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# Stock Market Law and the Accuracy of Public Companies' Stock Prices

Kevin Haerberle

University of South Carolina - Columbia, [haerberle@law.sc.edu](mailto:haerberle@law.sc.edu)

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## STOCK-MARKET LAW AND THE ACCURACY OF PUBLIC COMPANIES' STOCK PRICES

Kevin Haeberle\*

*The social benefits of more accurate stock prices—that is, stock-market prices that more accurately reflect the future cash flows that companies are likely to produce—are well established. But it is also thought that market forces alone will lead to only a sub-optimal level of stock-price accuracy—a level that fails to obtain the maximum net social benefits, or wealth, that would result from a higher level. One of the principal aims of federal securities law has therefore been to increase the extent to which the stock prices of the most important companies in our economy (public companies) contain information about firms' prospects so that society generates more wealth. Indeed, enhancing the accuracy of these prices in this way is perhaps the primary justification for the corporate disclosure, fraud, and insider-trading rules that make up the traditional core of federal securities law.*

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*Yet, important price-accuracy effects of a distinct area of the field (the law governing the market in which stocks are traded) have been overlooked.*

*This Article theorizes that a set of central, yet little-noticed, stock-market rules is resulting in society producing a lower level of stock-price accuracy than it otherwise might. The Article therefore provides examples of ways in which the laws governing stock trading can be altered to increase stock-price accuracy. And it urges regulators to consider whether such alternations might be socially desirable in one of two ways: by enhancing the current level of stock-price accuracy in a manner that results in net social benefits, or by providing society with a lower-cost means than those associated with existing disclosure, fraud, and insider-trading laws for obtaining that current level. Accordingly, the Article theorizes that regulators have a fourth main securities-law tool (stock-market law) for increasing the accuracy of public companies' stock prices, and sets forth a cost-benefit framework to help them determine whether it can be used to achieve one of the chief goals of securities law: obtaining a socially optimal level of stock-price accuracy.*

I.	Introduction .....	123
II.	Stock-Price Accuracy and Its Main Social Benefits ..	129
	A. Stock-Price Accuracy .....	130
	1. The Concept of Accurate Stock Prices .....	130
	2. The Production of Accurate Stock Prices .....	132
	B. The Main Social Benefits of Accurate Stock Prices .....	133
	1. Corporate Governance.....	133
	2. Capital Allocation.....	137
III.	Contemporary Stock Trading .....	139
	A. Stock Traders.....	139
	1. Informed Traders .....	139
	2. Uninformed Traders.....	140
	3. Professional Liquidity-Providing Traders .....	141
	B. Stock Trading Platforms .....	144
	1. Exchange Trading Platforms .....	146
	2. Off-Exchange Trading Platforms .....	148

IV.	Implications of Central, Yet Little-Noticed, Stock-Market Rules.....	150
A.	Contemporary Stock Trading.....	151
1.	Off-Exchange Trading.....	151
2.	Exchange Trading.....	157
3.	Exchange Liquidity Providers' Price Quotes.....	158
B.	Stock-Price Accuracy and Its Main Social Benefits.....	162
1.	Stock-Price Accuracy.....	162
2.	The Main Social Benefits of Accurate Stock Prices.....	166
C.	Securities Law's Effort to Obtain a Socially Optimal Level of Stock-Price Accuracy.....	167
1.	Materially Improving Stock-Price Accuracy via an Exchange-Trading Mandate.....	168
2.	Materially Improving Stock-Price Accuracy via a Public-Firm Subsidy for Exchange Liquidity Provision.....	170
V.	Examining Whether This New Accuracy-Enhancing Tool Can Be Used to Improve Social Welfare.....	172
A.	The Desirability of Using Stock-Market Law to Increase the Current Level of Stock-Price Accuracy.....	173
1.	The Main Social Benefits.....	173
2.	The Main Social Costs.....	175
a.	Main Costs of an Exchange-Trading Mandate.....	175
b.	Main Costs of a Public-Firm Subsidy for Exchange Liquidity Provision.....	181
B.	The Desirability of Using Stock-Market Law to Obtain the Current Level of Stock-Price Accuracy.....	182
VI.	Conclusion.....	183

## I. INTRODUCTION

Scholars and lawmakers have long touted the social benefits of public-company stock prices that more accurately

reflect the future cash flows that those companies are likely to produce. This type of enhanced stock-price accuracy, they assert, aids society by leading to improved capital allocation and corporate governance. But those who impound information about firms' prospects into stock prices are unable to capture the full amount of these social benefits that result from their efforts. This inability, in turn, leaves the vast beneficiaries of better resource allocation and firm management on their own to band together in a collective effort to make stock prices more accurate—something they cannot efficiently do. For these reasons, market forces alone are thought to lead only to a suboptimal level of stock-price accuracy—that is, a level that fails to obtain net social benefits, or welfare, that would result from a higher level. One of the principal aims of securities law is therefore to get more information about firms' prospects into stocks' market prices so that society generates more wealth. However, work in this area has overwhelmingly focused on the corporate disclosure, fraud, and insider-trading laws that compose the core of a typical Securities Regulation class. And important price-accuracy effects of a distinct area of the field (the law governing the market in which stocks are traded) have gone unnoticed.

This Article theorizes that a set of central stock-market rules to which no one seems to have paid much attention is resulting in society producing a lower level of stock-price accuracy than it otherwise might—and therefore quite plausibly generating less wealth than it otherwise might. The set of rules at issue is composed of what I refer to as the trading-platform access rules: the federal securities laws that requires stock exchanges to remain open to all traders,<sup>1</sup> but that allows off-exchange trading platforms to select

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<sup>1</sup> See Regulation National Market System Rule 610(a), 17 C.F.R. § 242.610(a) (2005) (prohibiting “national securities exchange[s] [from] . . . prevent[ing] or inhibit[ing] any person from obtaining efficient access” to the offers to buy and sell stocks that are posted on their trading systems); Securities and Exchange Act § 6, 15 U.S.C. § 78f (1934) (providing that a registered exchange must allow “any registered broker or dealer . . . [to] become a member of [its] exchange”).

which traders can and cannot access their trading systems.<sup>2</sup> In the end, I show that an examination of these rules and their far-reaching effects leads to the conclusion that lawmakers can modify stock-market law to increase stock-price accuracy. And I therefore urge lawmakers to consider whether such legal modifications could be used to increase social welfare in one of two ways: by enhancing the current level of stock-price accuracy in a manner that results in net social benefits, or by providing society with a lower-cost means than the existing core of securities law for obtaining that current level. Accordingly, the Article theorizes that regulators have a fourth main securities-law tool (stock-market law) for increasing the accuracy of public companies' stock prices, and offers them a cost-benefit framework to help them determine whether this tool can be used to achieve one of the chief aims of securities law: obtaining a welfare-maximizing level of stock-price accuracy.

Given the social benefits of enhanced stock-price accuracy and the concern that market forces without legal intervention will fail to produce accurate stock prices at an optimal level, it should come as little surprise that much of securities law attempts to facilitate the generation of information about firms' prospects and the price-correcting work of informed traders.<sup>3</sup> Informed traders—such as some sophisticated banks, hedge funds, private equity funds, and actively managed mutual funds—are those that buy and sell stocks based on superior information about companies'

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<sup>2</sup> See Regulation of Exchanges and Alternative Trading System Rule 301(b)(5), 17 C.F.R. § 242.301(b)(5) (1997); Concept Release on Equity Market Structure, Securities Exchange Act Release No. 34-61358, 17 C.F.R. § 242, at 72 (“As [trading systems] that are exempt from exchange registration, [off-exchange platforms] are not required to provide fair access [to all traders] unless they reach a 5% trading volume threshold in a stock, which none currently do[es]” and that “[a]s a result, access to . . . [these platforms] . . . is determined primarily by private negotiation.”).

<sup>3</sup> See, e.g., Zohar Goshen & Gideon Parchomovsky, *The Essential Role of Securities Regulation*, 55 DUKE L.J. 711, 715 (2006) (asserting that the essential role of “securities regulation is . . . to facilitate and protect the work of inform[ed] traders” that leads to the production of more information about firms' values).

values. These traders seek to profit by producing (or procuring) such information, and then using it to buy underpriced stocks and sell overpriced ones. As a byproduct of this profit-motivated trading, they generate (or pay others to generate) this information. And this information ultimately results in stock prices that more accurately predict the future cash flows that firms will produce as well as the social benefits that flow from those more informative prices.

Indeed, aiding informed traders and this process in which more information about companies' prospects is produced and incorporated into their stocks' market prices is perhaps the principal justification for the costly rules that compose the three-pronged traditional core of federal securities regulation.<sup>4</sup> Rules that require firms to disclose internal information about their businesses mandate the provision of that information to the public, thereby ensuring the production and dissemination of important information that informed traders use to price stocks more accurately.<sup>5</sup> Laws that prohibit fraud help increase the truthfulness and integrity of such corporate disclosures, thereby making sure that this key information is accurate and enabling informed traders to rely on it when pricing stocks. And even the general prohibition on insider trading is thought by many to foster investment in the production of this valuable information by those informed traders who are best situated to accurately evaluate stock prices (professional outside informed traders) because the proscription increases the likelihood that these traders can use this information to

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<sup>4</sup> See, e.g., Marcel Kahan, *Securities Laws and the Social Cost of "Inaccurate" Stock Prices*, 41 DUKE L.J. 977, 979 (1992) (noting that this "vast legal framework" is motivated "by one principal goal of securities laws: . . . creat[ing] stock markets in which the market price of a stock corresponds to its fundamental value.").

<sup>5</sup> See, e.g., Merritt B. Fox et al., *Law, Share Price Accuracy, and Economic Performance: The New Evidence*, 102 MICH. L. REV. 331, 342-44 (2003).

profit because it protects them from being undercut and misled by corporate insiders and their tippees.<sup>6</sup>

Yet, as a matter of theory, central aspects of the federal securities laws that regulate how stocks are traded affect both informed traders and the incentive to produce information about firms' prospects in a very different way. The theory proceeds as follows. The trading-platform access rules allow off-exchange platforms—through which an enormous portion of overall trading now occurs—to choose which traders can and cannot access their trading systems. These platforms use this power to target uninformed traders (such as individual retail-level investors and index-driven mutual funds) and exclude informed ones. This legal ability to discriminate among traders also often results in informed traders, as a practical matter, preferring to complete much of their trading through exchanges. In practice, then, these trading rules lead off-exchange platforms to be dominated by uninformed traders—and, critically, open exchanges to therefore have a far higher ratio of informed traders to uninformed ones. As a result, other traders on exchanges fear that they will be trading opposite informed traders, and that these informed traders will use superior information to profit at their expense. Well-established literature in the market-microstructure area of economics<sup>7</sup> shows that these other traders respond to this type of situation by providing all of their counterparties with prices that are both inferior and, crucially, more sensitive to trading activity. Facing these inferior and more reactive prices, informed traders—who, often unable to access off-exchange platforms and preferring to transact via exchanges, are to a significant extent relegated to exchanges—have fewer profitable trading

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<sup>6</sup> See generally Zohar Goshen & Gideon Parchomovsky, *On Insider Trading, Markets, and "Negative" Property Rights in Information*, 87 VA. L. REV. 1229 (2001).

<sup>7</sup> Market microstructure is a branch of economics focused on the forces at play between buyers and sellers in markets. For a seminal treatise on market microstructure authored by a former chief economist of the SEC aimed at a broad audience, see LARRY HARRIS, *TRADING & EXCHANGES: MARKET MICROSTRUCTURE FOR PRACTITIONERS* 6 (2003).



opportunities. Thus, their motivation to produce (or pay others to produce) information about firms' prospects and impound it into market prices is weaker, and public companies' stock prices are consequently less informative.

The law should be able to address these previously unidentified effects that trading rules are now having on the accuracy of stock prices. For example, a mandate that all trading take place through exchanges would give traders on exchanges comfort that they will face a lower ratio of informed traders to uninformed ones. That lower ratio would, in turn, lead them to provide all of their counterparties on exchanges with prices that are both superior and less sensitive to trading activity—thereby increasing the incentive to produce information about stocks' values and impound it into market prices. Alternatively, changing stock-market law to impose fees on public firms to subsidize trading in their stocks on exchanges would also likely result in informed traders facing superior and less reactive prices, and therefore accomplish the same end without requiring a restructuring of the stock market. Thus, it is likely that stock-market law can be reformed to make public companies' stock prices more accurately reflect the future cash flows that they will produce—that is, to improve stock-price accuracy.

To be sure, society may already be producing a high enough level of stock-price accuracy. A large portion of existing securities law, once again, already targets the under-production of information about firms' prospects. Moreover, from at least a political perspective, further legal support of sophisticated banks, hedge funds, private equity funds, and actively managed mutual funds may be unappealing—even if the ultimate goal of that support is the production of valuable information and not the wellbeing of these market participants. As such, to the extent that altering stock-market law to make prices more accurate fails to generate additional social benefits that exceed the additional social costs necessary to achieve them, these alterations certainly should not be added on top of the current extensive regulatory regime aimed at bolstering

stock-price accuracy. Nevertheless, using stock-market law to improve the accuracy of stock prices may still be desirable because it—along with adaptations to disclosure, fraud, and insider-trading laws—may enable society to achieve its current level of stock-price accuracy at a lower cost than the one associated with those burdensome rules that make up the bulk of existing securities law. Accordingly, as a matter of theory, regulators have a fourth securities-law tool that they can use to increase the accuracy of public companies' stock prices. And they should therefore consider whether this novel tool can be used to achieve what is perhaps the chief aim of the field: obtaining the level of stock-price accuracy that generates the most wealth.

The remainder of this Article proceeds as follows. Part II provides a brief overview of the concept of accurate stock prices, the process in which they are produced, and their main social benefits. Part III then describes how stocks are traded today, focusing on three basic types of market participants that trade stocks as well as the two broad types of platforms through which they trade them. Part IV explores how the trading-platform access rules theoretically affect this trading and, in turn, stock-price accuracy and its main social benefits—concluding by offering changes to stock-market law that would likely improve stock-price accuracy in a material manner. Lastly, in light of these new ideas, Part V urges regulators to consider whether such accuracy-enhancing changes to stock-market law could be used to help society achieve the level of stock-price accuracy that maximizes social welfare—and provides them with a cost-benefit framework to help them make that determination.

## II. STOCK-PRICE ACCURACY AND ITS MAIN SOCIAL BENEFITS

Companies have values that are based on the future cash flows that they are likely to produce, and the market prices of their stocks therefore reflect those values with varying degrees of accuracy. These market prices are thought to become more accurate when informed traders generate and

use information about firms' prospects to purchase underpriced stocks or sell overpriced ones. Scholars have encouraged lawmakers to respect this informed-trader work because when stock prices better reflect their values, they contend, corporations are better governed and capital is more efficiently allocated—thereby improving the functioning of the economy in a manner that creates more wealth for society.

Section A provides background on stock-price accuracy—namely, background on what it means to say that a stock's market price accurately reflects its value. It also describes the process in which information about stocks' values is produced and incorporated into market prices—thereby making them more accurate in this way. Section B then offers an overview of the main social benefits that are thought to result from higher levels of stock-price accuracy.

## A. Stock-Price Accuracy

Despite common conceptions, stocks can be said to have very real values. Stock-market prices reflect those values with different degrees of accuracy. When more information about the future cash flows that firms are likely to produce is generated and impounded into these prices, they are understood to be more accurate in this way.

### 1. The Concept of Accurate Stock Prices

Stocks are said to have fundamental values: the present value of the future cash flows that their holders will receive.<sup>8</sup> For example, imagine a holder of a share of stock who will

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<sup>8</sup> See, e.g., Kahan, *supra* note 4, at 979 n.11 (defining a stock's fundamental value as “the best estimate at any time, and given all information available at such time, of the discounted value of all distributions . . . accruing to a stockholder who continues to hold the stock.”). Indeed, stocks can even be thought of as ultimately having *actual* values based on the actual amounts that their holders end up receiving. See Merritt B. Fox, *Shelf Registration, Integrated Disclosure, and Underwriter Due Diligence: An Economic Analysis*, 70 VA. L. REV. 1005, 1013–14 (1984).

own that share over the stock's lifetime. And further imagine that the best information available today indicates that he will eventually receive a total of three payments of \$3.33 in the form of a mix of dividend and liquidation distributions. In this example, without considering the time value of money and the risk associated with varying future cash flows, the stock's fundamental value is \$10 per share. Thus, if someone offered you a choice between a certificate for a share of that stock and 9 one-dollar bills today, you would choose the certificate—and if someone offered you a choice between that certificate and 11 one-dollar bills, you would choose the bills.

Stocks' market prices reflect these fundamental values to varying degrees. When those prices are closer to fundamental values, they are said to have a higher degree of accuracy. Conversely, when they are farther from those values, they are said to have a lower degree of accuracy. For example, if the market's assessment of the stock's value from the above example was \$10 per share today, it would be accurately priced. If it was instead \$11 per share, it would be inaccurately priced—and if it was instead \$12 per share, it would be even more inaccurately priced.

Notably, stock prices are inherently susceptible to inaccuracy. Ex ante, humans can only imperfectly estimate the amount of cash flows to which an owner of stock will be entitled in the future, the timing of those cash flows, the risks associated with them, and more. In fact, these cash flows and risks may differ greatly depending, for example, on whether the company in the end remains in the hands of existing management as opposed to an acquirer such as Warren Buffett. Nevertheless, more and better information about such determinants of the cash flows that the holder of a stock will receive in the future provides a clearer—if imperfect—measures of a stock's value. Thus, the degree to which market prices provide accurate assessments of stocks' fundamental values (i.e. the level of stock-price accuracy) is a function of the amount and quality of information about the likely future cash flows associated with ownership of stocks that is produced and incorporated into their market prices.

## 2. The Production of Accurate Stock Prices

The production of accurate stock prices is commonly thought to depend on—among other things—the amount and quality of information about firms’ prospects that is generated by informed traders and their affiliates. Informed traders—such as some investment banks, hedge funds, private equity funds, and actively managed mutual funds—are those that buy and sell stocks based on information as to the likely future cash flows that their owners will receive that is not yet incorporated into their market prices.<sup>9</sup> These market participants are incentivized to produce more and better information about these likely cash flows because they are often able to use it to earn trading profits. More specifically, they are motivated to produce information that indicates that the market has inaccurately priced a stock because they can use that information to buy stocks that are priced inaccurately low or sell stocks that are priced inaccurately high.<sup>10</sup> And when they use their information to buy an underpriced stock or sell an overpriced one in sufficient quantities, they place enough upward or downward pressure, respectively, on its market price to cause that price to better reflect their information—and therefore to better reflect the stock’s fundamental value.<sup>11</sup> Thus, stock prices become increasingly accurate as a byproduct of informed traders’ profit-motivated trading.

It is important to note that informed traders will only invest in the production of information about stocks’ values if they expect to earn revenues that exceed the costs associated with procuring the information and more. Generally, the main source of revenue for informed traders comes in the form of trading profits. As such, the more revenue these

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<sup>9</sup> See generally *infra* Part III.A.1.

<sup>10</sup> See Goshen & Parchomovsky, *supra* note 3, at 726 (“[Informed] traders detect discrepancies between value and [market] price based on the information they possess. They then trade to capture the value of their informational advantage.”).

<sup>11</sup> See HARRIS, *supra* note 7, at 6 (“[Informed] [t]raders . . . estimate fundamental values [and] cause prices to reflect their value estimates.”).

traders expect to earn from profitable trades, the stronger their incentive to produce fundamental-value information and impound it into market prices. Conversely, the less such revenue they expect to garner, the weaker that information production-and-incorporation incentive. Accordingly, the extent to which stock prices will be accurate—that is, the extent to which more and better information about firms' prospects is produced and incorporated into market prices—is significantly driven by the amount of trading profits that informed traders expect to realize.

## B. The Main Social Benefits of Accurate Stock Prices<sup>12</sup>

For some time, scholars and lawmakers alike have contended that two main social benefits result when stocks' market prices are closer to their values: corporations are better governed, and capital is better allocated.<sup>13</sup>

### 1. Corporate Governance

Conventional economic theory asserts that society obtains more wealth when publicly traded corporations maximize their own values. (This assertion assumes, among other things, that externalities such as pollution are controlled.) Economists reason as follows: Firms generally maximize their values when they maximize their profits; firms' revenues are a measure of the benefits they add to society; firms' costs are an indicator of the resources they take away from society; and finally, firms' profits (i.e., their revenues minus their costs) therefore serve as a loose proxy for the net

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<sup>12</sup> Although I focus on the two main social benefits of accurate stock prices, more accurate pricing likely also leads to other important social benefits. For example, investors will discount the amount they are willing to pay in return for a company's stock if it is likely to be inaccurately priced. Those discounts harm society by increasing the cost of capital for firms. The existence of this common discounting practice dictates that higher levels of stock-price accuracy would, at a minimum, reduce the magnitude of such discounts and therefore benefit society.

<sup>13</sup> See, e.g., Fox, *supra* note 8, at 1013–14 (discussing the social benefits of enhanced stock-price accuracy).

utility gains that they provide to society. Accordingly, members of society want corporations to maximize their own values so that society has more wealth—wealth that it may ultimately distribute as it sees fit.

Shareholders also want the firms they own to maximize their own values. Indeed, firm value maximization, which maximizes shareholder investment returns, is generally the only goal on which the long line of diverse shareholders of publicly traded companies can find common ground.<sup>14</sup> However, for the overwhelming majority of public firms, the main decisions that determine whether or not the company will in fact maximize its profits fall not within the domain of society or shareholders, but within that of corporate managers—agents whose interests often diverge from those of their principals. As a result of this conflict, both society and shareholders suffer wealth losses in the form of well-known corporate agency costs—costs that arise out of agent managers failing to diligently and loyally further the social and shareholder-owner goal of maximizing firm values.<sup>15</sup>

Reducing these agency costs is one of the principal aims of corporate law.<sup>16</sup> Toward that end, corporate law has generated a wide range of agency-cost-reducing governance devices—including traditional ones relating to board supervision, shareholder voting, and manager fiduciary duties. The supervision of corporate officers by a centralized board with independent directors—which is required by SEC-approved exchange requirements for publicly traded

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<sup>14</sup> RICHARD A. BREALEY, STEWART C. MYERS & FRANKLIN ALLEN, *PRINCIPLES OF CORPORATE FINANCE* 7 (11th ed. 2013) (noting that shareholders “differ in age, tastes, wealth, time horizon, risk tolerance, and investment strategy” but that they can all agree on the financial objective of “[m]aximiz[ing] the current market value of [their] investment in the firm.”).

<sup>15</sup> See, e.g., ADOLF BERLE, JR. & GARDINER C. MEANS, *THE MODERN CORPORATION AND PRIVATE PROPERTY* (1932) (providing the seminal articulation of the agency problem that flows from the separation of ownership from control in publicly traded corporations).

<sup>16</sup> See, e.g., WILLIAM T. ALLEN, REINIER KRAAKMAN & GUHAN SUBRAMANIAN, *COMMENTARIES AND CASES ON THE LAW OF BUSINESS ORGANIZATIONS* 12–13 (3d ed. 2009).

companies—is widely thought to reduce these costs by ensuring that a small group of individuals that contains outside supervisors can better monitor (and increase) the extent to which firm insiders are maximizing profits on shareholders' behalf.<sup>17</sup> The shareholder right to vote in the election of directors and a variety of other key company decisions—a franchise that is conferred by state corporate law—aims to decrease agency costs by ensuring firm owners will have some degree of control over the extent to which managers maximize value. Lastly, fiduciary duties—also instituted by state corporate law—are imposed on both directors and officers in an effort to reduce agency costs by legally obligating these economic agents to work with both care for, and fidelity to, their principals and their interest in value maximization.

Corporate law has also facilitated the reduction of agency costs via more recent governance devices, including blockholder activism and stock compensation. Blockholder activism—that is, the situation in which investors acquire significant blocks of a company's stock so that they have both the economic incentive and the power to influence corporate management—takes place within a highly regulated legal framework. Although not without controversy, such activism is generally assumed to reduce agency costs because blockholders—large shareholders whose profit margins increase when the profit margins of the firms they target increase—are financially incentivized to take actions to reign in managerial slack.<sup>18</sup> Stock compensation—that is, pay for managers in the form of company stock and related forms rather than cash—has also been highly influenced by the law. This form of compensation, it is argued, reduces agency costs because with their fortunes tied to those of owners of the enterprise and society, managers are encouraged to

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<sup>17</sup> See, e.g., *Aronson v. Lewis*, 473 A.2d 805, 811 (Del. 1984) (citing Del. Code. Ann. tit. 8, § 141(a) (1983)).

<sup>18</sup> See generally Lucian A. Bebchuk & Robert J. Jackson, Jr., *The Law and Economics of Blockholder Disclosure*, 2 HARV. BUS. L. REV. 40 (Spring 2012) (asserting that unlike smaller dispersed shareholders, blockholders are incentivized to invest in managerial monitoring and engagement).



prioritize firm value maximization over competing personal goals.<sup>19</sup>

However, there is a consensus that the effectiveness of all of these governance devices depends on the extent to which stock prices are accurate. For the boards and shareholders that wield these devices, more accurate stock prices—that is, prices that contain more information about firms’ likely future cash flows—are believed to better communicate the extent to which management is in fact maximizing firm profits.<sup>20</sup> For this reason, scholars teach that when boards and shareholders can rely on these prices for such information, they can better use the traditional tools that corporate law provides for reducing agency costs. For example, stock prices that are accurately high relative to a firm’s book value or relative to the stock prices of similarly situated firms communicate to boards and shareholders that management is better maximizing firm value, while prices that are accurately low relative to these measures signal the opposite. Furthermore, higher levels of stock-price accuracy also improve the functioning of the newer corporate-governance tools of blockholder activism and stock-based compensation. For example, when stocks’ prices better reflect their fundamental values, managers place a higher value on company stock, thereby reducing agency costs by allowing firms to compensate managers with interest-aligning stock in lieu of straight salary. More specifically, enhanced stock-price accuracy allows companies to compensate managers in this form without having to pay excessive premiums to get the managers to accept payment in this riskier form.<sup>21</sup> Thus,

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<sup>19</sup> See Steven Shavell, *Risk Sharing and Incentives in the Principal and Agent Relationship*, 10 BELL J. ECON. 55 (1979); Michael C. Jensen & William H. Meckling, *Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure*, 3 J. Fin. Econ. 305, 308–10 (1976).

<sup>20</sup> See, e.g., HARRIS, *supra* note 7, at 211 (“Informative stock prices provide shareholders with useful information about how well their managers are performing.”).

<sup>21</sup> See Fox, *supra* note 8, at 1022 (“The higher the expected accuracy of a firm’s share price, [the less risk it poses to a manager, and therefore] the more willing a manager will be for a large portion of his compensation package to be share price based.”).

when public companies' stocks are more accurately priced, boards and shareholders are widely thought to be better able to use a variety of corporate-governance devices to reduce agency costs—thereby leading society to produce more wealth.

## 2. Capital Allocation

Conventional economic theory also holds that society generates more wealth when it allocates its scarce capital in an economically efficient manner—that is, when it allocates a larger amount of capital to more promising endeavors and a smaller amount to less promising ones. Scholars assert that when stocks' market prices more accurately reflect the the cash flows to which their holders will likely be entitled, firms with superior projects are able to access more of society's capital, and those with inferior ones are only able to access less of it. When stocks' market prices are accurate, these scholars reason, companies with larger expected profits have—all else equal—higher stock prices than those with smaller expected profits. As a result, they have a lower cost of capital because, for example, they can sell a given portion of their company in exchange for a larger amount of money. They therefore are able to access more capital to pursue their superior projects. Likewise, when stocks' market prices are accurate, firms with smaller expected profits have—all else equal—lower prices than those with superior ones. As a result, they have a higher cost of capital because, for example, they are only able to trade ownership rights to a given portion of their company for a smaller amount of money. As a result, they are only able to access less of society's capital to pursue those inferior projects. Accordingly, when stock prices are accurate, firms with superior prospects—that is, those with higher values—will generally draw more capital and firms with inferior ones—that is, those with smaller expected future cash flows—will draw less.<sup>22</sup>

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<sup>22</sup> See Friedrich Hayek, *The Use of Knowledge in Society*, 35 AM. ECON. REV. 519, 519–20 (1945); see also Goshen & Parchomovsky, *supra*

Of course, these scholars also assert that the reverse is true when stocks' market prices are less accurate. Stock prices that do not accurately reflect firms' values can lead companies with superior prospects to nevertheless have difficulty raising enough capital to pursue their projects and the associated superior returns. They can also allow those with inferior projects to raise more capital than society should allocate to their projects and the associated inferior returns. Accordingly, these scholars teach that inaccurate stock prices lead society to allocate capital less efficiently than it would if those prices more precisely reflected fundamental values.<sup>23</sup>

Finally, there is another way in which higher stock-price accuracy is thought to increase—and lower stock-price accuracy is thought to decrease—the extent to which society allocates its capital efficiently. Today, the predominant source of funds for new investment in the economy is internally generated firm capital, and the biggest consequence of poor corporate governance is the misuse of this capital. When stock prices are accurate, boards and shareholders are better able to use the corporate-governance tools discussed in the immediately preceding Subsection to limit the extent to which managers misuse these funds. So, the corporate-governance benefits of enhanced stock-price accuracy are also thought to improve the efficiency with which society allocates its scarce capital.

This initial background Part has recited consensus views relating to stock-price accuracy and its main social benefits. These broadly accepted understandings motivate a large amount of law and commentary on the corporate disclosure, fraud, and insider-trading laws that make up the lion's share of securities law today. However, those three main areas of securities law primarily center on the firms that issue stock. And the ability of regulators to improve stock-price accuracy

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note 3, at 720 ("Accurate pricing is essential for achieving efficient allocation of resources in the economy.").

<sup>23</sup> See, e.g., Fox, *supra* note 8, at 1016 ("If the market prices of securities are inaccurate, a misallocation of resources for real investment can occur.").

in a manner that would enhance firm governance and capital allocation by altering stock-market law has gone undetected. In building to the conclusion that it is likely that regulators can materially improve stock-price accuracy by reforming central aspects of stock-market law, the next Part provides essential background on how stocks are traded today.

### III. CONTEMPORARY STOCK TRADING

At its core, contemporary stock trading involves the market participants who trade stocks and the platforms through which they complete almost all of their trading. The former are composed of the individuals and institutions that buy and sell public companies' stocks based on a wide spectrum of motivations. The latter are made up of two types of highly sophisticated electronic trading systems: exchange platforms and off-exchange platforms.

Section A describes the universe of stock traders. Section B then details the platforms through which they buy and sell stocks.

#### A. Stock Traders

The market participants that buy and sell stocks in the contemporary stock market can be broken down into three broad types: informed traders, uninformed traders, and professional liquidity-providing traders.<sup>24</sup>

##### 1. Informed Traders

Informed traders are those who purchase and sell stocks based on information as to companies' fundamental values that is not yet reflected in market prices—thereby making stock prices more accurate.<sup>25</sup> They specialize in using firm-

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<sup>24</sup> This simplified description of stock traders draws from a fuller model described in the seminal treatise on market microstructure alluded to earlier. See HARRIS, *supra* note 7. A more detailed description, such as the fuller one referenced here, would delineate sub-types and describe traders as operating to varying degrees across them.

<sup>25</sup> See generally *supra* Introduction & Part II.A.2.

specific and market-wide information to identify when stocks' market prices are lower or higher than their fundamental values,<sup>26</sup> and then buying when they encounter underpriced stocks and selling when they find overpriced ones.

This group of traders is composed primarily of institutional traders—including some investment banks, hedge funds, private equity funds, and actively managed mutual funds. It is also thought to include some small subset of the universe of the individuals that buy and sell stocks through retail brokerage accounts.

Importantly, relative to uninformed traders, informed traders as a whole trade in and out of stocks frequently. On one end of the informed-trader spectrum, some “high-frequency” traders who are thought to be trading based on fundamental-value information enter and exit positions with the help of computer algorithms within less than one millisecond. On the other end of that spectrum, private equity funds, activist hedge funds, and actively managed mutual funds commonly hold stocks for years. However, even these longer-term informed traders generally enter and exit stock positions more frequently than uninformed traders do.

## 2. Uninformed Traders

In contrast to informed traders, uninformed traders are the market participants that buy and sell stocks for reasons other than those based on new fundamental-value information. Most commonly, they invest in stocks to store wealth for future consumption. As such, most of their trading is driven by the motivation to accumulate, adjust, or liquidate aspects of their desired portfolio of stocks.<sup>27</sup>

Like informed traders, uninformed ones come in the form of both individuals and institutions. With regard to the former, scholars, regulators, and the trading industry

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<sup>26</sup> See Goshen & Parchomovsky, *supra* note 3, at 714.

<sup>27</sup> See generally HARRIS, *supra* note 7, at 177–78 (describing these traders' wealth-storing motivation as well as a host of other extra-informational trading motivations).

generally assume that the great majority of individual retail-level traders does not trade on the basis of superior information.<sup>28</sup> With regard to the latter, many institutional traders (such as index-driven mutual funds, pension funds, and insurance-companies) pursue diversified portfolios of stock that allow them to earn a risk premium and are not trading based on unique new information about stocks' fundamental values.

Critically, unlike informed traders, the majority of uninformed traders buys and sells in and out of individual stocks only on an infrequent basis. In fact, a large portion of uninformed traders is made up of what are often referred to as "buy and hold" investors—that is, investors that purchase a number of stocks for their stock portfolio, and then hold them over sustained periods of time that are often more easily calculated by decades than milliseconds, seconds, days, weeks, or even months. For example, individuals often purchase stocks in their 401(k) accounts, holding those stocks until they sell them off to consume during retirement. And index-driven mutual funds generally accumulate diversified portfolios of stocks, trading only in a limited number of circumstances (such as when they must increase the size of their holdings when new investors buy into their investment funds).<sup>29</sup>

### 3. Professional Liquidity-Providing Traders

In today's stock market, informed traders and uninformed traders that seek to buy or sell stock quickly are generally unable to trade with each other. Instead, they must trade through the third and final type of stock trader: the professional liquidity provider. Professional liquidity

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<sup>28</sup> See, e.g., Christine A. Parlour & Uday Rajan, *Payment for Order Flow*, 68 J. FIN. ECON. 379, 381 (2003) ("Retail order flow is widely believed to be uninformed.").

<sup>29</sup> Additionally, I group noise traders under the category of uninformed trader because they, by definition, are traders "who act irrationally, falsely believing that they possess some valuable informational advantage or superior trading skills." Goshen & Parchomovsky, *supra* note 3, at 714–15.

providers are those that operate as intermediaries between other stock traders in a manner that allows those other traders to buy and sell stock in—at a minimum—a relatively quick timeframe. These professional traders typically maintain an inventory of shares for a large selection of public stocks,<sup>30</sup> thereby allowing them to supply their liquidity services to the traders that seek to purchase and sell those stocks on demand. Professional liquidity providers mostly come in the form of high-frequency traders—that is, a type of trader that often enters and exits stock positions via complex algorithms within well under a millisecond. Thus, this third type of trader is essentially composed of a highly evolved version of traditional market makers, securities dealers, exchange specialists, and the like.

Professional liquidity providers supply their services to other traders by executing their orders to buy and sell securities at, respectively, “ask” and “bid” prices. Ask prices are those at which these professionals are willing to sell stock from their inventories to those seeking to buy stock in a relatively quick timeframe, and thus represent the prices at which traders can buy stock quickly. For example, if a liquidity provider is executing traders’ buy orders at ask prices of \$44.12 per share, an investor can procure the stock by paying \$44.12 per share to the liquidity provider. Conversely, bid prices are those at which liquidity providers are willing to buy stock for their inventories from traders seeking to sell stock quickly, and therefore represent the prices at which traders can sell stock in a small timeframe. For example, if a liquidity provider is transacting traders’ sell orders at bid prices of \$44.08 per share, then an investor

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<sup>30</sup> See, e.g., Chris Concanon, President and Chief Operating Officer, Virtu Financial LLC, Columbia Law School and Business School Program on the Law and Economics of Capital Markets November 2012 Workshop on High-Frequency Trading (Nov. 29, 2012), *available at* <http://web.law.columbia.edu/capital-markets/previous-workshops/2012>, *archived at* <http://perma.cc/Y5RS-67NG>. Larger professional liquidity providers commonly supply liquidity services for all of the 5,000 or so exchange-listed equity securities in the United States.

can sell the stock to the liquidity provider by accepting \$44.08 in return for each share sold.

Crucially, professional liquidity providers' ask prices are generally above the market's current assessment of a stock's fundamental value, and their bid prices are generally below that market value—with each spaced out equidistantly from it.<sup>31</sup> This spacing out of their bid and ask prices around current market values allows liquidity providers to earn their “bid-ask spread”—that is, the revenue that they garner when they are able to buy shares from one trader at their lower bid prices and then turn around and sell them to another trader at their higher ask prices. Indeed, by placing their bid quotes and ask quotes equidistantly—yet not too far—away from stocks' current market values, these professionals aim to attract an even two-sided flow of trader buy and sell orders that allows them to make their spread from a long line of stock buyers and sellers.<sup>32</sup> For example, if the market currently assesses a stock's fundamental value to be \$44.10 per share, liquidity providers might be executing traders' sell orders at their best (highest) bid prices of \$44.08 per share, and other traders' buy orders at their best (lowest) ask prices of \$44.12 per share. In this situation, the liquidity providers would earn \$0.04 each time they bought a share from a trader at their \$44.08 bid prices and turned around and sold that share to another at their \$44.12 ask prices.

Moreover, because professional liquidity providers transact at this bid-ask spread, there is generally a difference between, on the one hand, the prices at which traders can purchase and sell stocks quickly and, on the other, the market's valuation of those stocks. This delta dictates that a trader seeking to buy a stock from a liquidity provider will generally pay more than the stock's market value to procure it, and that a trader that wants to sell a stock to a liquidity provider will for the most part receive less than that value in return for it. Returning to the

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<sup>31</sup> See HARRIS, *supra* note 7, at 287 (“[Liquidity providers] . . . set their bids below fundamental values and their offers above them.”).

<sup>32</sup> See, e.g., *id.* at 401 (“[Liquidity providers] simply try to discover the prices that produce balanced two-sided order flows.”).



previous example, if the current value of a stock is, once again, \$44.10 per share, and liquidity providers' best (lowest) ask prices are \$44.12 per share and their best (highest) bid prices are \$44.08 per share, then a stock buyer must pay \$0.02 more than the stock's current market value of \$44.10 to procure the stock quickly, and, likewise, a stock seller must be willing to accept \$0.02 less than that \$44.10 value to sell the stock in a short timeframe.

Lastly, it is important to note that the size of this delta between the market's assessment of a stock's fundamental value and liquidity providers' ask and bid prices determines the quality of the prices received by the traders that transact against them. Bid and ask prices that are closer to that market assessment are superior, while such prices that are farther away from that market valuation are inferior. To continue the above example, stock buyers that pay another liquidity providers' higher \$44.13-per-share ask price would receive an inferior price, while those that pay yet another liquidity provider's lower \$44.11-per-share ask price would receive a superior one.

Professional liquidity providers thus provide traders with a valuable service: they allow them to transact in a relatively fast timeframe. However, the ability to trade quickly comes with a caveat: those that buy from liquidity providers must pay their ask prices, and those that sell to them must accept their bid prices—ask and bid prices that are generally inferior to current market assessments of stocks' values.<sup>33</sup>

## B. Stock Trading Platforms

Through the end of the twentieth century, the great majority of all stock trading took place through people on the floor of the New York Stock Exchange.<sup>34</sup> However, there have

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<sup>33</sup> This need to transact against these inferior prices is commonly viewed as giving rise to a "spread cost." Thus, a buyer who bought the stock in the example in the text at a \$44.12 ask price when its current market value was \$44.10 would be said to have paid a \$0.02 spread cost in order to trade on demand.

<sup>34</sup> The NYSE was able to maintain its dominance throughout that century, in part, by prohibiting its members from trading stocks anywhere

been enormous changes in the industrial organization of the stock market since the beginning of the twenty-first century. Those changes have resulted in stock trading now occurring almost entirely through two types of sophisticated electronic trading platforms: exchange platforms (through which a little over 60% of all trading takes place) and off-exchange platforms (through which the remaining almost 40% occurs).<sup>35</sup>

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else. See *In the Midst of Revolution: The SEC, 1973–1981*, SECURITIES AND EXCHANGE HISTORICAL SOCIETY, <http://www.sechistorical.org/museum/galleries/rev/rev03g.php>, archived at <http://perma.cc/6ALF-EBNY>. Many securities professionals would have faced serious impediments to conducting a successful business if they had been barred from trading on the dominant exchange. For that reason, they opted for membership to the NYSE, and avoided trading elsewhere. The extent to which exchange-listed stocks were traded away from the “Big Board” was therefore limited in terms of both its sophistication and scope. However, in 1979, the SEC made it illegal for exchanges to prohibit their members from transacting at other exchanges—thereby paving the way for the emergence of competition from other exchanges. And in 2002, in the face of mounting SEC pressure, the NYSE repealed its member-limitation rule altogether—which thus allowed for robust off-exchange competition from new highly sophisticated off-exchange platforms. The SEC now broadly proscribes exchanges from restricting where their members transact. See Securities Exchange Act Rule 19c-3, 17 C.F.R. § 240.19c-3 (2005).

<sup>35</sup> See, e.g., Rosenblatt Securities, *Peeling the TRF Onion* (2013) (unpublished study on file with the author); JPMORGAN, MARKET STRUCTURE UPDATE 3 (Sept. 17, 2013) (on file with author). Notably, the distribution of trading across these two platforms can vary widely by individual security. Some stocks trade 75% through off-exchange platforms and 25% via exchanges. Others trade 15% through off-exchange platforms and 85% via exchanges. See Maureen O’Hara, *Is Market Fragmentation Harming Market Quality*, 100 J. FIN. ECON. 459, 465 (June 2011). However, about half of all publicly traded stocks now have over 40% of their trading volume occurring through off-exchange platforms. See Frank Hatheway, Amy Kwan & Hui Zheng, *An Empirical Analysis of Market Segmentation on U.S. Equities Markets* (2013), <http://web.law.columbia.edu/sites/default/files/microsites/law-economics-studies/Segmentation%20Hatheway%20Kwan%20and%20Zheng%20September%202013%20draft%20v1.pdf>, archived at <http://perma.cc/JMN6-WVF6>. Moreover, the portion of all trading attributable to off-exchange platforms has risen at an impressive clip in the years since the New York Stock Exchange repealed its rule that effectively led to the overwhelming majority of all trading to take place on

## 1. Exchange Trading Platforms

Contemporary stock exchanges—such as the well-known New York Stock Exchange and NASDAQ Stock Market—are electronic trading systems that operate continuous auctions in which liquidity providers post legally binding<sup>36</sup> price quotes.<sup>37</sup> More precisely, these exchange liquidity providers post firm ask price quotes—which allow other traders to purchase stocks from them at the quoted price on demand. And they display binding bid price quotes—which permit other traders to sell stocks to them in return for the quoted price immediately with certainty. Indeed, traders today may submit immediately executable buy and sell orders to one or more exchanges simultaneously and expect to transact even large quantities of shares against liquidity-provider quotes in a fraction of a millisecond.<sup>38</sup>

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its floor. In fact, just seven years ago, less than 15% of all trading occurred through off-exchange trading platforms. *See, e.g.,* Rosenblatt Securities, *supra*.

<sup>36</sup> *See* Regulation National Market System Rule 602(b), 17 C.F.R. § 242.602(b) (2005).

<sup>37</sup> Almost all exchange trading takes place through SEC-approved “registered national securities exchanges.” In addition to having to register and gain SEC approval to operate as such an exchange, *see* Securities and Exchange Act § 6, 15 U.S.C. § 78f (1934), these trading platforms are heavily regulated on an ongoing basis. *See, e.g., id.* § 19, 15 U.S.C. § 78s (requiring exchanges to procure SEC approval before changing trading rules). Currently, there are eleven trading platforms that are registered with the SEC as stock exchanges. The remainder of exchange trading takes place through what are known as “electronic communications systems.” Unlike registered exchanges, however, these systems that too operate continuous auctions with firmly posted liquidity-provider quotes are registered under Regulation of Exchanges and Alternative Trading System, which provides a more flexible framework than the one that governs registered exchanges. *See* Concept Release, *supra* note 2, at 18. ECNs now host as little as less than one percent of all trading. *See id.* at 14–15, 18.

<sup>38</sup> *See* Concept Release, *supra* note 2, at 16 (“The registered exchanges all have adopted highly automated trading systems that can offer extremely high-speed . . . order responses and executions. Published average response times . . . have been reduced to less than 1 millisecond.”).

Of paramount importance, trading at exchanges centers around more than simply these best liquidity-provider ask and bid quotes. At the threshold, exchange liquidity providers are not willing to post legally binding offers to the marketplace for infinite numbers of shares at their best ask and bid prices. For this reason, they quote a limited number of shares at those prices—and they then quote successively inferior ask and bid prices (both of which are also good for a set number of shares only). When traders exhaust the finite quantity that is firmly posted at those best prices, they must then trade at the next-best available price—and when the number of shares at that next-best price is exhausted, they must then transact at the next level of quoted prices, and so on. For example, assume again that exchange liquidity providers' best (lowest) ask price quotes are \$44.12 per share. These liquidity providers may be quoting only 1,000 shares at that best ask price, with another 1,000 shares at a next-best ask price of \$44.13 per share, and another 1,000 shares at an even higher next-best ask price of \$44.14 per share, and so on. A large investor seeking to buy, say, \$10 million of the stock immediately with certainty would therefore pay an average per-share execution price that is far higher than simply \$44.12.

Stock exchanges and the liquidity providers that post quotes on them thus provide traders with a valuable service above and beyond that provided by professional liquidity providers more generally: they allow traders to transact immediately with certainty against firm liquidity-provider quotes. However, the ability to trade on demand at exchanges comes with an even more significant version of the caveat associated with the services provided by liquidity providers more generally: stock buyers must pay exchange liquidity providers' ask prices, and stock sellers must accept their bid prices. And again, as a general matter, these prices are at least nominally inferior to those received by traders that transact through off-exchange trading platforms.

## 2. Off-Exchange Trading Platforms<sup>39</sup>

Off-exchange trading platforms are electronic trading systems through which liquidity providers—often the platform owners themselves—facilitate the execution of orders to buy and sell stocks at prices that reference those contemporaneously quoted through exchanges. By law, these off-exchange transactions must occur at ask and bid prices that are at least as good as the best ones then displayed on exchanges nationwide.<sup>40</sup> And by practice, they generally occur at prices that are at least nominally superior to those exchange prices.

Off-exchange platforms come in many forms across a wide spectrum. At one end of that spectrum, liquidity providers operating on these trading systems execute investor orders at prices that essentially match the best ones posted on exchanges. The traders that transact through these platforms also generally receive a nominal improvement on the exchange price—typically a mere hundredth of a penny (\$0.0001). For example, suppose once again that exchange liquidity providers are posting best (lowest) ask quotes of

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<sup>39</sup> A large portion of the universe of these platforms has been referred to as “internalizing” platforms because they grew out of the practice in which businesses that operate as both stock brokers and stock dealers transacted their customers’ orders within their organizations—that is, without routing them to outside trading platforms or stock dealers. *See generally* HARRIS, *supra* note 7, at 514, 162. That term is now anachronistic because the manner in which these platforms function has greatly expanded over the past decade or more. Further, a large portion of off-exchange trading systems are labeled “dark pools,” ostensibly because they allow liquidity providers to provide bid and ask prices without openly displaying them—that is, “in the dark.” However, that term provides an inaccurate impression of the trading associated with these platforms because bid and ask prices available at these platforms are often readily discernible. Moreover, transactions through these “dark pools” are anything but opaque: they are, by law, immediately reported to the public in the same manner in which exchange transactions are reported to the public. *See* Regulation National Market System Rule 601, 17 C.F.R. § 242.601 (2005).

<sup>40</sup> *See* Regulation National Market System Rule 611, 17 C.F.R. § 242.611 (2005).

\$44.12 per share. In this situation, a trader's buy order that is executed at one of these off-exchange platforms would transact at a slightly better (lower) price of \$44.1199 per share—thereby allowing the investor to purchase the stock at a \$0.0001-per-share discount on the exchange price.

In the middle of the off-exchange spectrum are trading platforms that facilitate trade execution that entails much more substantial improvement on exchange price quotes. To continue the previous example, if the best (lowest) ask quote for a stock on exchange platforms is \$44.12 per share, then off-exchange platforms may execute traders' orders to buy stock at a significantly better (lower) ask price of \$44.11 per share.

Lastly, although they are uncommon today, at the other end of the off-exchange spectrum are trading systems that help traders transact at the midpoint between the best exchange ask and bid quotes. Market participants' orders that are routed to these trading platforms therefore execute at what is generally the stock's current market value.<sup>41</sup> Indeed, this last type of off-exchange platform generally crosses traders' buy and sell orders against each other at that price—allowing traders to provide liquidity directly to each other, and thereby removing professional liquidity-provider intermediation from the trading process altogether.<sup>42</sup> Thus, the trader in our earlier example would transact at \$44.10—which was halfway between the best (highest) bid price in the market of \$44.08 and the best (lowest) ask price of \$44.12.

Focusing on the market participants that trade stocks as well as the platforms through which they conduct their buying and selling, this Part has laid out important information on how stocks are traded in the contemporary stock market. And Part II before it provided an equally relevant overview relating to the accuracy of stock prices—including consensus views as to the main social benefits of enhanced accuracy. With this background, the next Part

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<sup>41</sup> See generally *supra* Part III.A.3.

<sup>42</sup> See, e.g., O'Hara, *supra* note 35, at 463 tbl. 1.

offers novel insights on how central, yet little-noticed stock-market rules affect contemporary stock trading as well as stock-price accuracy and its main social benefits. Moreover, it explains why these insights lead to the conclusion that lawmakers, as a matter of theory, have a fourth main securities-law tool (stock-market law) for increasing both the accuracy of public companies' stock prices and the main benefits that flow from more accurate stock prices.

#### IV. IMPLICATIONS OF CENTRAL, YET LITTLE-NOTICED, STOCK-MARKET RULES

The trading-platform access rules allow off-exchange platforms to determine which traders can and cannot buy and sell stocks through their trading systems, while requiring exchanges to remain open to all traders.<sup>43</sup> As shown in this Part, these underappreciated stock-market rules theoretically affect contemporary stock trading in a manner that ultimately results in informed traders facing price quotes that are both inferior and more sensitive to trading activity. Facing these altered price quotes, informed traders have fewer profitable trading opportunities and therefore a lower incentive to produce (or pay in return for) information about firms' prospects. This lower incentive, in turn, leads to a situation in which society generates less of this valuable information. As a result, stock prices are materially less accurate than they otherwise might be—that is, the lower level of stock-price accuracy affects the quality under which corporations are governed and with which capital is allocated. In the end, these theoretical effects on contemporary stock trading and stock-price accuracy and its main social benefits lead to the inference that lawmakers have an additional securities-law tool for materially increasing the accuracy of public companies' stock prices. That is, they can enhance the accuracy of these prices in a manner that improves corporate governance and capital allocation not just by making adjustments to well-studied

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<sup>43</sup> See *supra* notes 1–2 and accompanying text.

core of securities law (disclosure, fraud, and insider-trading laws), but also by changing stock-market law.

Section A examines the likely effects of the trading-platform access rules on contemporary stock trading. Section B then explores the likely impact of those effects on stock-price accuracy and its main social benefits. Finally, Section C explains why these theories lead to the conclusion that lawmakers have a previously unidentified way in which they can materially bolster the accuracy of public companies' stock prices.

## A. Contemporary Stock Trading

As a matter of theory, the trading-platform access rules result in off-exchange trading being dominated by uninformed traders. And because almost 40% of all trading<sup>44</sup> occurs through these platforms that are dominated by uninformed traders, trading at exchanges necessarily involves a far higher ratio of informed traders to uninformed ones than it otherwise might. In response to this higher ratio, the exchange trading environment changes in ways that result in exchange liquidity providers quoting prices that are both inferior and more sensitive to trading activity.

### 1. Off-Exchange Trading

At the threshold, there is strong reason to believe that the legal ability of off-exchange platforms to determine which traders can and cannot access their trading systems results in off-exchange trading being dominated by uninformed traders. Off-exchange platforms likely use their legal ability to discriminate among traders in order to target uninformed traders and exclude informed ones. In the moments after uninformed traders buy or sell stocks, stock prices are generally stable. After all, these traders are not trading based on information as to mispricings that will soon become apparent to the market. This price stability allows those that supply liquidity services to uninformed traders to generate

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<sup>44</sup> See *supra* note 35 and accompanying text.



revenue by purchasing from some of them at their lower bid prices and selling to others at their higher ask prices. To continue the basic example used earlier, liquidity providers may be able to buy a stock at their best (highest) \$44.08-per-share bid prices from some uninformed traders, and then—before prices move—sell at their best (lowest) \$44.12-per-share ask prices to other uninformed traders, thereby gaining \$0.04 per share bought from one trader and sold to another.

Because liquidity providers can profit from their bid-ask spread when they supply their services to uninformed traders, off-exchange platforms can earn revenue by meeting those market participants' trading needs. For one thing, these platforms can bring in money by supplying liquidity services to uninformed traders on their own platforms. For another, they can earn income by using their uninformed-trader clients in order to attract others to perform that liquidity-supply function on their platforms. When they do so, the platforms can earn revenue in a variety of ways—including by charging those external liquidity providers in return for the right to supply their services through the platforms, by charging traders in return for the ability to access those liquidity providers' ask and bid prices on the platforms, or by charging for the dissemination of trading data attributable to trades that took place through the platforms. Accordingly, there is strong reason to believe that off-exchange platforms target uninformed traders because they can earn profits by meeting their trading needs.

Empirical evidence supports this assertion, as shown by the example of individual, retail-investor trading in the contemporary stock market. These investors are generally presumed to be uninformed ones.<sup>45</sup> And the SEC has found that retail stockbrokers—generally in return for payments from off-exchange platforms—now route nearly 100% of immediately executable orders from individual traders to

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<sup>45</sup> See Parlour & Rajan, *supra* note 28 and accompanying text.

these platforms.<sup>46</sup> Furthermore, all of the major exchanges have filed applications with the SEC requesting permission to operate off-exchange platforms that explicitly target retail investors and exclude institutional ones with the stated purpose of competing against off-exchange platforms in the market for individual investors' orders to buy and sell stock.<sup>47</sup>

At the same time, there is also strong reason to believe that off-exchange platforms use their legal discretion to deny access to their platforms in order to exclude informed traders. In contrast to the moments after uninformed traders buy and sell stocks, immediately after informed traders transact, prices generally move.<sup>48</sup> These price changes often occur so quickly that those that provided liquidity services to the informed traders—traders that have more information about stocks' fundamental values than liquidity providers have<sup>49</sup>—get stuck having bought a stock for their inventory that was overvalued, or having sold one that was undervalued. For this reason, providing liquidity services to

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<sup>46</sup> See Concept Release, *supra* note 2, at 21 (“A review of the order routing disclosures required by Rule 606 of Regulation [National Market System] of eight broker-dealers with significant retail customer accounts reveals that nearly 100% of their customer market orders are routed to [off-exchange trading platforms].”).

<sup>47</sup> See, e.g., Securities and Exchange Commission, Order Granting Approval to Proposed Rule Changes Adopting NYSE Rule 107C to Establish a Retail Liquidity Program for NYSE-Listed Securities, Exchange Act Release No. 34-67347 (July 3, 2012).

<sup>48</sup> See *supra* Part II.A.2 (explaining how trader buying and selling activity generally places, respectively, upward and downward pressure on prices).

<sup>49</sup> See, e.g., Goshen & Parchomovsky, *supra* note 3, at 725 (“[Liquidity providers] . . . do not invest as much time and effort in collecting and analyzing this information [as informed traders do].”); HARRIS, *supra* note 7, at 277 (“[Liquidity providers] tend to . . . not know much about . . . the fundamental values of the instruments that they trade.”); *supra* Part III.A. (explaining that professional liquidity providers primarily focus on maintaining a two-sided flow of buy and sell orders, while informed traders' main aim is to acquire information that indicates a mispricing).

informed traders is generally a losing proposition.<sup>50</sup> Indeed, it is well established that liquidity providers incur costs in the form of trading losses when they supply their liquidity services to informed traders.<sup>51</sup> And it is likewise well established that these losses to informed traders form one of the main costs associated with the liquidity-provision business. Thus, off-exchange platforms presumably use their legal ability to exclude in order to exclude informed traders so that they can mitigate this cost that informed traders impose on liquidity providers.<sup>52</sup>

Moreover, the legal ability to discriminate among traders also theoretically results in trading at these platforms being dominated by uninformed traders because it leads a significant portion of informed traders to prefer to complete much of its trading through exchanges. Inherent in the legal ability to select which traders they will and will not welcome is the ability to select which trader *orders* they will and will not transact. Liquidity providers generally want to execute only an even two-sided stream of buy and sell orders that allows them to earn the difference between their higher ask prices and lower bid prices.<sup>53</sup> Off-exchange liquidity providers therefore have an incentive to execute only those orders that will allow them to maintain a flow of trader orders that is at least somewhat balanced, and to avoid

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<sup>50</sup> See HARRIS, *supra* note 7, at 299 (“[I]nformed traders choose the side of the market on which they trade, and the [liquidity providers] end up losing money to them.”).

<sup>51</sup> For the seminal work identifying and measuring this liquidity-provider cost, see generally 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).

<sup>52</sup> Of course, off-exchange platforms will at times have difficulty identifying—and therefore excluding—informed traders. However, these platforms have plenary access to their customers’ identities and trading performance, and—not unlike a casino—can exclude known informed traders and repeat winners. Moreover, these platforms may also exclude informed traders by only granting access to traders who they know are uninformed (such as familiar portfolio managers at index funds).

<sup>53</sup> See HARRIS, *supra* note 7, at 401 (“[Liquidity providers] simply try to discover the prices that produce balanced two-sided order flows.”).

providing liquidity services opposite a disproportionately high set of buy orders or sell orders. As a result, they will often not execute orders from even the traders to which they grant access—let alone execute them with certainty within less than a millisecond as exchanges do. In fact, these platforms often reject—or at least do not immediately execute—the trader orders they receive. Consequently, these traders and their brokers must route their orders to other off-exchange platforms—with orders commonly going through several such platforms in succession.<sup>54</sup> In fact, orders are often routed to several such platforms before ultimately being sent to exchanges for guaranteed execution. In the end, the legal ability to select which traders they will and will not allow to access them can result in these trading systems providing liquidity services that entail, at a minimum, some material time delay—and, at a maximum, no execution whatsoever. Thus, the legal ability to pick and choose traders—which includes the power to select specific trader orders and reject or pass on others—also results in off-exchange platforms operating in a manner that provides traders with relatively little speed and certainty value.<sup>55</sup>

Speed and certainty are often of special concern to informed traders. Informed traders profit based on an information asset: information about firms' prospects that is not yet incorporated into their market prices.<sup>56</sup> However, the value of this asset generally depreciates over time. Moreover, the time period over which it loses its value is frequently small for three reasons. First, slow trade execution by the initial investor to procure information risks that other

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<sup>54</sup> See Robert A. Bright, Dennis Dick & Diane Anderson, Untitled SEC Comment Letter (Mar. 24, 2010), *available at* <http://www.sec.gov/comments/s7-02-10/s70210-63.pdf>, *archived at* <http://perma.cc/G5F2-X2DA>.

<sup>55</sup> Orders submitted to the off-exchange platforms that cross traders' orders against each other without the intermediation of a professional liquidity provider, *see supra* Part III.B.2, are associated with an especially low level of execution speed and certainty because they require corresponding, opposite-side orders in order to facilitate a trade.

<sup>56</sup> *See generally supra* Part III.A.1.

traders will have time to discover the information and trade on it first, thereby causing prices to reflect that information before the initial trader can profit on it.<sup>57</sup> Second, when information is known by the corporate issuer of a stock, but has not been made public by that issuer, the issuer may at any time make it public via disclosure or other means—thereby greatly reducing or eliminating altogether the value of the information to an informed trader who had procured it earlier.<sup>58</sup> Third, and perhaps most importantly, slow and uncertain execution risks that an informed trader's own transactions themselves will alert the rest of the market to its information before it can capture sufficient trading profits.<sup>59</sup> As a result, many informed traders place a high premium on the ability to transact quickly with certainty. In fact, for these traders execution speed and certainty are often more important than even the quality of the prices they receive.<sup>60</sup> So, to maximize the profits that they earn based on their depreciating asset, even those informed traders that are able to access off-exchange platforms often prefer to complete much of their trading at exchanges.<sup>61</sup>

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<sup>57</sup> See, e.g., Goshen & Parchomovsky, *supra* note 6, at 1267 (“Because [informed traders] operate in a competitive environment to maximize the return on investment in information, the [informed trader] who first obtains nonpublic information will have to process the information to the market as quickly as possible, lest she be beaten by other [informed traders].”).

<sup>58</sup> Once the information is publicly disclosed, any trader that is able to analyze its import can trade on it. Further, liquidity providers themselves may learn of this publicly disseminated information and adjust their bid and ask prices accordingly.

<sup>59</sup> See generally *infra* Part IV.B. (explaining how liquidity providers adjust their price quotes—and therefore market prices—in response to large one-sided buying or selling activity within milliseconds).

<sup>60</sup> See O'Hara, *supra* note 35, at 463 (“For some traders, [execution] speed is more important than [the inferior prices often associated with transacting at large bid-ask] spread[s].”).

<sup>61</sup> To be sure, some subset of the informed-trader universe will nevertheless want to conduct a portion of its trading through off-exchange platforms. For example, many activist hedge funds, private equity funds, and actively managed mutual funds trade based on information that does not depreciate in value as quickly as many other types of information.

Lastly, it is important to recall that traders are only able to transact at off-exchange platforms at prices that are equal to or better than those posted on exchanges.<sup>62</sup> Those that trade off-exchange will therefore often face only a relatively small number of shares available at these platforms because liquidity providers are only willing to supply so much liquidity at those top prices.<sup>63</sup> As a result, informed traders will be forced to turn to exchanges to complete their desired trading at those prices as well as the next-best ask and bid prices—meaning that there is a second reason why informed traders will prefer to complete much of their trading through exchanges.

Thus, as a matter of theory, the trading-platform access rules result in off-exchange trading being dominated by uninformed traders.

## 2. Exchange Trading

In addition to their impact on off-exchange trading, the trading-platform access rules also leave their mark on exchange trading. Because these rules require exchanges to welcome all traders, exchange trading is characterized by a mix of both informed and uninformed traders. However, almost 40% of all trading now occurs through off-exchange platforms,<sup>64</sup> which are theoretically dominated by uninformed traders as a result of their ability to discriminate among traders. With such a large portion of the uninformed-

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They therefore likely meet some of their trading needs through both exchanges and off-exchange platforms via smaller trades over a sustained period. Furthermore, even the informed traders that do have informational assets that depreciate more quickly routinely attempt to achieve their speed and certainty goals by at least initially sending their orders to both exchanges and off-exchange platforms simultaneously when they begin trading.

<sup>62</sup> See *supra* note 36 and accompanying text.

<sup>63</sup> See *supra* Part III.B.1 (explaining this concept in the closely related context of exchange liquidity providers and the limited number of shares that they are willing to offer at their best (lowest) ask prices and best (highest) bid prices).

<sup>64</sup> See O'Hara, *supra* note 35, at 465.

trader universe now transacting via off-exchange platforms, exchange trading necessarily entails a far higher ratio of informed traders to uninformed ones than it otherwise might.

### 3. Exchange Liquidity Providers' Price Quotes

Of critical importance here, the heightened ratio of informed traders to uninformed ones discussed immediately above creates an exchange trading environment that causes exchange liquidity providers to quote prices that are both inferior and more sensitive to trading activity.

Professional liquidity providers will not supply their services unless they can earn revenues that outweigh their costs. And one of their largest costs arises out of the trading losses that informed traders impose on them.<sup>65</sup> Moreover, *exchange* liquidity providers are especially concerned with these costs. For one thing, when these liquidity providers post their quotes, those quotes must—by law—be firm.<sup>66</sup> For another, any trader—also by law—may access those firm quotes.<sup>67</sup> To maintain a business with revenues that at least equal their costs, these vulnerable liquidity providers must therefore be particularly aware of how to offset the trading-loss costs imposed by informed traders.

The main way in which exchange liquidity providers offset the costs that informed traders impose on them is by garnering revenues via spread-earning transactions with uninformed traders.<sup>68</sup> Liquidity providers generate revenues by purchasing from some uninformed traders at their lower bid prices, and more or less contemporaneously selling to

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<sup>65</sup> See *supra* Part IV.A.1.

<sup>66</sup> See *supra* note 37.

<sup>67</sup> See *supra* note 1 and accompanying text; see generally *supra* Part III.B.1.

<sup>68</sup> See Glosten & Milgrom, *supra* note 51, at 72; HARRIS, *supra* note 7, at 299 (stating that exchange liquidity providers seek “to recoup from uninformed traders what they lose to informed traders.”); see generally Albert S. Kyle, *Informed Speculation with Imperfect Competition*, 56 REV. ECON. STUDIES 317 (1989) (providing the seminal articulation of this well-established principle of market microstructure).

other uninformed traders at their higher ask prices.<sup>69</sup> Indeed, the primary goal of those in the liquidity-provision business is to determine the bid and ask prices that will allow them to maintain a two-sided flow of sell and buy orders so that they can complete as many of these spread-earning transactions as possible—and so that they, at a minimum, have enough revenue from these transactions to more than cover their costs (including those imposed by informed traders).

Additionally, exchange liquidity providers are able to increase the chances of garnering sufficient revenues to cover their costs by minimizing the costs imposed by informed traders. Specifically, they minimize these costs by altering their price quotes in two well-known ways. First, exchange liquidity providers minimize the costs imposed by informed traders by quoting inferior prices. Inferior prices reduce the extent to which informed traders will spot profitable trading opportunities.<sup>70</sup> To return to the example used much earlier, imagine that the market currently assesses the value of a stock to be \$44.10 per share, that exchange liquidity providers are providing best (lowest) ask quotes of \$44.12 per share, and that informed traders have information that leads them to conclude that the stock is actually worth \$44.17 per share. If these traders buy the stock at \$44.12 per share from the liquidity providers, then they will profit at the liquidity providers' expense. However, if the liquidity providers instead were quoting inferior \$44.18-per-share best ask prices, then these traders would not be able to trade profitably—and they therefore would not impose trading losses on the liquidity providers.

Of paramount importance here, exchange liquidity providers do not merely decrease the costs imposed by informed traders by quoting inferior best (lowest) ask quotes and best (highest) bid quotes. They also decrease these costs by altering the number of shares that they are willing to trade at those prices as well as the number that they are

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<sup>69</sup> See *supra* Part IV.A.1.

<sup>70</sup> See HARRIS, *supra* note 7, at 6, 298.



willing to trade at their successively inferior quoted prices.<sup>71</sup> For example, a liquidity provider may quote a \$44.12-per-share best (lowest) ask price, albeit while posting a mere 500 shares at that price rather than 1,000, another 500 shares at \$44.13 per share rather than 1,000, and so on. Accordingly, exchange liquidity providers may decrease their losses to informed traders by quoting inferior prices—including both inferior best (lowest) ask prices and best (highest) bid prices as well as inferior quantities of shares at those prices and beyond.

Second, and equally as important here, exchange liquidity providers decrease the costs imposed by informed traders by altering the sensitivity of their quote-adjustment triggers. These liquidity providers alter their price quotes in response to the information that they glean from trading activity and more. It is such liquidity-provider alterations that result in informed traders' information being absorbed into market prices.<sup>72</sup> And in today's market, these price changes commonly occur within mere milliseconds after trades are executed. For example, suppose again that exchange liquidity providers are posting best (lowest) ask quotes of \$44.12 per share, and that they observe net buying against ask quotes in the market more generally for 30,000 shares in a short time period. After observing that buying activity, they may increase their best (lowest) ask quotes up from \$44.12 per share to \$44.16 per share in order to protect themselves from incurring losses to informed traders. But if they wanted even more protection, they may update their quotes upward after observing only 10,000 shares of such buying activity in that same time period. Thus, exchange liquidity providers also mitigate their losses to informed traders by lowering the threshold that elicits their price-quote adjustments.

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<sup>71</sup> See generally *supra* Part III.B.2 (detailing these aspects of exchange liquidity providers' quotes).

<sup>72</sup> See generally *supra* Part II.A.2 (describing the process in which fundamental-value information is incorporated into stocks' market prices as a consequence of trading activity).

The trading-platform access rules, however, lead to a trading environment on exchanges in which the main source of revenue for exchange liquidity providers is far smaller than it otherwise might be. Those rules result in large numbers of uninformed traders completing their trading through off-exchange platforms rather than exchanges. To ensure that they have revenues that exceed their costs despite this lower revenue received from uninformed traders, exchange liquidity providers must take steps to further reduce the costs imposed by informed traders. They do so by bolstering their price-quote defenses against informed-trader losses—that is, by quoting inferior prices<sup>73</sup> and reducing the trading-activity thresholds that trigger their adjustments to their prices. Accordingly, the far higher ratio of informed

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<sup>73</sup> A parallel work in progress in financial economics provides preliminary empirical support for the proposition that the growth of off-exchange trading is causing exchange liquidity providers to quote inferior prices. See Frank Hatheway, Amy Kwan & Hui Zheng, *An Empirical Analysis of Market Segmentation on U.S. Equities Markets 3* (Working Paper, 2014) (“[O]ur results show that [off-exchange] venues successfully segment the market and attract uninformed order flow from [exchanges]. The resulting market fragmentation leaves liquidity providers worse off on [exchanges], consequently harming overall market quality.”), available at [http://www.rhsmith.umd.edu/files/Documents/Centers/CFP/research/hatheway\\_kwan\\_zheng.pdf](http://www.rhsmith.umd.edu/files/Documents/Centers/CFP/research/hatheway_kwan_zheng.pdf), archived at <http://perma.cc/HM4Z-NYUB>. Moreover, financial economists have empirically demonstrated that previous diversions of far narrower sets of uninformed traders away from far narrower sets of liquidity providers caused those liquidity providers to quote inferior prices. See David Easley, Nicholas M. Kiefer & Maureen O’Hara, *Cream-Skimming or Profit-Sharing? The Curious Role of Purchased Order Flow*, 51 J. FIN. 811, 831 (1996) (“Since the orders diverted [away from the New York Stock Exchange and to regional exchanges] are the [informationally] ‘least risky,’ an adverse selection problem arises with respect to the remaining order flow [that goes to the New York Stock Exchange]. This, in turn, dictates that prices on the NYSE will worsen to reflect the change in order composition.”); see generally Mark J. Ready, *The Specialist’s Discretion: Stopped Orders and Price Improvement*, 12 REV. FIN. STUD. 1075 (1999) (evidencing that the New York Stock Exchange specialized liquidity providers were using their privileges to transact against uninformed traders, leaving external liquidity providers that posted quotes at the exchange to face a higher ratio of informed traders to uninformed ones than they might otherwise have faced, and therefore causing them to quote inferior prices).

traders to uninformed ones caused by the trading-platform access rules elicits a response from exchange liquidity providers: they quote prices that are both inferior and more sensitive to trading activity.

## B. Stock-Price Accuracy and Its Main Social Benefits

The inferior and more sensitive quotes posted by exchange liquidity providers that theoretically result from the trading-platform access rules have considerable import for informed traders. Specifically, they affect their trading profits—and therefore the extent to which these traders will invest in the production of information about firms' prospects. And for that reason, the exchange trading environment to which the trading-platform access rules lead has significant theoretical implications for both stock-price accuracy and its main social benefits.

### 1. Stock-Price Accuracy

Informed traders will only produce or procure information about firms' fundamental values and impound it into market prices if they can earn trading profits.<sup>74</sup> And to earn trading profits, they must bring in trading revenues that surpass their costs. These costs include considerable ones such as those relating to the procurement and analysis of fundamental-value information. Informed traders therefore must often buy and sell stock in large quantities to realize revenues sufficient to offset the high costs associated with their valuable work.<sup>75</sup>

However, it is likely that informed traders are to some significant extent relegated to transacting against firm liquidity-provider quotes on exchanges. For one thing, there is strong reason to believe that informed traders are often excluded by off-exchange trading platforms.<sup>76</sup> For another, it

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<sup>74</sup> See generally *supra* Part II.A.2; *supra* Part III.A.1.

<sup>75</sup> See HARRIS, *supra* note 7, at 290 (“[I]nformed traders like to acquire large positions in order to maximize their profits”).

<sup>76</sup> See generally *supra* Part IV.A.1.

is likely that a large portion of even those informed traders that are able to access off-exchange platforms prefers to complete much of its trading through exchanges in order to trade quickly with certainty against firm liquidity-provider quotes.<sup>77</sup> And, as a result of the trading-platform access rules, the price quotes that they face on exchanges are both of lower quality and more sensitive to trading activity than they might otherwise be.<sup>78</sup>

The lower-quality price quotes and more sensitive quote-adjustment triggers associated with the current exchange trading environment—by liquidity-provider design—decrease informed traders' profits. The inferior-pricing aspect of that environment decreases informed-trader profits by decreasing the margin between the prices for which these traders can purchase undervalued stocks and those for which they can sell them. (Inferior quotes also decrease informed-trader profits by decreasing the short-sale margin between the price for which these traders can sell overvalued stocks and the price for which they can re-purchase them.) To illustrate this point, suppose once again that the market currently values a stock at \$44.10 per share and that an informed trader has information that leads it to conclude that the stock is really worth \$44.15 per share. If liquidity providers are posting best (lowest) ask prices of \$44.12 per share, then the informed trader will be able to buy the stock at \$44.12 per share, and then—after the market recognizes the underlying information—sell it at some higher price that reflects that more accurate \$44.15-per-share value. However, if exchange liquidity providers—in response to the high ratio of informed traders to uninformed ones associated with exchange trading—are posting best (lowest) ask prices of \$44.15 per share, then our informed trader will not find a profit margin that incentivizes it to use its information to purchase this undervalued security.

The quote-adjustment-trigger aspect of the current exchange trading environment likewise prevents informed

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<sup>77</sup> See generally *id.*

<sup>78</sup> See generally *supra* Part IV.A.3.

traders from garnering profits that they might otherwise gain. These more reactive triggers greatly reduce the size of informed-trader profits. In fact, these sensitive price quotes are likely the primary intra-market business concern of informed traders today—as highlighted by descriptions of the contemporary stock market in a recent highly publicized book by best-selling author Michael Lewis.<sup>79</sup> To explain the point, start again with the assumption that the market currently values a stock at \$44.10 per share, and that our informed trader again has information that leads it to conclude that the stock is really worth \$44.15 per share. Even if the best (lowest) liquidity-provider ask quote in the market is \$44.12 per share, the informed trader will expect only a small profit if just milliseconds after it purchases, say, 5,000 shares at that price, all liquidity providers in the market move their best (lowest) ask prices up by \$0.05 per share to \$44.17 per share.<sup>80</sup>

When informed traders expect smaller trading profits, they will invest less in the production of information about firms' prospects. As a result, a lower amount of information as to firms' values will be produced—and therefore a lower amount will be incorporated into stock prices. Even more, when the profits associated with informed trading for any

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<sup>79</sup> See generally MICHAEL LEWIS, *FLASH BOYS: A WALL STREET REVOLT* (2014). Interestingly, Lewis's central gripe about the "rigged" American stock market, to use his words on a popular Sunday evening television news magazine episode, appears to be this aspect of the market. Given the exchange trading environment described above in Parts IV.A.2 and IV.A.3, the process in which information is incorporated into stock prices described above in Part II.A., and well-established models of the economics of the stock market traceable to work by Lawrence R. Glosten and Paul R. Milgrom in 1985, see *supra* note 51, the market appears to be operating exactly as one would think it should. That is, with price quotes quite quickly reflecting significant buying or selling activity given the chances that such activity is the result of trading based on superior information.

<sup>80</sup> Liquidity providers throughout the market learn of transactions right after they occur. See Regulation National Market System, Rule 601, 17 C.F.R. § 242.601 (2005) (requiring all platforms to report transactions executed through their systems immediately after they take place). This transaction-reporting system leads to market-wide price movements even after trading that is isolated to as little as one liquidity provider.

particular stock drop below a certain threshold, the informed-trader incentive to follow the stock and research its value disappears altogether. Thus, the federal securities laws that allow off-exchange platforms to pick who can and who cannot access their trading systems while requiring exchanges to grant access to all traders theoretically result in informed traders spotting fewer profit opportunities than they otherwise might—and therefore lead society to achieve a lower level of stock-price accuracy than it otherwise might.<sup>81</sup>

Notably, this concern about the effect of the trading-platform access rules on stock-price accuracy is likely relevant for the overwhelming majority of the 5,000 or so stocks that are publicly traded in the American stock market. After all, about half of all publicly traded stocks have over 40% of their trading taking place via off-exchange platforms.<sup>82</sup> However, the concern is perhaps most significant for the stocks of firms on the small- and medium-size end of the public-firm spectrum, as opposed to household names such as Apple, ExxonMobile, and Wal-Mart. Liquidity

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<sup>81</sup> At first glance, the posited relationship between these trading rules and stock-price accuracy may appear to be at odds with what may be the best-known theory in financial economics: the efficient-market hypothesis. However, it is important to note that the concept of stock-price accuracy is distinct from that of market efficiency. The latter concerns the extent to which information, once public, is incorporated into market prices. It therefore depends primarily on the process in which public information is incorporated into those prices. The former instead focuses on the extent to which market prices reflect fundamental values. It therefore turns not only on the process in which information is incorporated into prices, but also on the extent to which information is produced. This distinction is perhaps best explained by recognizing that prices can be highly efficient, yet not accurate whatsoever. To illustrate the point, imagine a firm that discloses only the bare minimum about its business to the public, and otherwise operates with secrecy. That firm's stock price may be perfectly efficient in today's market. After all, as soon as information about its prospects comes out, even a small amount of trading based on that information would immediately affect its market price. However, that price may still be highly inaccurate because little information on the firm's prospects may have been produced.

<sup>82</sup> See Hatheway, Kwan & Zheng, *supra* note 35.

provision for these stocks tends to be characterized by inferior pricing and very sensitive quote-adjustment triggers—making it hard for informed traders to identify pricing inaccuracies that allow them to earn significant trading profits before market prices adjust to the information on which they are trading. Not surprisingly, informed traders and others tend to produce far less information about these firms relative to larger ones. In fact, some large portion of these firms lacks a robust informed-trader following altogether, and relatively little is known about the future cash flows that they will produce. So, while the trading-platform access rules lead to an exchange trading environment that theoretically impedes stock-price accuracy for the great majority of all public companies, this effect is perhaps most disconcerting for smaller- and mid-size companies.

## 2. The Main Social Benefits of Accurate Stock Prices

As a general matter, laws that result in society generating a lower level of stock-price accuracy deprive society of valuable benefits (namely, those relating to corporate governance and capital allocation).<sup>83</sup> To be sure, though, not all effects on stock-price accuracy emanate to affect the quality of these benefits.<sup>84</sup> For example, think about laws that would require firms to disclose new material information within a minute of learning of that information rather than within, say, a week. Such laws that result in information about firms' fundamental values being incorporated into their stock prices within minutes of a new development rather than a week are unlikely to result in any sort of disconcerting misallocation of capital. Thus, despite the general concern about laws that reduce stock-price

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<sup>83</sup> See generally *supra* Part II.B. (describing the main social benefits of more accurate stock prices).

<sup>84</sup> See generally Kahan, *supra* note 4 (comparing instances in which enhanced stock-price accuracy results in significant social benefits with those in which it does not lead to such benefits).

accuracy, not all such reductions are of the kind about which society should care.

Critically, there is reason to believe that the effects on stock-price identified here are important to society. These effects on stock-price accuracy are traceable to the incentive to produce information about firms' values. And that incentive drives the process that results in accurate stock prices.<sup>85</sup> More specifically, the trading-platform access rules deprive informed traders of profits that would otherwise incentivize them to engage in their price-correcting work. These rules therefore reduce the extent to which informed traders will produce or procure information about firms' values. As a result, less such information will be produced—and stock prices will drift away from their values for sustained periods measured more easily in weeks than milliseconds. In fact, for whichever of the 5,000 or so public companies in America that struggle to attract informed traders to follow them and analyze their prospects, a lower incentive to produce fundamental-value information and engage in price-correcting work can cause a loss of an informed-trader following altogether.<sup>86</sup> Accordingly, the trading-platform access rules' effect on stock-price accuracy is likely of the kind that has a negative impact on the quality of firm governance and capital allocation, and not merely some immaterial one.

### C. Securities Law's Effort to Obtain a Socially Optimal Level of Stock-Price Accuracy

The conclusion that central aspects of the law governing stock trading are leading society to generate a materially lower level of stock-price accuracy than it otherwise might leads to a key inference: lawmakers have a new securities-law tool for improving stock-price accuracy. In different words, the theoretical effects of trading-platform access rules

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<sup>85</sup> See generally *supra* Part II.A.2.

<sup>86</sup> See Goshen & Parchomovsky, *supra* note 6, at 1263–66 (highlighting concerns about the accuracy of firms' stock prices and more when informed traders cease to follow those firms).



set out earlier in this Part suggest that modifications to stock-market law would alter contemporary stock trading in a way that would enhance stock-price accuracy and its main social benefits. This conclusion becomes clear by thinking about two examples of ways in which stock-market law could be modified in order to spur the production of accurate stock prices: by implementing an exchange-trading mandate, or by requiring a public-firm subsidy for exchange liquidity provision.

### 1. Materially Improving Stock-Price Accuracy via an Exchange-Trading Mandate

One way in which stock-market law could be altered to materially enhance the accuracy of stock prices would be by mandating that all trading take place through exchanges. Such a general prohibition on trading via sophisticated electronic platforms that fail to both post firm quotes and allow all traders to access them would affect the exchange trading environment in a manner that would lead to both more accurate stock prices and more of the benefits that generally flow from them. After all, the mandate would result in exchange liquidity providers facing a markedly lower ratio of informed traders to uninformed ones than they currently encounter. As a result, these liquidity providers would have more opportunities to offset the losses they incur to informed traders by completing spread-earning transactions with uninformed traders. Assuming healthy competition in the exchange liquidity-provision business,<sup>87</sup> these liquidity providers would respond by posting superior price quotes and increasing the threshold that triggers their

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<sup>87</sup> Large- and medium-size firms are commonly held by large uninformed institutional investors and more. For this reason, professional liquidity providers face competition—for at least these stocks—from not only a healthy set of fellow liquidity-providing professionals seeking to cater to these uninformed traders' needs, but also from these uninformed traders themselves. See *infra* Part V.A.2.a (explaining that uninformed traders commonly accomplish their trading needs by acting as liquidity providers to other traders—that is, by completing their buying needs via bid quotes and their selling needs via ask quotes).

adjustments of those price quotes. In such a trading environment, informed traders would have more opportunities to profit based on superior information as to firm's fundamental values. And for that reason, they (and those from whom they procure information) would have a larger incentive to produce this socially valuable information—which would lead to materially higher levels of stock-price accuracy.

Notably, such a broad prohibition would only apply to the trading of public companies' stocks. Further, even for those stocks, the mandate would be limited to a prohibition on trading through sophisticated electronic off-exchange trading platforms. It would therefore not affect the ability of parties to negotiate agreements to buy and sell blocks of stock with each other. Additionally, policymakers could adopt this measure in whole or in part, with the degree of its impact on price accuracy turning on the breadth of the mandate adopted. Indeed, they could begin by experimenting with a cross-section of stocks, which is something that Congress and the SEC have recently shown an inclination to do in this general area.<sup>88</sup>

Lastly, it is worth noting that Congress has granted the SEC broad powers to promulgate and revise stock-trading rules to develop and improve a national market system for the trading of exchange-listed equity securities.<sup>89</sup> This rulemaking delegation could be read to allow the SEC to impose the exchange-trading mandate in the name of enhanced stock-price accuracy. As such, the SEC may be able to promulgate such a mandate—in whole or in part—without any additional congressional action.

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<sup>88</sup> See, e.g., The Jumpstart Our Business Start-Ups Act § 106, 15 U.S.C. § 78k-1(c)(6) (2012) (encouraging the SEC to set up a study in which a sample of public firms experiment with different trading rules relating to the minimum allowable increment between quoted prices).

<sup>89</sup> See generally Securities Exchange Act § 11A, 15 U.S.C. § 78k-1 (2012).

## 2. Materially Improving Stock-Price Accuracy via a Public-Firm Subsidy for Exchange Liquidity Provision

Another example of a way in which lawmakers could change stock-market law to improve price accuracy would be by imposing a public-firm subsidy to support exchange liquidity provision. Such a subsidy could come in the form of a mandate that requires firms to make payments to the exchange liquidity providers that post the most competitive quotes in their stocks. These mandatory payments could be distributed as a per-share rebate each time one of the liquidity providers' standing quotes executes against an incoming order. Suppose, for example, that two liquidity providers quote ask prices for 1,000 shares of the same stock. One posts a superior (lower) ask price of \$44.11 per share, and the other posts an inferior (higher) ask price of \$44.12 per share. Suppose, too, that a trader submits a buy order that seeks to transact immediately against the best (lowest) ask prices in the market for 1,000 shares of that stock. In this example, then, the liquidity provider quoting the more competitive \$44.11-per-share ask price would complete this transaction, but the liquidity provider offering to sell the shares at the \$44.12 price would not. In this way, the proposed subsidy would reward those liquidity providers with the most competitive quotes—and thus encourage liquidity providers to offer the shares at the most competitive prices in order to capture the subsidy. In the end, this type of firm subsidy would achieve the same type of effect that the exchange-trading mandate would achieve. That is, it would incentivize exchange liquidity providers to post superior price quotes with less sensitive quote-adjustment triggers, which would in turn likely lead to larger profit opportunities for informed traders and therefore a higher level of stock-price accuracy.

With this perspective on a public-firm subsidy for exchange liquidity provision, one could view the exchange-trading mandate as, effectively, a similar type of mandatory subsidy. Remember that exchange liquidity providers make up what they lose to informed traders by completing spread-

earning transactions with uninformed ones.<sup>90</sup> This fact gives rise to the inference that forcing the off-exchange trading that is now dominated by uninformed traders to go through exchanges would provide an uninformed-trader subsidy of exchange liquidity provision. It would do so because pushing these traders to exchanges would permit exchange liquidity providers to earn more revenue from supplying their services to uninformed traders. For these reasons, the exchange-trading mandate can also be seen as a mandatory subsidy for exchange liquidity provision—albeit one in which the uninformed traders that currently transact through off-exchange platforms would be providing the subsidy.

However one views the exchange-trading mandate, one attractive attribute of the public-firm subsidy is clear: it leaves the current private ordering of the stock market in place. But despite the appeal of going with a straight-up firm subsidy that defers to that current industrial organization of the stock market, two caveats should be kept in mind. First, the contemplated subsidy effectively involves taxing the investors who currently own public-company stocks in order to help sophisticated banks, hedge funds, private equity funds, and actively managed mutual funds. Although many would argue that the three main areas of securities law do exactly this, and even though these market participants are thought to be integral to the production of information about firms' prospects, such a new subsidy is likely to be unpopular as a matter of politics. Second, relative to the exchange-trading mandate, it would presumably be tougher to argue that a public-firm subsidy falls under the congressional delegation that empowers the SEC to regulate the stock market.

Without getting into further detail,<sup>91</sup> this Part has shown that a central, yet little-noticed, set of stock-market rules

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<sup>90</sup> See *supra* Part IV.B.1.

<sup>91</sup> Other changes to stock-market law would undoubtedly have similar results. For example, requiring off-exchange platforms to accept all investors may accomplish these same ends—and fall squarely within the SEC's rulemaking authority. Such a change in the law too would have the benefit of allowing these platforms to continue to exist. However, it might

has significant theoretical implications for contemporary stock trading as well as stock-price accuracy and its main social benefits. In so doing, it has demonstrated that more than simply the conventional securities-law tools of disclosure, fraud, and insider-trading law can be used to materially increase stock-price accuracy. Instead, stock-market law too can be deployed toward that end—for example, by mandating that all trading take place through exchanges or by imposing a public-firm subsidy for exchange liquidity provision. Yet this area of securities law has been omitted from the broad debate on how to best achieve one of the principal goals of the field: obtaining a socially optimal level of stock-price accuracy. Given this gap between the conventional approach to reaching this goal and what stock-market law can likely do, Part V urges regulators to consider whether they can make accuracy-enhancing reforms to stock-market law that would increase social welfare.

#### V. EXAMINING WHETHER THIS NEW ACCURACY-ENHANCING TOOL CAN BE USED TO IMPROVE SOCIAL WELFARE

Regulators should consider whether accuracy-enhancing changes to stock-market law can be used to improve social welfare in one of two ways. First, they should examine whether such changes to stock-market law would enhance the current level of stock-price accuracy in a manner that would lead to net social benefits. Second, even if they determine that altering stock-market law in this way would not yield net social benefits, they should take steps to figure out whether those alterations in conjunction with reforms to securities law more generally would help society obtain the current level of stock-price accuracy at a lower cost than the

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effectively take away much of the appeal that these platforms now have. Without their ability to present liquidity providers with the pool of uninformed traders that they now present to them, liquidity providers would lack the incentive that they now have to provide their services on these platforms. In the end, the platforms may host little trading activity relative to the amount they now host.

one associated with the burdensome existing core of securities law.

Section A urges regulators to consider the desirability of using stock-market law to increase the current level of stock-price accuracy—and details some of the main social benefits and costs that they should consider in making that determination. Section B urges them to think about whether it would be socially desirable to direct the use of this new tool to replace some of the work now accomplished by disclosure, fraud, and insider-trading laws—and touches on the considerations that would dictate whether this tack would in fact provide a lower-cost way of arriving at the current level of stock-price accuracy.

#### A. The Desirability of Using Stock-Market Law to Increase the Current Level of Stock-Price Accuracy

Regulators should consider whether instituting reforms to stock-market law in order to increase the current level of stock-price accuracy would generate social benefits that exceed the social costs necessary to achieve them. The enormous task of evaluating the relative weights of all such benefits and costs is well beyond the scope of this Article. Nevertheless, this Section discusses some of the main benefits and costs associated with using at least the new accuracy-enhancing changes sketched out in this Article, thereby providing regulators with a basic cost-benefit framework for making that evaluation.

##### 1. The Main Social Benefits

Using an exchange-trading mandate or a public-firm subsidy for exchange liquidity provision to increase the current level of stock-price accuracy would have at least two main social benefits. The first would be the improvement in corporate governance and capital allocation that would result from a higher level of stock-price accuracy.<sup>92</sup> After all, both of these illustrative reforms to stock-market law would

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<sup>92</sup> See generally *supra* Part II.B & Part IV.B.2.

lead to price quotes on exchanges that are superior and less sensitive to trading activity. And when these quotes change in this way, informed traders have more profit opportunities—meaning that the incentive for them (and those from whom they procure information) to produce information about firms' prospects is higher.

The second main social benefit of making accuracy-enhancing changes to stock-market law would also relate to these better and less-reactive price quotes on exchanges. However, it would relate to how those price quotes affect something distinct from price-accuracy. Over 60% of all trading still takes place through exchanges. Despite the higher ratio of informed traders to uninformed ones at the heart of this Article, the overwhelming majority of that trading is still attributable to uninformed traders. These traders now face the same inferior prices and hair-trigger price-quote adjustment thresholds that informed traders now face at exchanges. If all trading instead took place through exchanges, or if exchange liquidity provision were subsidized, then these traders would share in the benefit of superior pricing and less sensitive quote-adjustment triggers. Facing these better and less sensitive prices, these traders would likely—at a minimum—engage in more voluntary transactions that are thought to be welfare-increasing. Perhaps even more importantly, finding stock transactions to be less costly when facing these altered prices, these traders may increase the amount they are willing to pay in return for stocks—thereby decreasing firms' costs associated with raising capital and increasing the economic benefits to which those lower costs lead.<sup>93</sup>

Thus, the changes to stock-market law contemplated here would lead to at least two main sets of social benefits: those

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<sup>93</sup> Notably, these changes would also aid the many noise traders that would undoubtedly trade via exchanges should either of these reforms be implemented. *See supra* note 27 (describing these traders). Although it is unlikely that policymakers would want to aid these irrational traders directly, it is worth noting that they are uninformed traders who generally lose to informed traders—and therefore provide those traders with larger profits.

related to more accurate stock prices, and those associated with better prices for the uninformed traders that now transact through exchanges.

## 2. The Main Social Costs

Altering stock-market law to improve the current level of stock-price accuracy would also impose notable social costs that regulators should consider in attempting to determine whether or not such alterations would result in net social benefits. The main costs of such alterations differ based on the form of the change. This Section provides a window into such costs by examining the main costs of the two illustrative changes to stock-market law discussed above.

### a. Main Costs of an Exchange-Trading Mandate

Requiring that stock trading be generally conducted through exchanges would result in at least two main social costs. First, the mandate may eliminate important benefits that traders currently receive as a result of private competition and innovation among trading platforms. Relatively little is publicly known about how off-exchange platforms operate. Certainly, however, the many entities that run these trading platforms have produced innovation that benefits the many traders that have been attracted to them. At a minimum, this innovation results in socially valuable trades between buyers and sellers that may not otherwise occur.

However, it is important to note that mandating that all trading generally occur on exchanges would not necessarily deprive society of these benefits. With this larger universe of traders completing its buying and selling through exchanges, exchanges will have greater reason to compete for the business of uninformed individual and institutional traders. Today, these trading platforms have less reason to innovate in this way because such a large portion of uninformed trading is occurring through off-exchange platforms. One would expect, though, that requiring trading to take place



via exchanges would give those more traditional platforms powerful new motivations to provide innovations that these traders will value. Therefore, the magnitude of this first cost is likely lower than it first appears.

The second notable cost to which the exchange-trading mandate may lead relates specifically to the quality of prices received by the traders that currently transact through off-exchange platforms. On the surface, off-exchange platforms appear to provide these traders with prices that are superior to those available at exchanges.<sup>94</sup> If the law were changed to eliminate these platforms, then these traders would therefore—at least at first glance—not receive these prices that likely lead to more welfare-increasing transactions among uninformed traders as well as a lower cost of capital for firms.

But, the value of the superior prices offered by off-exchange platforms today is not as substantial as it might initially appear. Indeed, these platforms may not provide a large portion of the traders that transacts through them with any price-quality benefit whatsoever relative to a market where all trading took place on exchanges. At the threshold, the “price improvement” offered by a large portion of off-exchange platforms is, at best, nominal.<sup>95</sup> But more importantly, because a substantial portion of these platforms essentially matches the best (highest) bid quote prices and best (lowest) ask quote prices generated by liquidity providers on exchanges, the traders who currently transact through them may actually face better prices if all trading occurred instead through exchanges.

Recall that exchange price quotes now reflect the higher ratio of informed traders to uninformed ones that results from the trading-platform access rules—and that this higher

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<sup>94</sup> See *supra* Part III.B.2 (explaining that off-exchange platforms generally provide traders with the prices that are at least nominally better than the best ones quoted on exchanges nationwide).

<sup>95</sup> See *id.*; Concept Release, *supra* note 2 (“The [typical off-exchange platform that is focused on individual retail-level investors] immediately executes retail order[s] [at a price that is] slightly better than the best [quoted] price in the market (usually by .0001 [per share.])”).

ratio leads to inferior price quotes on exchanges.<sup>96</sup> As such, off-exchange platforms may be charging a substantial portion of the traders that transact through them prices that reflect the higher ratio of informed traders to uninformed ones associated with the distinct exchange trading environment. These prices are therefore inferior to the ones that uninformed traders would receive through exchanges if exchanges had a lower ratio of informed traders to uninformed ones. And exchanges would have such a lower ratio in a market where all trading occurred through them. Thus, off-exchange platforms are now providing uninformed traders as a whole with less of a price-quality benefit than they appear to be providing at first glance—and are therefore supplying society with fewer of the benefits associated with increased price quality.

Indeed, uninformed traders themselves might actually prefer that all trading be conducted on exchanges today. However, the large portion of them that is composed of individual, retail-level investors. Those investors are likely routed to off-exchange platforms by their agents (stock brokers) without their knowledge. The remainder of the uninformed traders that current transact off-exchange is made up of larger index funds and the like. It is unlikely that these market participants are able to work collectively in order to ensure that they all move their trading to exchanges—thereby removing the incentive for any one of them to move its trading to exchanges. After all, the superior exchange pricing anticipated here will only result if enormous amounts of off-exchange trading is moved to exchanges.

Further, briefly looking even more deeply into the mechanics of exchange trading shows that the value of any superior pricing currently provided by off-exchange platforms may be larger than it first appears for a second reason: Even if all uninformed traders were forced to transact through exchanges, they would not always have to transact against exchange liquidity providers' price quotes.

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<sup>96</sup> See generally *supra* Part IV.A.

Instead, these traders will often be able to accomplish their trading goals through exchanges by purchasing at bid prices and selling at ask prices. And the former are generally lower than the market's current assessment of the stock's fundamental value, while the latter are generally higher than that assessment).<sup>97</sup>

In contrast to informed traders, uninformed traders place a relatively low value on execution speed and certainty.<sup>98</sup> By definition, these traders are not transacting based on some depreciating informational asset relating to a delta between current market prices and fundamental values that could change at any moment. Instead, before their transactions take place, as far as they know, stock prices during that next interval of time have a more or less 50-50 chance of increasing or decreasing.<sup>99</sup> Accordingly, whether their orders to buy and sell pieces of their stock portfolios are executed in a fraction of a millisecond, an hour, or even a week is largely—before the transaction—irrelevant to these traders.

By law, such patient traders are now able to complete their trading needs by providing liquidity services to other stock traders on exchanges. Any trader may access any exchange through any one of a long list of stock brokers that is a member of that exchange.<sup>100</sup> And every exchange allows its members to post their clients' bid and ask quotes on the exchange's trading system. For these reasons, all traders can accomplish a portion of their trading needs over time by purchasing stocks by placing market bid quotes and selling them by placing market ask quotes. By purchasing at bid prices and selling at ask prices in this manner, these patient traders avoid the inferior prices associated with transacting immediately with certainty against other liquidity providers' ask prices and bid prices. As a result, these traders can—and routinely do—meet some significant portion of their trading

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<sup>97</sup> See *supra* Part III.A.3.

<sup>98</sup> See *generally supra* Part IV.A.1 (explaining the premium that informed traders place on the ability to transact quickly with certainty).

<sup>99</sup> For one of the seminal works on this concept, see generally Eugene F. Fama, *The Behavior of Stock Market Prices*, 38 J. BUS. 34 (1965).

<sup>100</sup> See *supra* note 1 and accompanying text.

needs by providing liquidity services to other traders. That is, they complete their trading needs by posting bid price quotes and ask price quotes against which other traders will transact.<sup>101</sup> Thus, the social costs arising out of any inferior prices that uninformed traders face under an exchange-trading mandate may be far smaller than they might initially appear for this second reason.<sup>102</sup>

Lastly, and perhaps most importantly, it may be helpful to take a step back from the nuanced mechanics of the contemporary stock market to recognize something more basic: any inferior prices imposed on uninformed traders by an exchange-trading mandate may very well be immaterial. This point becomes clear when viewing these inferior prices as giving rise to a spread cost.<sup>103</sup> Like all traders, uninformed traders amortize their trading costs (including spread costs) over the lifetime of an investment. But, in contrast to most other traders, the typical investment horizon of an uninformed trader is long.<sup>104</sup> And that sustained time span is relevant to any assessment of

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<sup>101</sup> Purchasing and selling stocks via quotes rather than transacting immediately by paying liquidity providers' quoted prices has its own risks, including the risk of losing to informed traders. It also presents the risk of non-execution as market prices move in the opposite direction of the best quoted price, thereby leaving the trader to transact at a worse price than if its order had simply been executed immediately against a price quote. Still, completing one's trading needs by providing liquidity to other less patient market participants often results in obtaining superior prices.

<sup>102</sup> Interestingly, the portion of current off-exchange uninformed trading that would—in a world where all trading took place through exchanges—proceed through providing other traders with firm bid and ask quotes rather than transacting against liquidity-provider quotes would not help reduce the current exchange ratio of informed traders to uninformed ones. For this reason, even if all trading took place on exchanges, some degree of the issue for price accuracy identified here may still exist.

<sup>103</sup> See *supra* note 33.

<sup>104</sup> See *supra* Part III.A.1 (stating that informed traders enter and exit stock positions far more frequently than uninformed traders); *supra* Part III.A.2 (describing the longer-term investment window of the typical uninformed trader, including "buy and hold" investors that maintain ownership of stocks over sustained periods of time more easily measured in decades than milliseconds, seconds, days, or even weeks).

whether inferior exchange pricing would impose material costs on society.

In today's market the delta between bid and ask prices and current market valuations is generally on the order of a mere penny or two for most stocks<sup>105</sup>—meaning that the spread cost associated with the delta between bid prices and stock's fundamental values and ask prices and those values is typically but a half cent or a cent. For example, if a long-term uninformed trader purchases a stock at an exchange liquidity provider's ask price of \$44.11 per share when the current market valuation of the stock is \$44.10 per share, that trader can be said to overpay by \$0.01 per share as a result of having to transact against that ask quote. And twenty years later when that trader sells the stock, she would likely sell it in return for the price provided by an exchange liquidity provider's bid quote that is similarly below the stock's then-current value. These aspects of stock trading dictate that the investor will have paid a mere 0.02% spread cost in order to purchase the stock, and paid some similar tiny twenty years later in order to sell the stock. These transactions would thus give rise to a total bid-ask spread cost of approximately 0.04%—which is the average size of the bid-ask spread cost associated with buying and selling the stocks of large public companies today.<sup>106</sup> So, the costs associated with any inferior pricing for those uninformed traders that currently transact off-exchange that resulted from moving their trading to exchanges may be of little social consequence in a world where uninformed traders invest over long periods of time and the difference between exchange liquidity providers' quotes and current market values is but a penny or two for most stocks.

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<sup>105</sup> See, e.g., CFA INSTITUTE, ISSUE BRIEF: DARK POOLS, INTERNALIZATION, AND EQUITY MARKET QUALITY 5 (2012) (noting that in a cross-sectional sample of large-company, medium-company, and small-company stocks, the median quoted bid-ask spread was, respectively, one cent (0.04% of the average large-company stock's value), two cents (0.09% of the average medium-company stock's value), and nine cents (0.83% of the average small-company stock's value).

<sup>106</sup> See *id.*

### b. Main Costs of a Public-Firm Subsidy for Exchange Liquidity Provision

There are at least three key social costs associated with offering liquidity providers a subsidy funded through a fee on public companies. First, to the extent that public firms produce goods and services in competitive markets, we can expect this fee to increase these companies' costs in a manner that leads them to increase the prices that they charge for those goods and services. In this way, the fees would impose a social cost in the form of lost opportunities for consumers to transact with these firms.

Second, imposing a fee on publicly traded firms would, on the margin, dissuade some companies from publicly listing their shares altogether. The exact marginal effect would be unclear—particularly in light of the already-substantial costs associated with being a publicly traded company in the United States. But policymakers consider a public-firm subsidy for exchange liquidity provision should nevertheless examine whether imposing such a fee might meaningfully impair the ability of private firms to raise public capital. Those concerns deserve particular attention in light of the well-documented costs that result when companies are deterred from raising equity capital.

Finally, to the extent that domestic exchanges impose these fees but foreign ones do not, some firms may be more inclined to list their shares only on the latter.<sup>107</sup> While it is unclear whether this result would even be problematic from a social point of view, United States regulators would doubtless want to consider this effect when contemplating the imposition of a fee of this kind.

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<sup>107</sup> See, e.g., JOHN C. COFFEE, JR. & HILLARY A. SALE, *SECURITIES REGULATION CASES AND MATERIALS* 45 (12th ed. 2013) (noting that “shortly after 2000, [the] migration of foreign issuers to the U.S. market largely halted” and that “[c]learly . . . foreign issuers began to find the costs of a U.S. listing [that resulted from legal changes] . . . to be dauntingly expensive.”).

## B. The Desirability of Using Stock-Market Law to Obtain the Current Level of Stock-Price Accuracy

After doing a cost-benefit analysis, regulators may very well come to the conclusion that using stock-market law to increase the current level of stock-price accuracy in one of the above ways or in yet some other way is socially undesirable. But regulators should still consider whether they can use accuracy-enhancing changes to stock-market law in a manner that improves social welfare in distinct way: by serving as an alternative, lower-cost means for obtaining the current level of stock-price accuracy.

Improving the accuracy of public companies' stock prices is perhaps the principal aim of the three main areas of securities regulation.<sup>108</sup> However, these core areas of securities law that are so focused on improving stock-price accuracy impose well-documented costs on society. Mandatory-disclosure laws force firms to devote substantial resources toward providing the market with information that is necessary to produce more accurate stock prices.<sup>109</sup> Laws prohibiting fraud require these businesses to expend substantial resources to ensure the truthfulness and integrity of their disclosures so that market participants can rely on them when determining stocks' values. And laws that limit insider trading can be viewed as imposing law-enforcement and compliance costs on society to protect the sophisticated outside informed traders that will best generate accurate market prices from being undercut and misled by the trading of corporate insiders.<sup>110</sup>

To the extent that these securities laws now impose burdens on society in order to bring about price-accuracy benefits, lawmakers should consider whether society could obtain a better cost-benefit ratio by using stock-market law in lieu of parts of those existing laws. More simply stated, they should examine whether securities law can produce more bang for its buck by using a novel approach in place of

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<sup>108</sup> See *supra* notes 4–6 and accompanying text.

<sup>109</sup> See, e.g., Fox et al., *supra* note 5.

<sup>110</sup> See, e.g., Goshen & Parchomovsky, *supra* note 6.

some of the conventional ones: adopt accuracy-enhancing alterations to stock-market law like the ones set forth in this Article while also reducing some burdensome aspects of the core of securities law.

As with the relative weights of the social costs and benefits outlined in the preceding Section, determining whether or not stock-market-law reforms would provide a lower-cost means for achieving the current level of stock-price accuracy than the existing aspects of disclosure, fraud, and insider-trading law now aimed at that end is far beyond the scope of this work. However, those same costs and benefits of the exchange-trading mandate and the public-firm subsidy discussed in that Section provide regulators with a basic framework for beginning to examine that complex and important issue.

In sum, as a matter of theory, stock-market law can be used to enhance the accuracy of public firms' stock prices—and this Part has set forth a basic cost-benefit framework to help regulators determine whether using it to do so would increase the overall level of wealth generated by society.

## VI. CONCLUSION

For decades, securities law has been motivated by the view that accurate stock prices convey valuable social benefits relating to corporate governance and capital allocation, yet will be under-produced absent legal intervention into market forces. The effects of the well-known securities laws that mandate firm disclosure and prohibit corporate fraud as well as insider trading on the accuracy of public companies' stock prices and the amount of wealth generated by society have therefore been well-studied. But the price-accuracy and welfare implications of another, long-overlooked area (stock-market law) have generally escaped the attention of those who have long praised the social benefits of more accurate stock prices.

This Article has used well-established lessons from market-microstructure economics to theorize that the federal securities laws governing the market in which stocks are traded result in society producing a lower level of price



accuracy than it otherwise might—thereby failing to generate the benefits of improved corporate governance and capital allocation that it otherwise might. Because the trading-platform access rules mandate that all traders can buy and sell stocks through exchanges, but allow off-exchange platforms to decide which traders can and cannot access their trading systems, off-exchange trading is dominated by uninformed traders. Consequently, exchange trading entails a far higher ratio of informed traders to uninformed ones than it otherwise might. In response to the concern that they will be unable to bring in enough revenue to cover the costs that informed traders impose on them, exchange liquidity providers alter their price quotes in two ways: by providing inferior price quotes and by lowering the trading-activity thresholds that trigger their adjustments of those quotes. Facing these altered quotes, informed traders—traders whose buying and selling activity is to a significant extent often relegated to exchanges—will have lower expected trading profits. For this reason, these market participants will invest less in the production (or procurement) of information about firms' values—and inaccurate stock prices will remain uncorrected over sustained periods more often than they otherwise might. These theoretical implications of little-noticed trading rules thus led to the inference that regulators can change stock-market law to improve stock-price accuracy—and that they therefore have a previously unidentified tool that they can use to make public companies' stock prices more accurate.

Building on these theories, this Article has argued that regulators should consider whether they can use this new securities-law tool to achieve what is perhaps the principal aim of modern securities regulation: obtaining a wealth-maximizing level of stock-price accuracy. However, it has also cautioned that the pursuit of such reforms would be ill-advised if the social benefits that would result from the higher level of price accuracy to which they would lead would fail to outweigh the social costs necessary to achieve them. Still, though, it has advised regulators to determine whether accuracy-enhancing changes to stock market law may

improve social welfare even if the marginal benefits of increases to the current level of price accuracy and more would not outweigh the marginal costs associated with those changes. After all, these policymakers may find that they can to achieve the current level of stock-price accuracy at a lower cost by relying more on stock-market law and less on the resource-intensive core of securities law that has long been deployed toward that end.

These conclusions arising out of the analysis of long overlooked trading rules that dictate which of the two broad types of trading platforms is able to discriminate among traders and which is not thus reflect important considerations for policymakers. But just as importantly, the analysis provided in this Article has merely scratched the surface of what can be learned through market-microstructure-driven examinations of the law governing the market in which stocks—and financial instruments more broadly—are traded. In particular, the Article has shown that this relatively unstudied area of law can have implications that go far beyond trading minutia to influence the degree to which key prices reflect public companies' prospects in a manner that reverberates throughout society.