self-sustaining firestorm while prices collapse. . . . “Liquidity providers” with the freedom to provide liquidity for just a few seconds before demanding liquidity without regard to time or price are an unpredictable prelude to inevitable disaster, and our markets now completely depend on them.¹⁶⁸

Market Structure] (noting that a leading HFT firm “described virtually all of its short-term trading activities on the principal basis as ‘market making’”).

168. Letter from R.T. Leuchtkafer (pseud.) on File No. S7-02-10 (Oct. 31, 2010), <https://www.sec.gov/comments/s7-02-10/s70210-300.htm>; see also U.S. COMMODITY FUTURES TRADING COMM’N & U.S. SEC. & EXCH. COMM’N, FINDINGS REGARDING THE MARKET EVENTS OF MAY 6, 2010: REPORT OF THE STAFFS OF THE CFTC AND SEC TO THE JOINT ADVISORY COMMITTEE ON EMERGING REGULATORY ISSUES 15, 48 (Sept. 30, 2010), <http://www.sec.gov/news/studies/2010/marketevents-report.pdf> [<https://perma.cc/P3VC-9FND>] (analyzing the Flash Crash and finding that, with respect to futures markets, “net holdings of HFTs fluctuated around zero so rapidly that they rarely held more than 3,000 contracts long or short on that day [while] there was an unusually high level of ‘hot potato’ trading volume – due to repeated buying and selling of contracts – among the HFTs” and, with respect to securities markets, a subset of HFTs “traded with the price trend on May 6 and, on both an absolute and net basis, removed significant buy liquidity from the public quoting markets during the downturn”). An interagency report on the relatively short period of turbulence in the market for U.S. Treasury instruments and related markets on October 15, 2014 provides an additional data point. The report compared “principal trading firms” (“PTFs”), a category that may serve as a proxy for HFTs, and more traditional “bank-dealers” and concluded that both of these categories “were the main contributors to the pattern of net aggressive flows, consistent with their large share of overall trading volume, with PTFs accounting for much of the imbalance in aggressive flows during the event window across futures and cash markets.” U.S. DEP’T OF THE TREASURY, BD. OF GOVERNORS OF THE FED. RESERVE SYS., FED. RESERVE BANK OF N.Y., U.S. SEC. & EXCH. COMM’N & U.S. COMMODITY FUTURE TRADING COMM’N, JOINT STAFF REPORT: THE U.S. TREASURY MARKET ON OCTOBER 15, 2014, at 23 (July 13, 2015), <http://www.sec.gov/reportspubs/special-studies/treasury-market-volatility-10-14-2014-joint-report.pdf> [<https://perma.cc/GD2R-FLR6>]. Furthermore, the report suggested that “the aggressive buying [by PTFs] during the first part of the event window was unlikely to be hedging flows arising from . . . market making activities.” *Id.* at 24. However, the comparison was still in favor of PTFs vis-à-vis banks, as these market participants

Yet another consideration is that certain HFT strategies, while sometimes labeled as market making, really amount to market manipulation, and some of them indeed cross the legal line. For instance, the SEC recently penalized “an algorithmic, high-frequency trading firm [for] us[ing] complex computer programs to carry out a familiar, manipulative scheme: marking the closing price of publicly-traded securities.”¹⁶⁹ Despite the settlement with the regulators, the company still argued “its trading activity helped satisfy market demand for liquidity during a period of unprecedented demand for such liquidity.”¹⁷⁰

Indeed, even in the context of market making, HFTs are often viewed with suspicion as at-will liquidity providers.¹⁷¹ Another critical — and

collectively “remained engaged as liquidity providers throughout the event window, thus pointing towards more than one type of PTF strategies at work.” *Id.* at 23. An early critique of the report asserted that the relevant data set shows the existence of the “hot potato” effect among HFTs, as an explanation for volatility: “HFTs were aggressively buying from other HFTs on the way up, and HFTs were aggressively selling to other HFTs on the way down.” Eric Scott Hunsader, *HFT Hot Potato 2 – The Treasury Flash Crash*, NANEX (July 14, 2015), <http://www.nanex.net/aqck2/4703.html> [<https://perma.cc/3LP4-NR6C>]. Indeed, while describing this period of market turbulence, a government official stated “both sides of the order book were predominantly from PTFs and the aggressive orders were also predominantly from PTFs. So really throughout the spike – that 70 to 75 percent that we identified, PTFs were on both the passive and the aggressive side of things.” BROOKINGS INST., *supra* note 82, at 61 (remarks of Antonio F. Weiss, Counselor to the Secretary of the U.S. Department of Treasury).

169. Athena Capital Research, LLC, Exchange Act Release No. 73,369, Investment Advisers Act Release No. 3950, at 2 (Oct. 16, 2014), <http://www.sec.gov/litigation/admin/2014/34-73369.pdf> [<https://perma.cc/KMA7-HDTW>].

170. Press Release, Athena Capital Research LLC, Athena Capital Research LLC Agrees to Settlement with SEC (Oct. 16, 2014), <http://www.prnewswire.com/news-releases/athena-capital-research-llc-agrees-to-settlement-with-sec-279468512.html> [<https://perma.cc/QFN2-FRJP>].

171. *See, e.g.*, Thomas Peterffy, Chairman & CEO, Interactive Brokers Grp., Comments Before the Joint CFTC-SEC Advisory Committee on Emerging Regulatory Issues 3 (June 22, 2010), <http://www.sec.gov/comments/265-26/265-26-23.pdf> [<https://perma.cc/KK3F-BW5V>] (“High Frequency Traders are currently only fair weather liquidity providers, making markets when times are calm but leaving the market temporarily or permanently during turbulent periods. To enhance liquidity and stability and to integrate these HFTs into the National Market System, they should be encouraged and rewarded to become bona fide, registered Market Makers.”); *see also* BENOÎT LALLEMAND, FIN. WATCH, INVESTING NOT BETTING: MAKING FINANCIAL MARKETS SERVE SOCIETY 31 (Thierry Philipponnat et al. eds., Apr. 2012), <http://docs.edhec-risk.com/mrk/000000/Press/25-EBBSGCUGLNAFMHO.pdf> [<https://perma.cc/8V5U-Z6V6>] (“A business model built on being sufficiently fast to trade only certain selected transactions is by definition contradictory with liquidity providing.”); SE. ASSET MGMT., INC., SOUTHEASTERN’S PERSPECTIVE ON MARKET STRUCTURE AND HIGH-FREQUENCY TRADING 2–3 (Apr. 11, 2014), <http://southeasternasset.com/sites/default/files/commentary/Market%20Structure%20April%202014.pdf> [<https://perma.cc/BTR3-K3XY>] (“[M]any HFTs are electronic market makers and provide significant volume to the market. Less clear, however, is how much true

controversial — argument is that HFTs' lower profits margins than the ones enjoyed by old-style specialists are more than compensated for by a higher level of intermediation.¹⁷² Moreover, HFTs as informal market makers have been able to utilize certain “plumbing” features, often nontransparent, that may be characterized as market structure shortcuts that go far beyond speed:

HFT scalping [is] an opportunistic and discriminatory mimic of traditional market making — where HFT uses opaque advantages, including special order types, instead of explicit market making privileges — without the market making obligations. It is not a traditional spread-scalping strategy that posts on each side of the spread, relying on speed to jump ahead of the rest of the market.¹⁷³

This insight is particularly important in light of claims that HFTs' market making does not depend on structural advantages, unlike the old model of liquidity provision.¹⁷⁴ Moreover, some institutional investors are now open about the adverse impact of certain order types, which also points at a related problem of the costs of liquidity provided by HFTs.¹⁷⁵

Another critical perspective pertains to the nature of interaction of HFTs and other types of market makers. One argument points to an additional strain on DMMs in the form of an uneven playing field, as HFTs “compete with DMMs when market-making is profitable but withdraw altogether from the market when it is not, leaving DMMs to bear the brunt

liquidity that volume provides . . .”).

172. Letter from R.T. Leuchtkafer (pseud.) to Elizabeth M. Murphy, Sec'y, U.S. Sec. & Exch. Comm'n 2 (Nov. 3, 2011), <https://www.sec.gov/comments/s7-02-10/s70210-346.pdf> [<https://perma.cc/58DG-A3XL>].

173. Haim Bodek & Mark Shaw, *Introduction to HFT Scalping Strategies*, in BODEK, *supra* note 110, at 18, 23.

174. *See, e.g.*, Letter from Stuart J. Kaswell, Exec. Vice President, Managing Dir. & Gen. Counsel, Managed Funds Ass'n, to Elizabeth M. Murphy, Sec'y, U.S. Sec. & Exch. Comm'n 23 (May 7, 2010), <http://www.sec.gov/comments/s7-02-10/s70210-178.pdf> [<https://perma.cc/A6EM-3X5G>] (“[I]t would be unfair for the Commission to impose affirmative and negative obligations on today's liquidity providers as they are not receiving special trading privileges, such as registered specialists in the past and market makers who in return are required to maintain continuous two-sided displayed quotes.”).

175. *See, e.g.*, *High Frequency Trading's Impact on the Economy: Hearing Before the Subcomm. on Sec., Ins., & Inv. of the S. Comm. on Banking, Hous., & Urban Affairs*, 113th Cong. 69–70 (2014) (prepared statement of Andrew M. Brooks, Vice President and Head of U.S. Equity Trading, T. Rowe Price Associates, Inc.) (“[I]n the race for increased market share, exchanges and alternative trading venues continue to offer various types of orders to compete for investor order flow. Many of these order types facilitate strategies that can benefit certain market participants at the expense of long-term investors and, while seemingly appropriate, often such order types are used in connection with predatory trading strategies.”).

of market-making obligations in a stressed market.”¹⁷⁶ A very similar concern is whether the very presence of HFTs may impose a cost on other liquidity providers, resulting in longer-term consequences for securities markets:

HFTs might crowd out slow liquidity providers, who trade on long term fundamental information but are exposed to the risk of being picked off in the short term. Now, these slow liquidity providers have greater long-term risk-bearing capacity than HFTs. Hence the latter exert negative externality on other market participants by depriving them from liquidity supply at the time of significant shock that only slow traders could accommodate.¹⁷⁷

A theoretical analysis of the nature of interaction of “fast” and “slow” market makers somewhat analogously concluded that “[l]iquidity in the market may deteriorate unless high-frequency market makers fully replace low-frequency market makers in liquidity provision.”¹⁷⁸ A resulting recommendation pointed to the desirability of “some restrictions on high-frequency trading, such as minimum resting times [that] may improve market liquidity by leveling the playing field among market makers with different speeds.”¹⁷⁹ Given that such regulation has not been implemented on the market-wide basis, which may be difficult to do in any instance, a more practical, if not inevitable, result of this competitive environment is the integration of HFTs, such as KCG, Virtu Financial, and IMC, with the DMM segment of the securities industry, with some firms even entering the wholesaling business.¹⁸⁰ At the same time, any efforts to outlaw informal liquidity providers, however opportunistic and whether HFTs or otherwise, is bound to be a “red herring” regulatory option.

176. Benos & Wetherilt, *supra* note 46, at 349.

177. Bruno Biais & Thierry Foucault, *HFT and Market Quality*, BANKERS, MKTS. & INVESTORS, Jan.–Feb. 2014, at 5, 15; *see also* Lael Brainard, Governor, Bd. of Governors, Fed. Reserve Sys., Recent Changes in the Resilience of Market Liquidity: Remarks at Salzburg Global Forum on Finance in a Changing World (July 1, 2015), <http://www.federalreserve.gov/newsevents/speech/brainard20150701a.htm> [<https://perma.cc/RAT6-B9HM>] (“HFTs may have more limited capacity to support liquidity resilience since, on average, HFTs appear to trade with smaller inventories and lower capital than traditional traders. Although having less inventory and capital reduces the cost of trading, it also means that markets increasingly dominated by HFTs may be less able to absorb large shocks.”).

178. Jungsuk Han et al., *Liquidity with High-Frequency Market Making 1* (Swedish House of Fin., Research Paper No. 14-06, 2014), <http://ssrn.com/abstract=2416396> [<https://perma.cc/W3RQ-VTT6>].

179. *Id.*

180. *See also* DURBIN, *supra* note 28, at 94 (“Bottom line, in the most actively traded stocks, the market-maker can only expect to make profitable markets by getting just as smart as the predictor [i.e., an HFT].”).

While HFT has become associated with the term “front-running,” which is rarely used in its legal sense,¹⁸¹ the counterargument is that the capability to engage in trading strategies frequently labeled as “order anticipation”/“liquidity detection” is important for market making in the context of adverse selection:

To the extent that market makers — be they humans or machines — can get signals about the informativeness of order flow, and in particular about undisclosed flow that may be hitting the market soon, they can adjust their quotes accordingly and mitigate adverse selection problems. The ability to adjust quotes quickly in response to information about pending informed orders allows them to quote narrower markets. By pinging dark pools or engag[ing] in other strategies that allow them to make inferences about latent informed order flow, HFT can enhance liquidity. . . . [I]nformed traders’ anger at market makers that anticipate their orders is no different tha[n] the anger of a cat that sees the mouse flee before it can pounce. The criticisms of both dark pools and HFT (and particularly HFT strategies that attempt to uncover information about trading interest and impending order flow) are prominent examples.¹⁸²

A similar defense of this practice maintained, based on the rationale that “[t]he greatest threat to a liquidity provider is that one or several large orders move the market,” that HFTs as “liquidity providers need to identify, as quickly as possible, when the market moves in a certain direction through large orders (usually generated by institutional customers) [and they] may witness price changing orders through liquidity detection strategies only.”¹⁸³ While it is very problematic, if not futile, to

181. Indeed, the term “front-running” is used rather broadly in the context of the current market structure. *See, e.g.*, Schmitt, *supra* note 5, at 4 (“Technological front-running is a predatory High Frequency Trading tactic that leverages speed advantage, resulting from latency differences between different marketplaces, preferential access to data, co-location, faster communication networks, special order types, and internal processing capabilities, to detect, process and act upon information ahead of all slower market participants.”); *see also* Clifford S. Asness, *Why I Love High-Speed Trading*, BLOOMBERG VIEW (June 20, 2014, 11:15 AM), <http://www.bloombergview.com/articles/2014-06-20/why-i-love-high-speed-trading> [<https://perma.cc/3XA4-JZDQ>] (criticizing the view that the meaning of the term “front-running” should be extended to “encompass ‘order anticipation with speed advantages’”).

182. The Professor [Craig Pirrong], *Pinging: Who Is the Predator, and Who Is the Prey?*, STREETWISE PROFESSOR (Apr. 5, 2014, 11:59 AM), <http://streetwiseprofessor.com/?p=8340> [<https://perma.cc/VFE8-6JEA>].

183. EUREX EXCH., HIGH-FREQUENCY TRADING — A DISCUSSION OF RELEVANT ISSUES 22 (Feb. 2013), http://www.eurexchange.com/blob/426058/d66b6713e508ca546b5f2785386c958c/data/presentation_hft_media_workshop_chi_nyc_en.pdf [<https://perma.cc/6WPQ-RKJN>].

outlaw order anticipation/liquidity detection as such, the argument has been extended even further:

[W]ithout electronic front running, HFTs would find it harder to detect indications of possible trading on private information and as a result would increase their spreads. Informed traders would get all of the gains from being better able to hide the informed nature of their trades. But they pay, through the increased spreads, only part of the added costs incurred by HFTs as a result of entering into more losing transactions.¹⁸⁴

However, putting aside the overall contribution of HFTs to liquidity and hence the need to protect them as liquidity providers, this argument has to be balanced with the realization that HFTs themselves are short-term informed traders par excellence that could be either providing or consuming liquidity, as they have been able to exploit their speedy reaction to fundamental and trading process-based information — for instance, by utilizing private data feeds and corresponding latency differentials. Moreover, the arsenal of HFT has included numerous and often nontransparent market structure shortcuts, as contrasted to true quantitative models, effectively allowing to anticipate and respond to price moves.¹⁸⁵

184. Fox et al., *supra* note 164, at 231.

185. Indeed, one category of HFT strategies, “HFT scalping,” is described as “predatory in its aim of stepping ahead of institutional order flows [with] speed [being] simply a prerequisite for effective utilization of special order types and market microstructure,” and this approach is said to “use the market liquidity itself as insurance against large losses via its superior queue position and execution.” Haim Bodek & Mark Shaw, *Introduction to HFT Scalping Strategies*, in BODEK, *supra* note 110, at 18, 23. A related question is whether certain HFT strategies are simply “stepping ahead” of all other market participants rather than “front-running,” “anticipating,” or “detecting” specific trading interests. *See also id.* at 26–27 (“[U]ndocumented ‘queue jumping’ features at the exchanges can give the appearance of ‘statistical front running,’ as traditional orders fall to the back of the queue and tend to miss execution at the expected time and/or price.”). Furthermore, empirical evidence on “predictive” strategies of HFTs need to be viewed through the prism of market structure shortcuts. For instance, one study analyzed transactions in stocks on NASDAQ during the first quarter of 2011, while specifically flagging HFTs, and concluded that, despite very similar order cancellation ratios for HFTs and non-HFTs, “HFT firms tend to cancel buy (sell) limit orders ahead of a short-term price decrease (increase), while for non-HFT firms the relation is the opposite for large-cap stocks and significantly weaker for the medium- and small-cap stocks.” Avaniidhar Subrahmanyam & Hui Zheng, *Limit Order Placement by High-Frequency Traders 2–4* (Nov. 2015) (unpublished manuscript) (on file with author), <http://ssrn.com/abstract=2688418> [<https://perma.cc/4PEJ-M66E>]. The study drew a number of inferences, such as that, “compared with non-HFT firms, HFT firms are more capable of using order cancellation to manage the risk of trading with limit orders, which results in their liquidity being more informed,” *id.* at 4, that “[HFT] liquidity providers are informed about short-term price movements and strategically charge a liquidity premium in addition to the effective spreads to assert a competitive stance against the informed liquidity takers,” *id.* at 26, and that “the

Collectively branding HFTs as uninformed market makers — while acknowledging the existence of many shades of informed trading — might lead to questionable policy recommendations.

A critical issue for the phenomenon of HFT is whether it provides additional liquidity and improves market quality, which is a multifaceted empirical question. One better-known survey of HFT-focused empirical research concluded that “[v]irtually every time a market structure change results in more HFT, liquidity and market quality have improved because liquidity suppliers are better able to adjust their quotes in response to new information.”¹⁸⁶ Furthermore, there are empirical insights into whether HFT as a whole provides or consumes liquidity, as well as specialization of certain types of HFTs, and the role played by HFTs during periods of market turbulence.¹⁸⁷ Another issue relates to the nature of liquidity

technology that HFT liquidity providers employ helps them to effectively manage risk under normal trading conditions, which in turn enhances market quality,” *id.* at 35. However, such results from this time period, which probably qualifies as the pre-cleanup heyday of HFT, may also indicate a heavy usage of market structure shortcuts rather than quantitative models on their own, with both types of these strategies potentially relying on private data feeds. *See also* BODEK, *supra* note 110, at 50–51 (pointing out that the beginning of the cleanup of the HFT space occurred in late 2011–2012 and that “[s]ome of the more egregious HFT-oriented features appear to have been neutralized through order matching engine modifications”).

186. Charles M. Jones, *What Do We Know About High-Frequency Trading?*, at i (Columbia Bus. School, Research Paper No. 13-11, 2013), <http://ssrn.com/abstract=2236201> [<https://perma.cc/5SK5-4VXN>].

187. *See* Evangelos Benos & Satchit Sagade, *High-Frequency Trading Behaviour and Its Impact on Market Quality: Evidence from the UK Equity Market 20* (Bank of Eng., Working Paper No. 469, 2012), <http://www.bankofengland.co.uk/research/Documents/workingpapers/2012/wp469.pdf> [<https://perma.cc/VF4X-Y3BA>] (analyzing transactions in FTSE 100 stocks and concluding that, while some HFTs “mostly supply liquidity,” others “mostly consume it”); Anand & Venkataraman, *supra* note 75 (manuscript at 2–5) (analyzing transactions in stocks on the Toronto Stock Exchange, identifying “[e]ndogenous [l]iquidity [p]roviders” as market participants that “exhibit short holding periods, actively manage inventory, and earn the majority of trading profits from passive, liquidity supplying trades,” and concluding that “[h]igher stock volatility is associated with [their] higher . . . participation, even under conditions when market volatility is high”); Matthew Baron et al., *Risk and Return in High Frequency Trading 3* (Apr. 2014) (unpublished manuscript) (on file with author), http://www.cftc.gov/idc/groups/public/@economicanalysis/documents/file/oce_riskandreturn0414.pdf [<https://perma.cc/3FSH-JME7>] (analyzing transactions in the E-mini S&P 500 futures contract, finding that “HFT firms who specialize in liquidity-taking (aggressive) strategies generate substantially more revenue than those who specialize in liquidity-providing (passive) strategies,” and suggesting that “HFT firms have strong incentives to take liquidity”); Bruno Biais et al., *Who Supplies Liquidity, How and When? 3*, 16 (June 2015) (unpublished manuscript) (on file with author), <https://www.bis.org/events/conf150626/biais.pdf> [<https://perma.cc/2V2Z-KMDR>] (analyzing transactions in French stock on Euronext around the Greek crisis of 2010 and suggesting that “fast proprietary traders supply liquidity to the market via contrarian

provided by HFT. For instance, an empirical study of “the evolving Tokyo equity market and the mature London equity market” suggested that HFT is “highly concentrated in mega-cap names with the highest floating shares [and] mostly involved in opportunistic liquidity provisioning rather than engaging in predatory strategies,” but it “does not aim to maximize liquidity provision to [long-term investors].”¹⁸⁸ Furthermore, the same study pointed to another implication of HFT market making:

[T]he concentration of liquidity among top stocks results in a significant disparity in expected transaction costs per dollar traded. High correlations among stocks, which we have observed lately, limit the divergence of expected excess returns and force portfolio optimizers to prefer cheaper-to-trade securities, which ultimately contributes to crowdedness of the trade, further increases in correlations and more liquidity polarization.¹⁸⁹

Other empirical studies question the value of HFT in terms of its contribution to the level of liquidity.¹⁹⁰ Furthermore, there is some

marketable orders and non-immediately executed limit orders”); Jonathan Brogaard et al., *High Frequency Trading and Extreme Price Movements* 7–8, 26 (Dec. 2015) (unpublished manuscript) (on file with author), <http://ssrn.com/abstract=2531122> [<https://perma.cc/W44K-E3ME>] (analyzing transactions in stocks listed on the NYSE and NASDAQ and finding that “[HFTs] provide liquidity to [non-HFTs] during extreme price movement . . . episodes”).

188. Nataliya Bershova & Dmitry Rakhlin, *High-Frequency Trading and Long-Term Investors: A View from the Buy Side*, *J. INV. STRATEGIES*, Spring 2013, at 3, 3.

189. *Id.* at 42–43.

190. See George J. Jiang et al., *High-Frequency Trading Around Macroeconomic News Announcements: Evidence from the U.S. Treasury Market*, at iii (Bank of Can., Working Paper No. 2014-56, 2014), <http://www.bankofcanada.ca/wp-content/uploads/2014/12/wp2014-56.pdf> [<https://perma.cc/RR9C-BTU9>] (analyzing transactions in U.S. Treasury notes on BrokerTec, an electronic communication network, and concluding that “[high-frequency] activities have a negative effect on liquidity around economic announcements,” although “[high-frequency] trades improve price efficiency”); Álvaro Cartea et al., *Ultra-Fast Activity and Market Quality*, at i (Jan. 29, 2016) (unpublished manuscript) (on file with author), <http://ssrn.com/abstract=2616627> [<https://perma.cc/YG8B-H64H>] (analyzing transactions in stocks on NASDAQ and finding that “[a]n increase in [ultra-fast activity] leads to greater quoted and effective spreads and lower depth posted in the limit order book”); Amy Kwan & Richard Philip, *High-Frequency Trading and Execution Costs* 2, 8, 23–24 (June 12, 2015) (unpublished manuscript) (on file with author), <http://www.cifr.edu.au/assets/document/HFTExecutionCosts%20Kwan%20WP.pdf> [<https://perma.cc/J9NB-HZ3R>] (analyzing transactions in stocks on the Australian Securities Exchange in connection with the introduction of “a new, lower latency data feed,” concluding that “institutional and retail limit order trading costs increase, relative to the costs for HFT,” tracing this impact of HFT to “higher implementation shortfalls” for other market participants, and arguing that “HFT[s] typically supply liquidity to the thick side of the limit order book, where it is not required [and] strategically demand liquidity from the thin side, where liquidity is most needed, thus contributing to market instability”).

skepticism whether the adoption of Regulation NMS, which is seen as one of key ingredients in the rise of HFT, has improved market quality,¹⁹¹ although the ultimate long-term impact of this regulatory measure is certainly hard to quantify.¹⁹² Moreover, a cost-benefit analysis in terms of different facets of liquidity is needed.¹⁹³ In fact, one empirical study of transactions in stocks traded on NASDAQ asserted that “HFT represents a short-lived and expensive source of liquidity provision” to institutional investors, as expressed by execution shortfall, a multidimensional measure that “captures the bid-ask spread, the market impact, and the drift in price during order execution.”¹⁹⁴ On the other hand, a study of transactions in stocks traded on Canadian securities exchanges has a different conclusion: “Both HFTs and DMMs provide liquidity to large institutional trades, with HFTs providing substantially more. In high volume stocks, HFTs reduce liquidity provision for ‘stressful’ trades by 42 percent while DMM liquidity provision remains mostly unchanged.”¹⁹⁵ Yet, once again, it is problematic to lump together all forms of HFT and different market structure environments, and controlling certain types of conduct via regulatory measures, including stricter enforcement, is bound to be more productive

191. See Kee H. Chung & Chairat Chuwongnant, *Regulation NMS and Market Quality*, FIN. MGMT., Summer 2012, at 285, 285 (analyzing transactions in stocks listed on the NYSE, the American Stock Exchange, and NASDAQ around the implementation of Regulation NMS in 2007, and arguing that “both the quoted and effective spreads increased, the quoted depth decreased, and the market quality index decreased after the implementation of Regulation [NMS],” which was accompanied by “an increase in the price impact of trades and the dispersion of the pricing error”).

192. *But see* Barardehi et al., *supra* note 12, at 6, 13 (analyzing transaction in stocks listed on the NYSE from 2001 to 2012 and concluding that “illiquid stocks become more illiquid post Reg[ulation] NMS, and that liquid stocks became more liquid”).

193. See Stephen Bain & Shary Mudassir, *The Hidden Cost of Tighter Spreads*, TABB FORUM (Mar. 25, 2013), <http://tabbforum.com/opinions/the-hidden-cost-of-tighter-spreads> [<https://perma.cc/GH8D-8EWV>] (“[I]t seems clear that the behavior incited by today’s market has *increased effective spread costs* for investors by eroding the quality and reliability of the liquidity provided. This is particularly true when ‘liquidity providers’ have the ability to instantaneously morph into active position takers.”); *see also* PRAGMA SEC., HFT AND THE HIDDEN COST OF DEEP LIQUIDITY 5 (2012), <http://www.pragmatrading.com/research/> [<https://perma.cc/8R8L-L6G5>] (registration required) (“By competing to earn spreads and rebates by providing liquidity, HFTs crowd out directional traders’ passive orders, force them to cross the spread more often, and result in higher trading costs for investors.”).

194. Lin Tong, *A Blessing or a Curse? The Impact of High Frequency Trading on Institutional Investors*, at ii, 4 (Oct. 5, 2015) (unpublished manuscript) (on file with author), <http://ssrn.com/abstract=2330053> [<https://perma.cc/U946-PRX3>].

195. Robert Korajczyk & Dermot Murphy, *High Frequency Market Making to Large Institutional Trades 1* (Nov. 2014) (unpublished manuscript) (on file with author), www.iroc.ca/Documents/2014/747f94fd-69b6-400f-bf49-fe8165e5da95_en.pdf [<https://perma.cc/T6GV-Z4A7>].

than reversing technological developments as such with blunt measures.

In addition to clear parallels between HFT and the much older phenomenon of “scalping” in futures and commodities markets,¹⁹⁶ one important analogy pertains to historical debates over the nature and some practices of floor trading, including its contribution to liquidity. The reasoning articulated decades ago in an influential SEC study on the nature of such liquidity and the lack of market making obligations would be familiar to HFT critics:

[T]he liquidity [floor traders] provide is in most cases marginal, for they tend to enter the market only when other investors have already provided activity, a fact that poses the interesting question, “Who is providing liquidity for whom?”

It is indeed probable that on occasion the liquidity added to the marketplace by floor traders constitutes a positive disservice to the public by creating a misleading impression of a given stock’s actual liquidity. Thus investors who purchase a stock with a view to liquidity may find in stress situations that the floor traders, who are under no obligation to maintain fair and orderly markets, have abandoned the stock and its liquidity has been impaired when it is most needed.¹⁹⁷

Likewise, the advantages of floor traders were said to include “an opportunity to observe and act upon floor developments instantaneously” and “access to much greater and more current market information than individuals relying on tape reports and quotation systems,”¹⁹⁸ as well as lower trading fees and the ability to place and withdraw orders momentarily.¹⁹⁹ Moreover, concerns about obligations of HFTs to the marketplace also resemble the much earlier critique of floor trading: “Of all classes of exchange members on the floor, the floor trader stands alone in having no fiduciary status, no duty to execute transactions, and no market responsibilities or obligations in relation to the operation of the market as a public institution.”²⁰⁰ In other words, concerns about opportunistic trading

196. See, e.g., Letter from R.T. Leuchtkafer (pseud.) to the Joint CFTC-SEC Advisory Comm., *supra* note 162 (“Defining a ‘scalper’ as a firm that ‘typically buys and sells in large quantities, expecting to hold the trade open only a very short time’ and that ‘intends to be even as to quantities bought and sold at the close of the business day and is reluctant to carry a trade over night,’ the U.S. government’s 1920 [sic] definition of scalping tracks what today’s high frequency market maker firms say about themselves almost word for word.”) (quoting 7 REPORT OF THE FEDERAL TRADE COMMISSION ON THE GRAIN TRADE 4, 70 (1926)).

197. SEC, SPECIAL STUDY OF SECURITIES MARKETS, *supra* note 46, pt. 2, ch. VI, at 221.

198. *Id.* pt. 2, ch. VI, at 208, 210.

199. *Id.* pt. 2, ch. VI, at 239.

200. *Id.* pt. 2, ch. VI, at 238–39; see also Sean Hendelman & Brandon Rowley, A

combined with information- and speed-based advantages are nothing new, just as possible regulatory measures. At the same time, it was much easier to single out and monitor floor traders, compared to the current environment characterized by electronic trading, greater complexity, and fragmentation. A similar suppression of HFT as such may be a problematic policy option, given the diversity of trading strategies and their underlying purposes.

The value of HFT as a mechanism providing liquidity has been impaired in a number of instances by nontransparent market structure shortcuts created by recent transmutations of securities markets, such as certain order types, along with the growing level of complexity, with stealth wealth transfers as a result. In that respect, as observed by one commentator, many forms of HFT have amounted to “opportunistic skimming” coupled with “discriminatory advantages,” bringing memories of “the SOES bandits of the 1990’s and ‘barnacle’ customer market makers.”²⁰¹ Of course, these historical examples pertain to practices of a limited scope of somewhat marginalized groups, which were essentially stamped out with certain regulatory changes largely by trading venues themselves. On the other hand, the phenomenon of HFT is much more diverse in its scope, and some of its constituencies are well-entrenched. Accordingly, while the phenomenon of HFT as a whole cannot be stamped out or turned into bona fide market making, the elimination of such asymmetries will serve the market as a whole:

If the features that unjustly enrich HFT profitability [such as certain order types and matching engine practices] are eliminated from electronic exchanges, either by regulators or by industry pressure, the adverse impact of HFT activity in the market will rapidly dissipate. HFT strategies will still exist, but their role will once again be limited by their natural scale and volume.²⁰²

In any instance, these nontransparent features should not be coopted, either explicitly or implicitly, into the market making segment of the securities industry, and the regulators already seem to be on the path of eradicating the latest iteration of such features.²⁰³ Moreover, this cleanup is

Flawed Model: Relying on High Frequency Traders as Liquidity Providers, WALL ST. & TECH. (Sept. 20, 2010), [http://www.wallstreetandtech.com/trading-technology/a-flawed-model-relying-on-high-frequency-traders-as-liquidity-providers/d/d-id/1263989?](http://www.wallstreetandtech.com/trading-technology/a-flawed-model-relying-on-high-frequency-traders-as-liquidity-providers/d/d-id/1263989?https://perma.cc/YR8F-G9VB)

[<https://perma.cc/YR8F-G9VB>] (stating that HFTs “simply owe no fiduciary duty to anyone to create markets in stocks and thus should not be depended on for liquidity”).

201. BODEK, *supra* note 110, at 7.

202. *Id.* at 7–8.

203. For two recent SEC enforcement actions that specifically focused on order type practices, see UBS Sec. LLC, Securities Act Release No. 9697, Exchange Act Release No. 74,060 (Jan. 15, 2015) (settled proceeding), <http://www.sec.gov/litigation/admin/2015/33->

likely to be beneficial for both formal and informal liquidity providers and a variety of market making strategies that might have been displaced in the past.

Overall, the phenomenon of HFT presents a complex issue for regulation of market makers and touches on such key concepts as trading obligations and privileges, vulnerability, and opportunism in connection with HFTs, as well as their potential competitors and counterparties. While it is easy for an outside observer to picture this phenomenon as a parade of horrors, some HFT strategies may be providing liquidity, while others may be aggressive, predatory, or outright illegal. A more difficult task is to quantify the costs of opportunism and parasitic intermediation associated with certain forms of HFT and to evaluate the pros and cons of the interaction of HFTs as informal market makers and DMMs, while mapping the space for their healthy competition. Moreover, the rise of narrowly focused HFT firms that function as market makers, often playing the DMM role, definitely compresses the space for problematic practices. While this trend may appear to deemphasize the integrated model of market making, which is of particular importance for securities of smaller-cap/emerging companies²⁰⁴ contrasted to highly liquid large-cap stocks preferred by HFTs, there is no inherent reason why these two models cannot function side-by-side. HFT market makers can hardly be forced to become integrated securities firms, but there no inherent obstacles for the integrated model of market making to be successful.

V. THE REGULATORY OUTLOOK FOR MARKET MAKERS

Market making is one of the most fertile debate topics for regulatory reassessment and reform of modern securities markets, especially in the equities space, covering such themes as the shifting balance of trading

9697.pdf [https://perma.cc/29VN-K5QV]; EDGA Exch. Inc., Exchange Act Release No. 74,032 (Jan. 12, 2015) (settled proceeding), <http://www.sec.gov/litigation/admin/2015/34-74032.pdf> [https://perma.cc/UHU3-2TGB]. In one of these settlements, the SEC censured UBS for “failing to disclose PPP [the PrimaryPegPlus order type] to all UBS ATS subscribers [while] PPP was pitched almost exclusively to market makers and/or high-frequency trading . . . firms, which UBS expected to be the primary users of the order type.” UBS, Exchange Act Release No. 74,060, at 3 (footnote omitted). Furthermore, as specific examples of market participants favored by UBS, the SEC used unidentified firms that “engaged in high-frequency trading and market making.” *Id.* at 6–8. For an additional discussion of the so-called “order type controversy” from the standpoint of legal liability, see Dolgoplov, *High-Frequency Trading, Order Types, and the Evolution of the Securities Market Structure*, *supra* note 167, *passim*.

204. For a discussion of the importance of the integrated model of market making as a key component of capital formation process, see Dolgoplov, *Linking the Securities Market Structure and Capital Formation*, *supra* note 15, *passim*.

obligations and privileges, mandatory market making obligations, market disruptions, consolidation of the trading process, issuer-to-market maker compensation arrangements, the trade-at rule, the tick size regime, and the maker-taker pricing model. Sometimes, even the very existence of DMMs is still questioned. Yet, despite the concern that “no regulatory mechanism can ensure that the value of the liquidity provided is equal to the value of the special privileges exercised,”²⁰⁵ no such precision is needed in the constantly evolving market structure. Distortions caused by various combinations of trading obligations and privileges are inevitable, and an analogy to a moving target is quite appropriate. Likewise, there are reasons to qualify the argument that “during normal times, traders will avoid markets with designated market makers to avoid losses associated with the exercise of their special privileges,” and the corresponding conclusion that “[s]ystems with special privileges for designated market makers can only work well in markets in which all trading is consolidated by regulation to the sponsoring market”²⁰⁶ is not universally true. Overall, the mix of self-regulation and governmental regulation with respect to market makers remains important in the broader context of the architecture of securities markets: “Liquidity in a high-speed world is not a given: market design and market structure must ensure that liquidity provision arises continuously in a highly fragmented, highly interconnected trading environment.”²⁰⁷

A key issue is the shifting balance of trading obligations and privileges of market makers, as well as their mismatch in the current market structure. One common theme, as described by a leading HFT market maker, is that “the obligations, expectations and incentives for market makers have not kept pace with the evolution of our market structure.”²⁰⁸ Even years ago, a leading industry group described the growing crisis as follows:

The change to decimal quotes from fractions impacted liquidity by reducing the incentive for market makers and specialists to commit capital. The result has been a collapse in spreads, equating to reduced profit potential for these participants, or simply put, not enough reward to justify the risk for market makers and specialists. . . . The advent of fast markets further reduced the value of the incentives offered to liquidity providers. The specialist could no longer participate on a great enough scale to provide meaningful liquidity or profits. Market making

205. James J. Angel et al., *Equity Trading in the 21st Century: An Update*, 5 Q.J. FIN. 1550002-1, 1550002-29 (2015).

206. *Id.*

207. CFTC-SEC ADVISORY COMM., REGULATORY RESPONSES REPORT, *supra* note 13, at 2.

208. *A Parting Thought*, *supra* note 25, at 8.

incentives are no longer valuable enough to incentivize participants to risk their capital.²⁰⁹

Indeed, the current debates are searching for a new balance of trading obligations and privileges of market makers.

Another persistent theme is the balance between governmental regulation and self-regulation in setting up market making regimes. More universal rules on market making promulgated by regulatory agencies, including definitional aspects, are possible and sometimes asked for by certain major players. For instance, a leading market making firm proposed to create a new category of market makers that would “be recognized under SEC rules and be subject to SEC approved market making obligations” such as “best price, minimum size requirements, depth of liquidity, a minimum size basket of stocks for which they serve as market makers and enhanced capital requirements.”²¹⁰ Yet, in addition to very basic harmonization, anything detail-specific would be difficult to formulate and even more difficult to implement, given the wide variety of business models employed by trading venues and their market makers. Moreover, additional trading obligations imposed on DMMs would require further regulatory subsidies in the form of trading privileges. The following summary of a survey by an international group of securities regulators illustrates this question’s importance:

[Many respondents hold] the view that contractual arrangements should be left entirely to trading venues on the grounds that market making arrangements and liquidity provision are some of the dimensions on which trading venues compete. . . . As a result, regulatory authorities mandating a market making regime would reduce investor choice and stifle innovation by trading venues. A possible reduction in liquidity offered by some firms was also cited as a possible unintended consequence of a mandatory

209. SEC. TRADERS ASS’N, THE STA’S PERSPECTIVE ON U.S. MARKET STRUCTURE 6 (2008), <https://securitytraders.org/wp-content/uploads/2012/10/STA-WHITE-PAPER2008.pdf> [<https://perma.cc/F56Q-JR88>].

210. Roundtable on Equity Market Structure, Testimony of Douglas A. Cifu, Chief Executive Officer, Virtu Financial, at a Roundtable Discussion Hosted by U.S. Representative Scott Garrett (July 28, 2014), <http://www.virtu.com/news-23/roundtable-on-equity-market.html> [<https://perma.cc/87EW-NXXJ>]. An earlier comment letter from a major HFT firm maintained that “the definition of market making activity and the establishment of incentives for this activity should not be left to individual market centers” and called to avoid “a situation which leads either to a race to the bottom in which market maker obligations are completely eviscerated, or to exclusive market maker designations that increase dependence on single firms.” Letter from Peter Kovac, Chief Operating Officer & Fin. & Operations Principal, EWT, LLC, to Elizabeth M. Murphy, Sec’y, U.S. Sec. & Exch. Comm’n 19 (Aug. 27, 2010), <http://www.sec.gov/comments/s7-02-10/s70210-279.pdf> [<https://perma.cc/R7MQ-CBT3>].

regime. [O]ther respondents expressed mixed views and suggested that although the fine details of a market making schemes offered by a trading venue should be left to the trading venue as part of its competitive offering, implementation of regulation in this area may also lead to a harmonization of standards that could ensure that the integrity of the term “market maker” is upheld, thus providing confidence to the investing community.²¹¹

Overall, the most likely scenario for market makers is an evolving patchwork design via SEC-vetted rules adopted by individual trading venues, which may include strengthened trading obligations and additional trading privileges.

Another area of discussion relates to proposals for mandatory market making obligations for certain groups, such as HFTs in general and off-exchange market makers. While such proposals have been advanced by a range of commentators,²¹² this regulatory option seems unlikely or even infeasible, given its potentially broad application and the absence of counterbalancing incentives.²¹³ Furthermore, pursuing this course of action in the form of governmental regulation would likely require crafting a *comprehensive* set of market making obligations adopted and monitored by the regulators. As a counterargument, advantages conferred by superior technology and speed are sometimes thought of as a class privilege of “fast” traders, rather being confined to DMMs. Indeed, one academic paper argued that certain technology-based privileges, which are represented by the “information transmission distance,” should entail the obligation to become an “e-specialist.”²¹⁴ However, the argument that

211. TECH. COMM., INT’L ORG. OF SEC. COMM’NS, FR09/11, FINAL REPORT, REGULATORY ISSUES RAISED BY THE IMPACT OF TECHNOLOGICAL CHANGES ON MARKET INTEGRITY AND EFFICIENCY 59 (Oct. 2011), <http://www.iosco.org/library/pubdocs/pdf/IOSCOPD361.pdf> [<https://perma.cc/S7DD-8Y6P>].

212. For a description of such proposals, as well as the opposition to them, see Dolgoplov, *Providing Liquidity in a High-Frequency World*, *supra* note 33, at 352–53 & nn.256–58.

213. For a discussion of analogous proposals dealing with a minimum order duration and capped cancellation rates, see *id.* at 356–58. Interestingly, some trading venues have experimented or plan to experiment with minimum exposure order types with special compensation incentives, such as greater liquidity rebates or queue priority. For several examples of such order types, see Order Approving a Proposed Rule Change by NASDAQ OMX PHLX LLC To Introduce the Minimum Life Order as a New Order Type, Exchange Act Release No. 65,926, 76 Fed. Reg. 78,057 (Dec. 9, 2011); Press Release, TMX Grp., TSX Long Life Order Type Receives Regulatory Approval (Aug. 19, 2015), <https://www.tmx.com/newsroom/press-releases?id=352> [<https://perma.cc/T8NW-VGWM>].

214. KHALDOUN KHASHANAH ET AL., STEVENS INST. OF TECH., ON THE IMPACT AND FUTURE OF HFT 18 (May 10, 2014), <http://irrcinstitute.org/wp->

market making obligations should attach to de facto class privileges is still difficult to make, as these advantages do — and, very likely, should — support a wide variety of trading strategies. Even more tangible advantages, which may amount to mere access to services, such as co-location, do not present a strong case for applying a special regulatory regime based on that fact alone. Many representatives of the securities industry in fact critiqued this approach to co-location, offering several reasonable arguments.²¹⁵ Regulatory efforts to segment different tiers of technology are likely to be a difficult task, and, once again, regulatory sticks would work better with regulatory carrots. Furthermore, not all categories of HFTs could be converted to DMMs, given the sheer variety of trading strategies and potential problems with eradicating the ones with a very short time horizon.²¹⁶

In the context of debates about mandatory market making obligations,

content/uploads/2015/09/HFT-Academic-White-Paper1.pdf [https://perma.cc/YR2E-F8A5].

215. *See, e.g.*, Letter from Suhas Daftuar, Managing Dir., Hudson River Trading LLC, to Elizabeth M. Murphy, Sec’y, U.S. Sec. & Exch. Comm’n 5 (Apr. 30, 2010), <http://www.sec.gov/comments/s7-02-10/s70210-171.pdf> [https://perma.cc/58PF-24GH] (“[P]lacing obligations on co-location customers would mean that brokers would generally be unable to offer services harnessing the benefits of co-location to their retail or institutional customers, as their order flow presumably wouldn’t meet whatever obligation are being imposed.”); Letter from Janet M. Kissane, SVP – Legal & Corp. Sec’y, NYSE Euronext, to Elizabeth M. Murphy, Sec’y, U.S. Sec. & Exch. Comm’n 17 (Apr. 23, 2010), <http://www.sec.gov/comments/s7-02-10/s70210-154.pdf> [https://perma.cc/PC3R-BLUF] (“Application of obligation requirements to all co-location participants would be unnecessary and impractical, especially because only certain proprietary firms would be in a position to control their activity to meet such requirements (for example, firms with institutional agency algorithmic order flow would have no means to ensure obligations were met). It would be difficult to adequately define the scope of obligation requirements for co-location participants, and we are concerned that any such obligations could be inequitably applied.”); Letter from Ann Vlcek, Managing Dir. & Assoc. Gen. Counsel, Sec. Indus. & Fin. Mkts. Ass’n, to Elizabeth M. Murphy, Sec’y, U.S. Sec. & Exch. Comm’n 7 (Apr. 29, 2010), <http://www.sec.gov/comments/s7-02-10/s70210-167.pdf> [https://perma.cc/3QWR-PK3K] (“We do not believe . . . that firms engaging in co-location arrangements should have affirmative or negative obligations solely as a result of such arrangements. Co-location arrangements are unlike exchange specialist status (where . . . specialists enjoyed unique time and space advantages on exchange floors) because they should be available to any firm willing to devote resources to entering into such an arrangement.” (footnote omitted)).

216. *See also* PETER GOMBER ET AL., HIGH-FREQUENCY TRADING 61 (Mar. 2011), <http://ssrn.com/abstract=1858626> [https://perma.cc/6C5S-FXA4] (“HFT quoting obligations are in sharp contrast to the business model of HFTs that relies on minimizing risk, keeping positions for shortest periods and staying mostly flat. . . . The key challenge both for regulators and market operators is the design of the right economic incentives rather than imposing obligations/fines that drive liquidity providers temporarily or completely out of markets. The incentives should be based on the respective contribution to market liquidity of market makers independent of whether they are designated or voluntary liquidity providers.”).

the SEC's leadership indicated its preference for "more flexible, competitive solutions that could be adopted by trading venues," such as "affirmative or negative trading obligations for high-frequency trading firms that employ the fastest, most sophisticated trading tools [that are] analogous to the ones that historically applied to the proprietary traders with time and place advantages on manual trading floors."²¹⁷ Approaches chosen by other jurisdictions are also informative. For instance, the European Union is on the path to impose certain trading obligations on "[a]n investment firm that engages in algorithmic trading to pursue a market making strategy . . . taking into account the liquidity, scale and nature of the specific market and the characteristics of the instrument traded."²¹⁸ This regulatory measure amounts to a constraint on opportunism in the course of providing liquidity, applying to

[any] strategy [that], when dealing on own account, involves posting firm, simultaneous two-way quotes of comparable size and at competitive prices relating to one or more financial instruments on a single trading venue or across different trading venues, with the result of providing liquidity on a regular and frequent basis to the overall market.²¹⁹

In other words, this regulatory measure would not cover all manifestations of HFT, and, furthermore, it is meant to be implemented through "a binding written agreement with the trading venue" to specify the applicable trading obligations.²²⁰ Overall, this approach attempts to co-opt certain HFTs into the DMM space through trading venues rather than impose a detailed set of trading obligations.²²¹

Another area of concern is the role of market makers during periods of market turbulence. The futility of market making obligations is often asserted in connection with such conditions,²²² although this approach

217. Mary Jo White, Chairman, U.S. Sec. & Exch. Comm'n, Enhancing Our Equity Market Structure: Remarks at Sandler O'Neill & Partners, L.P. Global Exchange and Brokerage Conference (June 5, 2014), <http://www.sec.gov/News/Speech/Detail/Speech/1370542004312#.U99FBGN5WEc> [<https://perma.cc/U5XS-4225>].

218. Directive 2014/65/EU, of the European Parliament and of the Council of 15 May 2014 on Markets in Financial Instruments and Amending Directive 2002/92/EC and Directive 2011/61/EU, art. 17(3), 2014 O.J. (L 173) 349, 399.

219. *Id.* art. 17(4), at 399.

220. *Id.* art. 17(3)(b), at 399.

221. The same document specifically mandates agreements between trading venues and market makers providing "incentives in terms of rebates or otherwise offered by the regulated market to an investment firm so as to provide liquidity to the market on a regular and predictable basis and, where applicable, any other rights accruing to the investment firm as a result of participation in the scheme." *Id.* art. 48(3)(b), at 432.

222. See Fox et al., *supra* note 164, at 272–73 ("The historical evidence . . . suggests

needs to account for the distinction between crashes attributed to external events and crashes traced to or greatly magnified by market structure-related weaknesses.²²³ In order to *prevent and contain* self-inflicted market turbulence, one commentator has called for a resurrection of combined negative and affirmative obligations without necessarily imposing them on everyone, pointing to the problem of the cumulative impact of inventory management:

Without negative obligations, affirmative quoting obligations make quotes still more toxic – *firms required to provide liquidity will trade even more aggressively to manage inventory*. Negative obligations will prevent scalper fratricides, and stop high frequency market maker firms from unloading inventory onto the firms behind them. Without that kind of “hot potato” trading, the volume sensitive algorithm that tipped into the Flash Crash would not have descended into a lethal feedback loop as it traded against cart wheeling toxic quotes. The simplest negative obligations will extend market maker inventory cycles, preventing these firms from flipping into a liquidity crisis, as they did in the Flash Crash.²²⁴

Interestingly, even some major players in this segment of the securities industry are not too far behind with their recommendations. As articulated by an executive of an HFT market maker, “Flash crashes, miniflash crashes and other market disruptions demonstrate the need for additional obligated liquidity in our market.”²²⁵

that strong paper obligations have proved insufficient in the past to motivate market makers to continue supplying liquidity during periods of extreme volatility.”). Interestingly, Virtu Financial was reported as having one of the most profitable days in its history during the turbulent day of August 24, 2015, which was strongly influenced by fears about the Chinese economy. See Bradley Hope, *Historic Profits for High-Frequency Trading Firm*, WALL ST. J. (Aug. 24, 2015, 4:28 PM), <http://www.wsj.com/articles/historic-profits-for-high-frequency-trading-firm-today-1440446251> [https://perma.cc/F3KN-EREV] (reporting on Virtu Financial’s profits on that day and stating that “Virtu and other such trading firms, along with exchanges, emerged as early beneficiaries of the heightened volatility and volume”).

223. See also Demosthenes N. Tambakis, *Endogenous Market Turbulence* 15 (Ctr. for Fin. Analysis & Pol’y, Univ. of Cambridge, Working Paper No. 27, 2006), <http://www.cfap.jbs.cam.ac.uk/publications/downloads/wp27.pdf> [https://perma.cc/6D57-GWVH] (building a formal economic model under which “the link between feedback trading and asset returns can change qualitatively despite the absence of fundamentals driving the asset price [which] highlight[s] the critical role of market-making conditions for safeguarding financial stability”).

224. Letter from R.T. Leuchtkafer (pseud.) to the Joint CFTC-SEC Advisory Comm., *supra* note 162 (emphasis added).

225. *Senate Hearings on Computerized Trading*, *supra* note 25, at 47 (prepared statement of Chris Concannon, Partner and Executive Vice President, Virtu Financial,

Moreover, many crash-related concerns may be resolved by other regulatory means,²²⁶ while market making obligations would be consistently needed in calmer scenarios. Likewise, while criticizing the idea that “privileges will encourage liquidity provision in extraordinary time,” an industry insider maintained that “[m]arket maker obligations come with special privileges and some markets may need this to encourage liquidity providers in the ordinary course of business.”²²⁷ Finally, one novel weapon against glitches, which constitutes an alternative to a broader and burdensome scheme of market making obligations for all HFTs, is “anti-disruptive” regulation that would cover some currently legal practices. More specifically, the SEC is currently considering a market-wide approach that would be “carefully tailored to apply to active proprietary traders in short time periods when liquidity is most vulnerable and the risk of price disruption caused by aggressive short-term trading strategies is highest.”²²⁸

Another key concern is presented by the space occupied by smaller-cap/emerging companies. A potential solution, which has some support at the SEC, is a mandatory concentration of the trading process for certain securities, such as stocks of smaller-cap/emerging companies,²²⁹ which

LLC); *see also* INT’L MONETARY FUND, GLOBAL FINANCIAL STABILITY REPORT: NAVIGATING MONETARY POLICY CHALLENGES AND MANAGING RISKS 34 (Apr. 2015), <http://www.imf.org/External/Pubs/FT/GFSR/2015/01/pdf/text.pdf> [<https://perma.cc/Z29J-LLCL>] (“With lower liquidity, less market making, and more benchmarking, asset prices are more likely to be driven by common shocks, particularly at higher frequencies, than by their respective idiosyncratic fundamentals.”).

226. *See* Letter from Brian T. Durkin, Chief Operating Officer & Managing Dir., Products & Servs., CME Grp., to Werner Bijkerk, Int’l Org. of Sec. Comm’ns 11 (Aug. 12, 2011), <http://www.iosco.org/library/pubdocs/pdf/IOSCOPD361.pdf> (“[E]ffectively calibrated market-wide circuit breakers, coupled with automated volatility mitigation and risk management mechanisms and certainty regarding trade cancellation policies, are straightforward steps that will be much more impactful than mandated affirmative quoting obligations in encouraging liquidity providers to remain in the market during highly volatile periods.”). Such approaches are preferable to “protracted civil litigation over the duty of market makers to ‘catch a falling knife.’” Dolgoplov, *Providing Liquidity in a High-Frequency World*, *supra* note 33, at 359.

227. Michael A. Mendelson, AQR Capital Mgmt. LLC, Statement Before the Joint CFTC-SEC Advisory Committee on Emerging Regulatory Issues 4 (Aug. 11, 2010), <http://www.sec.gov/comments/265-26/265-26-34.pdf> [<https://perma.cc/7SDG-9D4U>].

228. White, *supra* note 217.

229. *See, e.g.*, Daniel M. Gallagher, Comm’r, U.S. Sec. & Exch. Comm’n, Whatever Happened to Promoting Small Business Capital Formation? Remarks at the Institute for Economic Freedom and Opportunity, The Heritage Foundation (Sept. 17, 2014), <http://www.sec.gov/News/Speech/Detail/Speech/1370542976550#.VCFCoBb4XQh> [<https://perma.cc/9ERA-KS66>] (“I’ve called for the creation of ‘Venture Exchanges’: national exchanges, with trading and listing rules tailored for smaller companies, including those engaging in issuances under Regulation A. . . The exchanges themselves would be

would amount to an additional advantage for market makers on these trading venues.²³⁰ While supporting such concentration on these “venture exchanges,” some commentators also articulated the need to suppress dark liquidity for the benefit of market makers: “[W]e believe it is essential that rules also be adopted to require lit liquidity . . . be given primacy over dark liquidity . . . [Otherwise] the incentive for market makers to participate in venture exchanges will be lost and liquidity will remain anemic in these securities.”²³¹ Other similar measures proposed for venture exchanges would also implicitly or explicitly benefit market makers.²³² As a unilateral concentration-related initiative in the less liquid segment, the BATS–Direct Edge group of securities exchanges adopted a softer policy that these exchanges “may determine not to designate for trading any security admitted to unlisted trading privileges that does not meet certain consolidated average daily trading volume thresholds.”²³³ The articulated

exempted from the Commission’s national market structure and unlisted trading privileges rules, so as to concentrate liquidity in these venues.”); Thomas Wittman, Executive Vice President, NASDAQ OMX Group, Inc., Statement at the Equity Market Structure Advisory Committee Meeting 5 (May 13, 2015), <https://www.sec.gov/comments/265-29/26529-14.pdf> [<https://perma.cc/C2VK-EHTR>] (“Affording . . . small companies the option to suspend unlisted trading privileges in their securities would deepen liquidity and re-ignite competition among orders by focusing all trading onto a single platform. To the extent that this competition results in improved spreads and deeper liquidity, smaller companies electing this option could enjoy many benefits, including reduced capital costs.”).

230. See also Letter from Dr. Jörg Walter, Joint CEO, Börse Berlin AG, et al. to the Eur. Sec. & Mkts. Auth. 2–3 (Feb. 27, 2015), <https://www.esma.europa.eu/file/12622/download?token=JkrHYv5a> [<https://perma.cc/JTN2-FCMR>]

(“[A market making] incentive scheme for securities that do not fall into the ‘blue chip’ category has to provide for a degree of ‘liquidity concentration’ if it is to be attractive to traders and if it is to be sustainable. . . . In addition to having a potentially deleterious effect on the provision of liquidity, unlimited access to ‘market making schemes’ irrespective of whether the security in question is liquid or illiquid is also likely to have other unintended consequences [such as] the technological ‘arms race’ that has so far been a characteristic only of high frequency trading . . .”).

231. *Venture Exchanges and Small-Cap Companies: Hearing Before the Subcomm. on Sec., Ins., & Inv. of the S. Comm. on Banking, Hous., & Urban Affairs*, 114th Cong. 28 (2015) [hereinafter *Senate Hearing on Venture Exchanges and Small-Cap Companies*] (prepared statement of Thomas W. Farley, President, NYSE Group).

232. See, e.g., DAVID WEILD & EDWARD KIM, THE U.S. NEED FOR VENTURE EXCHANGES 17 (Mar. 4, 2015), http://media.wix.com/ugd/c4bcbd_a7218106b4504d98a22c04df863b969a.pdf [<https://perma.cc/3CCH-H8JT>] (maintaining that venture exchanges should be exempt from several key regulations, such as the order handling rules and the penny-wide tick size requirement).

233. Order Approving Proposed Rule Changes by BATS Exchange, Inc., BATS Y-Exchange, Inc., EDGA Exchange, Inc., and EDGX Exchange, Inc. Relating to Liquidity Requirements for Securities Admitted to Unlisted Trading Privileges, Exchange Act Release No. 75,354, 80 Fed. Reg. 39,462, 39,462 (July 2, 2015).

rationales included the assertions that “liquidity providers will have an incentive to quote more competitively because concentrating the quoted liquidity on the listing exchange would: (1) reduce liquidity providers’ risk of adverse selection when quoting in a fragmented market [and] (2) provide greater certainty of execution on the one exchange at which liquidity providers are quoting.”²³⁴ Yet another proposal aimed at smaller-cap/emerging companies reemphasizes the concept of issuer-to-market maker compensation arrangements,²³⁵ which, once again, points to the importance of incentives originating outside the trading process, as well as the existence of liquidity externalities.

Another actively discussed proposal also deals with mandatory consolidation, but this approach is framed in terms of restrictions on off-exchange trading and not necessarily confined to less liquid securities. This proposal illustrates the conflict between on- and off-exchange market makers, although some securities firms wear both hats, and the relevance of adverse selection in the context of “cream-skimming” of retail order flow.²³⁶ Moreover, options markets, which essentially prohibit off-exchange trading in listed securities, are viewed as a desirable model:

234. *Id.*

235. See, e.g., *Senate Hearing on Venture Exchanges and Small-Cap Companies*, *supra* note 231, at 90 (prepared statement of Nelson Griggs, Executive Vice President, NASDAQ OMX Group) (“We believe that such support programs would also help growth companies. Market quality incentive programs of this kind have successfully enhanced liquidity and market quality for investors in Europe for several decades.”); Letter from Rey Ramsey, President & CEO, TechNet, to Elizabeth M. Murphy, Sec’y, U.S. Sec. & Exch. Comm’n 1 (June 20, 2012), <http://www.sec.gov/comments/sr-nasdaq-2012-043/nasdaq2012043-17.pdf> [<https://perma.cc/5GQU-F9Y3>] (“Looking forward, [issuer-to-market maker compensation arrangements] could benefit promising tech companies that today may lack liquid, quality markets.”); Wittman, *supra* note 229, at 5 (“We also believe that issuers should have the choice to compensate market makers that support their securities, with the goal of better spreads for their investors and enhanced liquidity. . . We believe that [such arrangements] could also be useful to smaller, less liquid companies, where it is currently not profitable for market making firms to provide liquidity and support.”).

236. See, e.g., *Computerized Trading Venues: What Should the Rules of the Road Be?: Hearing Before the Subcomm. on Sec., Ins., & Inv. of the S. Comm. on Banking, Hous., & Urban Affairs*, 112th Cong. 56 (2013) (prepared response of Joseph Mecane, Executive Vice President and Head of U.S. Equities, NYSE Euronext) (“Trading with retail flow is regarded as advantageous for two reasons — on average, the ‘informational’ content tends to be lower than other types of order flow encountered in the market, and secondly, retail flow tends to be smaller and have less liquidity impact in a given stock.”); *id.* at 75 (prepared response of Robert C. Gasser, Chief Executive Officer and President, ITG) (“[R]etail order flow carries little risk of adverse selection; specifically, interaction with retail order flow does not involve many of the concerns that arise when interacting with orders from certain high frequency trading strategies, such as information leakage and price deterioration.”).

[Options market makers] are motivated to provide liquidity because they get to interact with all of the flow. Some flow has less knowledge in it, so our liquidity providers are able to make markets for that flow. And mixing information-based flow together with the more ‘informationless’ flow will support a more profitable business.²³⁷

Conversely, “the good flow has been removed” from equities exchanges, making this environment more problematic for many liquidity providers.²³⁸ Accordingly, measures to restrict off-exchange trading in the equities space and thus make lit markets less toxic overall are seen as beneficial.²³⁹ The counterargument from the perspective of off-exchange market makers is as follows:

[A]s a market maker if I am making prices – if it’s a retail investor that flow is relatively uninformed and so I can give it a better price than an institutional investor who will likely have a much bigger order behind it. So by allowing this practice you’re allowing retail investors to get better prices than they otherwise would. If you forced everything on a lit venue where everyone would get the same price you would have a huge transfer of wealth from retail investors to institutional investors because [your] average spread would be the weighted average of both the retail and institutional which would mean institutional clients would get slightly better prices and retail clients would get worse prices.²⁴⁰

237. *May 6: Lessons Learned and Questions Raised*, in *THE QUALITY OF OUR FINANCIAL MARKETS: TAKING STOCK OF WHERE WE STAND* 29, 39 (Robert A. Schwartz et al. eds., 2013) (remarks of Gary Katz, President and Chief Executive Officer, International Stock Exchange).

238. *Id.*

239. See *repscottgartett* [U.S. Rep. Scott Garrett], *Rep. Garrett Equity Market Structure Roundtable – Panel 2 (5/13/13)* at 34:33–35:09, YOUTUBE (May 13, 2013), <http://www.youtube.com/watch?v=BBm7YZ73lqk> [<https://perma.cc/754E-QKQ7>] [hereinafter *EMS Roundtable: Creating a Level Playing Field for Equity Market Participants*] (remarks of Gary Katz, President and Chief Executive Officer of International Securities Exchange, LLC) (arguing that the consolidation of order flow on lit exchanges would benefit liquidity providers by diluting “exhaust” order flow and “take us further away from a fragile lit market to a more robust market.”); Letter from Christopher Nagy & Dave Lauer, KOR Grp. LLC, to Elizabeth M. Murphy, Sec’y, U.S. Sec. & Exch. Comm’n 1 (Dec. 22, 2014), <http://www.sec.gov/comments/4-657/4657-87.pdf> [<https://perma.cc/2ZLM-JE4K>] (arguing that “the decrease in off-exchange trading [would] reduce adverse selection on lit markets” and treating this approach as one of the steps to “a virtuous cycle that will enhance market quality overall, and most importantly will reduce market and order book fragility”).

240. BROOKINGS INST., *TRADING STOCKS IN AMERICA: KEY POLICY ISSUES* 65 (Jan. 30, 2014), http://www.brookings.edu/~media/events/2014/1/30%20trading%20stocks/20140130_tradi

In other words, this regulatory measure would reverse the process of segmentation, while benefitting market makers on trading venues at the expense of their off-exchange counterparts, but a market-wide beneficial impact is not an implausible scenario. Its twin proposal is the so-called trade-at rule, which would effectively ban the practice of de minimis price improvement that effectively sidesteps the tick size regime. While expressing its strong support for “a meaningful trade-at provision, as a critical means to protect displayed liquidity and limit off-exchange passive price matching,” one leading market maker articulated the following position:

With the rise of off-exchange trading . . . the publicly displayed quotes that we and other market makers generate are too often used by internalizers and alternative trading systems . . . to price and facilitate off-exchange business. Rather than facilitating interaction amongst all market participants, off-exchange trading limits such opportunities to a select and privileged group.²⁴¹

Once again, the trade-at rule is likely to strike at the heart of off-exchange market makers while benefitting their counterparts operating on trading venues, and quite a bit of criticism of this measure, often citing potential wealth transfers, decreased competition, and diminished liquidity, has come from that camp.²⁴² Additionally, there are concerns articulated by

ng_stocks_transcript.pdf [https://perma.cc/MCT9-WXE5] (remarks of Jamil Nazarali, Head of Citadel Execution Services, Citadel Securities); *see also* Letter from David Panko, to Mkt. Regulation Branch, Ont. Sec. Comm’n, *supra* note 74, at 4 (raising the issue of “whether it is fair for natural retail and institutional clients to pay wider spreads than necessary as a result of their orders being co-mingled with more toxic active orders”).

241. Letter from Andrew Stevens, Gen. Counsel, IMC Chi. LLC, to Brent Fields, Sec’y, U.S. Sec. & Exch. Comm’n 2–3 (Dec. 30, 2014), <http://www.sec.gov/comments/4-657/4657-89.pdf> [https://perma.cc/9BKD-KAHK].

242. *See, e.g., EMS Roundtable: Creating a Level Playing Field for Equity Market Participants*, *supra* note 239, at 44:16–26 (remarks of Thomas Matchett, Managing Director, Retail Market Making, UBS Americas, Inc.) (arguing that the trade-at rule would result in “a systematic transfer of very large numbers from retail investors and long-term investors to professionals and market makers [on lit markets]”); Letter from Leonard J. Amoroso, Gen. Counsel, Knight Capital Grp., Inc., to Elizabeth M. Murphy, Sec’y, U.S. Sec. & Exch. Comm’n 5 (Apr. 25, 2010), <http://www.sec.gov/comments/s7-02-10/s70210-156.pdf> [https://perma.cc/MK2Z-FP2E] (arguing that the trade-at rule “would minimize the opportunities for price improvement (and eliminate sub-penny price improvement) to retail orders [and] would reduce liquidity provided by market makers as increased costs would outweigh their liquidity provision ability in most cases”); Letter from Daniel Keegan, Managing Dir., Citigroup Global Mkts. Inc., to Elizabeth M. Murphy, Sec’y, U.S. Sec. & Exch. Comm’n 5 (May 5, 2010), <http://www.sec.gov/comments/s7-02-10/s70210-174.pdf> [https://perma.cc/J7SL-X9X8] (arguing that “the [trade-at] rule will reduce the amount of liquidity readily available to the market, and could correspondingly increase volatility”); Letter from John A. McCarthy, Gen. Counsel, KCG Holdings, Inc., to Brent J. Fields, Sec’y, U.S. Sec. & Exch. Comm’n 3, 12 (Dec. 19, 2014),

other commentators that the trade-at rule may be detrimental to the integrated model of market making,²⁴³ although many off-exchange market makers do not use this model.

One broad category of incentives relevant for the ongoing process of regulatory reform concerns traditional — but now diminished — time, place, and information-based advantages of market makers. Several policy recommendations aim at smaller-cap/emerging companies. For instance, one commentator suggested the following comprehensive set of trading privileges for a hypothetical trading platform in that space: “[M]arket makers would have very specific advantages to ensure that they had greater flexibility in managing quotes and sitting on the best bid/offer [such as] co-location, minimum time in force for non-market makers, or even quote precedence over non-market makers.”²⁴⁴ The countervailing factor is that time, place, and information-based advantages may be not as valuable in illiquid securities,²⁴⁵ which highlights the relative advantages of issuer-to-market maker arrangements that originate outside the trading process or the traditional model of cross-subsidization based on mixing liquid and illiquid securities.

Another relevant approach to time, place, and information-based advantages relates to more liquid securities and stresses the importance of such advantages as a regulatory tool for protecting market makers from HFTs’ predatory strategies. For instance, as proposed by a leading industry

657/4657-62.pdf [https://perma.cc/DL9L-A83D] (arguing that “the trade-at rule is anti-competitive” and that “[w]holesale market makers . . . provide a valuable service to retail broker-dealers and institutions by handling complex order types . . . that directly compete with exchange offerings”); Letter from John C. Nagel, Managing Dir. & Sr. Deputy Gen. Counsel, Citadel LLC, to Brent J. Fields, Sec’y, U.S. Sec. & Exch. Comm’n 7 (Jan. 5, 2015), <http://www.sec.gov/comments/4-657/4657-92.pdf> [https://perma.cc/Z92P-R6ZB] (criticizing a feature of the proposed tick size pilot, stating that “the trade-at rule should allow a market maker quoting on an exchange to trade-at that price internally,” and asserting that the SEC “should not force market makers to route all of their orders to the exchanges who would then reap the full benefit of their unnecessarily high, but permitted, ‘taker’ fees”).

243. See Letter from Eric Hess, Gen. Counsel, Direct Edge Holdings, LLC, to Elizabeth M. Murphy, Sec’y, U.S. Sec. & Exch. Comm’n 17 (Apr. 28, 2010), <http://www.sec.gov/comments/s7-02-10/s70210-159.pdf> [https://perma.cc/VUW6-SHNM] (“Dealers who have traditionally provided liquidity coupled with value-added services, such as the creation, compilation and dissemination of valuable company and related securities information to the marketplace, would be further marginalized under such a market structure regime.”).

244. Larry Tabb, *A New Structure for Smaller Cap Stocks?*, TABB FORUM (Feb. 15, 2012), <http://tabbforum.com/opinions/a-new-structure-for-smaller-cap-stocks> [https://perma.cc/HCH9-4Y8V].

245. For a discussion of this factor, see Dolgoplov, *Linking the Securities Market Structure and Capital Formation*, *supra* note 15, at 34–35.

figure, “Hold every order for a tenth of a second with the exception of market maker quote updates for products in which the market maker is registered and has affirmative obligations. There is simply no other measure that can protect market makers against being picked off.”²⁴⁶ Even a blue ribbon panel suggested that trading privileges of market makers “might include preferential co-location provisions,”²⁴⁷ and this statement could be interpreted in terms of tiers of informational advantages. Yet, despite numerous suggestions about granting time, place, and information-based advantages to market makers, the SEC still appears to have reservations about this course of action, which is illustrated by its recent disapproval of directed orders on NASDAQ OMX BX that would have granted a special priority to such market participants.²⁴⁸

A close — but more egalitarian — substitute for time, place, and information-based advantages of market makers is represented by the proposal to address the problem of adverse selection caused by certain forms of HFT through frequent batch auctions. As described by some of its proponents, this approach would “eliminate the cost of liquidity provision in continuous limit order book markets associated with stale quotes getting sniped.”²⁴⁹ On the other hand, the frequent batch auction mechanism was criticized as self-defeating with the argument that “liquidity providers’ total revenue would decrease because some investors’ orders offset each other in each auction [while] the cost associated with adverse selection stays the same because liquidity providers would still absorb the same imbalance of supply and demand.”²⁵⁰ In any instance, the concept of frequent batch auctions, as well as their possible randomization, may be a useful tool for experimentation by individual trading venues.²⁵¹

246. Thomas Peterffy, Chairman & CEO, Interactive Brokers Grp., Comments Before the 2010 General Assembly of the World Federation of Exchanges 6 (Oct. 11, 2010), <http://investors.interactivebrokers.com/download/worldFederationOfExchanges.pdf> [<https://perma.cc/9T6R-SQR7>].

247. CFTC-SEC ADVISORY COMM., REGULATORY RESPONSES REPORT, *supra* note 13, at 10.

248. Order Disapproving a Proposed Rule Change by NASDAQ OMX BX Inc. To Adopt a Directed Order Process, Exchange Act Release No. 70,756, 78 Fed. Reg. 65,396 (Oct. 25, 2013).

249. Budish et al., *supra* note 97, at 1556.

250. FIA PRINCIPAL TRADERS GRP., UNINTENDED CONSEQUENCES OF FREQUENT BATCH AUCTIONS AS A MARKET DESIGN 3 (2014), <http://www.futuresindustry.org/ptg/downloads/WHITEBOARD%20Frequent%20Batch%20Auctions.pdf> [<https://perma.cc/B87S-MSV9>].

251. One recent illustration is the approval of such a device proposed by the Chicago Stock Exchange. Order Approving a Proposed Rule Change by Chicago Stock Exchange, Inc. To Adopt and Implement CHX SNAPSM, an Intra-Day and On-Demand Auction Service, Exchange Act Release No. 76,087, 80 Fed. Reg. 61,540 (Oct. 6, 2015).

Another key regulatory issue that has relevance for market makers relates to the tick size regime. One common argument is that the process of decimalization has greatly contributed to the current market making crisis and led to additional liquidity-related problems for smaller-cap companies.²⁵² In other words, while the tick size regime is not directly aimed at DMMs, it has a powerful impact on market making strategies. Indeed, in some instances, adopting a coarser price grid has been a conscious policy decision to attract liquidity providers.²⁵³ Some market makers have declined to endorse this measure as a must-have for securities markets,²⁵⁴ although this situation might be explained by these firms' focus on very liquid securities. Moreover, there is some skepticism that an increased tick size would encourage market making firms to provide ancillary services or enhance such offerings.²⁵⁵

Despite the much-criticized recommendation of the SEC's own Investor Advisory Committee,²⁵⁶ the leadership of this regulatory agency still decided to proceed with a tick size pilot, ordering the securities industry to submit such a plan.²⁵⁷ Moreover, the SEC specifically articulated its goal of evaluating the impact of the tick size pilot on market makers,²⁵⁸ but, on the other hand, they would not be granted special

252. For a detailed discussion of this argument, see Dolgoplov, *Linking the Securities Market Structure and Capital Formation*, *supra* note 15, at 11–21.

253. See, e.g., RICHARD L. SANDOR, *GOOD DERIVATIVES: A STORY OF FINANCIAL AND ENVIRONMENTAL INNOVATION* 94 (2012) (“The tick size of the GNMA contract was designed to be larger than that of the grain contract so as to attract market makers — if market makers could buy at the bid price and sell at the offer price, they would make \$25.00 per contract.”).

254. See, e.g., Letter from John C. Nagel to Brent J. Fields, *supra* note 242, at 3 (“It is telling that market makers with significant market share are not pushing for wider tick sizes.”).

255. See TABB, *supra* note 129, at 2 (“This might be easier if smaller investment banks earned market-making spreads, but the current crop of high-speed market makers are not the integrated merchant and investment banks of the past. Currently, most market-making activity is conducted by small, independent market-making firms that have no research capabilities or banking prowess.”); Letter from John C. Nagel to Brent J. Fields, *supra* note 242, at 3 (“[M]any of the most active and competitive market makers . . . do not even provide research or investment banking services.”).

256. Investor Advisory Comm., U.S. Sec. & Exch. Comm’n, Minutes of January 31, 2014 Meeting, www.sec.gov/spotlight/investor-advisory-committee-2012/iac013114-minutes.htm [<https://perma.cc/R57Y-N5HK>] (last modified Apr. 14, 2014).

257. Order Directing the Securities Exchanges and FINRA To Submit a Tick Size Pilot Plan, Exchange Act Release No. 72,460, 79 Fed. Reg. 36,840 (June 24, 2014); see also Notice of Filing of a Proposed National Market System Plan by the Securities Exchanges and FINRA To Implement a Tick Size Pilot Program on a One-Year Pilot Basis, Exchange Act Release No. 73,511, 79 Fed. Reg. 66,423 (Nov. 3, 2014) (describing the proposed tick size pilot and soliciting public comments).

258. Order Directing the Securities Exchanges and FINRA To Submit a Tick Size

privileges vis-a-vis other market participants. As expected, this pilot, with the applicable price increment set at five cents, will be focused on smaller-cap/less liquid stocks rather than top tier/more liquid stocks, where HFTs play a big role. The criteria for participating stocks notably include the market capitalization of \$3 billion or less and the average daily trading volume of a million shares or less.²⁵⁹ In its approval order, the SEC recited the argument on the link between tick sizes and the attractiveness of market making, thus recognizing the necessity of testing this theory: “The wider tick size may incentivize market makers to increase their market making activities in these stocks. This, in turn, may attract more investors and with increased interest in those stocks, trading activity may increase, which may also improve liquidity and market quality.”²⁶⁰ Moreover, the participants in the pilot study would be responsible for collecting data on market makers and their profitability.²⁶¹

While the tick size pilot focuses on the smaller-cap space, another important perspective is that the existing penny-wide tick size may be too *large* for high-volume stocks.²⁶² Interestingly, the Tokyo Stock Exchange recently slashed its price grid for stocks in the TOPIX 100 Index, which represents the most actively traded securities.²⁶³ The new share price-based

Pilot Plan, 79 Fed. Reg. at 36,841–43, 36,846–48.

259. For the final criteria, as modified by the SEC, see Order Approving the National Market System Plan To Implement a Tick Size Pilot Program by Securities Exchanges and FINRA, as Modified by the SEC, for a Two-Year Period, Exchange Act Release No. 74,892, 80 Fed. Reg. 27,514 Exh. A, at 27,548–49 (May 6, 2015).

260. *Id.* at 27,516.

261. *Id.* at 27,518–19.

262. See, e.g., Letter from Chris Isaacson, Chief Operating Officer, BATS Exch., Inc., Eric Noll, Exec. Vice President, NASDAQ OMX Grp., Inc. & Larry Leibowitz, Chief Operating Officer, NYSE Euronext, Inc., to Elizabeth M. Murphy, Sec’y, U.S. Sec. & Exch. Comm’n 1 (Apr. 30, 2010), <https://www.sec.gov/spotlight/regnms/jointnmsexemptionrequest043010.pdf>

[<https://perma.cc/83HD-6ERC>] (arguing that “the imposition of [a minimum price variation] of \$0.01 has resulted in a publicly displayed quote that is artificially wide for certain lower priced, liquid securities, and has caused a detrimental impact to the public price discovery process, resulting in worse execution prices for investors” and petitioning the SEC to adopt a half-penny tick increment for such securities); Letter from John C. Nagel, Managing Dir. & Sr. Deputy Gen. Counsel, Citadel LLC, to Kevin M. O’Neill, Deputy Sec’y, U.S. Sec. & Exch. Comm’n 4 (July 21, 2014), <http://www.sec.gov/comments/equity-market-structure-2013/equitymarketstructure2013-7.pdf> [<https://perma.cc/X5AR-SKFQ>] (recommending to the SEC to “establish a half-penny tick increment for the highest trading volume stocks trading under a specified dollar value”).

263. See Anna Kitanaka & Yuko Takeo, *Tokyo Bourse Cuts Tick Sizes for Some of Biggest Stocks*, BLOOMBERG (July 22, 2014, 3:45 AM), <http://www.bloomberg.com/news/2014-07-21/tokyo-bourse-cuts-tick-sizes-for-some-of-biggest-stocks.html> [<https://perma.cc/4TX6-L3R7>] (describing this introduction of smaller tick sizes and motivations behind this measure).

tick sizes can go as low as 0.5 or 0.1 yen, which is a radical departure from the prior tick sizes not exceeding the one yen mark,²⁶⁴ and the contrast to the penny-wide tick size in U.S. securities markets is quite significant. Furthermore, preliminary results of this measure indicate that “trading-related costs under the [implementation shortfall] method fell, following the change in tick size.”²⁶⁵

Another contested topic in regulatory debates addresses the maker-taker pricing model, which differentiates between “makers” and “takers” of liquidity by charging access fees and paying out liquidity rebates.²⁶⁶ While this pricing model may be crafted to provide special incentives for DMMs, such as larger liquidity rebates for these market participants, a more salient debate is about its utility as a universal “democratic” tool to encourage market making trading strategies and compensate for the cost of adverse selection, thus enhancing liquidity.²⁶⁷ For example, institutional investors, a group that tends to take liquidity, seem to remain uneasy about the extent and cost of liquidity provided by the maker-taker pricing model, as evidenced by a recent comment letter by a coalition of these market participants.²⁶⁸ Furthermore, there are reasons to be cautious about a consistent enhancement of liquidity offered by the current implementation

264. See TOKYO STOCK EXCH., INC., TICK SIZES FOR TOPIX100 CONSTITUENT STOCKS WILL BE CHANGED 2 (Jan. 14, 2014), http://www.jpx.co.jp/files/tse/news/20/b7gje6000004313n-att/leaflet_english.pdf [<https://perma.cc/SVE7-QZRF>] (listing revised share price-based tiers of tick sizes for the TOPIX 100 constituent stocks and comparing them to other stocks). The chief reason behind this measure was described as “bring[ing] investors the benefits of price improvements due to lower spread costs, which would likely be seen mainly for issues of high liquidity.” TOKYO STOCK EXCH., INC., OPTIMIZATION OF INCREMENTS OF BIDS AND OFFERS IN STAGES 1 (May 14, 2013), http://www.jpx.co.jp/files/tse/rules-participants/public-comment/data/b7gje60000048plb-att/130514_kabu_e.pdf [<https://perma.cc/XH5J-Z2EH>]. However, another important rationale appears to be the goal of “win[ing] back business from private trading venues [with sub-yen tick sizes].” Kitanaka & Takeo, *supra* note 263.

265. Masafumi Kondo, *Impact of Tick Size Pilot Program on Trading Costs at Tokyo Stock Exchange 1* (Japan Exch. Grp., Working Paper No. 7, 2015), http://www.jpx.co.jp/english/corporate/research-study/working-paper/b5b4pj000000i468-att/JPX_working_paper_No7.pdf [<https://perma.cc/UM8L-2BNM>].

266. For a detailed discussion of this pricing model and its implications, such as the usage in the context of nontransparent trading advantages, the overall contribution to liquidity, and the emergence of perverse incentives, see Dolgoplov, *The Maker-Taker Pricing Model and Its Impact*, *supra* note 93, *passim*.

267. For a discussion of the relevant issues and debates, see *id.* at 233, 235–38, 261.

268. See Letter from Ari Burstein, Assoc. Gen. Counsel, Inv. Co. Inst., to Brent Fields, Sec’y, U.S. Sec. & Exch. Comm’n 4 (May 11, 2015), <http://www.sec.gov/comments/265-29/26529-10.pdf> [<https://perma.cc/X7KP-5E73>] (“If the current incentives for making routing decisions based on the availability and amount of liquidity rebates offered, and access fees charged, by trading venues are reduced or eliminated, we believe a number of benefits to the markets would be brought to bear.”).

of this pricing model, as it depends on a specific mixture of liquidity-making and liquidity-taking activity.²⁶⁹ An even more troubling development is that certain “order matching engine practices that served to preference HFTs over the public investor” effectively amounted to penalizing other market participants’ exposure of liquidity via “unfair conversion of investor orders eligible for *maker* rebates into unfavorable executions incurring *taker* fees.”²⁷⁰

Overall, the abolition of the maker-taker pricing model or a significant restriction on its magnitude, potentially through a lower cap on access fees, may be a welcome step to a simplification of the current market structure and a removal of certain undesirable incentives.²⁷¹ Still, this regulatory step needs to be evaluated from the standpoint of the attractiveness of providing liquidity, and other dimensions, such as a contained enhancement and even further concentration of liquidity in the most liquid segment, need to be considered as well.²⁷² A typical claim against the abolition of liquidity rebates is as follows: “[R]ebates lead to tighter quoted bid-ask spreads and eliminating liquidity rebates would widen quoted bid-ask spreads. This would benefit internalizers and dark pool operators, but would increase transaction costs for investors without contributing to price discovery in the public markets.”²⁷³ Another claim is that a lower cap on access fees would also imply lower liquidity rebates, which are largely funded by such fees, and hence a diminished incentive to provide liquidity, leading to wider bid-ask spreads.²⁷⁴

While the existence of liquidity rebates does provide an additional

269. See, e.g., LALLEMAND, *supra* note 171, at 31 (“The net effect of the liquidity maker/taker fee model is simple to understand: the liquidity making activity, despite the fact that it does not provide true liquidity, subsidises the liquidity taking activity.”).

270. BODEK, *supra* note 110, at 11–12.

271. See Dolgoplov, *The Maker-Take Pricing Model and Its Impact*, *supra* note 93, *passim* (describing the connection between the maker-taker pricing model and complexity and assessing the likely impact of potential regulatory restraints on this model); see also Letter from Douglas A. Cifu, Chief Exec. Officer, Virtu Fin., to Elizabeth M. Murphy, Sec’y, U.S. Sec. & Exch. Comm’n 2 (Dec. 19, 2014), <http://www.sec.gov/comments/4-657/4657-63.pdf> [<https://perma.cc/286L-TDYN>] (“[A] reduction in the market access fee cap to a level that is reflective of current market dynamics will ultimately reduce the distortive effect of the maker-taker pricing and simplify our overall fragmented market structure.”).

272. See Dolgoplov, *The Maker-Take Pricing Model and Its Impact*, *supra* note 93, at 262 & nn.116–17 (describing these factors in the context of a potentially non-uniform impact of incentives provided the maker-taker pricing model on liquidity).

273. Letter from Liam Connell, Chief Exec. Officer, Allston Trading, LLC, et al. to Elizabeth M. Murphy, Sec’y, U.S. Sec. & Exch. Comm’n 12 (Apr. 23, 2010), <http://www.sec.gov/comments/s7-02-10/s70210-155.pdf> [<https://perma.cc/47UB-P7Q4>].

274. *EMS Roundtable: Market Making and Trading in the 21st Century*, *supra* note 22, at 35:14–40 (remarks of Patrick Hickey, Head of Market Structure, Optiver).

incentive to expose an order at a given price, another question is whether this mechanism encourages price improvement and thus narrower bid-ask spreads, as it is often asserted,²⁷⁵ given that a typical liquidity rebate is less than a typical tick size.²⁷⁶ Furthermore, a double rebate, assuming a two-sided quote, would still be less than one tick for most securities. From this perspective, there is a substantial wedge between a marginal benefit and a marginal cost, which may imply that price improvement is not necessarily an unambiguous outcome, although *some* incentive is possible in the context of a binding price grid and an aggregate — rather than transaction-by-transaction — perspective. In any instance, the flip side of the coin that the very incentive for liquidity providers to offer price improvement is essentially financed by access fees passed onto/ultimately borne by end consumers of liquidity, and any true liquidity improvement must be traced to some fixed imperfection in the market for liquidity rather than a mechanic economic reallocation between makers and takers through access fees and liquidity rebates.²⁷⁷ Another important perspective is whether a

275. See, e.g., Letter from IMC Fin. Mkts. to the Comm. of Eur. Sec. Regulators 8 (Apr. 30, 2010), http://www.esma.europa.eu/system/files/IMC_CESR_responsex.pdf [<https://perma.cc/7LPP-RU8Z>] (“The maker/taker fee structure provides the benefit of incentivizing liquidity providers, resulting in more liquidity at narrower spreads than otherwise would be available.”). A recent memorandum by the SEC’s key unit has given this argument quite a bit of weight, while realizing some of its limitations. For this analysis, see Memorandum from the SEC Div. of Trading & Mkts. to the SEC Mkt. Structure Advisory Comm. 14–16 (Oct. 20, 2015), <https://www.sec.gov/spotlight/emsac/memo-maker-taker-fees-on-equities-exchanges.pdf> [<https://perma.cc/97YM-4DFH>]. More specifically, this memorandum posed the following scenario: “[I]f the maker-taker model was eliminated or substantially impaired, retail execution quality could suffer in stocks where maker-taker fees narrow the displayed quote, resulting in less money in the pockets of retail investors.” *Id.* at 16.

276. This relationship largely follows from Regulation NMS, as this regulatory measure caps access fees, which serve as a funding base for liquidity rebates, at \$0.003 per share and restricts subpenny pricing, with some exceptions for low-priced stocks applying to both of these provisions. Regulation NMS, Exchange Act Release No. 51,808, 70 Fed. Reg. 37,496, 37,631–32 (June 9, 2005) (to be codified at Access to Quotations, 17 C.F.R. § 240.610(c) & Minimum Pricing Increment, 17 C.F.R. § 240.612).

277. There are several empirical studies on the connection between the maker-taker pricing model and bid-ask spreads, with some of them specifically accounting for access fees. Compare Katya Malinova & Andreas Park, *Subsidizing Liquidity: The Impact of Make/Take Fees on Market Quality*, 70 J. FIN. 509, 511 (2015) (analyzing transactions in stocks on the Toronto Stock Exchange in connection with the introduction of liquidity rebates and concluding that “the ‘cum fee’ trading costs, measured by the effective bid-ask spread plus (twice) the taker fee, did not change, despite the decline in the ‘raw’ bid-ask spread, which does not include the taker fee”), with Marco Lutat, *The Effect of Maker-Taker Pricing on Market Liquidity in Electronic Trading Systems – Empirical Evidence from European Equity Trading* 1 (E-Fin. Lab, Paper No. 2010-2, 2010), <http://ssrn.com/abstract=1752843> [<https://perma.cc/A5LW-QY7G>] (analyzing transactions in stocks on the SWX Europe Exchange in connection with the introduction of the maker-

broad category of maker-taker-based trading strategies even aims to provide more aggressive prices:

[T]he HFT scalping [entails] profitable rebate capture when making a “zero width” market by buying and selling at same price is possible. Its core intent is, on every round trip trade, to step ahead of supply-and-demand imbalances evident in market depth, and to capture a micro-spread by closing on the other side for a tick or to scratch out by closing on the same side, both of which are favorably subsidized by rebate in the maker-taker market model that is currently prevalent in US equities.²⁷⁸

Moreover, while some commentators have expressed the view that the maker-taker pricing model offers a valuable incentive for liquidity providers in less liquid securities,²⁷⁹ others point to its insufficiency.²⁸⁰

taker pricing model and concluding that “maker-taker pricing does not affect [relative quoted] spreads”), *with* Laura Cardella et al., *Make and Take Fees in the U.S. Equity Market* 36–37 (Apr. 1, 2015) (unpublished manuscript) (on file with author), <http://ssrn.com/abstract=2149302> [<https://perma.cc/ST53-4V3K>] (analyzing transactions in stocks on U.S. securities exchanges and concluding that “a change in the total fee [i.e., the fee retained by the securities exchange in question after accounting for liquidity rebates and access fees] has no effect on both the quoted spread as well as the net-of-fees spread [while] the allocation of the total fee across the make and take sides has a significant effect on the quoted spread and the net-of-fees spread”), *and with* Shawn M. O’Donoghue, *The Effect of Maker-Taker Fees on Investor Order Choice and Execution Quality in U.S. Stock Markets* 4, 35 (Jan. 23, 2015) (unpublished manuscript) (on file with author), <http://ssrn.com/abstract=2607302> [<https://perma.cc/4N42-LJ5U>] (analyzing transactions in stocks on U.S. trading venues and finding evidence that “suggests that the fall in effective spread more than compensates for the increase in the taker fee”).

278. Haim Bodek & Mark Shaw, *Introduction to HFT Scalping Strategies*, in BODEK, *supra* note 110, at 18, 19–20.

279. *See* Letter from Daniel Keegan, Managing Dir. & Head of Equities for the Ams., Citigroup Global Mkts. Inc., to Elizabeth M. Murphy, Sec’y, U.S. Sec. & Exch. Comm’n 5 (Aug. 7, 2014), <http://www.sec.gov/comments/s7-02-10/s70210-416.pdf> [<https://perma.cc/FS42-8B47>] (“[I]t is unlikely that the amount of trading in high-volume securities is driven by access fees and rebates. Conversely, certain lower-volume securities benefit from this incentive for market participants to provide liquidity.”); *see also* David Weisberger, *Grand Bargain?*, REGONE SOLUTIONS (Feb. 5, 2015), http://www.regonesolutions.com/regone/web/me.get?WEB.websections.show&SITE_924 [<https://perma.cc/F4YK-3MYR>] (“[M]arket making in less liquid stocks will get more difficult when there is a lower rebate paid for liquidity provision. The predictable result of lower rebates will be wider and more volatile bid offer spreads in these stocks on exchanges.”); Open Letter from Joe Ratterman, Chief Exec. Officer & Chris Concannon, President, BATS Global Mkts., Inc., to U.S. Sec. Indus. Participants 4 (Jan 6, 2015), <http://cdn.batstrading.com/resources/newsletters/OpenLetter010615.pdf> [<https://perma.cc/D89N-7Y5B>] (“BATS believes that a more tiered and dynamic approach to access fees would preserve the benefits the current market structure has delivered, while offering enhanced opportunities to improve the trading experience for illiquid securities.”).

280. *See How Roadblocks in Public Markets Prevent Job Creation on Main Street, Hearing Before the Subcomm. on TARP, Fin. Servs. & Bailouts of Pub. & Private Programs*

Since less liquid securities are typically traded in an environment with wide spreads, the incentive provided by liquidity rebates is not as significant compared to an environment for more liquid securities with much lower or even one-tick spreads *and* a potentially greater number of competing trading venues. More generally, on the more liquid part of the securities spectrum, maker-taker arrangements essentially serve as a key driver of order flow across different trading venues and a competitive tool in the shadow of the constraints imposed by the tick size regime and its uneven application to such players.²⁸¹

Experimentation by individual trading venues with lower access fee caps and hence lower liquidity rebates is subject to the collective action problem.²⁸² As an illustration, NASDAQ's recent step in that direction with lower fees and rebates resulted, as indicated by an in-house study, in a smaller "equally-weighted market share in the experiment stocks" and a smaller "time at the [National Best Bid and Offer] in the experiment stocks" vis-à-vis the control sample.²⁸³ The same study also documented a sharp decline in the participation rate by dominant liquidity providers under the old regime, suggesting that they are "rebate sensitive traders."²⁸⁴

of the H. Comm. on Oversight & Gov't Reform, 112th Cong. 34–35 (2012) (remarks of Joseph Mecane, Executive Vice President and Chief Administrative Officer, U.S. Markets, NYSE Euronext) (discussing "various market maker programs on our exchange where we incentivize those liquidity providers to meet certain liquidity and quoting obligations," stating that, "in some of these [smaller-cap] names . . . we're paying out all the revenue that we generate and it's not necessarily enough to help get the liquidity to where we would like it to be," and expressing support for issuer-to-market maker compensation arrangements).

281. For instance, a recent memorandum originating within the SEC has focused on maker-taker arrangements as a competitive tool in the context of the co-existence of different types of trading venues and alternative allocation mechanisms such as payment for order flow. Memorandum from the SEC Div. of Trading & Mkts. to the SEC Mkt. Structure Advisory Comm., *supra* note 275, at 14–16. One key argument was that "[t]he payment of transaction-based rebates is a primary tool that exchanges use to compete with off-exchange venues." *Id.* at 13. Furthermore, the memorandum considered a possible competitive disadvantage from restraints on the maker-taker pricing model, as well as the trade-at rule as a potential fix. *Id.* at 13–14. However, these two allocation mechanisms do not *always* compete for same types of orders via monetary inducements: a securities exchange with typical maker-taker arrangements would *charge* market orders access fees, while an off-exchange market maker would *pay* for those orders.

282. See Gary Stone, *The Maker-Taker Model and Access Fees: It's Time for the SEC To Correct the Prisoner's Dilemma*, BLOOMBERG TRADEBOOK (Jan. 24, 2014), <http://www.bloombertradebook.com/blog/maker-taker-access-fees/> [<https://perma.cc/GG3H-87FM>] (providing the collective action approach to this issue and stating that "exchanges are reticent to lower their take rates independently").

283. FRANK HATHEWAY, NASDAQ OMX GRP., INC., NASDAQ ACCESS FEE EXPERIMENT 1–2 (Mar. 2015), http://www.nasdaqomx.com/digitalAssets/97/97754_nasdaq-access-fee-experiment--first-report.pdf [<https://perma.cc/VNC5-4XTX>].

284. *Id.* at 3–4. Such "rebate sensitive traders" are most likely to be HFTs. See PHILIP PEARSON, INV. TECH. GRP., INC., NASDAQ PILOT PROGRAM: A RACE TO ZERO (MARKET

Another important result provided by a different study is that “[t]he average spread before and after the change is virtually identical for both the NYSE and NASDAQ-listed names.”²⁸⁵ Interestingly, a NASDAQ executive provided the following evaluation of the link between the maker-taker pricing model and liquidity, while discussing other relevant concerns:

Complex order types exist, in large part, to capture liquidity rebates and avoid paying access fees. I see this both in equities and options trading. . . . I believe our fee experiment shows that access fees and rebates in the most active stocks serve solely as one means for exchanges and dealer systems to compete with each other [for order flow]. *These charges are largely unnecessary as incentives to provide liquidity in these stocks.*²⁸⁶

In any instance, given the limitations of unilateral experimentation, maker-taker-related issues “could be resolved through appropriate regulatory action,”²⁸⁷ including a possible pilot program on several trading venues and across a range of securities.²⁸⁸

To summarize, regulation of market makers is a bubbling field, and the impact on these market participants is a factor for even much broader regulatory measures. One likely scenario captures a (modest) revival of market making in certain segments as a result of regulatory stimulation, such as the permitted use of issuer-to-market maker compensation arrangements, changes in the tick size regime, the trade-at rule and the concomitant order flow diversion to lit exchanges, and consolidation-related measures for certain securities. A comprehensive set of market making obligations for HFTs in general and off-exchange market makers is

SHARE) 3 (Mar. 3, 2015), http://www.itg.com/marketing/ITG_Report_Pearson_20150309.pdf [<https://perma.cc/6YNE-SWWR>] (“NASDAQ will have to market these changes to institutional brokers for it to pay off, as the HFT community seems to disfavor lower rebates in all but the deepest-queued names.”).

285. Pearson, *supra* note 284, at 2.

286. Wittman, *supra* note 229, at 5 (emphasis added). Other industry heavyweights had spoken in favor of abolishing the maker-taker pricing model as such. See, e.g., *The Role of Regulation in Shaping Equity Market Structure and Electronic Trading: Hearing Before the S. Comm. on Banking, Hous., & Urban Affairs*, 113th Cong. 42 (2015) (prepared statement of Jeffrey Sprecher, Chairman and CEO of Intercontinental Exchange, Inc.) (“We should eliminate and ban maker-taker pricing schemes at trading venues. Rebates that were used to encourage participants to quote on regulated, transparent markets add to complexity and the appearance of conflicts of interest.”).

287. Aguilar, *supra* note 27.

288. For a discussion of the push for a maker-taker pilot, including a legislative proposal, see Rick Baert, *Managers Push SEC for Limits on Brokers’ Maker-Taker Rebates*, PENSIONS & INVS. (July 13, 2015), <http://www.pionline.com/article/20150713/PRINT/307139986/managers-push-sec-for-limits-on-brokers-maker-taker-rebates> [<https://perma.cc/7B7U-82AS>].

not a likely policy option, but additional HFTs might be drawn into the DMM space. At the same time, the balance of trading obligations and privileges for DMMs is bound to shift, while informal liquidity providers might feel additional pressure — for instance through changes in the implementation of the maker-taker pricing model.

CONCLUSION

Regulation of market makers, which is to a large degree driven by the dynamics of liquidity externalities, vulnerability, and opportunism, stands firm as a permanent fixture of securities markets. A range of liquidity commitment devices is needed in order to fix various imperfections in the market for liquidity and essentially spread liquidity around for a broader economic effect rather than for its own sake, and, without such devices, a further redistribution of liquidity from less liquid securities to more liquid ones is an expected outcome.²⁸⁹ Technological developments do not make

289. In fact, this phenomenon of the continuing concentration of liquidity in some markets, notably, the equities space, is of some worry to some commentators. For instance, this concentration was characterized as “another challenge [for] our current equity market structure,” while pointing out the market structure evolution went from “decent liquidity for a fairly large number of stocks” to “liquidity [being] jammed up into [the] top hundred names.” Eric Noll & Nicolas Colas, *U.S. Equity Market Structure “Flashback” Webinar* at 6:27-7:08, CONVERGEX (Mar. 26, 2015), <http://www.convergex.com/the-share/market-structure-survey-results-webinar-replay> [<https://perma.cc/DKY3-DTF9>]. Furthermore, in connection with options markets, another commentator observed that “[l]iquidity has become concentrated in the top 100 names,” while noting that “[s]preads continue to increase as shifts in market structure diminish incentives for market makers to quote.” Andy Nybo, Head of Derivatives Research, Tabb Grp., *US Options Trading 2014/2015: The Buy-Side’s Insatiable Thirst for Liquidity* 4–5 (Mar. 4, 2015) (unpublished presentation) (on file with author), <http://www.cboe.com/rmc/2015/Day-1-Session-3-Andy-Nybo.pdf> [<https://perma.cc/RA4L-Y7AZ>]. Indeed, the concentration of liquidity in options markets is a longer-term trend. *See* Andy Nybo, Head of Derivatives Research, Tabb Grp., *US Listed Options Trading: State of the Industry 2014*, at 5 (Oct. 2, 2014) (unpublished presentation) (on file with author), <http://www.securitytraders.org/wp-content/uploads/2014/10/TABBSTA-10-2-14-FINAL-c.11.pdf> [<https://perma.cc/VD76-GGF9>] (showing the increased concentration of liquidity for the top 10, 50, 100, and 500 names from 2007 to 2014). Interestingly, an earlier comment letter to the SEC analyzed market-structure related changes in the options industry and the diminishing role of market makers trading obligations and painted the scenario of “ultimately leading to liquidity limited to certain active option series during periods of low volatility.” Letter from Anthony J. Saliba, Chief Exec. Officer, LiquidPoint, LLC to Elizabeth Murphy, Sec’y, U.S. Sec. & Exch. Comm’n 5 (July 9, 2010), <http://www.sec.gov/comments/s7-09-10/s70910-32.pdf> [<https://perma.cc/5W67-6WDM>]. Yet another illustration is offered by fixed income markets, in which this concentrations appears to be caused by a reassessment of business models by market makers and new regulations in the aftermath of the financial crisis of 2008–09: “Changes in market-makers’ behaviour have had varying effects on the liquidity of different bond market segments. Market-making has concentrated in the most liquid

obsolete the model of dedicated liquidity provision in securities with a range of characteristics, whether in connection with the integrated model or on the stand-alone basis. While forcing market makers to “catch a falling knife” is meaningless, this model has value during both turbulent and stable market conditions.

The use of market making regimes by trading venues as a dimension of competition implies a gravitation to self-regulation rather than governmental regulation, although the latter is more appropriate for market-wide/collective action issues. On the other hand, the line between these spheres of authority is sometimes blurry, as government agencies often resort to formal and informal channels of influence, while the securities industry and trading venues, in their turn, try to predict, preempt, and soften direct regulation.²⁹⁰ Furthermore, broader regulatory shifts, such as the trade-at rule, may substantially, yet indirectly, impact the mix of trading obligations and privileges of market makers or favor different constituencies among these market participants.

Recognizing that some balance of trading obligations and privileges is required in order to improve markets for liquidity is a fairly simple concept, but it is often missing from public policy debates. Moreover, an elimination of obstacles for the interaction of natural liquidity, while largely commendable in terms of unlocking value and decreasing transaction costs, does not always present a complete solution, as important incentives for providing liquidity may disappear as well. While it has been postulated that “giv[ing] a large number of potential buyers and sellers easy access to the market” would result in a diminished or eliminated need for market makers and produce orderly markets without such intermediaries,²⁹¹

bonds [leading to] liquidity bifurcation . . .” BIS, 85TH ANNUAL REPORT, *supra* note 42, at 37–38.

290. For instance, one early example relates to possible state regulation: “In 1910, probably in response to the Hughes committee criticism, the [NYSE] adopted a rule prohibiting specialists from trading with the book, i.e., dealing as principal with a customer whose order the specialist holds as agent, without the customer’s consent.” SEC, SPECIAL STUDY OF SECURITIES MARKETS, *supra* note 46, pt. 2, ch. VI, at 65. As a much more recent example relating to the Flash Crash, the securities exchanges as a group, backed by several major market making firms, abolished the practice of stub quotes with a threat of direct intervention by the SEC in the background. For a description of this episode, see Dolgoplov, *Providing Liquidity in a High-Frequency World*, *supra* note 33, at 345 & nn.221–24; 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., Div. of Trading & Mkts., U.S. Sec. & Exch. Comm’n (July 9, 2010), <http://www.sec.gov/comments/s7-02-10/s70210-255.pdf> [<https://perma.cc/BX9T-4JXT>].

291. Fischer Black, *Toward a Fully Automated Stock Exchange* (pt. 1), FIN. ANALYSTS J., July–Aug. 1971, at 28, 34.

this argument should not be overused. Even putting aside existing players' self-interested resistance to change as a threat to their entrenched position, technological advances coupled with universal access cannot be a panacea in every instance. Indeed, "a huge misconception that somehow electronic markets are substitutes for the commitment of capital"²⁹² deserves to be criticized.²⁹³

The current strain on the market making business may be attributed to the disappearance of many advantages traditionally enjoyed by these market participants. Ironically, quite a few of these advantages had been nontransparent and thus often criticized, but their removal has had an adverse impact on liquidity in certain segments of securities markets. On the other hand, there is room for strengthening the market for liquidity through tested and novel means, including the use of *transparent* advantages for market makers.²⁹⁴ Likewise, an "external incentive" might be needed to encourage market making in certain securities,²⁹⁵ and this perspective once again highlights the underlying externality in the market for liquidity. Increasing the size of the pie can be achieved by involving issuers in the process of enhancing liquidity.

Dating back to crowded floors of old, market makers have jealously guarded their formal and informal class privileges, with the franchise value being enhanced by insulation, whether for technological imperfections or otherwise, and the sheer dominance enjoyed by major trading venues. One may recall the ancient story of how market makers on the LSE opposed the efforts of brokers to use a supporting pillar as a notice board for indications of interest in less liquid securities, which resulted in such notices being torn down and finally the installation of a locked glass case that served as yet another obstacle.²⁹⁶ Indeed, the image of traditional market makers as rent-

292. *Alternative Call Auction Designs*, in CALL AUCTION TRADING: NEW ANSWERS TO OLD QUESTIONS 49, 64 (Robert A. Schwartz et al. eds., 2003) (remarks of Ian Domowitz, Smeal Professor of Finance, Pennsylvania State University).

293. See also Letter from Colm Kelleher to the Bank of Eng., HM Treasury & Fin. Conduct Auth., *supra* note 42, at 7 ("Current corporate bond market liquidity issues will not be solved by electronic trading or greater market transparency . . .").

294. On a related note, in the context of futures and commodities markets, it has been suggested that direct monetary payments are preferable to time, place, and information-based advantages: "[F]ee or other monetary incentives alone, should provide adequate incentive to attract sufficient liquidity provider(s) with far less public costs than violating the time/price paradigm. Said another way, all financial incentive alternatives should be exhausted before pursuing non-financial alternatives." CFTC'S TECH. ADVISORY COMM., BEST PRACTICES FOR ORGANIZED ELECTRONIC MARKETS, *supra* note 89, at 37 (footnote omitted).

295. *EMS Roundtable: Market Making and Trading in the 21st Century*, *supra* note 22, at 48:30-:49 (remarks of Douglas Cifu, CEO of Virtu Financial).

296. For a description of this practice, see LSE COMMISSION, MINUTES OF EVIDENCE,

seeking intermediaries — often protected by regulation or its selective enforcement — has proved to be correct on many occasions, but this experience does not justify abandoning a balance of trading obligations and privileges applicable to these market participants. Navigating between the Scylla of anticompetitive profits and the Charybdis of illiquidity and preserving a viable mix of formal and informal liquidity providers remain necessary for regulatory design.

supra note 2, para. 3493, at 132 (testimony of Charles Branch, a former broker at the LSE); *id.* paras. 4558-62, at 179 (testimony of Frederick Banbury, a broker at the LSE). The same hearing also witnessed the perception that “jobbers are said to rule the Stock Exchange” and that “the market is over-jobbed,” although combined with the realization that the existence of jobbers even in widely traded securities was “both an advantage and a necessity.” *Id.* paras. 3515, 3519, 3527, at 133 (testimony of Charles Branch, a former broker at the LSE). For a description of the historical struggle of the NYSE specialists for the influence over, if not control of, the Big Board, which provides a similar example, *see* SELIGMAN, *supra* note 32, *passim*.