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Spoofting and Its Regulation

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SPOOFING AND ITS REGULATION

Merritt B. Fox,* Lawrence R. Glosten,** and Sue S. Guan***

Nearly a century after the United States enacted its first securities laws, urgent questions remain as to the scope of manipulation law: whether manipulation is possible in principle, and if so, how the law should respond in practice. Sharp disagreement among courts, economists, and legal scholars as to whether trading or quoting activity constitutes illegal manipulation has led to a legal framework that lacks precision and cogency. Moreover, the poorly articulated normative basis for court rulings has resulted in enforcement that is both under-inclusive and over-inclusive in ways that do a poor job of discouraging socially harmful transactions and enabling socially beneficial ones.

This Article seeks to clarify this confusion. Drawing on microstructure and financial economics, this Article offers a new understanding of a common kind of quote-driven manipulation, often referred to as “spoofing.” By employing an analytical and normative framework developed previously by two of the authors in assessing another major form of manipulation, trade-driven manipulation, this Article assesses the impact of spoofing on what occurs in the securities markets and carefully evaluates its effects on social welfare and economic efficiency. The result is a new understanding of quote-based manipulation that helps resolve essential questions in manipulation law and provides guidance for future regulation and enforcement.

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I. INTRODUCTION

Nearly a century has passed since the United States enacted its first securities laws. Principally animated by the desire to prevent manipulation that was deemed a central cause of the 1929 stock market crash,¹ the Securities Exchange Act of 1934 (“Exchange Act”) expressly prohibits manipulation pursuant to sections 9 and 10(b).² Despite this initial intensity of concern, the regulation of manipulation has, for most of the following eighty-seven years, largely failed to attract much serious scholarship by either legal jurists or

¹ See, e.g., Daniel R. Fischel & David J. Ross, *Should the Law Prohibit “Manipulation” in Financial Markets?*, 105 HARV. L. REV. 503 (1991) (“The drafters of the Securities Act of 1933 and the Securities Exchange Act of 1934 . . . were convinced that there was a direct link between excessive speculation, the stock market crash of 1929, and the Great Depression of the 1930s.” (footnotes omitted)); Charles R. Korsmo, *High-Frequency Trading: A Regulatory Strategy*, 48 U. Rich. L. Rev. 523, 551 (2014) (“[P]revention of manipulation has been said to be at ‘the very heart’ of the securities acts.” (quoting LOUIS LOSS, FUNDAMENTALS OF SECURITIES REGULATION 853 (2d ed. 1988))).

² See Securities Exchange Act of 1934, 15 U.S.C. §§ 78i(a)(2), 78j(b) (2018).

economists. And the minimal case law interpreting these statutory provisions has been fraught with confusion.

In the last few decades, some academics have begun to consider one major type of manipulation: *trade-driven manipulation*.³ This is where the manipulator uses purchases and/or sales to effect changes in the price of a security that allow the manipulator to profit. In contrast, there continues to be almost no scholarly attention paid to another major type of manipulation: *quote-driven manipulation*. This is where the manipulator uses quotes—binding commitments posted on an exchange indicating a willingness, until canceled, to buy or sell a given number of shares at a stated price—in order to buy or sell shares at a more favorable price in a separate transaction. Once the price for the separate transaction has been favorably changed, the manipulator is usually able to cancel her quotes before they are accepted and become executed transactions.

These shortfalls in the scholarly literature and in the law are ironic given that some of the most noteworthy

³ Until very recently, even such literature as has existed consisted of legal and economics academics largely talking past each other. Perhaps the most well-known piece in the legal literature, by Daniel Fischel and David Ross, argues that trade-driven manipulation is so difficult to identify that it is not worth regulating. Fischel & Ross, *supra* note 1. This piece ignored the then-developing market microstructure literature that shows that it may not be so difficult, a point also missed by Steve Thel, the strongest critic of the Fischel and Ross piece. Steve Thel, *\$850,000 in Six Minutes—The Mechanics of Securities Manipulation*, 79 CORNELL L. REV. 219 (1994). Similarly, much of the literature on the subject by economists that does employ learning from microstructure economics has been written without a clear notion of what the legal requirements are for a trade to be manipulative. In the last few years, some scholarship has taken a more nuanced view of trade-driven manipulation by incorporating both legal and economic arguments. *See, e.g.*, Albert S. Kyle & S. Viswanathan, *How To Define Illegal Price Manipulation*, 98 AM. ECON. REV. PAPERS & PROC.) 274 (2008); Merritt B. Fox, Lawrence R. Glosten & Gabriel V. Rauterberg, *Stock Market Manipulation and Its Regulation*, 35 YALE J. ON REG. 67 (2018) [hereinafter Fox et al., *Manipulation*]; MERRITT B. FOX, LAWRENCE R. GLOSTEN & GABRIEL V. RAUTERBERG, *THE NEW STOCK MARKET: LAW, ECONOMICS, AND POLICY* 200–40 (2019) [hereinafter FOX ET AL., *THE NEW STOCK MARKET*]; Gina-Gail S. Fletcher, *Legitimate Yet Manipulative: The Conundrum of Open-Market Manipulation*, 68 DUKE L.J. 479 (2018).

manipulation cases brought by the government in recent years—*United States v. Coscia*⁴ and *CFTC v. Nav Sarao Futures Ltd. PLC*⁵ (“*Sarao*”) (involving futures market activity), and *SEC v. Taub*⁶ and *SEC v. Lek Securities Corporation (“Lek”)*⁷ (involving equity market activity)—are based on allegations of quote-driven, not trade-driven behavior. In the *Sarao* case, the Department of Justice charged a single individual with a quote-driven manipulation that was alleged to have “significantly” contributed to 2010’s “Flash Crash,” during which U.S. equity market prices temporarily declined by more than nine percent.⁸ Individual defendants in these cases have sometimes made tens of millions of dollars using quote-based strategies.⁹

The obstacles to assessing the appropriate reach of manipulation law originate with the statutory provisions themselves. The Exchange Act provides remarkably little guidance as to the conduct covered by the statutory provisions. Section 9(a)(2) prohibits effecting “a series of transactions” in a security (1) that “creat[e] actual or apparent active trading” or affect its price, (2) “for the purpose of inducing the purchase or sale of such security by others.”¹⁰

⁴ 866 F.3d 782, 788–89 (7th Cir. 2017).

⁵ No. 15-cv-3398, 2016 WL 8257513, at *4 (N.D. Ill. Nov. 14, 2016).

⁶ Amended Complaint at 7–8, *SEC v. Taub*, No. 2:16-cv-09130 (D.N.J. Apr. 26, 2018), ECF No. 37.

⁷ 276 F. Supp. 3d 49, 54–55 (S.D.N.Y. 2017).

⁸ Nathaniel Popper & Jenny Anderson, *Trader Arrested in Manipulation That Contributed to 2010 ‘Flash Crash’*, N.Y. TIMES (Apr. 21, 2015), <http://www.nytimes.com/2015/04/22/business/dealbook/trader-in-britain-arrested-on-charges-of-manipulation-that-led-to-2010-flash-crash.html> [<http://perma.cc/R73P-L7AL>]; Suzi Ring, *Flash-Crash Trader Sarao Gets Bail in U.S. Extradition Fight*, BLOOMBERG BUS. (Apr. 22, 2015, 11:36 AM), <http://www.bloomberg.com/news/articles/2015-04-22/flash-crash-trader-sarao-gets-bail-in-u-s-extradition-fight> (on file with the Columbia Business Law Review) (reporting that CFTC Enforcement Director Aitan Goelman said that Sarao was “a significant factor in market imbalance . . . [which] was one of the chief conditions that allowed the flash crash to occur”).

⁹ *E.g.*, *Lek Sec. Corp.*, 276 F. Supp.3d at 54 (“layering and cross-market manipulation activity generated profits of more than \$28 million.”).

¹⁰ 15 U.S.C. § 78i(a)(2) (2018).

With regard to its possible application to trade-driven manipulation, the first half of the proscription captures conduct that will be part of nearly *every* trading strategy, no matter how innocuous: Buying or selling a security inherently entails the creation of an actual trade and often affects its price. The force of the prohibition is thus found in the second half of the proscription, the vague clause relating to purpose. With regard to section 9(a)(2)'s possible application to quote-driven manipulation, the first half of the proscription presents the opposite problem: It is unclear that the first half applies to *any* use of quotes. Placing into the market an offer to sell, or an offer to buy, at a given price, is clearly an "action," but with no counterparty involved, it is hard to call it a "transaction." And even if that problem is surmounted, there is still the problem, shared with applying section 9(a)(2) to trade-driven manipulation, of the vague clause relating to purpose that constitutes the second half of the proscription.

Section 10(b) starkly prohibits the use, in violation of a Securities and Exchange Commission (SEC) rule, of "any manipulative or deceptive device" in connection with trading a security.¹¹ The term "manipulative" on its face is capacious enough to potentially capture behavior involving quotes, but the statute fails to define what the reach of the term in fact is, and the only SEC attempt to do so through rulemaking merely refers back to section 9.¹² Moreover, the rule promulgated under section 10(b) that has been used to impose liability for certain kinds of allegedly manipulative behavior, Rule 10b-5, does not even contain the word "manipulation."¹³

Two of us have written earlier on the appropriate application of these statutory provisions to trade-driven

¹¹ *Id.* § 78j(b).

¹² *See* 17 C.F.R. § 240.10b-1 (2021) ("The term manipulative . . . is hereby defined to include any act or omission to act with respect to any security exempted from the operation of section 12(a) . . . pursuant to any section in this part which specifically provides that this section shall be applicable to such security if such act or omission to act would have been unlawful under section 9(a).[.]").

¹³ *See Id.* § 240.10b-5.

manipulation.¹⁴ As we noted there, strikingly little progress has been made in defining these statutory terms in the nearly nine decades since the Exchange Act's passage.¹⁵ Many commentators do not consider manipulation to be a sufficiently meaningful concept as to justify a prohibition on any sort of behavior.¹⁶ Other jurists, legal scholars, and economists consider manipulation to be a useful concept but have struggled to define the term and determine its harms. Overly broad or circular definitions are often invoked, occasionally caveated by "I know it when I see it" platitudes.¹⁷

¹⁴ See Fox et al., *Manipulation*, *supra* note 2.

¹⁵ *Id.* at 70.

¹⁶ See, e.g., Fischel & Ross, *supra* note 1, at 506–07 (“[N]o satisfactory definition of [manipulation] exists. . . . the concept of manipulation should be abandoned[.]”); Robert C. Lower, *Disruptions of the Futures Market: A Comment on Dealing with Market Manipulation*, 8 YALE J. ON REG. 391, 392 (1991) (“Manipulation is difficult to define [D]rawing a line between healthy economic behavior and that which is offensive has proved to be too subjective and imprecise to produce an effective regulatory tool.”). The Supreme Court has even on occasion apparently done away with any distinction between a “manipulative” device and a “deceptive” one by determining that any violation of section 10(b) must involve a misrepresentation. See *Schreiber v. Burlington N., Inc.*, 472 U.S. 1, 7–8 (1985) (“Congress used the phrase ‘manipulative or deceptive’ in § 10(b) as well, and we have interpreted ‘manipulative’ in that context to require misrepresentation.” (citing *Santa Fe Indus., Inc. v. Green*, 430 U.S. 462, 476–77 (1977); *Piper v. Chris-Craft Indus., Inc.*, 430 U.S. 1, 43 (1977); *Ernst & Ernst Hochfelder*, 425 U.S. 185, 199 (1976))); see also Steve Thel, *Regulation of Manipulation Under Section 10(b): Security Prices and the Text of the Securities Exchange Act of 1934*, 1988 COLUM. BUS. L. REV. 359, 378–79 (1988) (describing the difficulties of defining manipulation under federal securities law).

¹⁷ See, e.g., THOMAS LEE HAZEN, *THE LAW OF SECURITIES REGULATION* 471 (6th ed. 2009) (“The purpose of the various statutes and rules prohibiting market manipulation is to prevent activities that rig the market and to thereby facilitate operation of the ‘natural law’ of supply and demand. . . . [M]anipulation consists of any intentional interference with supply and demand.”). Another articulation characterizes the core of manipulation “as *exercising unsupported price pressure* because this creates societal costs.” Matthijs Nelemans, *Redefining Trade-Based Market Manipulation*, 42 VAL. U. L. REV. 1169, 1176 (2008). In these formulations, the normative criticism of the relevant conduct is doing all the work in determining the precise sort of behavior to be prohibited, yet no guidance is

We noted that for trade-driven manipulation, the result has been a legal framework that lacks precision, cogency, and consistent application. This has resulted in unpredictable and varying outcomes for cases with comparable facts, raising basic questions of fairness.¹⁸ Moreover, the poorly articulated normative basis for these rulings results in enforcement that is both under-inclusive and over-inclusive in ways that do a poor job of discouraging socially harmful transactions and enabling socially beneficial ones.¹⁹ The law and commentary on quote-driven manipulation have these same problems in spades.

In seeking to find a way out of this quagmire, this Article employs a similar approach to that in our earlier work. We start with some basic constraints on a theory of quote

supplied as to what actually violates the norm. Alternatively, the formulation can be too narrow. For example, two well-known microstructure economists propose that a practice is manipulative only if it lowers both price accuracy and liquidity. Kyle & Viswanathan, *supra* note 2, at 274. This prohibition neglects strategies that increase one and reduce the other, and the negative social impact of the market characteristic that is lowered outweighs the positive impact from the one that is increased. Attempts to define manipulation in related areas, such as commodities regulation, reveal some of the same struggles. *See, e.g., In re Henner*, 30 Agric. Dec. 1151 (U.S.D.A. 1971) (“Manipulation’ is a vague term used in a wide and inclusive manner, possessing varying shades of meaning, and almost always conveying the idea of blame-worthiness deserving of censure.” (quoting J. G. SMITH, ORGANIZED PRODUCE MARKETS 109 (1922))); 2 TIMOTHY J. SNIDER, REGULATION OF THE COMMODITIES FUTURES AND OPTIONS MARKETS § 12.01, at 12-5 (2d ed. 1995) (referring to the law of manipulation as “a murky miasma of questionable analysis and unclear effect”); *see also* Jonathan R. Macey & Maureen O’Hara, *From Markets to Venues: Securities Regulation in an Evolving World*, 58 STAN. L. REV. 563, 588–90 (2005) (noting the negative effects of manipulation on liquidity); Edward T. McDermott, *Defining Manipulation in Commodity Futures Trading: The Futures “Squeeze,”* 74 NW. U. L. REV. 202, 205 (1979) (referring to manipulation law as “an embarrassment—confusing, contradictory, complex, and unsophisticated”); Yesha Yadav, *The Failure of Liability in Modern Markets*, 102 VA. L. REV. 1031, 1053–55, 1089 (2016).

¹⁸ Fox et al., *Manipulation*, *supra* note 2. FOX ET AL., THE NEW STOCK MARKET, *supra* note 2, at 201.

¹⁹ Fox et al., *Manipulation*, *supra* note 2. FOX ET AL., THE NEW STOCK MARKET, *supra* note 2, at 201.

manipulation and suggest that for a quote driven strategy to be considered manipulation prohibited by the Exchange Act, four essential queries must be answered in the affirmative. First, is the strategy, exclusively as a conceptual matter, distinguishable from other, plainly acceptable quote-driven strategies, and does the strategy cause social harm? Second, does the strategy plausibly fit under the general dictionary meaning of the term “manipulation”? Third, are there circumstances under which the strategy can yield positive expected profits, and do they occur often enough to raise concern? Fourth, are there practical methods for prohibiting the strategy whereby the social gains from its reduction or elimination exceed the social costs of doing so, including deterring socially beneficial activity that might be erroneously classified as instances of the practice?²⁰ This four-question approach starts with some basic rules of statutory interpretation to identify the outer borders of the plausible reach of the prohibitions of quote-driven manipulation under sections 9 and 10(b), and then seeks to determine, on policy grounds, what activities within these outer borders ought actually to be prohibited.

In this Article, we utilize this approach to analyze the most common quote-driven strategy that has been labeled as “manipulative” in at least some commentary and found to be illegal in at least some actions against persons undertaking it. We will refer to this strategy as “at or away quote manipulation” or its more common, though sometimes less precisely defined label, “spoofing.” In advance of describing this strategy, a two-paragraph introduction to the way modern equity markets work and associated vocabulary is in order.

²⁰ A practice or regulation can generate social harm if it lowers economic efficiency in a specific way or systematically leads to unfair outcomes. It can generate a social gain if it improves economic efficiency or reduces unfairness. *See infra* Part III. Thus, the desirability of a regulation that prohibits a specific practice turns on whether the world with the regulation is superior to the world without it, when evaluating on a net basis all the social harms and benefits arising in a comparison between a world with and without the regulation.

Equities trade on a variety of trading venues, nearly all of which are *electronic limit order books*, where a trader can post a *limit order*, which is a firm commitment (until cancelled) to buy or sell up to a specified number of shares at a quoted price.²¹ For a posted sell limit order, this stated limit price is an *offer*. For a posted buy limit order, this stated limit price is a *bid*.²² Bids and offers are often referred to as *quotes*.²³ A computer (the venue's *matching engine*) matches these posted limit orders, referred to as *non-marketable limit orders*, with incoming buy and sell *marketable orders*, which are orders that have terms allowing them to execute at what is then the nationally best available price in the market.²⁴ The best offer is referred to as the NBO; the best bid is referred to as the NBB; and the two together are referred to as the NBBO.²⁵

Today, high-frequency traders (HFTs) post a significant portion of the quotes that are matched in this fashion with marketable orders and result in executed trades.²⁶ An HFT

²¹ FOX ET AL., THE NEW STOCK MARKET, *supra* note 2, at 13 (footnote omitted).

²² *Id.* at 300 n.4.

²³ *See id.* at 13.

²⁴ *Id.*

²⁵ Marketable orders include both “market orders” and “marketable limit orders.” A “market order” is where the person submitting the order commits to trading at whatever is the best available price in the market. The computer will also match the limit orders posted on the venue with “marketable limit orders.” A buy limit order is “marketable” when it has a limit price greater than or equal to the lowest offer in the market, and a sell limit order is “marketable” when it has a limit price less than or equal to the highest bid. It is “non-marketable” if it is at a price equal to or inferior to the best offer or bid in the market. *See id.*; Fox et al., *Manipulation*, *supra* note 2, at 90.

²⁶ *See* Jonathan Brogaard, Terrence Hendershott & Ryan Riordan, *High-Frequency Trading and Price Discovery*, 27 REV. FIN. STUD. 2267 (2014) (from NASDAQ data set, finding that HFTs supply liquidity for forty-two percent of all trades and provide the market quotes forty-two percent of the time); *see also* Allen Carrion, *Very Fast Money: High-Frequency Trading on the NASDAQ*, 16 J. FIN. MKTS. 680, 680–81 (2013) (“[A]n identified group of high-frequency traders (HFTs) participates in 68.3% of the dollar volume in the [paper’s] sample[.]”). *See generally* Albert J. Menkveld, *High Frequency Trading and the New Market Makers*, 16 J. FIN. MKTS. 712, 714–

utilizes high-speed communications to continuously update its information concerning transactions occurring in each stock that it commonly trades, as well as changes in the quotes posted by others on every major trading venue.²⁷ The HFT automatically feeds this information into a computer that uses algorithms to change the prices and quantities of its own quotes posted on each of the various trading venues.²⁸

Against this background, we can define “at-or-away quote manipulation” or what, for our purposes, we will call “spoofing.” This manipulative strategy involves three steps. First, the manipulator engages in an activity intended to result in an actual transaction by submitting either a bid at the current NBB or an offer at the current NBO. Second, as the actual manipulative step, the manipulator submits to an exchange one or more quotes going in the opposite direction, each for a large number of shares at a price equal to, or less favorable than the preexisting best quote in the market. So, if these quotes are offers, the price of each is equal to or above the preexisting NBO, and if these quotes are bids, the price of each is at or below the preexisting NBB. The motivation for this second step is to influence the quoting and transacting behavior of other market participants in order to allow the manipulator’s first step to result in an actual purchase or sale at a more favorable price than was otherwise likely to occur. Third, the manipulator cancels their quotes (assuming they have not already been executed against), either just before or just after the actual transaction. There are other types of quote manipulation besides spoofing,²⁹ but we will save an analysis of them for future work.

15 (2013) (discussing high frequency traders’ role as market makers in today’s markets).

²⁷ FOX ET AL., *THE NEW STOCK MARKET*, *supra* note 3, at 95–96.

²⁸ *Id.* at 95 (identifying characteristics of HFTs).

²⁹ We have identified three other kinds of quote manipulation, each differing from spoofing only with regard to the manipulative step, i.e., the method by which others are induced to change their quotes or engage in transactions to the advantage of the manipulator in terms of her second step. “Inside-the-spread quote manipulation” involves, as its manipulative step, submitting one or more quotes at prices within the spread between the then preexisting NBO and NBB. “Opening quote manipulation” involves, as

Each of spoofing's three steps—submitting the large quotes, the actual purchase or sale of shares, and cancelling of the large quotes—is, by itself, a perfectly acceptable form of behavior of a kind that is at the core of any efficiently operating secondary market for securities. What the critical commentators and case opinions find problematic about the strategy is the three steps being undertaken together, combined with the intent to have the quotes favorably influence the price at which the actual transaction occurs. But what is the social harm, if any, when the manipulator succeeds? Often missing in these accounts by commentators and jurists is a perspicuous determination of precisely who is hurt and who is helped if the practice is left unregulated, and how this would change if the practice were instead banned by law. Our framework permits a comparison of these two worlds in terms of economic efficiency and the fairness of the resulting wealth positions of the various market participants. We then derive an approach that provides regulators the tools to deter actually socially undesirable quote-driven activity without unnecessarily deterring socially beneficial quoting that superficially appears to be undesirable. Although objections to certain quoting practices are commonly framed in terms of their unfairness, we argue that such practices are often undesirable mostly on straightforward efficiency grounds.

The normative and analytical building blocks in our framework derive from key results in microstructure and financial economics. Normatively, we posit that the primary social functions of trading markets pertain to directing the efficient allocation of capital across firms, and between households and enterprises over time, and to providing

its manipulative step, submitting one or more quotes as part of the auction process that constitutes an exchange's daily opening. "Auto-quote manipulation" involves, as its manipulative step, submitting a bid or offer on an exchange that is inside the spread between the preexisting NBO and NBB, thereby, improving, respectively the NBB or the NBO, after which the quote-maker sends a marketable order to a broker that will predictably send it on to an internalizer whose pricing is based on this favorably altered NBB or NBO.

signals to facilitate various mechanisms of corporate governance. Price accuracy of shares and liquidity of the market they trade in act as useful proxies for these broad social functions.³⁰ Analytically, we develop an informal model of the way in which the secondary equity market typically behaves.

The remainder of this *Article* proceeds as follows: Part II provides a more detailed description of spoofing. Part III establishes our normative framework for evaluating whether a potentially manipulative quoting strategy is genuinely socially undesirable and whether the social benefits of prohibiting the strategy outweigh the costs. There we identify the ways in which spoofing and its regulation can affect the efficiency with which the economy functions. We also explain how we assess the fairness of a given practice. Part IV briefly describes the basic institutional and economic features of the stock market to provide the tools for understanding complex quoting and trading strategies. For those familiar with our recent work on various aspects of regulating stock markets, Parts III and IV will be unnecessary.³¹ Part V assesses the efficiency and fairness implications of spoofing. Parts VI and VII deploy the analysis that precedes them to illuminate and evaluate the existing statutory framework and case law relating to spoofing. We then conclude.

³⁰ See *infra* Section III.C. For a more in-depth discussion on how price accuracy and liquidity act as such proxies, see FOX ET AL., *THE NEW STOCK MARKET*, *supra* note 2, at 33–47.

³¹ Portions of these Parts draw significantly from more detailed treatments in our prior work. See Merritt B. Fox, Lawrence R. Glosten & Gabriel V. Rauterberg, *The New Stock Market: Sense and Nonsense*, 65 DUKE L.J. 191, 217–26 (2015) [hereinafter Fox et al., *Sense and Nonsense*]; see also Merritt B. Fox, Lawrence R. Glosten & Gabriel V. Rauterberg, *Informed Trading and Its Regulation*, 43 J. Corp. L. 817 (2018) [hereinafter Fox et al., *Informed Trading*]; Fox et al., *Manipulation*, *supra* note 2.

II. OVERVIEW

A. Understanding Spoofing

Spoofing, as noted above, involves submitting to an exchange one or more quotes for a large number of shares at prices equal to, or less favorable than, the preexisting best quote in the market. It depends on the following empirically verified observations. Upon the arrival of an offer for a large number of shares at a price equal to, or higher than, the preexisting NBO, market participants, absent a corresponding increase in bids at or below the NBB, tend to react in the same fashion as if bad news had arrived about the issuer.³² Similarly, upon the arrival of a bid for a large number of shares at a price equal to, or lower than, the NBB, market participants, absent a corresponding increase in offers at or above the NBO, react in the same fashion as if good news arrived about the issuer.³³

The computer-based algorithmic trading programs of HFTs appear to reflect this observation. As noted above, HFTs are a major source of liquidity in the modern stock market, posting a significant portion of the bid and offer quotes that result in trades.³⁴ These quotes constitute the prices at which other traders can transact. HFTs revise their quotes at rapid speeds based on information that they receive concerning purchases and sales of shares that are occurring and changes in quotes.³⁵ HFTs can see and react very quickly when such an offer or bid arrives and they can use this speed to their advantage.³⁶ In response to a new offer for a large number of shares at or above the NBO, HFTs will cancel their bids. And because they may well also wish to lower their offers to a level at or below the pre-existing NBB, they are also likely to wish to clear the market of remaining other bids, and the only way

³² See *infra* Section V.A.

³³ See *infra* Section V.A.

³⁴ See note 26 and accompanying text.

³⁵ See FOX ET AL., THE New Stock Market, *supra* note 3, at 95.

³⁶ See *id.*

of doing this is to send in marketable sell orders to execute against those bids. Because an HFT doing this believes that the appropriate new offer price is at or below the pre-existing NBB, sending in these bid-clearing sell orders would appear costless to it since it is selling at a price at or above what it now thinks is the right price at which to buy shares.³⁷

Spoofing is best understood through an example involving a manipulator named Atlee. Immediately prior to Atlee's first move, the NBO for ABC shares is \$10.12 and the NBB \$10.10, each for 1,500 shares. All of these existing quotes were submitted by liquidity supplying HFTs. In the first stage of the manipulation, Atlee starts by placing ten 100 share non-marketable buy orders at \$10.10. He immediately follows this by placing a 5,000 share non-marketable sell limit order at \$10.12, constituting an addition of 5000 shares offered at this price. This large order on the offer side induces the HFT liquidity suppliers to cancel all their \$10.10 bids, totaling 1500 shares. That leaves just Atlee's bids for a total of 1,000 shares at \$10.10. The HFTs then submit sell limit orders at \$10.10 for 1,000 shares, reflecting their belief that the price of ABC shares is going to fall and that they will wish to quote offers at \$10.10 or below. These execute against Atlee's \$10.10 bids for a total of 1,000 shares. Atlee immediately cancels his 5,000 share \$10.12 offer, no part of which has been executed against.³⁸ So at this point, Atlee has bought 1,000 shares at \$10.10 and has no bids or offers outstanding.

Now Atlee enters the second stage of this manipulation, reversing the strategy used in the first stage. He submits ten 100 share non-marketable sell limit orders at \$10.12 and a 5,000 share non-marketable buy limit order at \$10.10, constituting an additional 5000 shares bid for at this price.

³⁷ Even if the revised offer will be above the current NBB, \$10.10, the HFT's expectation is that the sniping of shares at the existing bid may be bought back profitably at what it expects to be a new NBB below \$10.10.

³⁸ Even if some market participants, slower to pick up on Atlee's new offers or their apparent significance, still put in marketable buy orders that execute at \$10.12, any quotes not yet cancelled by the HFT liquidity suppliers will be first in line to be hit, likely leaving Atlee's quote totally (as assumed here), or at least mostly, unexecuted against.

Again, the HFTs respond by cancelling their offers at whatever price they are now set and submitting marketable buy orders at \$10.12 for 1000 shares, which execute against Atlee's ten 100 share offers at \$10.12. Atlee then cancels his 5,000-share bid at \$10.10, none of which has been executed against.

Atlee is now flat, having first bought 1000 shares for \$10.10 and then sold 1000 shares at \$10.12, collecting \$20.00 all in a matter of milliseconds. He also likely collected rebates of about \$4.00 for the roundtrip transaction (\$0.20 per hundred shares times 2000/100).

Although \$24 might not seem like much, the whole process is automated and can be repeated in milliseconds for this security and many others and on a repeated basis over time. That this can work in ways that generate tens of millions of dollars is evidenced by the cases that we will discuss in Parts VI and VII. Its profit potential is also demonstrated by empirical work that shows that large relative size at the offer does predict a subsequent decline in the NBO and NBB and large relative size at the bid does predict an increase in each.³⁹

B. The Role of Purpose

In court opinions and legal commentary pertaining to section 9(a)(2), a considerable amount turns on the "purpose" of the transactions involved. Likewise, the concept of a "manipulative . . . device" under section 10(b) signifies some form of scienter, a legal concept that refers to intent. The

³⁹ This was first pointed out in Huang and Stoll, which shows that $\log(\text{ask size}/\text{bid size})$ is negatively related to short term (five-minute) log price changes. Roger Huang & Hans Stoll, *Market Microstructure and Stock Return Predictions*, 7 REV OF FIN. STUD. 179, 210 (1994). This qualitative relation is confirmed in recent papers. Charles Cao, Oliver Hansch & Xiaoxin Wang, *The Information Content of an Open Limit-Order Book*, 29 J. FUTURE MKTS. 16, 16 (2009); Nikolaus Hautsch & Ruihong Huang, *The Market Impact of a Limit Order*, 36 J. ECON. DYNAMICS & CONTROL 501, 501 (2012); see also Lawrence E. Harris & Venkatesh Panchapagesan, *The Information Content of The Limit Order Book: Evidence From NYSE Specialist Trading Decisions*, 8 J. FIN. MKTS. 25 (2005); Charles Cao, Oliver Hansch & Xiaoxin Wang, *Order Placement Strategies in a Pure Limit Order Book Market*, 31 J. FIN. RSCH. 113 (2008).

intent of a spoofer such as Atlee, in his quoting activity on each side of the book, is to influence the quoting and trading behavior of others so that his actual purchase or sale can occur at a favorable price. Determining the purpose for which a given quote was submitted raises, of course, notoriously complicated questions. Most critically, an individual's purpose in submitting a quote is inherently subjective. Thus, practically speaking, two analytic questions are inseparable: what establishes an improper purpose, and what establishes adequate evidence of that improper purpose.

Before we can determine what evidence would be sufficient to constitute an improper purpose for a quote, however, it is crucial to have a cogent conceptual idea of what constitutes an improper purpose. Consider an individual who submitted a quote and not long after engages in an actual transaction going in the opposite direction, cancelling the quote at about the same time, but the reason is because she received new information concerning either the prospects of the issuer or concerning other quotes or trades relating to the issuer's shares. Or consider an individual who engages in the actual transaction going the other way to improve her risk/return ratio in response to some change involving other securities in her portfolio that occurs after making the quote. We presumably would not wish to prohibit such quoting even though it may inevitably have had a favorable influence on the price at which the actual transaction occurs. The individual with whom we would potentially be concerned is instead the individual who engages in the quoting behavior in anticipation of an actual transaction going the other way and solely for the purpose of executing this actual transaction at a more favorable price. As we will explore further in Part V, quoting behavior of this sort is socially undesirable.

This concept of what is socially undesirable quote-driven manipulation is close to that adopted by Lawrence Harris for what he considers socially undesirable trade-driven manipulation by persons he calls "bluffers":

The distinguishing difference between bluffers and informed speculators is that the speculators trade on opinions about fundamental values that they base on

fundamental information. Bluffers behave as though they are informed speculators, and they hope that others will believe they are well-informed speculators, but they do not have well-founded opinions about values. Instead, they try to fool other traders into thinking they do.⁴⁰

It is also similar to a concept of trade-driven manipulation recognized by Fischel and Ross:

(1) The trading is intended to move prices in a certain direction; (2) the trader has no belief that the prices would move in this direction but for the trade; and (3) the resulting profit comes solely from the trader's ability to move prices and not from his possession of valuable information.⁴¹

For quote-driven manipulation, the parallel idea would be that the quote does not represent an assessment by the person submitting it that having the quote executed against would, at the time it was made, be to her advantage, and that the quote was submitted solely with the intent of executing an actual transaction going the other way solely to improve the terms on which that transaction occurs.

Fischel and Ross, however, do not think that their concept of trade-driven manipulation could be operationalized because they think it is too difficult to obtain adequate evidence concerning intent and that as a result any attempt would chill too many legitimate, socially useful transactions.⁴² We have disagreed with their belief in the case of trade-driven manipulation and, as will be developed in this paper, we think it is also possible to develop evidentiary tests suggesting that a given sequence of quoting, transacting, and quote cancelling associated with spoofing was undertaken for an improper purpose. We share, however, their concern about chilling socially useful market activities that are part of similarly

⁴⁰ LARRY HARRIS, *TRADING AND EXCHANGES: MARKET MICROSTRUCTURE FOR PRACTITIONERS* 266 (2003).

⁴¹ Fischel & Ross, *supra* note 1, at 510.

⁴² *See id.* at 519, 522–23.

appearing sequences. Thus, these evidentiary tests need to be designed to avoid such significant chilling.

III. THE NORMATIVE FRAMEWORK

Analyzing the social value of a quoting strategy and whether it should be prohibited as illegal manipulation requires understanding the core functions served by the equity trading market and the role that quoting plays in it.⁴³ It also requires understanding that if a specific kind of quoting occurs and its extent is generally understood, other actors in the system will take its existence into account in determining their own behavior. Thus, the normative question is how the occurrence of a given quoting practice—and any attempts to regulate it—affect the system’s ultimate ability to advance the various social goals that equity trading markets serve and that give rise to the justification for regulation when these markets fall short.

A. Social Goals

Five key social goals motivate most discussion of secondary equity markets⁴⁴ and their regulation:

- (i) promoting the efficient allocation of capital to the most promising investment projects; (ii) furthering the efficient use of the economy’s existing productive capacity; (iii) advancing the efficient allocation of resources between current and future periods; (iv) promoting the efficient allocation of the risks associated with volatility of issuers’ cash flows to risk-

⁴³ Parts III and IV provide a brief overview of the normative framework for assessing whether a given quoting strategy is socially undesirable and the basic institutional and economic features of the stock market. More detailed analysis is found in previous work referenced throughout by Fox, Glosten, and Rauterberg. *See generally*, Fox et al., *Manipulation*, *supra* note 3; Fox et al., *Sense and Nonsense*, *supra* note 31, at 207–61; Fox et al., *Informed Trading*, *supra* note 31.

⁴⁴ Primary markets are those where stocks are purchased from the company issuing those stocks, while traders buy and sell stocks from each other in the secondary market. Stock exchanges are secondary markets. FOX ET AL., *THE NEW STOCK MARKET*, *supra* note 3, at 11.

averse investors with the least disutility; and (v) operating fairly and advancing a sense of fairness throughout.⁴⁵

In addition, any cogent analysis of quote manipulation and its regulation must consider its impact on the real resources that society devotes to trading in, and uses to operate, the stock market.⁴⁶ Enforcement and compliance costs accompanying its regulation, including any socially beneficial transactions that regulation may deter, must also be considered.

B. The Use of Ex Post and Ex Ante Analysis

Analyzing the impact of an ongoing quoting practice on these five core social goals is best understood by beginning with a single instance of the quoting practice and evaluating its ex post effect. From this, we can determine the impact of the quoting activity on participants' wealth positions, which in turn reveals the incentives generated by the occurrence of the practice. Then we can assess, from an ex ante perspective, the impact of the activity as a known ongoing phenomenon taking place over the long run within a competitive environment. This ex ante analysis allows us to evaluate the efficiency and fairness implications of the activity. As is fairly standard in the law and economics literature, we consider efficiency in Kaldor-Hicks terms,⁴⁷ and evaluate fairness by

⁴⁵ Fox et al., *Manipulation*, *supra* note 3, at 80.

⁴⁶ *Id.*

⁴⁷ See generally John R. Hicks, *The Foundations of Welfare Economics*, 49 *ECON. J.* 696 (1939); Nicholas Kaldor, *Welfare Propositions of Economics and Interpersonal Comparisons of Utility*, 49 *ECON. J.* 549 (1939) (together establishing the Kaldor-Hicks conception of efficiency). The Kaldor-Hicks conception of efficiency is still the standard welfare criterion in law-and-economics analyses of corporate and securities law. Cf. John Armour et al. *What is Corporate Law?* in *THE ANATOMY OF CORPORATE LAW: A COMPARATIVE AND FUNCTIONAL APPROACH* 1, 23 n.87 (Reinier Kraakman et al. eds., 3d ed. 2017).

considering a practice's effects on the wealth positions of various participants from an ex ante perspective.⁴⁸

C. Market Characteristics that Impact These Goals

A given quoting strategy may interact with these five social goals in dynamic ways that relate to a stock market's two most critical characteristics: the price accuracy and the liquidity of the stocks trading in it.⁴⁹ The social impact of any kind of quoting activity is best evaluated through a two-step process: first analyzing the impact of the practice on these two market characteristics and then determining the characteristic's effect on the five social goals.

1. Price Accuracy

Price accuracy refers to the accuracy with which the market price of an issuer's shares estimates the issuer's future cash flows.⁵⁰ More accurate stock market prices will generate a more efficient allocation of capital by funneling new capital towards the issuers with the most promising real investment projects, the first basic social goal.⁵¹ In addition, more

⁴⁸ As developed in our previous work, many of the concerns around fairness are best evaluated within an efficiency framework. Using an ex ante perspective to evaluate fairness means that a practice is not unfair if it does not affect a market participant's *expected* outcomes—if a participant is not worse off on average entering into trades due to the practice. See Fox et al., *Informed Trading*, *supra* note 31, at 841.

⁴⁹ THIERRY FOUCAULT, MARCO PAGANO & AILSA RÖELL, MARKET LIQUIDITY: THEORY, EVIDENCE, AND POLICY 31 (2013) (“The two main roles of a securities market are to provide trading services for investors who wish to alter their portfolios, and to determine prices that can guide the allocation of capital by investors and firms. . . . [A] market is efficient if it enables investors to trade quickly and cheaply (i.e., if it is liquid) and if it incorporates new information quickly and accurately into prices.”).

⁵⁰ See FOX ET AL., NEW STOCK MARKET, *supra* note 3, at 34.

⁵¹ For further detail, see Fox et al., *Informed Trading*, *supra* note 31, at 833–34. See also Merritt B. Fox, *Civil Liability and Mandatory Disclosure*, 109 COLUM. L. REV. 237, 260–64 (2009) [hereinafter Fox, *Civil Liability and Mandatory Disclosure*]; Marcel Kahan, *Securities Laws and the Social Costs of “Inaccurate” Stock Prices*, 41 DUKE L. J. 977, 1005–16 (1992). See generally Qi Chen, Itay Goldstein & Wei Jiang, *Price*

accurate share prices help reveal badly performing managers and sharpen incentives for superior managerial decision-making with respect to the first two basic social goals.⁵² Over time, more accurate share prices are also likely to increase investors' sense of fairness—a part of the fifth basic social goal—because these investors will sustain fewer negative surprises following their purchase or sale.⁵³

2. Liquidity

Liquidity is a multi-dimensional concept that refers to the size of a trade, the price at which the trade occurs, and the time it takes to execute the trade. In general, the larger the size of the trade and the more quickly one wishes to accomplish it, the more inferior (higher for a buyer, lower for a seller) the price will be. However, these tradeoffs will be less severe the more liquid the market is.⁵⁴ Liquidity also interacts with a number of social goals.⁵⁵ Greater liquidity leads to more efficient allocation of social resources over time, the third social goal.⁵⁶ By lowering transaction costs associated

Informativeness and Investment Sensitivity to Stock Price, 20 REV. FIN. STUDS. 619 (2007).

⁵² Fox, *Civil Liability and Mandatory Disclosure*, *supra* note 51, at 258–60. There is plentiful empirical evidence to indicate that accurate price signals do in fact enhance the efficiency of managerial decisions. *See, e.g.*, FOUCAULT ET AL., *supra* note 49, at 361–68 (collecting relevant empirical studies).

⁵³ When a negative surprise occurs, it leads to grievance even though a positive surprise was equally probable *ex ante*. *See, e.g.*, DONALD C. LANGEVOORT, *SELLING HOPE, SELLING RISK: CORPORATIONS, WALL STREET, AND THE DILEMMAS OF INVESTOR PROTECTION* 11 (2016).

⁵⁴ For a small retail trade, the “bid-ask spread” is a useful measure of liquidity because the trader can buy or sell instantly at those respective prices and will basically be paying half the spread to do so. For larger orders, the volume of shares available at prices not too inferior to the best bid or offer (the “depth of the book”) is also relevant. *See* Fox et al., *Informed Trading*, *supra* note 31.

⁵⁵ For further detail, see Fox et al., *Informed Trading*, *supra* note 31, at 834–35.

⁵⁶ *Id.* The more liquid that investors believe an issuer's shares will be in the future, the higher the price at which the issuer can sell its shares (the

with the purchase and sale of securities, more liquidity also fosters more efficient allocation of risk, the fourth basic social goal.⁵⁷ Increased liquidity also increases share price accuracy by reducing the transaction costs associated with fundamental informed trading and spurring such activity, with the associated benefits discussed above of increasing efficient allocation of capital and use of existing productive capacity—the first two social goals.⁵⁸

IV. THE WORKINGS OF THE EQUITY MARKET

Assessing the impact of any particular quoting strategy on price accuracy and liquidity requires a basic understanding of how the equity market functions. This Part therefore supplies a brief description that will provide a baseline understanding of how the market would work in the absence of trade-based or quote-based manipulation, which will in turn develop the tools to understand the discussion in Part V as to the impact of spoofing if it is present in the market.

A. Market Participants and Their Reasons for Trading

Traders in the market can be divided into several categories: informed traders, uninformed traders, and price-sensitive fundamental value traders, among others.⁵⁹ Professional suppliers of liquidity are also among the buyers and sellers in the market. As will be developed in Part V, a trader engaging in spoofing has a special kind of private information: the knowledge that the quote she has submitted into the market does not represent an assessment by her that it would be advantageous for her to have her quote executed against. This information in some ways makes her similar to an informed trader when she engages in her actual purchase

more valuable those shares are), all else equal, which lowers the issuer's cost of capital.

⁵⁷ *Id.*

⁵⁸ See Fox et al., *Manipulation*, *supra* note 3, at 53.

⁵⁹ While dividing traders into informed and uninformed is a basic tool of microstructure economics, our taxonomy is much indebted to Larry Harris's work. See HARRIS, *TRADING & EXCHANGES*, *supra* note 40, at 194.

or sale. The baseline depiction of the market that follows, however, assumes that no traders are carrying out any type of quote or trade-based manipulation.

1. Informed Traders

Informed traders transact based on information that provides them with a more accurate assessment of the stock's value than the assessment implied by the stock's current market price.⁶⁰ This information can take several forms. Fundamental-value information estimates an issuer's future cash flows discounted to present value and is generated by gathering pieces of publicly available information about the world and analyzing that information, leading to a superior appraisal of those cash flows.⁶¹ Announcement information appears in an announcement by an issuer or other institution with clear implications for the issuer's future cash flows, and is only profitable during the short period of time between the announcement and when the information is fully reflected in the price.⁶² Issuer inside information is non-public information held within an issuer that is not yet reflected in price but is relevant to its future cash flows.⁶³ Non-issuer inside information is non-public information relevant to predicting an issuer's future cash flows that is not yet reflected in price and held within an institution other than an issuer.⁶⁴

Two of us have concluded elsewhere that informed trading makes share prices on average more accurate, but reduces liquidity.⁶⁵ Thus it is necessary to net out the tradeoff between the positive social impact resulting from increased share price accuracy and the negative social impact resulting from lowered liquidity. We have also concluded elsewhere that

⁶⁰ See *id.*; Fox et al, Informed Trading

⁶¹ *Id.*

⁶² Fox et al., *Informed Trading*, *supra* note 31, at 846.

⁶³ *Id.* at 847.

⁶⁴ *Id.* at 858.

⁶⁵ See Fox et al., *Manipulation*, *supra* note 2, at 87; see also *infra* Section IV.C.

fundamental value informed trading is socially desirable, while trading on the basis of announcement information, issuer inside information and non-issuer inside information (unless permitted by the non-issuer institution that developed the information) are all socially undesirable.⁶⁶

2. Uninformed Traders

Uninformed traders buy and sell shares without holding information that provides a more accurate estimate of the stock's value than the assessment that current market prices imply.⁶⁷ An uninformed trade can be motivated by various reasons, including deferring consumption until a later period, rebalancing portfolios, or even gambling.⁶⁸ These transactions are not motivated by information yet to be reflected in the share price at the time of the transaction.⁶⁹

3. Price Sensitive Fundamental Value Traders

Each price-sensitive fundamental value trader has her own reservation price for buying and selling a given stock. That reservation price is a product of her own best estimate of the issuer's future cash flows based on her specific analysis of already publicly available information, how much exposure she already has to the issuer's shares, and a discount to reflect the possibility that what appears to be an attractive purchase or sale price might be the result of informed trading.⁷⁰ Often these fundamental value traders are traders who, though not in the business of supplying liquidity like professional liquidity suppliers, have submitted non-marketable limit orders.⁷¹ Thus, they are showing that they are interested in

⁶⁶ See Fox et al., *Informed Trading*, *supra* note 31, at 834–35.

⁶⁷ *Id.* at 827; HARRIS, TRADING & EXCHANGES, *supra* note 40, at 194.

⁶⁸ See Fox et al., *Informed Trading*, *supra* note 31, at 827; HARRIS, TRADING & EXCHANGES, *supra* note 40, at 194–95.

⁶⁹ See Fox et al., *Informed Trading*, *supra* note 31, at 827.

⁷⁰ See MERRITT B. FOX, FINANCE AND INDUSTRIAL PERFORMANCE: THEORY, PRACTICE AND POLICY 34–43, 55–57 (1987).

⁷¹ FOX ET AL., THE NEW STOCK MARKET, *supra* note 3, at 64.

buying or selling shares of an issuer, but only if they can do so at a more favorable price than the current NBO or NBB.

4. Professional Liquidity Suppliers

Professional liquidity suppliers both frequently purchase and sell an issuer's shares, generating a business from being willing to buy and sell these shares up to stated amounts at quoted prices.⁷² Today, this is typically a proprietary HFT. An HFT uses high-speed communications to continuously update its information about others' transactions and quotes occurring in each stock that it frequently trades and revises its own quotes accordingly, rather than relying on information about the issuer itself to set these quotes.⁷³

B. Trading Venues and Orders

Any stock is potentially traded in each of several competing venues. As previewed in Part I, almost all these venues are *electronic limit order books*, where a liquidity supplier or a trader can post, as a *limit order*, its firm commitment to buy or sell up to a specified number of shares at a quoted price.⁷⁴ This limit order remains posted on an exchange until it is either executed against or canceled.⁷⁵ The price of the lowest-priced sell limit order or orders posted on any exchange in the country is the national best offer (NBO).⁷⁶ The price of the highest-priced buy order or orders posted on any exchange in the country is the national best bid (NBB).⁷⁷ A computer (the

⁷² See Fox et al., *Informed Trading*, *supra* note 31, at 827–28.

⁷³ The professional liquidity supplier is not “informed” in the sense used here. Fox et al., *Informed Trading*, *supra* note 31, at 828. Because of its unique intermediary market making role, in contrast to all other buyers and sellers of securities in the market, we will not refer to it as a “trader.” *Id.*

⁷⁴ Fox et al., *Informed Trading*, *supra* note 31, at 828; FOX ET AL., THE NEW STOCK MARKET, *supra* note 3, at 13.

⁷⁵ Fox et al., *Informed Trading*, *supra* note 31, at 828; FOX ET AL., THE NEW STOCK MARKET, *supra* note 3, at 13.

⁷⁶ Fox et al., *Informed Trading*, *supra* note 31, at 828.

⁷⁷ *Id.*

venue's *matching engine*) matches posted limit orders with incoming buy and sell *marketable orders*.⁷⁸ A marketable order can be a market order or a marketable limit order.⁷⁹ A *market order* is an order from a trader willing to trade immediately and unconditionally at the best available price in the market.⁸⁰ A *marketable limit order*, if a buy order, has a limit price at or above the NBO, and so, on its terms, can execute immediately against a posted limit order with the NBO. For the same reasons, a sell limit order is marketable if its limit price is at or below the NBB.⁸¹ The limit orders posted on exchanges and which constitute the available quotes in the market are referred to as *non-marketable limit orders*.⁸² These are posted since they do not execute immediately upon submission. This is because, if they are sell limit orders, they are above the NBB, and if they are buy limit orders, they are below the NBO.⁸³ The law requires as a general matter that a venue not allow a marketable order to execute on it if that venue's own best offer is above the NBO or its own best bid is below the NBB.⁸⁴ Instead, the venue will usually send the order to an exchange posting orders at the NBO or NBB.⁸⁵

HFTs, acting as professional liquidity suppliers, post a significant portion of the non-marketable limit orders that

⁷⁸ FOX ET AL., *THE NEW STOCK MARKET*, *supra* note 3, at 13.

⁷⁹ *Id.* at 21.

⁸⁰ *Id.*

⁸¹ *Id.*

⁸² *Id.* at 22.

⁸³ *Id.* at 21–22.

⁸⁴ See Order Protection Rule, 17 C.F.R. § 242.611(a)(1) (2021).

⁸⁵ See Memorandum from the SEC Div. of Trading and Mkts. to the SEC Mkt. Structure Advisory Comm. 6 (April 30, 2015), <https://www.sec.gov/spotlight/emsac/memo-rule-611-regulation-nms.pdf> [<https://perma.cc/5UUN-3SX2>] (“If a broker-dealer routes an order to a trading venue that cannot execute the order at the best price, the venue cannot simply execute the order at an inferior price. It can either cancel the order back to the broker-dealer or route the order to another venue that will execute the order at the best price or better.”).

constitute the quotes in the market.⁸⁶ Still, any trader can also submit a non-marketable limit order, which also becomes a quote.

C. The Economics of Liquidity Provision

A liquidity supplier faces a classic adverse selection situation⁸⁷ and will, on average, lose money when it buys at the bid from informed sellers or sells at the offer to informed buyers.⁸⁸ This is because the informed trader has information suggesting that there are expected profits from entering into a transaction at the liquidity supplier's price.⁸⁹ Trading is a zero-sum game, so if the informed trader has expected profits from the trade, the liquidity supplier will have expected losses. However, the liquidity provider can still break even, as long as enough transactions occur with uninformed traders.⁹⁰ These transactions are on average profitable.⁹¹ This is because the offer—the price at which the liquidity supplier sells shares—is higher than the bid—the price at which they are bought, and the uninformed trader possesses no information suggesting expected profits from buying or selling the shares at the offer and bid, respectively.⁹² For the liquidity supplier to break even, there simply needs to be a wide enough spread between the bid and offer such that the losses from

⁸⁶ See Brogaard, Hendershott & Riordan, *supra* note 26, at 2273–74 (finding that HFTs provide liquidity for forty-two percent of all trades and supply the market quotes forty-two percent of the time).

⁸⁷ See generally George A. Akerlof, *The Market for "Lemons": Quality Uncertainty and the Market Mechanism*, 84 Q.J. ECON. 488, 488–93 (1970) (the seminal article examining how informational asymmetries can spur declines in the quality of market goods until the market unravels and only low quality "lemons" remain). For a parallel application in the securities markets, see Stewart C. Myers & Nicholas S. Majluf, *Corporate Financing and Investment Decisions When Firms Have Information that Investors Do Not Have*, 13 J. FIN. ECON. 187, 187 (1984).

⁸⁸ FOX ET AL., *THE NEW STOCK MARKET* *supra* note 3, at 65–66.

⁸⁹ *Id.*

⁹⁰ Fox et al., *Informed Trading*, *supra* note 31, at 829.

⁹¹ *Id.*

⁹² *See id.*

transacting against informed traders are offset by the profits from transacting against uninformed traders.⁹³

If a liquidity supplier rationally anticipates a higher incidence of informed trading, it will raise its offers and lower its bids to survive in a competitive market.⁹⁴ Moreover, the actions of rational liquidity providers thus act as a kind of “invisible hand”: as a result of their work to avoid losses to informed traders, liquidity providers, in reaction to changes in quotes and new marketable orders, are constantly revising their quotes so that, over time, those quotes fully reflect the information in informed trades.⁹⁵ Empirical evidence supports these theoretical results.⁹⁶

This Part provided a brief baseline of how securities markets would work if there were no spoofing. Against this baseline, Part V will assess the impact if spoofing does occur in the market. Until now, we have assumed that, for explanatory simplicity, all the non-marketable limit orders posted on trading venues are submitted by HFT professional liquidity suppliers and all traders use market orders. In fact, many traders also use non-marketable limit orders. In the absence of quote manipulators, the introduction of this complication does not by itself change the conclusions in any important way. What Part V explores is what happens when

⁹³ For a more in-depth model of how the bid-ask spread is set, see FOX ET AL., *THE NEW STOCK MARKET* *supra* note 3, at 66–69.

⁹⁴ FOX ET AL., *Id.* at 68–69. Lawrence R. Glosten & Paul R. Milgrom, *Bid, Ask and Transaction Prices in a Specialist Market with Heterogeneously Informed Traders*, 14 J. FIN. ECON. 71 (1985) (setting forth a model of trading behavior under information asymmetries in securities markets).

⁹⁵ See Fox et al., *Informed Trading*, *supra* note 31, at 831.

⁹⁶ See Kalok Chan, Y. Peter Chung & Herb Johnson, *The Intraday Behavior of Bid-Ask Spreads for NYSE Stocks and CBOE Options*, 30 J. FIN. & QUANT. ANAL. 329, 332–43, (1995) (indicating that adverse selection provides an important determinant of the intraday behavior of bid-ask spreads); Lawrence R. Glosten & Lawrence E. Harris, *Estimating the Components of the Bid-Ask Spread*, 21 J. FIN. ECON. 123 (1988) (developing a model in which the bid-ask spread is separated into an adverse selection component and a transitory component due to inventory costs, clearing costs, and other factors).

some of the traders who submit non-marketable limit orders—i.e., submit quotes—are spoofers.

V. SPOOFING

Recall that spoofing involves submitting one or more quotes to an exchange, each quote for a large number of shares at a price equal to, or less favorable than, the pre-existing best quote in the market.⁹⁷ The practice is based on the observation, confirmed by empirical studies, that the arrival of an offer for a large number of shares at a price equal to, or higher than, the pre-existing NBO, is followed by market participants acting in the same manner as if bad news had arrived about the issuer; and the observation that the arrival of a bid for a large number of shares at a price equal to, or lower than, the NBB, is followed by market participants acting in the same manner as if good news arrived about the issuer.⁹⁸

The analysis below suggests that spoofing is a market practice that gives rise to an affirmative answer to each of the four foundational questions posed at the beginning, and hence is an appropriate target of a ban under the Exchange Act. It is socially harmful in a way that makes it distinguishable as a conceptual matter from other trading strategies. It fits under a broad dictionary meaning of the word “manipulation.” The practice can yield positive expected profits. And there are identifiable, objectively observable factors that can serve as a condition for imposing legal sanctions on undesirable quotes while minimizing prosecution of socially desirable quotes.

Our analysis backing up these conclusions, set out below, is built on the Atlee example in Part II. Recall that at the start, the NBO for ABC shares is \$10.12 and the NBB \$10.10, each for 1500 shares. All these quotes were submitted by liquidity supplying HFTs. Atlee places ten 100 share non-marketable buy orders at \$10.10, immediately followed by placing a 5,000 share non-marketable sell limit order at \$10.12. This large order on the offer side induces the HFT

⁹⁷ See *supra* Part II.

⁹⁸ See *supra* note 27 and accompanying text.

liquidity suppliers to cancel all their \$10.10 bids and to submit sell limit orders at \$10.10 for 1000 shares. These moves reflect their belief that the share price will fall and, consequently, their desire to clear out the remaining bids at \$10.10 so that they can submit new offers at that price or lower. The HFTs' marketable sell orders execute against Atlee's total of 1000 share bids at \$10.10 bid. Atlee immediately cancels his 5,000 share \$10.12 offer, all or almost all of which has not been executed against. Atlee then enters into a mirror-image set of actions. In the roundtrip, Atlee collected \$20.00 (buying 1000 shares at \$10.10 and selling them at \$10.12), all in a matter of milliseconds. Atlee has also likely collected rebates of about \$4.00 from the exchanges for sending them 1000 non-marketable buy, and 1000 non-marketable sell, limit orders \$4.00 (\$0.20 per hundred shares times 2000/100). Unless there are other developments in the market during the very brief time of this two-sided manipulation, the bid and offer should return very quickly to \$10.10 and \$10.12, respectively.

Below, we start by assessing the wealth transfer implications of spoofing. That starts with examining the ex post effects of what Atlee did. Making trading profits is a zero-sum game: Atlee made positive trading profits so someone else lost money. After this ex post analysis, we consider, from an ex ante perspective, what the impact of the practice is as a generally known ongoing phenomenon occurring over the longer run within a competitive environment. From this, we can make conclusions about the efficiency implications of the practice in terms of liquidity and share price accuracy, as well as the fairness of its impact on different members of society. Finally, we consider whether there are practical ways of deterring this practice without at the same time chilling a significant amount of socially useful activity, and whether, instead of relying on a legal prohibition, there is a mechanism in the market which generates self-protection that would be better to rely on.

A. Why Does Spoofing Work?

The question of why spoofing works has been explored in some recent market microstructure theory. One possible

approach goes as follows. The equilibrium in a limit order book derived in the standard microstructure models assumes a world with continuous prices.⁹⁹ Real world exchanges, though, have a minimum tick size, typically a penny,¹⁰⁰ and use time priority (first in, first out) to determine which quotes at the same price get executed against first.¹⁰¹ A limit order book with these features will have the offer side of the book as an upward step function approximation of a market with a continuous price range of prices. The bid side of the book will be a downward step function approximation of the same market.

In this world with a penny tick, there would still be a consensus as to the “true” offer price, bid price, and mid-point price, i.e., the ones that would have prevailed if prices had in fact been continuous. No liquidity supplier will be willing to sell at or below this true offer price, or buy at or above this true bid price. As a result, if the true offer price is close to, but below, the NBO, the offer size will be small relative to where it would have been if it were close to, but above, the next tick below the NBO. Conversely, if the true bid price were close to, but below, the next tick above the NBB, the bid size will be large relative to where it would have been if it were close to, but just above, the NBB.

To illustrate, when manipulators such as Atlee are absent, if the NBO and NBB remain unchanged but there is an increase in the number of shares offered at the NBO relative to the number bid at the NBB, this would suggest a drop in the true midpoint price. Consider the following example. At the start, the NBO for ABC shares is \$10.12, with 1500 shares offered, and the NBB is \$10.10, with 1500 shares bid. Assume

⁹⁹ Lawrence R. Glosten, *Is the Electronic Open Limit Order Book Inevitable?*, 49 J. FIN. 1127, 1128 (1994).

¹⁰⁰ Minimum Pricing Increment, 17 C.F.R. § 242.612 (2021)

¹⁰¹ *Explaining Parity/Priority*, N.Y. STOCK. EXCH., <https://www.nyse.com/article/parity-priority-explainer> [<https://perma.cc/UGU7-X8JK>] (last visited Dec. 23, 2021) (“Most securities markets operate on the basis of Price/Time priority. This means that orders are executed based on best price, and if multiple orders are at the same price, an order with an earlier time trades first.”).

that this reflects the true offer price for ABC shares being \$10.115 and the true bid price being \$10.105, with the midpoint being \$10.11 and the implied spread in the continuous market being \$.01. Next, the number of shares offered at \$10.12 increases relative to the number bid at \$10.00. These respective changes in the number of shares offered and bid would imply a downward valuation of ABC shares in the market, because, if such a downward valuation occurred, it would be attractive to more people to sell ABC shares at \$10.12 and attractive to fewer of them to buy them at \$10.10.

This step-function theory cannot be the whole story, however. First, this theory only relates to changes in the “true offer” and “true bid” price within a single tick, whereas the HFT behavior that leads to spoofing yielding expected profits depends on HFTs inferring, from changes in size at the NBO or NBB, changes in valuation greater than just within a single tick.¹⁰² Second, at least two empirical studies suggest that extra size at a tick above the NBO also leads to a subsequent decrease on average in the NBO and NBB, and the reverse for extra size a tick below the NBB.¹⁰³ The step function theory

¹⁰² Hautsch and Huang, based on Euronext Amsterdam data, estimate that a 50% increase in the size at the offer leads on average to a half basis point decrease in the NBB and NBO (and the opposite reaction to a comparable increase at the bid) within about 10 units of event time (i.e. 10 order arrivals). This is half of a tick for a \$100 stock. In contrast, a comparable increase in marketable orders (sell orders at the NBB and buy orders at the NBO) has about a 2.5 basis point effect on the price. Hautsch & Huang, *supra* note 39, at 513.

¹⁰³ Early studies, Huang & Stoll, *supra* note 39, were constrained by the fact that the authors did not have access to necessary data concerning quote away from the NBBO. More recently, data has become available from Euronext and the Australian Stock Exchange. See Hautsch & Huang, *supra* note 39 (Euronext Amsterdam); see also Cao et al., *supra* note 39 (Australian Stock Exchange). Both papers agree with the results of the earlier studies, Huang & Stoll, *supra* note 39, that added size at the NBO leads on average to a subsequent decrease in the NBO and NBB, and added size NBB leads to the opposite result. See Hautsch & Huang, *supra* note 39, at 511; Cao et al., *supra* note 39, at 125, 127. But, more to the point, these two newer papers also agree with each other that, extra size placed one tick above the NBO, or below the NBB has a smaller, but still significant impact on the

has nothing to say about these results. In this connection, cases brought against some alleged manipulators who have reaped substantial gains from their pattern of quoting and trading have, as part of this pattern, substantial additions to quotes above the NBO and below the NBB, not just at the NBO and NBB.¹⁰⁴ This suggests that the alleged quote manipulators believed that market participants infer changes in the value of securities from increases in the size of quotes away from NBO and NBB, not just from increases at the NBO and NBB.¹⁰⁵

We are not aware of any formally worked out microstructure theory that perfectly describes why, in a market with a minimum tick size, added size away from the NBO or NBB has predictive power as to the value of the security in the direction indicated both by the empirical literature and by the profitable actions of spoofers themselves. We can, however, make a few observations that together can help understand what is going on. On the one hand, a trader with negative private information would rather sell for more than for less, which, in isolation, could explain why the trader might post non-marketable limit orders both at and above the NBO, and not just submit marketable orders at the NBB (as well as the mirror image of this for a trader with positive private information). On the other hand, an offer to sell at

NBO and NBB in the same directions, respectively, as added size at the NBO or NBB. See Hautsch & Huang, *supra* note 39, at 511; Cao et al., *supra* note 39, at 136 tbl.8. The papers' respective results for an increase in size two ticks or more from the NBO or NBB are more mixed. Hautsch and Huang show that such additions to size predict a statistically positive, but economically insignificant, change in the NBB and NBO in the same direction as an increase in size at the NBO or NBB or at one tick away of either. See Hautsch & Huang, *supra* note 39, at 513. However, Cao et al. show that in a sample of 100 stocks, 30% or less of the estimated coefficients for two ticks away have the "anticipated" sign (that is an increase in size two ticks above the best offer leading to price decreases and an increase in size two ticks below the best bid leading to price increases). See Cao et al., *supra* note 39, at 136 tbl.8.

¹⁰⁴ See Complaint, SEC v. Lek Sec. Corp., No. 17CV1789(DLC), 2018 WL 417596 (S.D.N.Y. Jan. 16, 2018).

¹⁰⁵ See United States v. Coscia, 177 F. Supp. 3d 1087 (N.D. Ill. 2016); Complaint at 2, SEC v. Milrud, No. 15-cr-00455 (D.N.J. Jan. 13, 2015).

above the NBO may also suggest to the market there is someone out there who values the stock for more than the NBO and so would only sell if she got some higher price. And market participants, in assessing the likelihood as to which of these two kinds of traders put in the quote, will assume that the more the quote is above the NBO, the less likely it is that it was submitted from a negatively informed trader. This is because a negatively informed trader will know that because of competition among traders wishing to sell, the farther a quote is above the NBO, the less likely it will be executed against (the same proposition being true in mirror image fashion for quotes below the NBB by positively informed investors).¹⁰⁶

These observations can be put together to tell the following informal but plausible story, which both explains the empirical studies showing that large size in quotes away from the best (above the NBO or below the NBB) predict a subsequent change in the NBO and NBB and provides a supplementary explanation in addition to the step-function theory for explaining as well the large-order-at-the-best-quote phenomenon exemplified by the Atlee example.¹⁰⁷ We will tell this story in terms of quotes above the NBO, but it applies equally well for quotes below the NBB. In this story, think about a trader who would prefer to sell at the NBB (i.e., use a marketable order) than to keep holding the stock in the longer run, but who would, of course, prefer to dispose of her shares for some higher price. This trader might be informed with negative information, or she might be uninformed and selling for idiosyncratic reasons such as a consumption need or portfolio rebalancing. Suppose further that the trader believes

¹⁰⁶ For a model that does not fully describe what we observe empirically in real world markets with minimum tick sizes, but which incorporate some or all of these observations, see Ronald L. Goettler, Christine A. Parlour & Uday Rajan, *Informed Traders and Limit Order Markets*, 93 J. FIN. ECON. 67 (2009). For a model that in fact suggests behavior contrary to what we observe in the real world, see Michael Brolley & Katya Malinova, *Informed Liquidity Provision in a Limit Order Market*, 52 J. FIN. MKTS. (2021).

¹⁰⁷ We thank Christine Parlour for helping in our efforts to understand this. She, of course, bears no responsibility for the final product.

that there is not much competition to sell, either because she is informed and thinks others will not learn what she knows soon, or she is uninformed and does not believe her idiosyncratic desire to sell is felt at the same time by many others. Such a trader might try the following strategy. First, she places a sell order a tick away from the market. If that order does not execute fairly quickly, she cancels it and replaces it with a non-marketable limit order at the NBO. Finally, if that order does not execute, she cancels it and submits a marketable sell order at the NBB.

If everyone followed this strategy all the time, then one would expect that the informational content of the tick away orders would be roughly the same as at the market orders and marketable orders. However, empirical studies based on Euronext Amsterdam data suggest that the effect of a 50% increase in marketable orders is on average a roughly 2 basis point (bps) subsequent change in the NBO and NBB.¹⁰⁸ The comparable effect for non-marketable orders at the NBO is about .5 bps, the comparable effect at one tick above the NBO is about .2 bps, and the comparable effect at two ticks above the NBO is about zero.¹⁰⁹ We suspect that this pattern is in part the product both of the fact that some sellers are more anxious to sell than our hypothetical seller described above, with one reason being that they are informed traders with information that is particularly negative or not likely to stay private for long. The pattern is in part also probably due to the fact that for some persons who submit quotes a tick or more above the NBO, it is because they value the stock for more than the NBO.

In any event, whether the step function theory and our suggestive story are correct explanations of the market's response to a large order at or away from the NBO, market participants act as though someone has new negative information about the issuer, and this strongly suggests that in fact such orders are signals that this is the case.

¹⁰⁸ Hautsch & Huang, *supra* note 39, at 513.

¹⁰⁹ *Id.*

B. Wealth Transfers: Fairness and Efficiency

Considering the fairness and efficiency effects of spoofing starts with examining the ex post effects of what Atlee did. This is followed by a look at the practice from an ex ante perspective, considering the impact of the practice as a generally known ongoing phenomenon occurring over the long run within a competitive environment. We can then draw conclusions both about the efficiency implications of the practice in terms of liquidity and share price accuracy and the fairness of its impact on different members of society.

1. Assessing the Impact of the Practice from an Ex Post Perspective

The distributive question is—who has benefited from this activity and who has been harmed? Since secondary market trading in pursuit of profits is a zero-sum game,¹¹⁰ gains and losses by different market participants are mirror images of each other and must sum to zero. Atlee made \$20 in trading profits. He purchased 1000 shares for \$10.10 and sold them for \$10.12. The losers were HFTs, that, as a group, lost \$20. They were induced into selling 1000 shares for \$10.10 and buying 1000 shares at \$10.12 when they otherwise would not have. No one else is affected in this simple story.¹¹¹

¹¹⁰ See LARRY HARRIS, *TRADING AND ELECTRONIC MARKETS: WHAT INVESTMENT PROFESSIONALS NEED TO KNOW 2* (2015) (suggesting that “[t]rading is a zero-sum game when gains and losses are measured relative to the market index”).

¹¹¹ In our simple story, no one else is affected. It is, of course, possible, for example, that some marketable sell orders submitted by ordinary traders by chance arrive in the very brief time before the HFTs execute against Atlee’s \$10.10 bid, but that would just dilute the effect of Atlee’s manipulation since he would simply be providing liquidity to these sellers at the price that the non-manipulated market suggested was appropriate. There also could be, in addition to Atlee’s bids at \$10.10, other bids submitted by ordinary traders willing to be patient in hopes of being able to buy at a lower price than the offer. These traders, who move more slowly than HFTs and thus would not cancel their bids, would, in the end, be happy to have their bids executed against, but selling to these ordinary investors just adds to the losses that the HFTs will suffer from the manipulation,

2. Ex Ante Perspective

Now assume—not unrealistically—that all the players have unbiased (though not necessarily accurate) expectations concerning the prevalence of successful spoofing, and that all the players operate within a competitive environment. We want to compare what the long run equilibrium would look like in a world where such a quoting strategy is occurring freely with a world where it is somehow blocked. The object is to see how the availability of the practice affects the wealth positions of the various participants and the implications of these effects in terms of fairness and, through the incentives they create, on efficiency.

a. Spoofers

Spoofers will generate positive trading profits from engaging in the practice. The resources necessary to conduct such a business are a combination of ordinary and specialized inputs. The ordinary inputs are physical, organizational, and financial assets that could equally as usefully be utilized elsewhere in the economy. The specialized inputs are the efforts of persons who have abilities and skills uniquely suitable for predicting and acting on such situations. All of these inputs will be put into this business up to the point where, at the margin, the expected profits from successfully predicting and acting on such situations are equal to the costs of paying for the inputs. This activity occurs in an openly competitive environment; so the suppliers of the ordinary inputs will be paid a market return comparable to what they would earn if the resources they supplied were utilized elsewhere. Thus, whether spoofing occurs freely or not has no effect on their wealth positions. The persons with uniquely useful abilities and skills will be paid greater rents than they

since they would need to clear out these bids as well as those of Atlee in order to be able to submit offers at or below \$10.10. It is also possible that the NBB would decline very, very briefly before Atlee's mirror set of actions but, in that case, so would the offer. So, a few ordinary trader sellers might suffer ex post losses, but a few buyers would enjoy ex post gains of a comparable amount. The mirror set of actions will have the opposite effects.

would otherwise be paid if they had to work in a different business because spoofing was somehow prohibited. Thus, their wealth positions will be enhanced if spoofing is allowed to occur freely.¹¹²

b. Liquidity Suppliers

Viewing the effects of spoofing on liquidity suppliers from an ex-ante perspective requires attention to two different phenomena. One is the trading losses that the suppliers sustain when they sell at a price equal to the pre-existing bid and buy back at one equal to the pre-existing offer. The other is the damage that the manipulation does to the information environment that liquidity suppliers use to protect themselves in their quoting activity against adverse selection by informed traders.

i. Trading Losses

As we have seen from the example, ex post, liquidity suppliers will lose in their transactions with a successful spoofer because the reversing purchases from the manipulators are at higher prices than the initial sales.

Who ultimately bears these costs, however, is an interesting question. For the HFTs, these are not ordinary adverse selection costs that arise from liquidity supply, selling to investors with private positive information and buying from ones with private negative information. This point is best understood by considering an alternative scenario where Atlee would be creating adverse selection costs through his manipulation. Suppose Atlee did not put in his bids totaling 1000 shares at \$10.10, but did put in his large quote at \$10.12. The large quote sent a sufficiently negative signal that it pushed prices down by more than the spread so that the new NBO, say \$10.09, was below the pre-existing NBB of \$10.10. In this scenario, Atlee then buys at the new offer. After

¹¹² This is the same analysis that two of us have previously applied to naked open market manipulation. See Fox et al., *Manipulation*.

canceling the large quote, the bid returns to \$10.10, and Atlee sells the shares for \$10.10 that he bought for \$10.09.

In this alternative scenario, Atlee would, in essence, be an informed trader because he would know that the large quote at the NBO did not represent bad news when predictably other market players would think that it did. From the ex ante perspective, losses of that sort would be passed on by the liquidity suppliers to the other traders in the market. In a simple model, like that set out in Part IV, where the only cost to liquidity supply is adverse selection, to survive in a competitive market, a liquidity supplier must set its bids and offers so that these losses and gains balance out.¹¹³ If its spreads are wider than this, it will not attract orders because they will be undercut by other liquidity suppliers. If they are narrower than this, at least some of its inputs will be receiving less than a market return, and thus the business will not be able to survive in the longer run.

In contrast, in the Atlee scenario that is, in fact, our focus, where he does submit the ten 100 share bids at \$10.10, the HFTs' losses, rather than coming directly from their liquidity supplying activity, arise because the HFTs choose not to wait until marketable sell orders by ordinary investors executed against the bids in the market at \$10.10 submitted by persons whom the HFTs (incorrectly) thought were just ordinary traders (not professional liquidity suppliers) who had submitted non-marketable buy orders at \$10.10 and failed to cancel because they were unaware of Atlee's large order at the pre-existing NBO and its negative implications. The HFTs make this choice to clear the market themselves in these kinds of situations in essence as an opportunity to expand their businesses by quoting during a period of time that they otherwise would not have been because there would still be bids at or above the price at which they wish to quote offers. So, the choice by an HFT to engage in this kind of activity is more like a larger overall cost of business-related to how much quoting they can provide during the year.

¹¹³ See *supra* Section IV.C.

The existence of spoofing is thus more like other real-world costs of being in the liquidity supply business not captured by the simple, pure adverse selection model. These would include what must be paid to personnel, a market return on the capital needed for acquiring real estate and equipment and for engaging in the trading itself, and compensation for the undiversified nature of the portfolio that the business will be holding most of the time. At least over the long run, the spread must be wide enough to cover these costs as well for liquidity suppliers to stay in business and provide liquidity at the level they do, or it must erode what are still positive rents for particular inputs into what is a competitive business. In other words, spoofing is a cost of providing liquidity at this level, which may or may not be passed on through a wider spread.

ii. Detecting Informed Trading

The presence of spoofing in the market has a more indirect effect on liquidity suppliers, however, because it makes the incidence of informed trading harder to detect. Although, as noted above, we are not sure of the exact mechanisms, the very fact that large orders at or away from the best quote predict price changes indicates that such orders are a signal that informed trading is going on. If spoofing is occurring from time to time in the market, this signal gets muddied. When the liquidity supplier sees a large quote at or above the NBO (or at or below the NBB), it cannot be sure whether this is due to informed trading or manipulation.

The worse liquidity suppliers are at detecting the incidence of informed trading, the less able they are to protect themselves against adverse selection losses by changing their quotes in response to what they learn.¹¹⁴ This means that the spread is wider because liquidity suppliers anticipate more in the way of adverse selection losses. In accordance with the simple model in Part IV, this clearly will be a cost that will be passed on to traders in the form of a wider spread.

iii. Ultimate Incidence of the Negative

¹¹⁴ FOX ET AL., THE NEW STOCK MARKET, *supra* note 3, at 65–75.

Effects on Liquidity Suppliers

To the extent, if any, that the trading losses associated with spoofing cannot be passed on to traders in the form of a higher spread, they will have a direct negative effect on persons associated with the business by reducing the rents they receive for their participation.

To the extent that liquidity suppliers can pass on—through a wider spread—the trading costs to them associated with spoofing, they will still have a negative effect on the wealth positions of certain persons associated with the liquidity supply business, but only indirectly. The same goes for the negative effect of the manipulation on liquidity suppliers' ability to detect informed trading and protect themselves in their quoting activity.¹¹⁵ A wider spread increases the cost of trading.¹¹⁶ This means that less trading occurs.¹¹⁷ Less trading means less of both their ordinary and specialized inputs will be pulled into the business.¹¹⁸ Suppliers of the ordinary inputs will earn the same ordinary market return whatever the level of liquidity supply activity.¹¹⁹ For persons with abilities and skills uniquely useful for liquidity supply, however, they will be paid less in rents and so their wealth positions will be negatively affected by the prospect of successful manipulation of this type.¹²⁰

c. Uninformed Traders

In the simple story that we tell in the Atlee example, uninformed investors are not directly involved because the whole manipulation takes so little time. Thus, few if any of their marketable orders would, for example, execute against Atlee's \$10.10 bids and if any did, they would receive the same price as if the manipulation had not occurred. It is possible

¹¹⁵ See *supra* Section V.C.2.b.ii.

¹¹⁶ FOX ET AL., *THE NEW STOCK MARKET*, *supra* note 3, at 54.

¹¹⁷ *Id.*

¹¹⁸ See *id.*

¹¹⁹ *Id.*

¹²⁰ See *supra* Section IV.A.4.

that the NBB would decline briefly before Atlee's mirror set of actions but, in that case, so would the NBO. Therefore, where sellers might lose, buyers would win by a comparable amount. From an ex ante point of view, an uninformed investor is as likely to be a buyer as a seller, hence, on an expected basis the impact to uninformed investors of manipulation is zero. Moreover, the mirror set of actions will have the opposite effects on buyers versus sellers, but again, there is no impact on an expected basis.

The expected cost to uninformed traders from spoofing is instead indirect. It arises from the need, in the cycle of a purchase and sale, to pay any increase in spread because this kind of manipulation is occurring. They will purchase at the offer but only be able to sell at the bid. Calculating the ultimate incidence of this cost on uninformed traders is a bit complicated, however. When an issuer's entrepreneurs and initial investors engage in an initial public offering, the shares they are offering will be discounted to reflect the prospect that the spread must be paid with each subsequent sale and purchase in the secondary market as well as the prospect that any future equity offerings by the issuer over time will be similarly discounted.¹²¹ Thus, the entrepreneurs and early investors receive less than if there were no impact on the spread by this kind of manipulation. This discount continues at the same level for as long as the firm appears to have a long run future. For uninformed investors who buy and sell less frequently than average, this discount makes the purchase a bargain and so they are gainers from spoofing. Those who buy and sell more frequently than average¹²² are hurt by repeatedly paying the spread more than they benefit from the discount, and so they are losers from the practice.

¹²¹ FOX ET AL., THE NEW STOCK MARKET, *supra* note 3, at 44–45, 138.

¹²² See Brad M. Barber & Terrance Odean, *The Behavior of Individual Investors*, in HANDBOOK OF THE ECONOMICS OF FINANCE 1533, 1534 (George M. Constantinides, Milton Harris & Rene M. Stulz eds., 2013) (“Many apparently uninformed investors trade actively, speculatively, and to their detriment.”).

d. Informed Traders

Informed traders of each kind pay the same increased spread due to the presence of spoofing that uninformed traders do. This increase in their cost of doing business has a depressing effect on the level of each of the kinds of informed activity. This decreases the level of resources going into each of these activities, which has a negative impact on the wealth of the suppliers of the specialized inputs.

3. Fairness Considerations

Based on the survey above, we can see that freely occurring spoofing will not affect the wealth position of uninformed traders from an ex ante point of view because it is unlikely that the spoofing will affect the price at which they transact and if it does, they are as likely to benefit as to be hurt. It may add to the riskiness of their trading, but this is a risk that can typically be eliminated by holding a diversified portfolio. They will face an increase in the bid-ask spread, but on average this will be compensated by the lower cost of buying shares that generate a given expected future cash flow.

Any wider bid-ask spread will result in fewer resources being drawn into the businesses of liquidity supply and fundamental-value informed trading, thereby decreasing the wealth positions of their specialized input suppliers.¹²³ A prospective flow of rents is not an entitlement, however. In a market economy, the offer of rents to prompt the suppliers of specialized inputs to come forward is simply the mechanism by which these resources get directed to the activity for which they are most particularly suited.¹²⁴ The effects on the rents being paid in the case of the businesses being considered here do not raise any greater fairness issues than do the rents paid persons with special abilities and skills across the whole market-based part of our economy.

¹²³ See *supra* Section IV.C.1.

¹²⁴ See FOX ET AL., THE NEW STOCK MARKET, *supra* note 3, at 54.

The bottom line is that the more serious normative question concerning spoofing is whether its effect on the allocation of resources enhances or decreases efficiency.

4. Efficiency Considerations

From an efficiency point of view, spoofing has no redeeming virtues. Although it will not directly affect price accuracy in any important way, it consumes resources that could be usefully employed elsewhere in the economy and it has a negative impact on liquidity. This in turn can indirectly hurt price accuracy in ways that are socially harmful.

a. Price Accuracy

As our discussion of the mechanisms of the market shows, in the absence of manipulation, market prices have the remarkable quality of reflecting a large amount of information relevant to predicting an issuer's future cash flows. Spoofing, in its direct effects, is unlikely to move price away from where it otherwise would be. Even if it does, the dislocation will be so brief as to have no real economic efficiency implications. Therefore, interestingly, although most commentators and jurists focus on the price distortion effects of manipulation of all kinds, reduced price accuracy is not an important direct consequence of spoofing.¹²⁵ Recall that accurate prices benefit the economy by helping allocate the economy's scarce capital to the potentially most promising real investment projects.¹²⁶ Accurate prices also improve the utilization of the economy's existing productive capacity by optimizing the signals provided to management about investment decisions and the signals given to boards and shareholders about the quality of management decisions.¹²⁷ This form of manipulation will either have no direct effect on prices or will only directly affect prices for a very brief period of time. Very short run distortions in price of the kind that will typically occur with

¹²⁵ See *infra* Section VI.

¹²⁶ See *supra* Section III.C.1.

¹²⁷ See *id.*

spoofing will not seriously undermine the role that share prices play in guiding the real economy in these ways.

However, this form of manipulation can have an indirect effect on longer run price accuracy in ways that can be important to the real economy through its impact on liquidity and among the various kinds of informed trading. The level of fundamental-value informed trading will be most sensitive to this increase in cost. This is because fundamental-value informed traders create, at a cost to them, the information on which they trade. A wider spread means their trading will be less profitable and so they will have less incentive to create information.¹²⁸ In contrast, the level of issuer insider and non-issuer insider informed trading and trading based on the tips of such insiders depends mostly on the opportunities that the insiders encounter in their employment.¹²⁹

The decrease in the level of fundamental-value informed trading is unfortunate because the social gain from its contribution to long run price accuracy exceeds the social costs of the activity.¹³⁰ Thus, the social disadvantage from a lower level of fundamental-value informed trading is likely to dominate the advantage from the likely smaller decrease in the other, socially undesirable, forms of informed trading.

b. Liquidity

The prospect of freely occurring spoofing will lessen liquidity. It will definitely do so, through its muddying of the signal of quotes at or slightly less favorable than the NBBO and the consequent widening of spreads. Although it is considerably less clear, the trading costs associated with selling at what had been the bid and buying at what had been the offer may also widen spreads.

It should be noted that by increasing the cost of supplying liquidity, spoofing might reduce the number of HFT firms that would find it profitable to compete. This reduction in the

¹²⁸ See *supra* Section V.2.b.iii.

¹²⁹ FOX ET AL., *THE NEW STOCK MARKET*, *supra* note 3, at 145, 156.

¹³⁰ See Fox et al., *Informed Trading*, *supra* note 31.

number of strategic competitors can lead to a reduction in the amount of liquidity supplied.¹³¹

As discussed in Part III, less liquidity reduces social welfare because of the resulting misallocation of resources over time and misallocation of risk. Socially beneficial transactions fail to occur, leaving investors with suboptimal, riskier portfolios and driving up the cost of capital for firms.¹³² By raising the costs of fundamental-value informed trading and thereby lessening the incentives to search out and trade on new information, less liquidity also reduces longer run share price accuracy.¹³³

c. Resource Misallocation

If spoofing were freely permitted, it would pull resources into a socially useless business. If not, these extra resources would be used elsewhere in the economy, positively contributing to the production of goods and services.

d. Market Confidence

There is one more, rather nebulous efficiency consideration: market confidence. This goes to investors' sense that the market is fair, which is part of the fifth basic social goal discussed above. Even if spoofing does not actually decrease the wealth position of ordinary investors, and any additional risk that it creates can be diversified away, public awareness that spoofing occurs may harm everyday investors' "confidence" in the stock market. The public may view such manipulations as improper or harmful and hence unfair. As a result, to their own and others' detriment, they may reduce their participation in the stock market.¹³⁴ Typically, the most

¹³¹ See Shmuel Baruch & Lawrence R. Glosten, *Tail Expectation and Imperfect Competition in Limit Order Book Markets*, 183 J. ECON. THEORY 661, 662 (2019).

¹³² See Fox et al., *Informed Trading*, *supra* note 31; Section III.C.2.

¹³³ *Id.*

¹³⁴ See Lydia Saad, *U.S. Stock Ownership Stays at Record Low*, GALLUP ECON. (May 8, 2013), <http://news.gallup.com/poll/162353/stock-ownership-stays-record-low.aspx> [<http://perma.cc/FU35-QUMR>]. Michael Lewis

effective response to public misunderstanding is education, but if a perception might be especially stubborn and is causing damage, then that perception may engender an independent policy ground for banning the relevant conduct.¹³⁵

C. The Appropriateness of Legal Sanctions

As noted in Part I, some commentators oppose regulation of any type of manipulation, at least beyond such obvious abuses as wash or matched sales.¹³⁶ Their concern is that no observable conduct separates manipulative market activity from market activity that serves socially useful purposes.¹³⁷ Determining the purpose of the transaction is highly speculative. The question then is, will making spoofing illegal deter much socially worthwhile quoting activity as well? Will persons contemplating making a socially worthwhile quote fear that it might be mistaken for a manipulative one?

Where there is a pattern of repeated sequences of a small quote on one side of the market followed almost immediately by a much larger quote on the other side and then, upon execution of this smaller quote, the cancellation of the initial large quote, we think that the intent to use the large quote to get a more advantageous price for the transaction going the other way is clear, even more so when all this is immediately followed by a mirror set of actions. A sudden change in the information obtained by a trader could explain an occasional incidence of such a sequence of quoting, trading and cancellation, but an established pattern of such sequences as

attributes this drop, which has occurred in the face of a sharply rising market over the last five years, to a sense that the market is unfair. See MICHAEL LEWIS, *FLASH BOYS: A WALL STREET REVOLT 200–01* (2014); see also Ed. Bd., Opinion, *The Hidden Cost of Trading Stocks*, N.Y. TIMES (Jun. 22, 2014), <http://www.nytimes.com/2014/06/23/opinion/best-execution-and-rebates-for-brokers.html> [<http://perma.cc/5U2M-MM2E>]; Bradley Hope, *Five Things To Know About Spoofing In Financial Markets*, WALL ST. J. (Feb. 22, 2015, 10:37 PM), <https://www.wsj.com/articles/BL-263B-3591> (on file with the Columbia Business Law Review).

¹³⁵ Fox et al., *Manipulation*, *supra* note 3, at 102–03.

¹³⁶ See *supra* note 16 and accompanying text.

¹³⁷ See *id.*

a significant percentage of all market activity is not plausibly caused by sudden information changes.

A more interesting objection to including spoofing within the reach of prohibitions on manipulation is the idea that the market itself can take care of the problem. There is anecdotal evidence that when a spoofer has been very active in a market for a while, liquidity suppliers begin to discount the meaning of large quotes at or away from the best quote in the market and decline to respond in the way that the manipulator hopes for. Even if this in fact is going on, we are not convinced that it is a good reason to give this quoting strategy a pass, however. An epidemic can be brought under control if enough people take precautions. But the epidemic still has caused problems in the interim, and, after it is vanquished, people will gradually stop taking precautions again and another epidemic will come along eventually. Moreover, the precautions themselves are costly. In the context of quote manipulation, the very discounting of the meaning of the large quotes is the extreme muddying of the signal that is coming from the quotes at or near the NBBO that are in fact indications that informed trading is going on. This lessens the ability of liquidity suppliers to protect themselves against such trading and widens spreads.

VI. THE LAW OF SPOOFING

Cases concerning spoofing in the securities markets, although becoming more prominent, are far less common than those involving trade-based manipulation.¹³⁸ Perhaps for this reason, the federal court and SEC opinions that have considered the legality of spoofing rely heavily on precedent that was developed to consider trade-based manipulation.¹³⁹ With both types of manipulation, the challenge is how an

¹³⁸ See Jessica Masella & Jonathan Haray, 'Spoofing' Prosecutions: The DOJ's Approach, N.Y. L. J. (April 2, 2021, 2:40 PM), <https://www.law.com/newyorklawjournal/2021/04/02/spoofing-prosecutions-the-doj-s-approach/> (on file with the Columbia Business Law Review).

¹³⁹ *Id.* (collecting cases).

action which is perfectly legal viewed in isolation—respectively, submitting a quote and entering into a purchase or sale—can become illegal when repeated in some particular pattern or under particular circumstances. As with trade-based manipulation, sections 9(a)(2) and 10(b) of the Securities and Exchange Act remain the primary tools used to police misconduct.

Little distinction exists in case law between spoofing and other types of quote manipulation.¹⁴⁰ Therefore, to the extent that a statement in a judicial opinion relating to another type of quote manipulation appears by its terms equally applicable to spoofing as well, we will include it in our discussion.

A. Section 9(a)(2)

Section 9(a)(2) prohibits effecting (1) “a series of transactions” in a security that “creat[e] actual or apparent active trading” or affect its price, (2) “for the purpose of inducing the purchase or sale of such security by others.”¹⁴¹ As we have discussed, anything covered by the first prong will likely induce purchases or sales, and so section 9(a)(2)’s legal force must come from concluding that the purpose of inducing these transactions is illegitimate.¹⁴² This boils down to the issue of determining what constitutes sufficient evidence that the motivation of at least some portion of a person’s trading activity is solely to move the price.

In considering the application of section 9(a)(2) to spoofing, however, a threshold issue must first be resolved: Does section 9(a)(2) by its own terms even cover efforts to move price through quoting activity? After addressing this question, we will consider what section 9(a)(2) trade manipulation cases

¹⁴⁰ See *supra* note 18–19 and accompanying text. As noted in Part I, these would include such other quote-based manipulations as making quotes inside the existing NBBO solely to move price and submitting quotes to an exchange in order to influence the NBB or NBO after which favorably influence the terms on which the quote-maker sends a marketable order to a broker that will predictably send it on to an internalizer whose pricing is based on this favorably altered NBB or NBO. See *id.*

¹⁴¹ See 15 U.S.C. § 78i(a)(2) (2018).

¹⁴² See *supra* Part V.

have to tell us if in fact the provision does properly apply to quoting activity. Finally, we will consider the substance of the small number of decided section 9(a)(2) spoofing cases, i.e., ones involving quoting at or away from the NBBO.

1. Does Section 9(a)(2) Cover Bids and Offers?

A bid or offer—the tools used by spoofers to move price—is clearly an “action,” but it is the action of a single person and, until and unless executed against, involves no counterparty. So, it is reasonable to ask where the “trans” is to make a bid or offer a “transaction,” which the first prong of section 9(a)(2) says is the only thing that it covers?

As this question implies, the most literal reading of the term “transaction” would seemingly exclude manipulation based on quoting behavior as outside section 9(a)(2)’s reach. The few courts that have confronted this issue, however, have interpreted the term more inclusively. In *SEC v. Resch-Cassin & Co.*, manipulators drove up the price of an over-the-counter stock using bids as well as completed purchases in order to facilitate after-market sales to other traders.¹⁴³ The court concluded that bids were included under the term “transaction,” stating “[s]ince Rule 10b-7 of the Exchange Act . . . defines the term transaction as “a bid or a purchase”, an alleged manipulator can be said to effect transactions in a security if he bids for it in the pink sheets or purchases it or sells it.”¹⁴⁴ This is extremely strained reasoning because the then existing Rule 10b-7(b) simply provided “*for the purposes of this section* the following terms shall have the meaning indicated: . . . (2) The term transaction shall mean a bid or a purchase.”¹⁴⁵ In other words, this definition, by its terms, was intended just for Rule 10b-7, which related to stabilization

¹⁴³ *SEC v. Resch-Cassin & Co.*, 362 F.Supp. 964, 977 (S.D.N.Y. 1973). Interestingly, the finding that section 9(a)(2) was violated in this case seems to be dicta because section 9(a)(2) at the time of the decision only covered transactions in exchange listed securities. The court conducted the section 9(a)(2) analysis to show by analogy that section 10(b) must have been violated. *Id.* at 978.

¹⁴⁴ *Id.*

¹⁴⁵ 17 C.F.R. § 240.10b-7(b) (2021) (emphasis added) (replaced 1996).

activities associated with a securities offering rather than for the Exchange Act as a whole. Moreover, the definition only covers bids, not offers, because only bids at the time of an offering, not offers, are the concern of the rule. The court's seeming real reason for including bids and offers within the reach of section 9(a)(2) is more result-oriented. For example, the court observed: "The insertion of increasingly higher bids for a stock in the sheets is an obvious device to create a false appearance of activity in the over-the-counter market and tends to support the price at an inflated level."¹⁴⁶ The outcome from such activity, the court concludes, "was to artificially stimulate the so-called market price of the stock while making it appear to be the product of the independent forces of supply and demand when, in reality, it was completely a creature of defendants' subterfuge."¹⁴⁷ In essence, the court side-stepped the central linguistic question, instead simply saying that quotes can be used to create the same type of evils as can completed purchases and sales, and so quotes too should be considered "transactions."

The other courts that have addressed the issue of whether quotes constitute "transactions" under section 9(a)(2) have either assumed that quotes are "transactions" or summarily declared so. For example, in the recent case *SEC v. Lek Securities Corp.*, the court considered a quote manipulation whereby the defendant entered quotes at successively increasing (decreasing) prices, moving the NBB (NBO) in order to execute another order to sell (buy) at a higher (lower) price than previously existed, immediately upon which the original quotes were cancelled.¹⁴⁸ This pattern was repeated on both sides of the market, and in multiple securities.¹⁴⁹ For its assertion "a 'series of transactions' that create 'actual or apparent' active trading encompasses not only executed trades but also bids and orders to purchase or sell

¹⁴⁶ *Resch-Cassin & Co.*, 362 F. Supp. at 976.

¹⁴⁷ *Id.* at 978.

¹⁴⁸ *SEC v. Lek Sec. Corp.*, 276 F. Supp. 3d 49, 55 (S.D.N.Y. 2017).

¹⁴⁹ *Id.*

securities,”¹⁵⁰ the court relies on *SEC v. Malenfant*,¹⁵¹ which in turn relies on *Resch-Cassin*.¹⁵² Courts in the other cases take a similar approach.¹⁵³

Other than the poorly-reasoned *Resch-Cassin*, we have found no other court opinions directly addressing why the term “transaction” should be interpreted more broadly than the most literal reading of the term. However, there is an opinion that attempts to do so in a case adjudicated by the relevant administrative agency, the SEC. *In re Kidder Peabody & Co.* is a 1945 discipline action against a broker-dealer.¹⁵⁴ The Commission found that because Kidder’s agents had engaged in a number of bids, it violated section 9(a)(2) despite the fact that only one bond was purchased for its account, not a series of purchases or sales.¹⁵⁵ The Commission justified this broader interpretation of “transaction” based on an expansive dictionary definition of the term, a claim that the terms “transactions” and “purchases and sales” are used elsewhere in different contexts, and, most interestingly, section 9(a)(2)’s legislative history.¹⁵⁶ We are not fully convinced by this reasoning. The

¹⁵⁰ *Id.* at 62.

¹⁵¹ *Id.* (citing *SEC v. Malenfant*, 784 F. Supp. 141, 145 (S.D.N.Y. 1992)).

¹⁵² *Malenfant*, 784 F. Supp. at 145 (S.D.N.Y. 1992) (citing *SEC v. Resch-Cassin*, 362 F.Supp. 964, 978 (S.D.N.Y.1973)).

¹⁵³ See *Spicer v. Chi. Bd. Options Exch., Inc.*, No. 88 C 2139, 1990 WL 172712, at *7 (N.D. Ill. Oct. 30, 1990) (for purposes of section 9(a)(2), noting in *dicta* that “plac[ing] bids” would “also qualify” as “means of effecting a transaction”); *Malenfant*, 784 F. Supp. 141, 145 (S.D.N.Y. 1992) (in a case concerning violations of sections 9(a)(1) and 9(a)(2), noting that “[i]t was not necessary for the matched buy and sell orders to have been executed”).

¹⁵⁴ *Kidder, Peabody & Co.*, Exchange Act Release No. 3673, 18 S.E.C. 559–60, *amended* Exchange Act Release No. 3679, 1945 WL 26140 (1945).

¹⁵⁵ *Id.* at 568.

¹⁵⁶ The SEC’s reasoned in *Kidder*:

[W]e do not agree that the term *transactions* as used in Section 9(a)(2) is limited to completed purchases or sales. While the term is not defined in the Act, its broad meaning in everyday usage, the context in which it is used in the various sections of the Act, as well as its use in the various drafts of the bill while under consideration by Congress

show that as used in Section 9(a)(2) it has a broader meaning t[h]an *purchases or sales*.

Id. at 569 (footnote omitted).

With regard to the everyday usage of *transactions*, the SEC noted that “Funk & Wagnall’s New Standard Dictionary (1937) defines transaction to include ‘the conduct of any business . . . any matter or thing that has been brought partly or wholly to a conclusion . . . any act as affecting legal rights or obligations[.]’” *Id.*

In terms of the context in which the term is used, the SEC commented that “Various sections of the Act refer to transactions and others refer to purchases and sales but in different contexts. Section 9(a)(2) employs both terms, and it is obvious from the context that they are not intended to be synonymous.” *Id.* at 569 n. 12.

Finally, the SEC analyzed the legislative history of section 9(a)(2):

The legislative history of Section 9(a)(2) shows that Congress clearly intended its prohibition against manipulation to extend beyond the actual consummation of purchases or sales. The original draft of the bill before both Houses (Sec. 8(a)(3) of S. 2693 and H. R. 7852, 73rd Cong., 2d Sess.) sought to prohibit “transactions for the purchase and sale” for manipulative purposes.

That the change from this phrasing to the broader phrasing now present in the Act was intentional and purposeful is indicated by committee reports. The Senate Committee on Banking and Currency in recommending the passage of S. 3420, (a later form of the bill which proposed to prohibit “any series of transactions”) indicated in its report that what was intended to be prohibited was affecting the market artificially by raising or depressing security prices, or creating actual or apparent activity, whether or not accomplished by actual purchases or sales. And the conference report on the bill which became law (H. E. 9323) shows that both houses intended to make the scope of the prohibition broader than a mere prohibition of purchases and sales.

Id. at 569 (footnotes omitted) (citing S. REP NO. 73-792, at 7 (1934) (“Several devices are employed for the purpose of artificially raising or depressing security prices. Those which appear to serve no legitimate function are specifically prohibited. Among such practices fictitious or ‘wash’ sales; ‘matched’ orders or orders for the purchase and sale of the same security emanating from a common source for the purpose of recording operations on the tape and thereby creating a false appearance of activity; *and other*

claim that making an offer to buy or sell falls within the ordinary meaning of the term “transaction” does not seem very plausible on its face, whatever the breadth of possible meanings assigned to the term in a dictionary; the fact that the terms “transactions” and “purchases and sales” appear in different places in the Exchange Act in different contexts does not mean much absent more explanation in terms of how the contexts differ; and our own review of section 9(a)(2)’s legislative history suggests to us that although the Commission’s argument, based on this legislative history, that Congress intended section 9(a)(2) to cover quotes is not completely farfetched, it is also not highly persuasive.¹⁵⁷

transactions specifically designed to manipulate the price of a security.” (emphasis added)) and H.R. REP. 73-1838, at 31 (1934) (“The House bill (Section 8(a)(2)) contains a provision prohibiting any series of transactions in a registered security for the purpose of rising or depressing the price of such security. The corresponding provision in the Senate amendment prohibits the manipulation of a registered security by means of any series of transactions effected with the specific intent of raising or depressing such price. Both provisions were intended to prohibit pool activities, the rigging or jiggling, or *marking up or down of prices by manipulative operations*. The substitute, combining the ideas underlying the Senate and the House provisions, prohibits any series of transactions in a registered security creating actual or apparent trading in such security, or raising or depressing the price of such security, for the purpose of inducing the purchase or sale of such security by others.” (emphasis added))).

¹⁵⁷ With reference to the SEC’s arguments based on legislative history detailed in *supra* note 156, at least as plausible explanation for the change from “transactions for the purchase and sale” in an early version of the bill to “transactions” in the bill as adopted is simply a reduction in verbosity through the excising of redundant language. The reference to “other transactions” in the Senate Committee report could well be meant to cover purchase and sale transactions that affect price in ways different from how wash and matched sales create the appearance of activity. The typical naked open market manipulation, for example, generates profits based on the expectation that current circumstances suggest a disproportionate price reaction from the reverse set of transactions. Fox et al., *Manipulation, supra* note 3, at 94–96, 104–06. The typical open market transaction with an external interest manipulation generates expected profits by the gain the manipulator enjoys as the result of some unrelated interest that depends on the issuer’s share price being moved by the manipulators first purchase or sale. *Id.* at 107–08. Neither of these manipulations fit easily into the category of “such practices as fictitious or ‘wash’ sales; ‘matched’ orders or

Once the SEC completed the first step in its analysis and concluded that there were plausible grounds in language and history for it to consider a quote as a kind of “transaction,” it went on to a second step.¹⁵⁸ In this second step, it concluded that it made sense to determine what quotes fell within the reach of section 9(a)(2)’s prohibitions by reference to the larger policy aims of the section, saying that “[i]n an auction market, the placing of bids, though not met by sellers, may be as effective an influence on price as a completed sale.”¹⁵⁹ So if one were to accept the SEC’s conclusion in the first step, our analysis in Part V certainly supports its conclusion in the second step from a policy perspective.

2. Transaction-based Section 9(a)(2) Case Law as a Guide to What Quoting Behavior It Prohibits

If bids and offers are properly considered “transactions” within the purview of section 9(a)(2), it would be reasonable to use transaction-based section 9(a)(2) cases as a guide to what kind of quote behavior should also be illegal under the provision. And indeed, as we will see below, the case law relating to quote-based manipulation is largely based on the case law surrounding trade-based manipulation. Unfortunately, although the case law related to trade-based manipulation is littered with references to section 9(a)(2),¹⁶⁰ there has been a consistent failure to substantively analyze, precisely identify, or even define the improper purpose

orders for the purchase and sale of the same security emanating from a common source for the purpose of recording operations on the tape and thereby creating a false appearance of activity” and so could require the reference to “other transactions” in the Senate Report even though each of these kinds of manipulation *does* involve purchases and sales. *Kidder, Peabody & Co.*, 18 S.E.C. 559, 570 n.14 (1945).

¹⁵⁸ *Kidder, Peabody & Co.*, 18 S.E.C. at 570.

¹⁵⁹ *Id.* The SEC was correct here. Both theory and the empirical literature support the proposition that unexecuted bids and offers can affect the price at which executed transactions occur. *See supra* Part II.

¹⁶⁰ *See, e.g.*, *Markowski v. SEC*, 274 F.3d 525, 529 (D.C. Cir. 2001); *Nanopierce Techs., Inc. v. Southridge Cap. Mgmt.*, No. 02 Civ. 0767, 2002 WL 31819207, at *20 (S.D.N.Y. Oct. 10, 2002).

required by the provision or discuss what evidence would satisfactorily prove it. Rather, the cases typically only reiterate the language of the statute and then just assert that the trading behavior under examination is covered,¹⁶¹ or provide such question-begging statements as the Seventh Circuit's:

[T]he essence of the offense is creating "a false impression of supply or demand," for example through wash sales, where parties fictitiously trade the same shares back and forth at higher and higher prices to fool the market into thinking that there is a lot of buying interest in the stock.¹⁶²

The two transaction-based section 9(a)(2) cases that do provide a bit more reasoning each involve what we have referred to in earlier work as "open market manipulation with an external interest," i.e., the situation where a person engaging in trading that affects a security's price has a pre-existing economic interest in this price *independent* of making a profit from the price-affecting trades themselves.¹⁶³ The

¹⁶¹ See *AnchorBank, FSB v. Hofer*, 649 F.3d 610, 616–17 (7th Cir. 2011); *Sharette v. Credit Suisse Int'l*, 127 F. Supp. 3d 60, 78 (S.D.N.Y. 2015); *SEC v. Malenfant*, 784 F. Supp. 141, 144–45 (S.D.N.Y. 1992). A private suit under section 9(a)(2) would also require proof that the relevant transactions were relied on by the plaintiff, and affected the price of plaintiffs' transaction. *Chemetron Corp. v. Bus. Funds, Inc.*, 682 F.2d 1149, 1165 (5th Cir. 1982), *vacated on other grounds*, 460 U.S. 1007 (1983).

¹⁶² *Sullivan & Long, Inc. v. Scattered Corp.*, 47 F.3d 857, 864 (7th Cir. 1995) (citing *Santa Fe Indus., Inc. v. Green*, 430 U.S. 462, 476 (1977)).

¹⁶³ Fox et al., *Manipulation*, *supra* note 3. Some courts have articulated the notion that an external interest creates an evidentiary presumption, i.e., that "it appears to us that a prima facie case exists when it is shown that a person who has a substantial direct pecuniary interest in the success of a proposed offering takes active steps to effect a rise in the market for outstanding securities of the same issuer." Federal Corp., Exchange Act Release No. 3909, 25 S.E.C. 227, 230 (Jan. 29, 1947); *see also* *Wright et al.*, Exchange Act Release No. 467, 1938 WL 34042, at *13 (Feb. 28, 1938), *reversed* *Wright v. SEC*, 12 F.2d 89 (2d Cir. 1940) ("The very existence of an option when coupled with buying on the market by those having an interest in its exercise is an indication of a purpose to raise the market price, to increase market activity and thus to distribute profitably the stock covered by the option.").

first, *Resch-Cassin*, discussed above, involved the use of trades as well as quotes to drive up the price of a stock in a situation where these trades were made to ease an offering's after-market sales to other traders.¹⁶⁴ The court considered these trades to be section 9(a)(2) violations because the defendants "had an obvious incentive to artificially influence the market price of the security in order to facilitate its distribution or increase its profitability . . . manipul[at]ing the after-market to sell the Africa stock to the public."¹⁶⁵ *Crane Co. v. Westinghouse Air Brake Co.* involved the attempt by one of two firms competing to take over a target company engaging in trades to raise the target's share price.¹⁶⁶ The purpose of doing this was to defeat the competing firm's tender offer for the target's shares.¹⁶⁷ The court held that trading solely to change an issuer's share price in order to gain an advantage pursuant to an external interest—in this case, to defeat a rival acquirer's tender offer—involved a manipulative purpose that rendered the trades in violation of section 9(a)(2).¹⁶⁸

3. Quote-based Section 9(a)(2) Cases

In the few decisions concerning quote-based manipulation and section 9(a)(2), courts summarize the case law around trade-based manipulation, and then, without further critical analysis, declare a violation of section 9(a)(2). In *Lek*, for example, after reviewing cases discussing open market, trade-

¹⁶⁴ SEC v. Resch-Cassin & Co., 362 F. Supp. 964, 975–76 (S.D.N.Y. 1973).

¹⁶⁵ *Id.* at 977. Interestingly, the finding that section 9(a)(2) was violated in this case seems to be dicta as it was conducted to show that by analogy section 10(b) must also have been violated. *Id.* at 975.

¹⁶⁶ 419 F.2d 787, 795 (2d Cir. 1969).

¹⁶⁷ *Id.*

¹⁶⁸ *Id.* ("In furtherance of its interest in defeating the Crane tender offer and consummating its own merger with Air Brake, Standard took affirmative steps to conceal from the public its own secret sales off the market at the same time it was dominating trading in Air Brake shares at a price level calculated to deter Air Brake shareholders from tendering to Crane.").

based manipulation, the court summarily concluded that a violation of section 9(a)(2) was adequately pled, as “[e]ach of the [manipulation] schemes was designed to create a false impression of supply or demand for securities and to induce other market participants to purchase or sell securities.”¹⁶⁹

Little further guidance exists in case law as to how to define illegitimate purpose, although one SEC settlement addressing quote-based manipulation under section 9(a)(2) has offered the following somewhat helpful description of what, according to the SEC, made the trading activity in question illegitimate:

[The trader’s] intent to induce others to trade at disadvantaged prices is evident from his repeated submission of orders at rising (or declining) prices, his opportunistic executions on the opposite side of the market after these non-bona fide orders had altered the stock’s price to his advantage, and his prompt cancellation of the non-bona fide orders before they could be executed. The trader’s intent to induce market participants using algorithmic platforms is also evident in his usage of 100-share orders interspersed with pressure orders for much higher share quantities at prices several cents away from the inside bid or inside ask in order to induce the purchase or sale of securities by others who used trading algorithms that focus on changes to the NBBO or liquidity imbalances.”¹⁷⁰

In this Release, the SEC seems to be focused on the repeated *pattern* of submitting orders that induce a price change, followed by “opportunistic executions on the opposite side of the market,” and “prompt cancellation” of the initial

¹⁶⁹ SEC v. Lek Sec. Corp., 276 F. Supp. 3d 49, 62 (S.D.N.Y. 2017).

¹⁷⁰ Biremis Corp., Exchange Act Release No. 68,456, 105 SEC Docket 862 (Dec. 18, 2012). The scheme is described as follows: “[L]ayering occurs when a trader creates a false appearance of market activity by entering multiple non-bona fide orders on one side of the market, at generally increasing (or decreasing) prices, in order to move that stock’s price in a direction where the trader intends to induce others to buy (or sell) at a price altered by the non-bona fide orders. . . . This trading by the Overseas Traders violated Exchange Act Section 9(a)(2)[.]” *Id.*

“non-bona fide” orders that had not already been executed against.¹⁷¹

B. Section 10(b)

Exchange Act section 10(b) prohibits any person from using in a securities transaction “any manipulative or deceptive device” in contravention of an SEC rule promulgated thereunder.¹⁷² Rule 10b-5 is such a rule and is the primary engine of regulation under section 10(b). Rule 10b-5 makes it unlawful, in connection with the purchase or sale of any security

(a) To employ any device, scheme, or artifice to defraud, (b) To make any untrue statement of a material fact or to omit to state a material fact necessary in order to make the statements made, in the light of the circumstances under which they were made, not misleading, or (c) To engage in any act, practice, or course of business which operates or would operate as a fraud or deceit upon any person[.]¹⁷³

On the one hand, it is easier than with section 9(a)(2) to contemplate that whatever is prohibited by Rule 10b-5 includes quoting activity as well as trading activity. Quoting and trading each involve an action “in connection with the purchase and sale of a security,” and courts have very broadly interpreted the “in connection with” clause.¹⁷⁴ On the other hand, we are focusing on manipulation. Rule 10b-5, despite its broad language, reads much more as a provision focused on fraud than on manipulation. Indeed, unlike section 10(b), the section of the statute under which the rule was promulgated, Rule 10b-5 does not even include the term “manipulation.”¹⁷⁵

¹⁷¹ *Id.* at 11.

¹⁷² 15 U.S.C. § 78j(b) (2018).

¹⁷³ Employment of Manipulative and Deceptive Devices, 17 C.F.R. § 240.10b-5 (2021).

¹⁷⁴ See Fox et al., *Manipulation*, *supra* note 3, at 123, (citing SEC v. Texas Gulf Sulphur, 401 F.2d 833, 859–61 (2d Cir. 1968)); see also *infra* Part VII.A.

¹⁷⁵ Compare 17 C.F.R. § 240.10b-5 with 15 U.S.C. § 78j(b).

As we discuss below, there is a split of authority as to whether trading behavior on its own can ever constitute a Rule 10b-5 violation or whether some additional unlawful act is necessary. Thus, although it seems like a straightforward proposition that Rule 10b-5 cases dealing with open market trade-based manipulation provide useful precedent for quote-based cases, the trade-based case law to which this proposition refers is confused as to whether Rule 10b-5 even applies to open market manipulation in the first place.¹⁷⁶ This is critical because most of the case law relating to trade-based manipulation is based on Rule 10b-5 rather than section 9(a)(2).¹⁷⁷

1. Confusion Concerning the Application of Rule 10b-5 to Trade-Based Manipulation

The case law concerning whether Rule 10b-5 applies to open market manipulation is not consistent. The source of the problem goes back to a series of Supreme Court decisions in the 1970s and 1980s where, in cases far removed from manipulation, the Court emphasized the role of deceit and misrepresentation in a section 10(b) claim.¹⁷⁸ In these cases,

¹⁷⁶ Open market manipulation comes in two forms. See Fox et al., *Manipulation*, *supra* note 3, at 74–75. One is open market manipulation with an external interest. The other is naked open market manipulation, which involves the purchase of a number of shares, with an upward push on prices, and then their resale under circumstances where the corresponding downward push on prices is less severe, thereby resulting in the average sale price exceeding the average purchase price. This strategy yields positive expected profits where, at the time of the purchase, the trader has good reason to believe that the likelihood of such an asymmetric price reaction is sufficiently great that it will yield net gains from trading.

¹⁷⁷ *Id.* at 117 (Discussing the reasons for this).

¹⁷⁸ *Id.* at 118 & n.122 (“See, e.g., *Schreiber v. Burlington N., Inc.*, 472 U.S. 1, 8 n.6 (1985) (‘Congress used the phrase “manipulative or deceptive” in § 10(b) and we have interpreted “manipulative” in that context to require misrepresentation.’ (citations omitted)); *Santa Fe Indus., Inc. v. Green*, 430 U.S. 462, 476 (1977) (manipulation ‘refers generally to practices, such as wash sales, matched orders, or rigged prices, that are intended to mislead investors by artificially affecting market activity’ (citations omitted)); *Emst & Ernst v. Hochfelder*, 425 U.S. 185, 199 (1976) ([T]he word “manipulative”

the Court almost transformed section 10(b) into a statute that only caught fraud and fraud-like claims within its ambit.¹⁷⁹ This culminated in statements by the Court, such as, “Section 10(b) is aptly described as a catchall provision, but what it catches must be fraud.”¹⁸⁰ The Court’s language has resulted in a sharp circuit split regarding whether open market manipulation, without an additional act that is unlawful by itself, is ever prohibited under section 10(b).

Against this background, the key question in applying Rule 10b-5 to both trading and quoting is what constitutes a “manipulative act.” With regards to trading, on one side, there is a series of court opinions that have been read to assert that actual trading behavior on its own cannot constitute a manipulation; some additional unlawful act is necessary as well. In essence, this would mean that open market manipulation per se is not illegal under Rule 10b-5. The Third Circuit, for example, has held that because “the essential element of the [manipulation] claim is that *inaccurate* information is being injected into the marketplace,” trading for the sole purpose of moving a securities price is not sufficient to be considered an injection of inaccurate information into the market place.¹⁸¹ The court reasoned that because the trades themselves were lawful, they could not be creating inaccurate information and therefore did not constitute deceptive trading behavior.¹⁸² If this is correct, it is

... is and was virtually a term of art when used in connection with securities markets. It connotes intentional or willful conduct designed to deceive or defraud investors by controlling or artificially affecting the price of securities.’ (citations omitted)).

¹⁷⁹ These developments are discussed in *id.* at 118–19.

¹⁸⁰ *Chiarella v. United States*, 445 U.S. 222, 234–35 (1980).

¹⁸¹ *GFL Advantage Fund, Ltd. v. Colkitt*, 272 F.3d 189, 205 (3d Cir. 2001) (quoting *In re Olympia Brewing Co. Sec. Litig.*, 613 F. Supp. 1286, 1292 (N.D. Ill. 1985)).

¹⁸² *Id.* at 207. In *Foss v. Bear, Stearns & Co.*, the Seventh Circuit stated, in response to a plaintiff who wanted to “call the [alleged] conduct ‘manipulation’ rather than ‘fraud,’” that “this is a distinction without a difference” because in “securities law, manipulation is a kind of fraud; deceit remains essential.” 394 F.3d 540, 542 (7th Cir. 2005) (emphasis omitted). It should be noted, however, that this is dicta.

hard to see how spoofing violates Rule 10b-5 since both spoofing and open market manipulation involve what are otherwise legal activities, quoting and trading respectively, with no further illegal act. In each case, it is only the purpose for which the otherwise legal activity is undertaken—to make a profit solely from the activity’s influence on prices—that makes it a manipulation. Indeed, the case for requiring the additional illegal act may be stronger with quoting than with trading because every bid or offer risks execution and thus actually adds to liquidity. A manipulator’s intent to cancel prior to execution is no guarantee against execution.

Other circuits, however, have come to the opposite conclusion from the Third Circuit, at least under certain circumstances. In *Markowski v. SEC*,¹⁸³ a case involving open market manipulation with an external interest, the D.C. Circuit found that the defendants’ activities violated section 10(b) and Rule 10b-5, holding that these provisions proscribe manipulations involving trades based “solely because of the actor’s purpose” when that purpose was improper, without necessitating any further unlawful act.¹⁸⁴ The Second Circuit, has recently stated in dictum that manipulation under section 10(b) does *not* require “reliance by a victim on direct oral or written communications by a defendant”¹⁸⁵ and that “a

¹⁸³ 274 F.3d 525 (D.C. Cir. 2001).

¹⁸⁴ *Id.* at 529.

¹⁸⁵ See *Fezzani v. Bear, Stearns & Co.*, 777 F.3d 566, 571 (2d Cir. 2015). The case involved a broker-dealer that was accused of prompting its customers to purchase certain stocks and then later maintaining the price of these stocks by buying shares in the secondary market, presumably to increase its clients’ appetites for its next round of recommendations. The case involves a defendant, who, rather than being the broker-dealer itself, was someone accused of allowing the broker-dealer to “park” these shares in his account (i.e., allowing the broker-dealer to sell him the shares it had purchased but with an understanding that he would be protected against any drop in price). *Id.* at 572. The language quoted in the text is dictum because the court dismissed the complaint against the defendant. According to the court, the plaintiff failed “to allege acts by [the defendant] that amounted to more than knowingly participating in, or facilitating,” the broker-dealer’s fraud. *Id.* at 25. To be liable in a private damages action, the court concluded that the defendant would have needed to make the false communication himself. *Id.* The fact that this language is dictum is

showing of reliance may be based on ‘market activity’ intended to mislead investors by sending ‘a false pricing signal to the market,’ upon which victims of the manipulation rely.”¹⁸⁶

2. Rule 10b-5 Spoofing Cases

We have already considered the *Lek* case in connection with section 9(a)(2),¹⁸⁷ but the court’s pronouncements concerning that section of the statute are dicta because the SEC’s claim was that the defendant’s quoting activity violated section 10(b) and Rule 10b-5. The court concludes that a violation of section 10(b) and Rule 10b-5 has been adequately pled under a theory that under the alleged circumstances, the bids and offers involved constituted “false” pricing information.¹⁸⁸ In doing so, however, the court does not provide helpful or critical analysis beyond a recitation of trade-based manipulation case law. The court assumed the bids or offers in question to have been non-bona fide, irrespective of whether they were executed against.¹⁸⁹

In another case, *CP Stone Fort Holdings, LLC v. Doe(s)*, the court determined that all elements of Rule 10b-5 other than loss causation had been adequately pled in plaintiff’s

important because, although the Circuit appeared to moving in this direction, there is earlier precedent going the other way. For a review of this history, see Fox et al., *Manipulation*, *supra* note 3, at 120–21.

¹⁸⁶ *Fezzani*, 777 F.3d at 571–72.

¹⁸⁷ See *supra* notes 148–151.

¹⁸⁸ SEC v. Lek Sec. Corp., 276 F. Supp. 3d 49, 58–60 (S.D.N.Y. 2017).

¹⁸⁹ *Id.* at 55. The court in *Lek* does state the following, again focused on a pattern of quoting, in dicta in response to Lek’s argument that their “orders were ‘live, real, and actionable’ orders that were subject to market risk and therefore could not create a false impression of supply and demand or send a false pricing signal”:

To the extent that the Lek Defendants argue that the entry of an order in the open market may never constitute manipulative conduct, they are wrong. Moreover, this argument largely misses the mark. It ignores the thrust of the SEC’s claim, which concerns coordinated *patterns of trading*, indeed voluminous trading, designed to mislead the market. *Id.* at 64 (emphasis added).

complaint.¹⁹⁰ Although the complaint is somewhat confusing, the alleged manipulative scheme had the hallmarks of spoofing and appears to have been very similar to the Atlee example: The defendant added size at the NBO, put in a marketable order going in the opposite direction, and after that order executed, very quickly cancelled the added size at the NBO, and then engaged in a mirror set of transactions going the other way.¹⁹¹ In adjudicating defendant's motion to dismiss the amended complaint, the court "agrees with plaintiff that *by alleging a pattern . . .* it has sufficiently alleged that defendants have both injected inaccurate information into the market, created a false impression of market activity, and had an illegal intent."¹⁹² Nearly all the other law that has developed around quote manipulation under section 10(b) and Rule 10b-5 has developed in the context of SEC administrative proceedings. The SEC has entered into multiple settlements with firms pursuant to section 10(b) and Rule 10b-5 concerning a variety of kinds of quote manipulation.¹⁹³ Such manipulation has been described

¹⁹⁰ CP Stone Fort Holdings v. Doe(s), No. 16-cv-4991, 2017 WL 1093166 (N.D. Ill. Mar. 22, 2017).

¹⁹¹ Second Amended Complaint at 6–7, CP Stone Fort Holdings v. Doe(s), No. 16-cv-4991, 2017 WL 1093166 (N.D. Ill. Mar. 22, 2017).

¹⁹² CP Stone Fort Holdings, 2017 WL 1093166, at *4 (emphasis added). Interestingly, the court originally dismissed the case because plaintiff's theory amounted to one equating cancellation with the intention to never execute. CP Stone Fort Holdings v. Doe(s), No. 16-cv-4991, 2016 WL 5934096, at *6 (N.D. Ill. Oct 11, 2016). The court is of course correct to this extent: there are many reasons—many of which perfectly legitimate—for cancelling an order prior to execution. Without "any allegation of how many orders were executed, how long the ultimately cancelled orders had remained resting and available for execution prior to cancellation, or whether the platform rules required the orders to be exposed further[.]" the court originally agreed with defendant "that plaintiff's theory boils down to an allegation that 'if a subset of orders was ultimately cancelled, those orders, in hindsight, must never have been intended to be executed.'" *Id.* Nevertheless, the court, in its ruling on the subsequent amended complaint, seemed to endorse plaintiff's theory of wrongdoing under Rule 10b-5, though it again dismissed the complaint but this time on the grounds that plaintiff did not adequately allege loss causation. *Id.* at *4, 6–7.

¹⁹³ See *infra* note 194–195.

in one representative settlement as the submission of “non-bona fide orders, or orders that the trader does not intend to have executed, to induce others to buy or sell the security at a price not representative of actual supply and demand.”¹⁹⁴ More broadly, in an administrative proceeding concerning auto-execution manipulation, the SEC took the position that “manipulation is intentional interference with the free forces of supply and demand.”¹⁹⁵ The defendant, Terrance Yoshikawa, had allegedly “engaged in a manipulative scheme by artificially moving the NBBO in the specified securities and thereby fraudulently affected the nature of the market for these securities.”¹⁹⁶ Specifically, Yoshikawa had repeatedly placed a small limit order in one direction that reset the NBO or NBB and then placed a much larger order in the opposite direction that he had good reason to believe would be executed in a venue that used the NBO and NBB as reference prices even when the order it received was larger than the amount

¹⁹⁴ Hold Bros. On-Line Inv. Servs., Exchange Act Release No. 67,924, Investment Company Act Release No. 30,213, 104 SEC Docket 2686 (Sept. 25, 2012) (inside the spread manipulation) (“Layering concerns the use of non-bona fide orders, or orders that the trader does not intend to have executed, to induce others to buy or sell the security at a price not representative of actual supply and demand.”). There are a number of SEC settlements for quote manipulation in violation of Rule 10b-5, which offer little in the way of specific guidance in assessing violations of the law and do little to distinguish among the types of quote manipulation we have identified in this article. *See, e.g.*, Behruz Afshar, Securities Act Release No. 10,094, Exchange Act Release No. 78,043, Investment Company Act Release No. 32,144, 114 SEC Docket 1731 (June 13, 2016) (inside the spread manipulation) (“Market participants were deceived when they interpreted the small-lot orders as reflecting genuine demand or supply and joined those orders with hopes of offering liquidity and earning rebates.”); Briargate Trading, Securities Act Release No. 9,959, Exchange Act Release No. 76,104, 112 SEC Docket 3263, 3265 (Oct. 8, 2015) (open market manipulation) (“The non-bona fide buy or sell orders create a false appearance of buy or sell interest in the security, which often results in a price change.”).

¹⁹⁵ Application of Terrance Yoshikawa for Review of Disciplinary Action Taken by NASD, Exchange Act Release No. 53,731, 87 SEC Docket 2580, at 8 (Apr. 26, 2006).

¹⁹⁶ *Id.* at 11.

available in the market at the NBO or NBB.¹⁹⁷ This case is one of many auto-execution manipulation cases that enabled a manipulator “to buy or sell a security at a price that otherwise would not have been available in the market,” as “the investing public and other market participants, including broker-dealers who rely on the integrity of the NBBO, were unaware that the NBBO quotes altered as result of [the manipulator’s] orders, reflected not genuine market activity, but the [manipulator’s] coordinated actions.”¹⁹⁸

VII. ASSESSING THE LAW OF SPOOFING

In our view, spoofing—submitting to an exchange one or more quotes, each for a large number of shares at a price equal to, or less favorable than, the preexisting best quote in the market, and then taking advantage of the resulting change in the market’s view of the value of the security by trading in the opposite direction—should be considered illegal. In Part I we posed a four-question test for when a quoting strategy should be condemned. First, is the strategy, purely as a conceptual matter, distinguishable from other, clearly acceptable quote-

¹⁹⁷ *Id.* at 2–3.

¹⁹⁸ Ian Fishman, Securities Act Release No. 7547, Exchange Act Release No. 40,115, 67 SEC Docket 783 (June 24, 1998). *see also, e.g.*, Jason T. Frazee, Securities Act Release No. 8,209, Exchange Act Release No. 47,522, 79 SEC Docket 2361 (Mar. 18, 2003) (violating section 10(b) and Rule 10b-5, “Frazee repeatedly engaged in a pattern of conduct that affected the NBBO and permitted the execution of orders at prices that would not otherwise have been available in the market. Frazee’s actions interfered with the free forces of supply and demand and undermined the integrity of the NBBO.”); Leonard Sheehan, Securities Act Release No. 8208, Exchange Act Release No. 47,521, 79 SEC Docket 2359 (Mar. 18, 2003) (violating section 10(b) and Rule 10b-5, “Sheehan repeatedly engaged in a pattern of conduct that affected the NBBO and permitted the execution of orders at prices that would not otherwise have been available in the market. Sheehan’s actions interfered with the free forces of supply and demand and undermined the integrity of the NBBO.”); Joseph R. Blackwell, Securities Act Release No. 8030, Exchange Act Release No. 45,018, 76 SEC Docket 502 (Nov. 5, 2001) (same); Israel M. Shenker, Securities Act Release No. 8029, Exchange Act Release No. 45,017, 76 SEC Docket 501 (Nov. 5, 2001) (same); Robert J. Monski, Securities Act Release No. 7,975, Exchange Act Release No. 44,250, 74 SEC Docket 1815 (May 3, 2001) (same).

driven strategies, and does the strategy under examination cause social harm? Second, does the strategy plausibly fit under the broad dictionary meaning of the term “manipulation”? Third, are there circumstances under which the strategy can yield positive expected profits, and do they occur frequently enough to cause concern? Fourth, are there practical procedures for implementing a ban on the strategy whereby the social gains from its reduction or elimination exceed the social costs of doing so, including deterring socially valuable activity that might be erroneously identified as examples of the practice? With spoofing, as discussed below, all four questions can be answered affirmatively. The existing case law roughly accomplishes the goal of making the practice illegal, but it lacks clarity and makes errors in its reach.

A. Optimal Regulation

The analysis in this Article easily shows affirmative answers to the first, third and fourth questions. As for the first question, we established in Part V that the strategy is distinguishable from clearly acceptable quote-driven activities and causes social harm. Spoofing, directly, or indirectly through the market anticipating its occurrence, lessens both liquidity and price accuracy, wastes productive resources by supporting a socially useless activity, and lessens market confidence.¹⁹⁹ We have also seen that the practice can yield positive expected profits.²⁰⁰ The instances of enforcement against spoofers and the sizes of their alleged profits suggest that instances of it occur frequently enough to cause concern.²⁰¹ And we have identified objectively observable factors that can serve as a condition for imposing legal sanctions on undesirable trades, while minimizing prosecution of socially desirable trades.

The answer to the second question requires a bit more explication. We do not have any trouble concluding that spoofing fits within the dictionary definition of

¹⁹⁹ See *supra* Section V.B.4.

²⁰⁰ See *supra* Section V.A.

²⁰¹ See *supra* Part VI.

“manipulation.”²⁰² The problem is that neither Exchange Act section 9(a)(2)²⁰³ nor section 10(b)²⁰⁴ and Rule 10b-5²⁰⁵ directly outlaw anything that could be termed “manipulation.”

Section 9(a)(2) outlaws “a series of transactions” that in effect have as their purpose manipulation.²⁰⁶ It may be too great a stretch, however, to argue that quoting involves engaging in “transactions.” As we have seen, the district courts that have found quoting activity to violate section 9(a)(2) have either largely ignored this difficulty or dealt with it in an unconvincing fashion.²⁰⁷ If a federal court of appeals or the Supreme Court took a serious look at the issue, we are not fully confident that they would find quotes to be transactions.

Section 10(b) and Rule 10b-5 constitute a more solid route to finding a doctrinal basis for implementing our approach to outlawing spoofing. Our analysis in preceding parts leads to the conclusion that quote-based manipulation can be analogized to misstatement manipulation.²⁰⁸ This is because the manipulators, by placing bids and offers that other market participants believe contain information about the future prospects of the issuer, profit off of the market’s reaction. As two of us have analyzed elsewhere, misstatement manipulation can be thought of as a subset of informed trading, where the manipulator is privately informed that the information that the market believes to be true is in fact false.²⁰⁹

²⁰² In its definition of “manipulate,” the Merriam-Webster dictionary includes “to change by artful or unfair means so as to serve one’s purpose[.]” *Manipulate*, MERRIAM-WEBSTER, <https://www.merriam-webster.com/dictionary/manipulate> [<https://perma.cc/5VM5-QNAX>] (last visited Dec. 24, 2021).

²⁰³ 15 U.S.C. § 78i(a)(2) (2018).

²⁰⁴ *Id.* § 78j(b).

²⁰⁵ Employment of Manipulative and Deceptive Devices, 17 C.F.R. § 240.10b-5 (2021).

²⁰⁶ *See* 15 U.S.C. § 78i(a)(2).

²⁰⁷ *See supra* Section VI.A.

²⁰⁸ *See supra* Section VI.B.

²⁰⁹ *See* Fox et al., *Manipulation*, *supra* note 3, at 112.

Rule 10b-5(b) makes it unlawful for any person “to make any untrue statement of a material fact or to omit to state a material fact necessary in order to make the statements made, in light of the circumstances under which they were made, not misleading . . . in connection with the purchase or sale of a security.”²¹⁰ When, in our spoofing example, Atlee has his broker submit a quote to an exchange on his behalf, he is in essence making the following statement: “I am prepared, unless and until I cancel, to be legally bound to buy or sell x amount of securities at y price.” This statement is communicated to the market by the posting of the quote on an exchange. Though literally true, it is at least arguably misleading. Others would reasonably assume that submitter of the quote in fact wants someone to execute against the bid or offer, when the opposite is the case. Atlee would have to say he does not want anyone to execute against his quote to make the statement not misleading.²¹¹

²¹⁰ 17 C.F.R. § 240.10b-5.

²¹¹ At least one precedent exists that the submission of an order can, under particular circumstances, be a misleading statement in violation of Rule 10b-5. *VanCook v. SEC*, 653 F.3d 130 (2d Cir. 2011) is a case arising out of the mutual fund “late trading” scandals of the early 2000s. The defendant VanCook, a broker, aided his mutual-fund-specialized hedge fund customers in an arrangement that regularly allowed them to determine after 4:00 p.m. their orders for amount of mutual fund shares to buy or redeem for the day. *Id.* at 133. 4:00 p.m. was the time at which each mutual fund set its net asset value (NAV), the price at which it would redeem or sell its shares for the day. *Id.* This NAV was based on the closing prices of the securities that the mutual fund held in its portfolio. *Id.*

VanCook’s arrangement allowed the hedge funds to take advantage of post-4:00 p.m. developments that indicated expected profits from a purchase or redemption that could be made given the NAV that was set at 4:00 p.m. *Id.* The way the arrangement worked was to take advantage of the mutual fund’s clearing bank’s procedure that permitted persons who had submitted orders prior to 4:00 p.m. to correct errors in those orders after 4:00 p.m. *Id.* at 134. VanCook assisted his customers to take advantage of this procedure by submitting orders prior to 4:00 p.m. that did not really reflect how many shares they wanted to buy or redeem, but rather were simply a place holder that they would alter, using the error-cleaning-up procedure, after 4:00 p.m. based on post-4:00 p.m. determinations of how many shares to redeem or purchase. *Id.* In other words, they regularly submitted to VanCook orders prior to 4:00 p.m. which were time-stamped as such, and then, after 4:00

There has long been a basis in court-made law for imposing sanctions for making misstatements related to securities trading. As far back as 1968, the Second Circuit ruled in *SEC v. Texas Gulf Sulphur* that whenever an issuer makes a statement that is “reasonably calculated to influence the investing public,” such a statement satisfies Rule 10b-5’s requirement that it be “in connection with the purchase or sale of a security,” even if neither the issuer nor its managers buy or sell shares themselves.²¹² This interpretation of the “in connection with” requirement has subsequently been expanded to reach other persons besides the issuer and its officials, and to include the statements of these other persons

p.m., sent in “corrected” orders that were really represented post-4:00 p.m. purchase or redemption determinations. VanCook then passed on to the clearing bank these “corrections.” Investment Company Act Rule 22c-1, 17 C.F.R. § 270.22c-1, requires that orders submitted by customers to their brokers after the determination of the day’s NAV must be executed at the next day’s NAV. *Id.* at 135. The Second Circuit found that VanCook was aiding a violation of Rule 10b-5(b) by his hedge fund customers. *Id.* at 138. The idea was that the mutual funds reasonably assumed that the submission of an order for execution at the current day’s NAV was in an amount determined prior to the setting of the day’s NAV since Rule 22c-1 would prohibit execution, at that day’s NAV, of post-4:00 p.m. determined orders. *Id.*

While this precedent establishes that a purchase or sale order can be a misleading statement, it is admittedly not a perfect analogy to spoofing. In the late-trading case, it violated an SEC rule for the mutual funds to execute the orders passed on by VanCook at the current day’s NAV and so the court was saying in essence that it is reasonable for the mutual fund to assume that the orders it received would be in compliance with Rule 22c-1 when executed. In contrast, whether it is reasonable for the market to assume that quotes are not the product of spoofing cannot depend on whether spoofing violates Rule 10b-5(b): We are asking the question concerning reasonable market expectations to determine whether spoofing violates Rule 10b-5 in the first place. That said, we have shown that spoofing fits the dictionary definition of manipulation and answers our three other questions in the affirmative. So, the fact that section 10(b), under which Rule 10b-5 was promulgated, authorizes rules against “manipulative” as well “deceptive” “device[s]” argues in favor of a reading of Rule 10b-5(b) to include, as a misleading statement, a spoofer’s quotes intended to move market prices. *See* 15 U.S.C. § 78j(b); 17 C.F.R. § 240.10b-5.

²¹² *SEC v. Tex. Gulf Sulphur Co.*, 401 F.2d 833, 859–62 (2d Cir. 1968).

when they would predictably affect investors' judgments.²¹³ Moreover, the courts have made clear that in government-based actions, there need not be a showing of reliance by the particular purchasers or sellers of shares.²¹⁴

B. Comparing Existing Case Law to Optimal Regulation

Let us now compare our description of existing case law to what we have just described as optimal regulation. First, section 9(a)(2) is an insecure basis for outlawing spoofing in the manner we recommend, because by its terms, its trigger is a series of "transactions."²¹⁵ Although district courts and the SEC have found quotes to be "transactions,"²¹⁶ their rationales for doing so are not fully convincing and it is certainly possible that an appellate court would not agree with them.²¹⁷ Second, section 10(b) and Rule 10b-5 provide a doctrinally sounder basis. Section 10(b) unambiguously authorizes the SEC to promulgate rules against manipulation. The language of Rule 10b-5 is not obviously the rule to do this, but, as we have argued, spoofing can be viewed as a kind of misleading statement in violation of Rule 10b-5(b).²¹⁸ The existing case law, however, is rather confused and suggests that the statute and the rule can be interpreted both under inclusively and over inclusively.

If, as we argue, a spoofer's submission of quotes solely to move price is a violation of Rule 10b-5's prohibition against making misleading statements, how in the absence of documentary evidence can it be determined that this was the sole purpose for submitting the quotes? We have suggested that an established pattern of repeated sequences of large quotes on one side followed almost immediately by a smaller

²¹³ See Adam C. Pritchard & Robert B. Thompson, *Texas Gulf Sulphur and the Genesis of Corporate Liability Under Rule 10b-5*, 71 *SMU L. REV.* 927, 939–42 (2018).

²¹⁴ *Id.*

²¹⁵ See 15 U.S.C. § 78i(a)(2).

²¹⁶ See *supra* Section VI.A.

²¹⁷ See *supra* Section VII.B.

²¹⁸ See *id.*

marketable quote on the other side and then, upon execution of this smaller quote, the cancellation of the initial large quote, is sufficient circumstantial evidence to conclude that at least in some of the instances of this pattern, the sole intent to use the first quote was to get a more advantageous price for the transaction going the other way. This is even more clear when this pattern in most instances is followed by a mirror set of actions going the other way. Those courts that find Rule 10b-5 violations in such cases, analogizing the quoting activity to trade-based open market transactions, are doing the right thing.

As we have seen, however, there are courts that have held that actual trading behavior on its own cannot constitute a manipulation and that some additional unlawful act is necessary—in essence that open market manipulation is *per se* not illegal under Rule 10b-5.²¹⁹ These courts, by misinterpreting earlier Supreme Court opinions relating to matters far removed from manipulation, are doing the wrong thing with regard to trade-based manipulation. And derivatively, they would likely do the wrong thing as well if they were faced with a spoofing case. The logic they use in trade-based open market cases—that trading by itself is perfectly legal and therefore something independently illegal is necessary for the manipulative trades to violate Rule 10b-5—would seem equally applicable with regard to spoofing: just substitute “quoting” for “trading.” What is missed in this logic when it comes to spoofing is that a perfectly legal activity—generally quoting—can be used in an anti-social way if its only purpose is to change prices by sending a misleading signal. Evidence that a person repeatedly engaged in spoofing’s pattern of behaviors can often be persuasive evidence that this is exactly what is going on.

On the other hand, because quote manipulation has been under theorized both economically and legally, courts can also be too quick to include some quoting behavior as a basis for Rule 10b-5 liability. It makes little sense, in our view, to apply a fraud-on-the-market theory to a spoofing case, as was done

²¹⁹ See *supra* Section VI.B.1.

in the *CP Stone Fort Holdings*²²⁰ case discussed earlier. There, the court ultimately granted the defendant's motion to dismiss. It did so on the basis of an erroneous understanding of what needs to be shown to establish loss causation in a fraud-on-the-market case²²¹ rather than rejecting the application of the fraud-on-the-market theory to a spoofing case in the first place.

The first step in understanding why it is inappropriate to apply the fraud-on-the-market theory to spoofing cases is to note, as shown in Part V, that it is liquidity suppliers who are induced into loss-resulting action by the quotes introduced by a spoofer. In essence, they relied on these quotes as being statements by their submitter that it genuinely wanted the quote—unless and until cancelled—to be executed against. If a liquidity supplier can offer convincing evidence that it acted because of the spoofer's quotes, it would be able to bring a traditional reliance-based action for damages against the spoofer. The idea consistent with the traditional reliance-based Rule 10b-5 private damages action,²²² is that the Rule

²²⁰ No. 16-cv-4991, 2017 WL 1093166 at *5 (N.D.III. Mar. 22, 2017).

²²¹ *Id.* at *5–6. The court found that the plaintiff failed to demonstrate loss causation because it “has not tied those purchases or sales [that it connects to the alleged manipulation] to any loss because the complaint fails to allege the reversal of each transaction[.]” *id.* at *6, citing the Supreme Court's decision in *Dura Pharmaceuticals, Inc. v. Broudo*, 544 U.S. 336, 342–43 (2005). In *Dura*, the Court did not hold that the plaintiff needed to reverse its transaction to demonstrate loss causation, rather it held that only showing that the purchase price was inflated due to the defendant's misstatement is not by itself enough to demonstrate loss causation. *Id.* at 346. The key to showing loss causation is not resale at a loss, but rather a drop in price due to the Rule 10b-5 violation no longer inflating price at a time when the plaintiff still holds her shares. Thus, the Court in *Dura* notes that “the Restatement of Torts . . . set[s] forth the judicial consensus, say[ing] that a person who ‘misrepresents the financial condition of a corporation in order to sell its stock’ becomes liable to a relying purchaser ‘for the loss’ the purchaser sustains ‘when the facts . . . become generally known’ and ‘as a result’ share value ‘depreciate[s].’ § 548A, Comment b, at 107.” *Id.* at 344.

²²² See Merritt B. Fox, *After Dura: Causation in Fraud-on-the-Market Actions*, 31 J. CORP. L. 829, 832 (2006) (exploring the difference in the causal connection between the Rule 10b-5 violation and the plaintiff's loss in a

10b-5 violation—the spoofer’s quotes—caused the plaintiff to *act* to its disadvantage.

The fraud-on-the-market theory is an alternative Rule 10b-5 private damages cause of action. It is based on the theory that the Rule 10b-5 violation *changed the price* at which the plaintiff traded, even though she might have traded even if the misstatement had not been made.²²³ As we saw earlier, in the Atlee example, only the liquidity suppliers, no one else, were hurt by the spoof. As a result, there would be no basis for a damages action by anyone under either cause of action other than by these liquidity suppliers, who can use the traditional reliance-based cause of action.²²⁴ Spoofing in alternative configurations, however, could, with an initial submission of quotes at or above the NBO, result in a slight lowering of both the NBB and NBO. However, this dip would last for only a very, very brief time because the spoofer will cancel these quotes as soon as his sell order executes.²²⁵ Therefore in any given instance of a spoof with such alternative configuration, a few ordinary trader sellers might lose by a small amount and a few ordinary trader buyers would win by an equivalently small amount. With the spoofer’s subsequent mirror set of actions, the opposite effects will occur. Ex ante, an ordinary investor is as likely to be a buyer as a seller, making herself as likely to gain as to lose if she transacted in either of these two stages of the spoof. Moreover, the trader who suffers a loss from one iteration of a spoofer’s spoof quite possibly may be the gainer from another. Such a small change in price, because of its brevity affects only a small number of traders in any given instance of spoofing. It may also work the other way for these traders in another instance. Thus, it is not a good justification for bringing the

traditional reliance based private damages action versus this causal connection in a fraud-on-the-market one).

²²³ See *id.* at 855.

²²⁴ See *supra* Part VII.

²²⁵ See *supra* note 38 and accompanying text.

socially expensive fraud-on-the-market class action type of litigation.²²⁶

In the final analysis, it is likely that the main deterrent to spoofing will need to be government enforcement, not private damages litigation. This is because, as argued above, a fraud-on-the-market suit is not appropriate. It is also because a traditional reliance-based action by the adversely affected liquidity suppliers, while perfectly appropriate from a doctrinal and policy point of view, may be difficult for these suppliers to bring successfully. The problem for the liquidity suppliers is that it may be hard for them to present convincing evidence that their actions were in response to the spoofers' quotes even when that was in fact the case.

VIII. CONCLUSION

The precise reach of federal securities manipulation law has long eluded critical consensus. Spoofing is no exception despite the spate of recent enforcement actions against those accused of the practice. In response, this Article has sought to clarify the understanding of spoofing through the lens of microstructure economics. It has also sought to answer essential normative and practical questions around the scope of illegal manipulation. By elucidating the mechanisms of spoofing, assessing who is hurt and helped by the practice and its impact on social welfare, and evaluating optimal legal

²²⁶ Total settlements for the years 2009-2018 have averaged about \$3.55 billion per year; CORNERSTONE RSCH., SECURITIES CLASS ACTION SETTLEMENTS: 2018 REVIEW AND ANALYSIS 3 (2018). Available data suggests that contingent-fee awards to plaintiffs' lawyers in securities class-action lawsuits average around 25 percent. Lynn A. Baker, Michael A. Perino & Charles Silver, *Is the Price Right? An Empirical Study of Fee-Setting in Securities Class Actions*, 115 COLUM. L. REV. 1371, 1394 (2015). If we assume that defendants' lawyers are paid fees comparable to this amount, this would suggest that the total annual legal expenses in recent years for the two sides associated with securities class actions (the defense's legal fees ultimately being paid by shareholders and the plaintiff's legal fees coming out of the recovery) totaled about \$1.8 billion $((0.25 + 0.25) \times \$3.55 \text{ billion})$. This figure on legal expenses does not include the additional social costs associated with the time consumed by the officials of the parties to the litigation and by the judiciary.

responses, this Article has offered a new understanding of spoofing that can guide regulatory responses without inadvertently capturing socially beneficial quoting activity.