REASONABLE INVESTOR(S)

TOM C.W. LIN*

Much of financial regulation is built on a convenient fiction. In regulation, all investors are identically reasonable investors. In reality, they are distinctly diverse investors. This fundamental discord has resulted in a modern financial marketplace of mismatched regulations and misplaced expectations—a precarious marketplace that has frustrated investors, regulators, and policymakers.

This Article examines this fundamental discord in financial regulation and offers a better framework for thinking anew about investors and investor

* Associate Professor of Law, Temple University Beasley School of Law. Many thanks to Benjamin Edwards, Jim Fanto, Jill Fisch, Joan Heminway, Henry Hu, Kristin Johnson, Roberta Karmel, Donald Langevoort, Gregory Mandel, Andrea Monroe, Saule Omarova, Sabeel Rahman, and workshop participants at Brooklyn Law School, the 2014 Association of American Law Schools Mid-Year Meeting, and the 2014 National Business Law Scholars Conference for helpful comments and exchanges. Additionally, I am grateful to Eleanor Bradley and Thomas Helbig for their extraordinary research assistance.

protection. This Article presents an original typology of heterogeneous investors that exposes the common regulatory fallacy of homogeneous investors. It explains that the simple paradigm of perfectly reasonable investors, while profoundly seductive, is an inadequate foundation for designing investor protection policies in a complex, contemporary marketplace. It demonstrates how this critical divergence has harmed investors and regulators in the modern, high-tech marketplace. To begin addressing such harms, this Article advocates for a novel algorithmic investor typology as an important step towards better reconciling financial regulation with financial reality. Specifically, it illustrates how core concepts of financial regulation like regulatory design, disclosure, and materiality can pragmatically improve as a result of the new typology. This Article ultimately argues that in order to better protect all investors, financial regulation must shift from an elegantly false, singular view of reasonable investors towards a more honest, pluralistic view of diverse investors—from protecting one type of reasonable investors to protecting all types of reasonable investors.

INTRODUCTION

Investors exist everywhere, in every form.[1] They reside in big cities and small towns, in magnificent mansions and modest apartments. They are famous as well as anonymous. They are financiers and farmers, old retirees and new workers, homemakers and fund managers, public employees and private entrepreneurs, sole proprietorships and partnerships, people and corporations. Yet for all their diversity, financial regulation frequently treats them monolithically as "the reasonable investor."[2]

[1] *See* U.S. CENSUS BUREAU, THE 2012 STATISTICAL ABSTRACT 746 tbl.1201 (2013), *available at* http://www.census.gov/compendia/statab/2012/tables/12s1201.pdf, *archived at* http://perma.cc/J3XA-TC8V (charting the heterogeneity of investors); Stephen M. Bainbridge, *Mandatory Disclosure: A Behavioral Analysis*, 68 U. CIN. L. REV. 1023, 1051-52 (2000) (stating that the U.S. capital markets consist of investors that are ethnically diverse, geographically dispersed, and of varying wealth); William W. Bratton, *Shareholder Value and Auditor Independence*, 53 DUKE L.J. 439, 445 (2003) (finding that equity investors are diverse and fragmented into multiple classifications such as "speculators, investors, short-term holders, long-term holders, noise traders, fundamental value investors, dumb money, and smart money"); Usha Rodrigues, *Corporate Governance in an Age of Separation of Ownership from Ownership*, 95 MINN. L. REV. 1822, 1828 (2011) ("[I]nvestors come in different shapes and sizes.").

[2] *See, e.g.*, *In re* Merck & Co. Sec. Litig., 432 F.3d 261, 274 (3d Cir. 2005) ("'[R]easonable investors' are the market."); Sec. & Exch. Comm'n v. Tex. Gulf Sulphur Co., 401 F.2d 833, 849 (2d Cir. 1968) ("The speculators and chartists of Wall and Bay Streets are also 'reasonable' investors entitled to the same legal protection afforded conservative traders."); Donald C. Langevoort, *The SEC, Retail Investors, and the Institutionalization of the Securities Market*, 95 VA. L. REV. 1025, 1025 (2009) (suggesting that the Securities and Exchange Commission equates all investors by focusing on the

This Article is about that diversity, its dissonance from financial regulation, and the need for new legal understandings of investor protection to better harmonize financial regulation with financial reality.[3] It offers one of the first sustained examinations of contemporary investors, highlights serious flaws in outdated rules designed to protect them, proposes a new investor typology for a fundamentally changed marketplace, and explains the effects of such a proposal on law and finance.

While much of the regulatory and scholarly attention since the financial crisis has been given to the large monolithic institutions at the apex of the financial marketplace,[4] this Article shifts the focus to the base of the marketplace. Building upon the author's previous works on new financial technology, and drawing on a rich body of literature that spans law, finance, psychology, and economics,[5] this Article presents an original examination of the diverse participants at the frontlines of finance: the investors.

"plight of average investors"); Philip J. Leas, *The Measure of Damages in Rule 10b-5 Cases Involving Actively Traded Securities*, 26 STAN. L. REV. 317, 379 (1974) (criticizing "[t]he reduction of the investor population to a single standard"); Ralph K. Winter, *On "Protecting the Ordinary Investor,"* 63 WASH. L. REV. 881, 882-83 (1988) (discussing the singular view of homogenous investor in securities regulation).

[3] For the purpose of this article, the term "financial regulation" will primarily refer to federal securities regulation and other federal laws relating to investor protection.

[4] *See, e.g.*, STAFF OF S. PERMANENT SUBCOMM. ON INVESTIGATIONS, 112TH CONG., WALL STREET AND THE FINANCIAL CRISIS: ANATOMY OF A FINANCIAL COLLAPSE (2011) [hereinafter SENATE INVESTIGATION]; SAL ARNUK & JOSEPH SALUZZI, BROKEN MARKETS: HOW HIGH FREQUENCY TRADING AND PREDATORY PRACTICES ON WALL STREET ARE DESTROYING INVESTOR CONFIDENCE AND YOUR PORTFOLIO 13-14 (2012); SCOTT PATTERSON, DARK POOLS: HIGH-SPEED TRADERS, A.I. BANDITS, AND THE THREAT TO THE GLOBAL FINANCIAL SYSTEM 245 (2012); Stephen M. Bainbridge, *Dodd-Frank: Quack Federal Corporate Governance Round II*, 95 MINN. L. REV. 1779, 1783 (2011); John C. Coffee, Jr., *The Political Economy of Dodd-Frank: Why Financial Reform Tends To Be Frustrated and Systemic Risk Perpetuated*, 97 CORNELL L. REV. 1019, 1025-26 (2012); Jill E. Fisch, *Top Cop or Regulatory Flop? The SEC at 75*, 95 VA. L. REV. 785, 788-89 (2009); Henry T. C. Hu, *Too Complex to Depict? Innovation, "Pure Information," and the SEC Disclosure Paradigm*, 90 TEX. L. REV. 1601, 1713-15 (2012); Kathryn Judge, *Fragmentation Nodes: A Study in Financial Innovation, Complexity, and Systemic Risk*, 64 STAN. L. REV. 657, 657, 662 (2012); Marcel Kahan & Edward B. Rock, *When the Government Is the Controlling Shareholder*, 89 TEX. L. REV. 1293, 1295-99 (2011); Andrew W. Lo, *Regulatory Reform in the Wake of the Financial Crisis of 2007–2008*, 1 J. FIN. ECON. POL'Y 4, 4 (2009); Saule T. Omarova, *Wall Street as Community of Fate: Toward Financial Industry Self-Regulation*, 159 U. PA. L. REV. 411, 413 (2011); Steven L. Schwarcz, *Regulating Complexity in Financial Markets*, 87 WASH. U. L. REV. 211, 265 (2009); Robert B. Thompson, *Market Makers and Vampire Squid: Regulating Securities Markets After the Financial Meltdown*, 89 WASH. U. L. REV. 323, 376 (2011); Charles K. Whitehead, *The Goldilocks Approach: Financial Risk and Staged Regulation*, 97 CORNELL L. REV. 1267, 1269 (2012).

[5] *See, e.g.*, Stephen J. Choi & A.C. Pritchard, *Behavioral Economics and the SEC*, 56 STAN. L. REV. 1 (2003); Stephen Choi, *Regulating Investors Not Issuers: A Market-Based*

The objective of this Article is not to assert that financial regulation is completely blind to the differences among investors, nor is it to declare that decades of investor protection efforts are fatally flawed. It is acknowledged and understood that regulators are aware of the differences among investors in designing imperfect, but workable rules for investor protection.[6] Rather the objective herein is more nuanced, more practical, and two-fold: this Article seeks to make a general positive claim and a specific normative claim. First, the general positive claim contends that a fundamental dissonance between investor heterogeneity in reality and investor homogeneity in regulation has created significant discontent in financial markets for both regulators and investors.[7] Second, the specific normative claim argues that policymakers should formally recognize a new typology of algorithmic investors as an early step towards better acknowledging contemporary investor diversity, so as to forge more effective rules and regulations in a fundamentally changed

Proposal, 88 CALIF. L. REV. 279 (2000); John C. Coffee, Jr., *Market Failure and the Economic Case for a Mandatory Disclosure System*, 70 VA. L. REV. 717 (1984); Eugene F. Fama, *Random Walks in Stock Market Prices*, 21 FIN. ANALYSTS J. 55 (1965); Merritt B. Fox et al., *Law, Share Price Accuracy, and Economic Performance: The New Evidence*, 102 MICH. L. REV. 331 (2003); Zohar Goshen & Gideon Parchomovsky, *The Essential Role of Securities Regulation*, 55 DUKE L.J. 711, 711 (2006); David A. Hoffman, *The "Duty" to Be a Rational Shareholder*, 90 MINN. L. REV. 537 (2006); Peter H. Huang, *Moody Investing and the Supreme Court: Rethinking the Materiality of Information and the Reasonableness of Investors*, 13 SUP. CT. ECON. REV. 99 (2005); Christine Jolls et al., *A Behavioral Approach to Law and Economics*, 50 STAN. L. REV. 1471 (1998); Donald C. Langevoort, *Taming the Animal Spirits of the Stock Markets: A Behavioral Approach to Securities Regulation*, 97 NW. U. L. REV. 135 (2002); Terrance Odean, *Do Investors Trade Too Much?*, 89 AM. ECON. REV. 1279, 1296 (1999); Jeffrey J. Rachlinski & Cynthia R. Farina, *Cognitive Psychology and Optimal Government Design*, 87 CORNELL L. REV. 549, 607 (2002); Roberta Romano, *The Sarbanes-Oxley Act and the Making of Quack Corporate Governance*, 114 YALE L.J. 1521 (2005); Robert J. Shiller, *Measuring Bubble Expectations and Investor Confidence*, 1 J. PSYCHOL. & FIN. MARKETS 49, 49 (2000); Andrei Shleifer & Robert W. Vishny, *The Limits of Arbitrage*, 52 J. FIN. 35 (1997); Andrei Shleifer & Lawrence H. Summers, *The Noise Trader Approach to Finance*, 4 J. ECON. PERSP. 19 (1990); Lynn A. Stout, *Are Stock Markets Costly Casinos? Disagreement, Market Failure, and Securities Regulation*, 81 VA. L. REV. 611, 616 (1995); Amos Tversky & Daniel Kahneman, *Loss Aversion in Riskless Choice: A Reference-Dependent Model*, 106 Q.J. ECON. 1039, 1039 (1991).

[6] A number of financial regulations acknowledge the differences among investors. *See, e.g.*, FIN. INDUS. REGULATORY AUTH., FINRA MANUAL RULE 2111: SUITABILITY (2014), *available at* http://finra.complinet.com/en/display/display_main.html?rbid=2403%20&record_id=13390, *archived at* http://perma.cc/MYC9-9ZT2; SEC, STUDY ON INVESTMENT ADVISERS AND BROKER-DEALERS 55-63 (2011) (explaining the suitability standard for investments offered to different types of investors); *infra* Part III.C (discussing existing, formal categories of different investors).

[7] *See infra* Part II.

marketplace.[8] Together, this two-part objective aims to highlight the harms caused by not better recognizing contemporary investor diversity and explain how we can begin to address those harms. Collectively, this Article aspires to create a new and better framework for thinking about investors and investor protection.

This Article constructs this framework in four parts. Part I provides a typology of diverse investors. It begins with the bedrock paragon of the reasonable investor that is the central character of financial regulation. It then introduces other types of investors that deviate from the bedrock paragon in terms of cognition, activism, wealth, and personhood. It exposes the varying types of reasonable investors in the modern marketplace in contrast with regulatory theory's dominant, singular type of reasonable investors. In doing so, Part I presents a lineup of distinct investors and reveals a fundamental incongruity in financial regulation.

Part II explores that incongruity. It reveals the critical dissonance between investor heterogeneity in reality and investor homogeneity in regulation. It then explains how this problematic dissonance has generated a dissatisfying set of mismatched regulations and misplaced expectations for regulators and investors. Part II investigates the problem of how this critical dissonance in financial regulation has harmed investors and frustrated regulators.

Part III turns from problem to solution. It proposes a new typology of investor, the algorithmic investor, as an initial step towards improving investor protection. It starts by outlining a fundamental shift in financial markets and the emergence of a new algorithmic investor typology. It describes the significant shift in finance from human intelligence and human actors to artificial intelligence and supercomputers that gave rise to a new type of investor. Part III then articulates the definitional parameters of this new investor typology to provide an early template for regulators.

Part IV considers key implications of the new typology. It examines the impact of the proposed typology on the design of financial regulation in general. It then focuses specifically on the ramifications of the proposal on disclosure and materiality, two of financial regulation's core concepts. Part IV suggests that the formal adoption of a new algorithmic investor typology can lead to a better understanding and protection of all investors.

This Article ends with a brief conclusion. It recounts the comforts and complexities inherent in protecting a diverse population of investors in a changing financial marketplace and echoes the important call for a more nuanced, more honest, and more workable understanding of investors and investor protection.

[8] *See infra* Part III.

I. TYPOLOGY OF INVESTORS

According to Warren Buffett, one of the greatest investors of all time, "[i]nvesting is laying out money now to get more money back in the future."[9] While the reasonable investor profile is the quintessential, archetypical investor in financial regulation,[10] there nonetheless exist additional profiles of investors in the real world of finance that depart significantly from key attributes of the reasonable investor. This Part presents an original typology of investors, starting with the conventional reasonable investor paradigm. It then moves to crosscutting categories that differ from that paradigm in terms of cognition, activism, wealth, and personage.[11] Whereas the conventional reasonable investor profile represents an idealized, homogeneous view of similar, straightforward investors, this typology reveals a realistic, heterogeneous view of diverse, complicated investors that may also be considered reasonable investors.

A. *The Reasonable Investor*

The chief paragon and protectee of financial regulation is "the reasonable investor."[12] This protagonist was the focal point at the genesis of modern financial regulation during the enactments of the Securities Act of 1933 and the Securities Exchange Act of 1934, and during the creation of the Securities and Exchange Commission ("SEC").[13] In the many decades since the birth of the modern financial regulatory framework, regulators, scholars, and courts have not universally agreed upon the identity and defining characteristics of the reasonable investor.[14] Nonetheless, a leading paradigm of the reasonable

[9] Warren Buffett, *Mr. Buffett on the Stock Market*, *in* TAP DANCING TO WORK: WARREN BUFFETT ON PRACTICALLY EVERYTHING, 1966-2013, at 166, 167 (Carol J. Loomis ed., 2012).

[10] *See, e.g.*, Hoffman, *supra* note 5, at 538 ("Courts require investors to investigate their purchases, to coldly process risk, to disregard oral statements of optimism, and in general be *economically rational*.").

[11] This typology is crosscutting because investors can simultaneously fit into multiple categories.

[12] *See, e.g.*, Hoffman, *supra* note 5, at 537-40 (describing the importance of the reasonable investor construct in securities law); Margaret V. Sachs, *Materiality and Social Change: The Case for Replacing "the Reasonable Investor" with "the Least Sophisticated Investor" in Inefficient Markets*, 81 TUL. L. REV. 473, 475 (2007).

[13] *See, e.g.*, H.R. REP. NO. 73-1383, pt. 2, at 5 (1934) (discussing the need to protect individual investors in enacting the Securities Exchange Act of 1934); H.R. REP. NO. 73-85, pt. 1, at 2 (1933) (highlighting protecting reasonable investors as the purpose of the Securities Act of 1933).

[14] *See, e.g.*, Joan MacLeod Heminway, *Female Investors and Securities Fraud: Is the Reasonable Investor a Woman?*, 15 WM. & MARY J. WOMEN & L. 291, 293-94 (2009) (investigating "certain descriptive and normative characteristics of the reasonable investor"); Stefan J. Padfield, *Is Puffery Material to Investors? Maybe We Should Ask Them*, 10 U. PA. J. BUS. & EMP. L. 339, 365 (2008) (recognizing the unsettled profile of the

investor has emerged—the idealized retail investor—with a distinct profile that encompasses cognition, activism, wealth, and personage.[15]

In terms of cognition, the reasonable investor is generally understood to be the idealized, perfectly rational actor of neoclassical economics.[16] The reasonable investor is presumed to operate rationally to maximize returns in the marketplace. Prior to making investment decisions, the reasonable investor is capable of reading and comprehending all the noise and signals in the marketplace that encapsulate formal disclosures, economic data, market trends, senseless speculation, and irresponsible rumors.[17] As such, when given the requisite information, reasonable investors are able to properly price the risks and rewards of an investment.[18]

In terms of activism, the reasonable investor is generally understood to be a passive, long-term investor.[19] Once the reasonable investor makes an investment in a company, the reasonable investor does not try to actively influence the managers of that company. Additionally, once invested in a company, the reasonable investor is presumed to be holding the investment for a significant amount of time to generate long-term value.[20]

In terms of wealth, the reasonable investor is generally understood to be a retail investor of average wealth and financial sophistication.[21] The reasonable investor does not possess extraordinary wealth, extraordinary financial acumen, or special business insights.[22] Hence, reasonable investors, by virtue

"reasonable investor").

[15] *See* Heminway, *supra* note 14, at 297 (discussing the dominant legal view of the reasonable investor); Huang, *supra* note 5, at 111 ("[M]any courts appear to view the reasonable investor as referring to a normative idealized type of behavior, instead of a descriptive realistic depiction of actual behavior.").

[16] *See* Carlos Rodriguez-Sickert, *Homo Economicus*, *in* HANDBOOK OF ECONOMICS AND ETHICS 223, 223 (Jan Peil & Irene van Staveren eds., 2009).

[17] Tom C.W. Lin, *A Behavioral Framework for Securities Risk*, 34 SEATTLE U. L. REV. 325, 336-49 (2012).

[18] *See* Fama, *supra* note 5, at 56 (explaining how investors incorporate information into the pricing of securities).

[19] *See, e.g.*, Regulation NMS: Final Rules and Amendments to Joint Industry Plans, Exchange Act Release No. 34-51808, 70 Fed. Reg. 37,496, 37,500 (June 29, 2005) ("Indeed, the core concern for the welfare of long-term investors . . . was first expressed in the foundation documents of the Exchange Act itself.").

[20] *See* ARTHUR R. PINTO & DOUGLAS M. BRANSON, UNDERSTANDING CORPORATE LAW 191 (4th ed. 2013) ("A contention could be made that the reasonable investor is the conservative investor purchasing common stocks for medium-to long-term performance.").

[21] *See, e.g.*, Padfield, *supra* note 14, at 345 (stating the SEC's "'average' investor conceptualization"); Sachs, *supra* note 12, at 475-76 (claiming that "reasonable investors" perhaps includes individuals with little financial sophistication).

[22] *See, e.g.*, *In re* Cavanaugh, 306 F.3d 726, 737 n.20 (9th Cir. 2002) ("If financial sophistication had been Congress' principal concern, it would not have made the plaintiff who *lost* the most money the presumptive lead plaintiff.").

of their very ordinary nature, are vulnerable and in need of financial regulation's protection.[23]

In terms of personage, the reasonable investor is generally understood to be a private human being.[24] The reasonable investor is generally not thought of as a public institution like the federal government or a state government.[25] Likewise, the reasonable investor is generally not thought of as a private business entity or other non-human legal persons like a hedge fund, mutual fund, or investment bank.[26]

In sum, the reasonable investor, the central character of financial regulation, is frequently envisioned as a rational human being of average wealth and ordinary financial sophistication that invests passively for the long term.

B. *The Irrational Investor*

A growing body of research on behavioral law and economics critiques the rational cognition of the reasonable investor and offers another investor profile: the irrational investor.[27] The perfect rationality of the reasonable investor is an incredibly instructive attribute that is rooted more in theory than in fact.[28] The conventional reasonable investor is premised on the *homo*

[23] *See, e.g.*, Schlesinger Inv. P'ship v. Fluor Corp., 671 F.2d 739, 743 (2d Cir. 1982) ("The Williams Act was meant to protect the ordinary investor."); Feit v. Leasco Data Processing Equip. Corp., 332 F. Supp. 544, 565 (E.D.N.Y. 1971) ("[P]rospectuses should be intelligible to the average small investor."); Winter, *supra* note 2, at 884 ("Many also believe that Ordinary Investors are the most vulnerable of all investors to fraud, mismanagement, insider trading and the like.").

[24] This view is reflected in the original congressional intent to protect ordinary investors by creating modern securities regulation. H.R. REP. NO. 73-1383, pt. 2, at 5 (1934); H.R. REP. NO. 73-85, pt. 1, at 2 (1933).

[25] *See* Padfield, *supra* note 14, at 344-45 (discussing the notion of a reasonable investor by referring to types of individuals without mentioning institutions).

[26] *Id.* at 345 (describing the reasonable investor as an average shareholder).

[27] The influential field of behavioral economics is built on challenging the rational actor assumption of neoclassical economics. *See* DANIEL KAHNEMAN, THINKING, FAST AND SLOW 377-85 (2011); BEHAVIORAL LAW & ECONOMICS (Cass R. Sunstein ed. 2000); Choi & Pritchard, *supra* note 5, at 2-3; Jolls et al., *supra* note 5, at 1473-74; Langevoort, *supra* note 5, at 139 ("There are many vexing problems in securities law that might benefit from fresh possibilities, opening up new lines of thinking if not obvious answers."); Richard A. Posner, *Rational Choice, Behavioral Economics, and the Law*, 50 STAN. L. REV. 1551, 1553 (1998); Shiller, *supra* note 5, at 49-52. *But see* Ryan Bubb & Richard H. Pildes, *How Behavioral Economics Trims Its Sails and Why*, 127 HARV. L. REV. 1593, 1597 (2014) (discussing the drawbacks of conventional behavioral law and economics); Gregory Mitchell, *Why Law and Economics' Perfect Rationality Should Not Be Traded for Behavioral Law and Economics' Equal Incompetence*, 91 GEO. L.J. 67, 127 (2002) ("[L]egal scholars who have no training in the social sciences or who have only a superficial understanding of behavioral decision theory should refrain from the unaided application of behavior decision theory to the law.").

[28] *See* David L. Faigman, *To Have and Have Not: Assessing the Value of Social Science to the Law as Science and Policy*, 38 EMORY L.J. 1005, 1047 n.151 (1989) ("[E]conomists

economicus, the flawless, utility-maximizing individual existing only in the theoretical world of economics.[29] In contrast, the irrational investor is premised on the *homo sapien*, the flawed, ordinary individual of the real world.

The reasonable investor and the irrational investor diverge in critical ways. First, unlike the rational investor, the irrational investor cannot perfectly comprehend and synthesize enormous volumes of complex information prior to making an investment decision.[30] It is not hard to imagine an ordinary investor in the real world as someone who is incapable of flawlessly comprehending dense and voluminous securities disclosures in addition to the plethora of modern business information prior to making an investment. A 2012 study conducted by the SEC found that "American investors lack basic financial literacy" and lack the wherewithal to protect themselves from securities fraud.[31] In case reminders are necessary, recent financial history offers strong evidence of the limited cognition of investors. During the dotcom boom, many investors purchased securities in companies based on company names alone—without ever properly understanding their risks.[32] More recently, during the financial crisis, many investors purchased homes they could not afford with mortgages that they did not understand.[33]

Second, unlike the reasonable investor, the irrational investor does not make investment decisions dispassionately, uninfluenced by irrelevant internal and external stimuli.[34] Rather, in addition to rational considerations, the irrational

who assume that people are 'rational' decisionmakers have articulated highly sophisticated models that purport to make predictions of great exactitude. In the real world, of course, people are not rational decisionmakers, and the economists' models suffer accordingly."); Russell B. Korobkin & Thomas S. Ulen, *Law and Behavioral Science: Removing the Rationality Assumption from Law and Economics*, 88 CALIF. L. REV. 1051, 1075-84 (2000).

[29] Rodriguez-Sickert, *supra* note 16, at 223.

[30] *See* Nicholas Barberis & Richard Thaler*, A Survey of Behavioral Finance*, *in* 1B HANDBOOK OF THE ECONOMICS OF FINANCE 1053, 1065 (George M. Constantinides et al. eds., 2003); *see also* Erwann Michel-Kerjan & Paul Slovic, *An Idea Whose Time Has Come*, *in* THE IRRATIONAL ECONOMIST: MAKING DECISIONS IN A DANGEROUS WORLD 1, 3-6 (Erwann Michel-Kerjan & Paul Slovic eds., 2010).

[31] OFFICE OF INVESTOR EDUC. & ADVOCACY, SEC. & EXCH, COMM'N, STUDY REGARDING FINANCIAL LITERACY AMONG INVESTORS 15 (2012).

[32] *See* ADAM ALTER, DRUNK TANK PINK 21-22 (2013); JASON ZWEIG, YOUR MONEY AND YOUR BRAIN: HOW THE NEW SCIENCE OF NEUROECONOMICS CAN HELP MAKE YOU RICH 8 (2007).

[33] *See* SENATE INVESTIGATION, *supra* note 4, at 48-51 (reviewing mortgage practices prior to the financial crisis); Gerald H. Lander et al., *Subprime Mortgage Tremors: An International Issue*, 15 INT'L ADVANCES ECON. RES. 1, 4 (2009) ("Numerous borrowers say they didn't understand the loan structure and the escalating payments; in many cases, they couldn't afford them.").

[34] *See, e.g.*, KAHNEMAN, *supra* note 27, at 377-85; RICHARD RESTAK, THE SECRET LIFE OF THE BRAIN 109 (2001) ("[R]eason and emotion are as intertwined as the threads in an oriental carpet."); Huang, *supra* note 5, at 100-04 (positing that ordinary investors are motivated by irrelevant factors like emotions); Paul J.H. Schoemaker, *A Two-Edged Sword:*

investor is swayed by emotions, biases, heuristics, and framing effects.[35] These cognitive limitations frequently lead to excessive trading and suboptimal investment decisions.[36] Many investors, for instance, are motivated by irrelevant factors like sunlight, weather, and sleep when making investment decisions.[37] Irrational investors also chase fads and exhibit herd mentality with their investments.[38] Additionally, irrational investors frequently possess perilous amounts of optimism, confidence, and loss aversion that diminish their capacity to make the best investment decisions.[39] For example, many

Implications of Decision Psychology for Decision Analysis, *in* THE IRRATIONAL ECONOMIST, *supra* note 30, at 57-59.

[35] *See* ROY F. BAUMEISTER & BRAD J. BUSHMAN, SOCIAL PSYCHOLOGY AND HUMAN NATURE 161 (2008) ("[M]ental shortcuts, [or] heuristics, provide quick estimates (though sometimes inaccurate ones) for decisions about uncertain events." (emphasis omitted)); Lin, *supra* note 17, at 340-44 (surveying various cognitive biases); Margit E. Oswald & Stefan Grosjean, *Confirmation Bias*, *in* COGNITIVE ILLUSIONS: A HANDBOOK ON FALLACIES AND BIASES IN THINKING, JUDGMENT AND MEMORY 79, 80-81 (Rüdiger F. Pohl ed., 2004) (explaining the confirmation bias); William Samuelson & Richard Zeckhauser, *Status Quo Bias in Decision Making*, 1 J. RISK & UNCERTAINTY 7, 7-10 (1988) (discussing the status quo bias); Amos Tversky & Daniel Kahneman, *Judgment Under Uncertainty: Heuristics and Biases*, 185 SCIENCE 1124, 1128-29 (1974) (discussing the anchoring heuristic); Amos Tversky & Daniel Kahneman, *The Framing of Decisions and the Psychology of Choice*, *in* BEHAVIORAL DECISION MAKING 25 (George Wright ed., 1985) (describing the concept of "framing").

[36] *See, e.g.*, Brad M. Barber & Terrance Odean, *Online Investors: Do the Slow Die First?*, 15 REV. FIN. STUD. 455, 461-62 (2002).

[37] *See* David Hirshleifer & Tyler Shumway, *Good Day Sunshine: Stock Returns and the Weather*, 58 J. FIN. 1009, 1013-14 (2003); Mark Jack Kamstra et al., *Losing Sleep at the Market: The Daylight Savings Anomaly*, 90 AM. ECON. REV. 1005, 1007-10 (2000); Mark Jack Kamstra et al., *Winter Blues: A SAD Stock Market Cycle*, 93 AM. ECON. REV. 324, 325-27 (2003); Walter Kramer & Ralf Runde, *Stocks and the Weather: An Exercise in Data Mining or Yet Another Capital Market Anomaly?*, 22 EMPIRICAL ECON. 637, 638 (1997); Mark A. Trombley, *Stock Prices and Wall Street Weather: Additional Evidence*, 36 Q.J. BUS. & ECON. 11, 11 (1997).

[38] *See* Abhijit V. Banerjee, *A Simple Model of Herd Behavior*, 107 Q.J. ECON. 797, 798-800 (1992) (discussing the heuristics of herd behavior); David Hirshleifer & Siew Hong Teoh, *Herd Behaviour and Cascading in Capital Markets: A Review and Synthesis*, 9 EUR. FIN. MGMT. 25, 44-52 (2003); Thomas Lux, *Herd Behaviour, Bubbles and Crashes*, 105 ECON. J. 881, 881-83 (1995).

[39] *See* David A. Armor & Shelley E. Taylor, *When Predictions Fail: The Dilemma of Unrealistic Optimism*, *in* HEURISTICS AND BIASES: THE PSYCHOLOGY OF INTUITIVE JUDGMENT 334, 334 (Thomas Gilovich et al. eds., 2002) (addressing the cognitive bias of overoptimism); Brad M. Barber & Terrance Odean, *Boys Will Be Boys: Gender, Overconfidence, and Common Stock Investment*, 116 Q.J. ECON. 261, 262-66 (2001); John R. Nofsinger, *Do Optimists Make the Best Investors?*, 6 CORP. FIN. REV. 11, 11 (2002); Shiller, *supra* note 5, at 50-52 (studying investor overconfidence in stock markets).

investors tend to sell winning positions too early and hold on to losing positions for too long.[40]

Third, unlike the reasonable investor, who lives in a simple, perfectly efficient world populated only with other perfectly informed, rational characters, the irrational investor inhabits a complicated world populated with other flawed, complex characters—the real world. Optimal investment decisions and sustained investment successes are much more difficult to model and predict in the real world.[41] As Isaac Newton noted after suffering large losses during the South Sea Bubble of 1720, "I can calculate the motion of heavenly bodies but not the madness of people."[42]

Despite its critical divergences with the reasonable investor paradigm, the irrational investor typology does not presuppose an investor population that is *completely* irrational and erratic. Rather, the irrational investor typology describes a population of investors that is predictably flawed and cognitively bounded, as an alternative profile to the rational actor profile of the conventional reasonable investor paradigm.[43] Following the financial crisis, the irrational investor typology has become more influential in the marketplace as an alternative model of investors.[44]

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[40] *See* Hersh Shefrin & Meir Statman, *The Disposition to Sell Winners Too Early and Ride Losers Too Long: Theory and Evidence*, 40 J. FIN. 777, 779-85 (1985).

[41] *See, e.g.*, ALAN GREENSPAN, THE MAP AND THE TERRITORY: RISK, HUMAN NATURE, AND THE FUTURE OF FORECASTING 6 (2013) ("Simple models do well in the classroom as tutorials, but regrettably have had less success in the world beyond."); Robert E. Scott, *The Limits of Behavioral Theories of Law and Social Norms*, 86 VA. L. REV. 1603, 1639-46 (2000) (discussing the difficulties of deriving legal norms from behavioral findings).

[42] SCOTT PATTERSON, THE QUANTS: HOW A NEW BREED OF MATH WHIZZES CONQUERED WALL STREET AND NEARLY DESTROYED IT 12 (2010) (quoting Isaac Newton).

[43] *See* DAN ARIELY, PREDICTABLY IRRATIONAL: THE HIDDEN FORCES THAT SHAPE OUR DECISIONS 239 (rev. & expanded ed. 2009) ("Our irrational behaviors are neither random nor senseless—they are systematic and predictable."); Choi & Pritchard, *supra* note 5, at 2 ("These [cognitive] biases are not merely isolated quirks, rather, they are consistent, deep-rooted, and systematic behavioral patterns."); Jolls et al., *supra* note 5, at 1475 ("Behavioral economics does not suggest that behavior is random or impossible to predict; rather it suggests, with economics, that behavior is systematic and can be modeled."); Rahul Verma et al., *The Impact of Rational and Irrational Sentiments of Individual and Institutional Investors on DJIA and S&P500 Index Returns*, 18 APPLIED FIN. ECON. 1303, 1314 (2008) ("Unlike previous studies, which conjecture investor sentiments as fully irrational, we find that the individual and institutional investor sentiments are driven by both rational and irrational factors.").

[44] *See, e.g.*, *The Financial Crisis and the Role of Federal Regulators: Hearing Before the H. Comm. on Oversight & Gov't Reform*, 110th Cong. 46 (2008) (statement of Alan Greenspan, Former Chairman of the Federal Reserve Board) (acknowledging that he "found a flaw in the [neoclassical] model that . . . defines how the world works"); Verma et al., *supra* note 43, at 1314 ("[I]rrational sentiments have a more rapid and pronounced effect than rational sentiments on stock market returns."); Richard A. Posner, *How I Became a Keynesian*, NEW REPUBLIC, Sept. 23, 2009, at 34-37.

C. *The Active Investor*

The reasonable investor paradigm generally describes a passive, long-term investor, but there exists a significant population of investors that can be better described as active investors. The active investor typology is characterized by investor activism relating to ownership style and investment timeline.[45]

In terms of ownership style, rather than passively investing in a company like the reasonable investor, active investors aggressively attempt to affect and influence the business underlying their investment.[46] When reasonable investors disagree with management about a matter, rather than challenge powerful corporations and their executives, the reasonable investor normally holds on silently or sells its stake.[47] Active investors, in contrast, vigorously seek to influence corporate boards, senior executives, and other investors. The active investor does this via direct, private engagements with company executives, as well as through public engagements with the world at-large via lawsuits, proxy fights, and public relations campaigns.[48] In recent years, the world has witnessed the rise of the active investor paradigm in the form of activist investors like Bill Ackman, David Einhorn, Carl Icahn, and Daniel Loeb.[49] Depending on one's perspective, these activist investors may be viewed pejoratively as corporate raiders or positively as shareholder advocates.[50] Regardless of one's perception, the influence of leading activist investors is undeniable. With a single presentation or tweet, an activist investor can move billions of dollars in the marketplace.[51]

Beyond a more dynamic ownership style, the active investor typology also describes investors with shorter investment timelines. Rather than invest for long-term value creation, the active investor focuses on short-term returns. The active investor invests in positions for periods measured by days, hours, minutes, seconds, and nanoseconds—not years. The active investor is less

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[45] *See* John H. Armour & Brian R. Cheffins, *Origins of "Offensive" Shareholder Activism in the United States*, *in* ORIGINS OF SHAREHOLDER ADVOCACY 253, 253-76 (Jonathan G.S. Koppell ed., 2011); Maria Goranova & Lori Verstegen Ryan, *Shareholder Activism: A Multidisciplinary Review*, 40 J. MGMT 1231, 1231 (2014).

[46] Stephen J. Choi & Jill E. Fisch, *On Beyond CalPERS: Survey Evidence on the Developing Role of Public Pension Funds in Corporate Governance*, 61 VAND. L. REV. 315, 326-33 (2008).

[47] *See, e.g.*, Tom C.W. Lin, *CEOs and Presidents*, 47 U.C. DAVIS L. REV. 1351, 1370-88 (2014) (discussing the power dynamics of corporate CEOs).

[48] *See, e.g.*, David H. Webber, *The Plight of the Individual Investor in Securities Class Actions*, 106 NW. U. L. REV. 157, 201 (2012) ("Actual corporate governance activism manifests itself in two basic forms: nonlitigation activism and litigation activism.").

[49] *See* Rana Foroohar, *The Original Wolf of Wall Street*, TIME, Dec. 16, 2013, at 20.

[50] *See id.*

[51] *See* David Carr, *Using Twitter to Move the Markets*, N.Y. TIMES, Oct. 7, 2013, at B1 ("[W]ithin an hour of Icahn's posts on Twitter, Apple's market capitalization increased by $17 billion."); William D. Cohan, *Little Big Man*, VANITY FAIR, Dec. 2013, at 158, 158-63 (profiling the tactics of activist shareholder Dan Loeb).

focused on the long-term value of a company or investment and more focused on the short-term profits of a particular investment. High-frequency investors, for instance, frequently hold positions measured in fractions of seconds without any regard for the fundamentals underlying the businesses of their positions.[52] Amateur day traders also move in and out of positions on very short timelines, based on market noise and momentum.[53]

Therefore, in contrast to the passivity of reasonable investors, the active investor typology represents a distinctly more dynamic population of investors. This population of investors is more active in terms of its ownership style and investment timeline.

D. *The Sophisticated Investor*

The reasonable investor paradigm is frequently understood to describe an investor of average wealth and ordinary financial sophistication, but there exists a significant population of investors who possess superior wealth and financial acumen and who can be better described as sophisticated investors. The sophisticated investor typology describes investors possessing above-average wealth and financial sophistication. The typology of sophisticated investors includes many professional investors such as investment banks, hedge funds, mutual funds, pension funds, and their respective asset managers.

The SEC has specifically defined a subset of this typology as "accredited investor[s]" in Rule 501 of Regulation D.[54] Under the SEC's definition, an accredited investor includes "[a]ny natural person whose individual net worth, or joint net worth with that person's spouse, exceeds $1,000,000" or "who had an individual income in excess of $200,000 in each of the two most recent years or joint income with that person's spouse in excess of $300,000 in each of those years and has a reasonable expectation of reaching the same income level in the current year."[55] According to the SEC, private investment offerings made to accredited investors are exempt from some of the more stringent

[52] *See* IRENE ALDRIDGE, HIGH-FREQUENCY TRADING: A PRACTICAL GUIDE TO ALGORITHMIC STRATEGIES AND TRADING SYSTEMS 14-15 (2d ed. 2013) (stating that holding periods of high frequency traders range "from a fraction of a second to one day (no positions held overnight)").

[53] *See* Brad M. Barber & Terrance Odean, *Trading Is Hazardous to Your Wealth: The Common Stock Investment Performance of Individual Investors*, 55 J. FIN. 773, 785-88 (2000); J. Bradford De Long et al., *Noise Trader Risk in Financial Markets*, 98 J. POL. ECON. 703, 704-06 (1990); Shleifer & Summers, *supra* note 5, at 20-23.

[54] 17 C.F.R. §230.501 (2014).

[55] *Id.*; *see also* Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, § 413, 124 Stat. 1376, 1577-78 (2010) (requiring that the SEC update the definition of an accredited investor); Net Worth Standard for Accredited Investors, 76 Fed. Reg. 20, 5307 (proposed Jan. 31, 2011) (to be codified at 17 C.F.R. pts. 230, 239, 270 & 275) (providing notice of the updated accredited investor standards to be promulgated by the SEC).

requirements of investment opportunities made to average investors.[56] These exemptions are justified because regulators believe that accredited investors—because of their superior wealth and financial acumen—need less protection than ordinary investors and can "fend for themselves."[57]

Beyond the SEC's definition of accredited investors, there exists a significant population of individuals that may not be captured by the SEC's wealth-driven definition but may nonetheless possess superior financial wealth or acumen. For instance, financially sophisticated individuals that approach but do not meet the income and net wealth thresholds of the SEC's definition may reasonably be considered distinct from the reasonable investor.[58] This subset of sophisticated investors not only falls outside of the SEC's conception but also outside of traditional conceptions of the reasonable investor. Conversely, there are investors that are captured by the SEC's definition of accredited investors who are truly not financially sophisticated enough to engage in some of the more risky investment opportunities offered to accredited investors.[59] The 18-year-old boy who just inherited a multimillion-dollar fortune is a prime example of someone who may qualify as an accredited investor in letter but not in spirit.

It is worth noting that some scholars and commentators have suggested that the primary goal of financial regulation should be to create optimal market conditions for sophisticated investors.[60] This is because sophisticated investors, with their technical expertise and market power, are best positioned to facilitate efficient capital markets for all investors.[61]

E. *The Entity Investor*

The reasonable investor paradigm is frequently understood to be describing a private, natural person, but there exists a significant population of investors that are legal creations that can be better described as entity investors. The entity investor typology describes non-human, institutional investors that can be private or public in constitution.

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[56] 17 C.F.R. §§ 230.501-508 (2014).

[57] *See* Sec. & Exch. Comm'n v. Ralston Purina Co., 346 U.S. 119, 125 (1953).

[58] *See, e.g.*, U.S. CENSUS BUREAU, *supra* note 1, at 750 tbl.1211 (showing stock ownership by investors across various income brackets).

[59] *See* Wallis K. Finger, *Unsophisticated Wealth: Reconsidering the SEC's "Accredited Investor" Definition Under the 1933 Act*, 86 WASH. U. L. REV. 733, 748-49 (2009). *See generally* Ethiopis Tafara & Robert J. Peterson, *A Blueprint for Cross-Border Access to U.S. Investors: A New International Framework*, 48 HARV. INT'L L.J. 31, 32 (2007).

[60] *See* Goshen & Parchomovsky, *supra* note 5, at 714-15.

[61] *See In re* Apple Computer Sec. Litig., 886 F.2d 1109, 1114 (9th Cir. 1989) ("[I]t is a basic assumption of the securities laws that the partially-informed investors will cancel each other out . . . ."); Goshen & Parchomovsky, *supra* note 5, at 714-15 (discussing the significance of sophisticated "information traders").

Private entity investors can be organized as corporations, limited liability companies, partnerships, limited partnerships, or joint ventures, among other forms of business organizations. They represent hedge funds, mutual funds, family trusts, and a host of other private businesses varying in size and industry. Private institutional investors play an outsized role in the financial markets. Whereas one reasonable investor is unlikely to possess the power to alter global markets, private institutional investors can (and do) singularly wield that type of power. Pacific Investment Management Company ("PIMCO"), one of the largest fixed income investors in the world, holds substantial sway over the global bond markets.[62] Similarly, Vanguard, one of the world's largest investment management companies, oversees nearly $3 trillion in assets and holds significant influence over equity markets around the world.[63]

On the other side of the public/private divide, public entity investors can include governments and government-affiliated institutions. They represent cities, states, nations, and entities created by public law and given investment authority. Public entity investors play an incredibly powerful role in financial markets. For example, CalPERS, the California Public Employees' Retirement System, which manages the pensions of California public employees and their beneficiaries, is one of the most influential investors in the world.[64] In recent years, the U.S. government has been one of the most important investors in private companies.[65] Between 2008 and 2010, in the aftermath of the financial crisis, the federal government invested billions of dollars and owned significant stakes in American corporations like AIG, Citigroup, Chrysler, and General Motors.[66] Beyond American public entities, foreign countries and their sovereign wealth funds act as some of the largest and most influential investors in financial markets.[67] China and Japan, for instance, each hold hundreds of billions of dollars in U.S. debt obligations.[68]

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[62] *See, e.g.*, Geraldine Fabrikant, *The Bond Market Discovers a New Leading Man*, N.Y. TIMES, July 29, 2012, at BU1.

[63] *About Vanguard*, VANGUARD, https://americas.vanguard.com/institutional/abt-vanguard.htm#stability-and-experience, *archived at* https://perma.cc/9QSD-RZQG (last visited Jan. 16, 2015).

[64] *See* TESSA HEBB, NO SMALL CHANGE: PENSION FUNDS AND CORPORATE ENGAGEMENT 45 (2008) (examining the "CalPERS effect," which caused underperforming companies to improve upon being targeted by CalPERS for poor corporate governance).

[65] Kahan & Rock, *supra* note 4, at 1299-1301.

[66] *See* Nick Bunkley, *G.M. Repays U.S. Loan, While Chrysler Posts Improved Quarterly Results*, N.Y. TIMES, Apr. 22, 2010, at B3; Bill Vlasic & Nick Bunkley, *Obama Is Upbeat for G.M. Future on a Day of Pain*, N.Y. TIMES, June 2, 2009, at A1; Jeff Zeleny & Eric Dash, *Citigroup Nears Payment Deal; Obama to Press Banks for Help*, N.Y. TIMES, Dec. 14, 2009, at A1; Press Release, Bd. of Governors of the Fed. Reserve Sys. (Sept. 16, 2008), *available at* http://www.federalreserve.gov/newsevents/press/other/20080916a.htm, *archived at* http://perma.cc/XLP4-PGAL.

[67] *See, e.g.*, CHRISTOPHER BALDING, SOVEREIGN WEALTH FUNDS: THE NEW INTERSECTION

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This typology of investors reveals a complicating view of investors. In theory, investors are homogeneously envisioned as reasonable investors: perfectly rational human beings of average wealth and ordinary financial sophistication that invest passively for the long term. In reality, contemporary investors are more diverse.[69] In addition to the conventional, singular reasonable investor paradigm, this typology of investors acknowledges that diversity by offering crosscutting profiles of the irrational investor, the active investor, the sophisticated investor, and the entity investor. By better recognizing the diversity of investors, one can begin to think beyond a singular type of reasonable investor and move towards multiple types of reasonable investors. More importantly, by better recognizing the diversity of investors, one can better diagnose the shortcomings of current investor protection efforts and begin to consider superior safeguards for all investors.

II. DISSONANCE AND ITS DISCONTENTS

The dissonance between the singular paradigm of reasonable investors and the diverse profiles of real investors has created discontent for regulators and investors alike. For regulators, this dissonance has resulted in mismatched regulations that hinder and obviate the soundness of financial regulation. For investors, this dissonance has resulted in misplaced investment expectations that are harmful and frustrating.

A. *Mismatched Regulations*

The discord between the homogeneity of the reasonable investor paradigm and the heterogeneity of investors in financial markets has produced mismatches in regulations designed to achieve the mission of protecting investors.[70] Designing regulations for a homogeneous population of reasonable investors, and then applying them to a diverse population of investors, has

OF MONEY AND POLITICS 15-23 (2012) (providing an overview of modern sovereign wealth funds).

[68] CONG. BUDGET OFFICE, FEDERAL DEBT AND INTEREST COSTS 13 (2010).

[69] *See* U.S. CENSUS, *supra* note 1; Leas, *supra* note 2, at 379 ("The reduction of the investor population to a single standard seems particularly unrealistic.").

[70] *See The Investor's Advocate: How the SEC Protects Investors, Maintains Market Integrity, and Facilitates Capital Formation*, U.S. SECURITIES & EXCHANGE COMMISSION, http://www.sec.gov/about/whatwedo.shtml (last modified June 10, 2013), *archived at* http://perma.cc/L5SM-VURC ("The mission of the U.S. Securities and Exchange Commission is to protect investors, maintain fair, orderly, and efficient markets, and facilitate capital formation.").

limited the effectiveness of financial regulation aimed at investor protection, given the incongruence between theory and reality.[71]

In theory, investors are in need of protection from the agency problems associated with owning shares, particularly those of large public corporations, given the inherent separation of ownership and control in the corporate form.[72] Despite significant debate about the true efficiency of capital markets,[73] regulation is frequently designed to minimize agency costs so as to sustain efficient markets that best serve and protect reasonable investors.[74] Efficient

[71] *See* Anita K. Krug, *Downstream Securities Regulation*, 94 B.U. L. REV. 1589, 1594 (2014) (suggesting that regulatory misapplications have "produced a securities regulatory regime scattershot with flaws and vulnerabilities"); Thomas Lee Hazen, *Rational Investments, Speculation, or Gambling?—Derivative Securities and Financial Futures and Their Effect on the Underlying Capital Markets*, 86 NW. U. L. REV. 987, 1012-13 (1992) (challenging the utility of regulation based on rational investments); Alan R. Palmiter & Ahmed E. Taha, *Mutual Fund Investors: Divergent Profiles*, 2008 COLUM. BUS. L. REV. 934, 938-40 (summarizing differing profiles of investors between regulators and reality).

[72] *See* ADOLF A. BERLE & GARDINER C. MEANS, THE MODERN CORPORATION AND PRIVATE PROPERTY 112-16 (rev. ed. 1967) (describing the common separation of ownership and management in corporations); Stephen M. Bainbridge, *The Business Judgment Rule as Abstention Doctrine*, 57 VAND. L. REV. 83, 105 (2004) ("Shareholders, who are said to 'own' the firm, have virtually no power to control either its day-to-day operation or its long-term policies." (footnotes omitted)); Margaret M. Blair & Lynn A. Stout, *A Team Production Theory of Corporate Law*, 85 VA. L. REV. 247, 248 (1999) ("[C]orporations are little more than bundles of assets collectively owned by shareholders (principals) who hire directors and officers (agents) to manage those assets on their behalf."); Eugene F. Fama, *Agency Problems and the Theory of the Firm*, 88 J. POL. ECON. 288, 290 (1980) ("[C]ontrol over a firm's decisions is not necessarily the province of security holders.").

[73] *See* ROBERT A. HAUGEN, THE NEW FINANCE: THE CASE AGAINST EFFICIENT MARKETS, at xi (1995); ANDREI SHLEIFER, INEFFICIENT MARKETS: AN INTRODUCTION TO BEHAVIORAL FINANCE 10-16 (2000); James D. Cox, *Coping in a Global Marketplace: Survival Strategies for a 75-Year-Old SEC*, 95 VA. L. REV. 941, 953 (2009) ("There is a good deal of debate regarding not only whether securities markets are efficient, but more fundamentally what the meaning of market efficiency is."); Lawrence A. Cunningham, *From Random Walks to Chaotic Crashes: The Linear Genealogy of the Efficient Capital Market Hypothesis*, 62 GEO. WASH. L. REV. 546, 547-51 (1994) ("[T]he [efficient capital market hypothesis] is a major premise for a substantial body of corporate and securities law and scholarship."); Daniel R. Fischel, *Efficient Capital Markets, the Crash, and the Fraud on the Market Theory*, 74 CORNELL L. REV. 907, 907 (1989); Burton G. Malkiel, *The Efficient Market Hypothesis and Its Critics*, 17 J. ECON. PERSP. 59, 60 (2003); Robert C. Merton, *A Simple Model of Capital Market Equilibrium with Incomplete Information*, 42 J. FIN. 483, 486 (1987) (suggesting that perfectly efficient capital markets may just be "a useful abstraction"); Shleifer & Vishny, *supra* note 5, at 51-52 ("[T]he theoretical underpinnings of the efficient markets approach to arbitrage are based on a highly implausible assumption of many diversified arbitrageurs."); Lynn A. Stout, *The Mechanisms of Market Inefficiency: An Introduction to the New Finance*, 28 J. CORP. L. 635, 636-39 (2003).

[74] Minimizing agency costs in order to protect investors has been a core goal of securities regulation ever since its infancy. *See* H.R. REP. NO. 73-1383, pt. 2, at 5 (1934) ("As a

capital markets benefit investors (and society at large), because they exhibit accurate prices and enhanced liquidity so that investors can effectively realize their investment preferences by allocating capital accordingly.[75]

Theoretically, designing regulation for the idealized, reasonable investor with perfect rationality is relatively straightforward because rational individuals can "maximize their utility from a stable set of preferences and accumulate an optimal amount of information and other inputs in a variety of markets."[76] Regulation, therefore, should aim to provide investors with essential investment information and tools so that investors can protect themselves against corporate mismanagement.[77] Simply put, transparency is intended to serve as a bulwark against bad corporate governance.[78] As such, policymakers have tried to "substitute a philosophy of full disclosure for the

complex society so diffuses . . . the financial interests of the ordinary citizen that he . . . cannot personally watch the managers of all his interests . . . it becomes a condition of the very stability of that society that its rules of law . . . protect that ordinary citizen's dependent position."); H.R. REP. NO. 73-85, pt. 1, at 2 (1933) ("The purpose of the legislation . . . is to protect the public with the least possible interference to honest business."); Goshen & Parchomovsky, *supra* note 5, at 713 ("[S]cholarly analysis of securities regulation must proceed on the assumption that the ultimate goal of securities regulation is to attain efficient financial markets and thereby improve the allocation of resources in the economy.").

[75] *See* Victor Brudney, *Insiders, Outsiders, and Informational Advantages Under the Federal Securities Laws*, 93 HARV. L. REV. 322, 341 (1979) ("The market will thus function efficiently to allocate savings to enterprises which are more profitable and divert them from enterprises which are less profitable."); Eugene F. Fama, *Efficient Capital Markets: A Review of Theory and Empirical Work*, 25 J. FIN. 383, 383 (1970); Fox et al., *supra* note 5, at 367-68 (opining on the economic benefits of accurate stock prices); Ronald Gilson & Reinier R. Kraakman, *The Mechanisms of Market Efficiency*, 70 VA. L. REV. 549, 557 (1984); Goshen & Parchomovsky, *supra* note 5, at 714 ("The two main determinants of market efficiency are share price accuracy and financial liquidity."); Marcel Kahan, *Securities Regulations and the Social Costs of "Inaccurate" Stock Prices*, 41 DUKE L.J. 977, 988 (1992).

[76] GARY S. BECKER, THE ECONOMIC APPROACH TO HUMAN BEHAVIOR 14 (1976).

[77] *See* Bernard S. Black, *The Legal and Institutional Preconditions for Strong Securities Markets*, 48 UCLA L. REV. 781, 783 (2001) (arguing that financial regulation should ensure shareholders access to "good information about the value of a company's business" and "confidence that the company's insiders . . . won't cheat investors"); Merritt B. Fox, *Retaining Mandatory Securities Disclosure: Why Issuer Choice Is Not Investor Empowerment*, 85 VA. L. REV. 1335, 1369-95 (1999); Troy A. Paredes, *Blinded by the Light: Information Overload and Its Consequences for Securities Regulation*, 81 WASH. U. L.Q. 417, 418 (2003) ("Once they are empowered with information . . . investors can protect themselves against corporate abuses and mismanagement, and there is no need for the government to engage in more substantive securities regulation . . . ."); Robert B. Thompson & Hillary A. Sale, *Securities Fraud as Corporate Governance: Reflections upon Federalism*, 56 VAND. L. REV. 859, 860-62 (2003).

[78] *See* Louis Lowenstein, *Financial Transparency and Corporate Governance: You Manage What You Measure*, 96 COLUM. L. REV. 1335, 1342-45 (1996).

philosophy of *caveat emptor*" as a guiding principle for rulemaking.[79] For instance, the Sarbanes-Oxley Act requires public company executives to publicly certify to investors the veracity of their annual and quarterly reports, as well as inform their auditors about weaknesses in their financial controls.[80] Such mandatory disclosure rules, in conjunction with standardized presentations, help reduce the agency costs associated with collecting, authenticating, and analyzing information for investors.[81] Such disclosure rules also help promote integrity in the marketplace by allowing market pricing to reward good actors and punish bad actors by making comparative examinations easier.[82] Not surprisingly, this regulatory pathology of "full disclosure" has manifested in more disclosure[83] and more direct governance tools such as "say-on-pay" for investors.[84] Practically, this has resulted in

[79] Sec. & Exch. Comm'n v. Capital Gains Research Bureau, Inc., 375 U.S. 180, 186 (1963).

[80] Sarbanes-Oxley Act of 2002 § 302, 15 U.S.C. § 7241 (2002).

[81] *See* Coffee, *supra* note 5, at 733-34 (explaining how disclosure mandates decrease information costs for investors); Douglas W. Diamond, *Optimal Release of Information by Firms*, 40 J. FIN. 1071, 1083-89 (1985); Michael J. Fishman & Kathleen M. Hagerty, *The Optimal Amount of Discretion to Allow in Disclosure*, 105 Q.J. ECON. 427, 439-40 (1990) ("Standardization makes it easier to filter out the common noise. This allows the market to more efficiently price projects, and increases the efficiency of the flow of capital."); Goshen & Parchomovsky, *supra* note 5, at 738 ("Mandatory disclosure duties reduce the cost of searching for information."); Paul G. Mahoney, *Mandatory Disclosure as a Solution to Agency Problems*, 62 U. CHI. L. REV. 1047, 1051-52 (1995) ("By reducing monitoring costs, disclosure reduces overall agency losses."); Robert B. Thompson & Ronald King, *Credibility and Information in Securities Markets After Regulation FD*, 79 WASH. U. L.Q. 615, 616-18 (2001); Manuel A. Utset, *Towards a Bargaining Theory of the Firm*, 80 CORNELL L. REV. 540, 598-99 (1995). *But see* George J. Benston, *Required Disclosure and the Stock Market: An Evaluation of the Securities Exchange Act of 1934*, 63 AM. ECON. REV. 132, 153 (1973) (critiquing the high costs of mandated disclosures); Frank H. Easterbrook & Daniel R. Fischel, *Mandatory Disclosure and the Protection of Investors*, 70 VA. L. REV. 669, 683 (1984) (criticizing mandatory disclosure rules); George J. Stigler, *Public Regulation of the Securities Markets*, 37 J. BUS. 117, 122-24 (1964) (questioning the utility of mandated disclosures).

[82] *See, e.g.*, Cox, *supra* note 70, at 960 ("Mandatory disclosure rules are believed to facilitate allocational efficiency because uniform disclosure will lead to sharper comparative judgments respecting the relation of risk and return."); Zohar Goshen & Gideon Parchomovsky, *On Insider Trading, Markets, and "Negative" Property Rights in Information*, 87 VA. L. REV. 1229, 1238-43 (2001).

[83] *See, e.g.*, Lin, *supra* note 17, at 336 ("[T]his assumption has produced a regulatory framework that emphasizes more information over less information, more disclosure over better disclosure, quantity over quality.").

[84] Shareholder Approval of Executive Compensation and Golden Parachute Compensation, Securities Act Release No. 9178, Exchange Act Release No. 63,768, 76 Fed. Reg. 6010, 6012 (proposed Feb. 2, 2011) (to be codified at 17 C.F.R. pt. 229, 240 & 249) (adopting "say-on-pay" amendments as an indication of shareholder approval of corporate

lengthier and more detailed securities filings from firms.[85] For instance, between 1950 and 2004, annual reports of Fortune 500 companies increased in length from approximately 16 pages per firm to over 165 pages per firm.[86] All of this additional information was (and is) intended, in theory, to better inform investors, so that they can better protect themselves.

In reality, financial regulations designed for a homogeneous population of reasonable investors has frequently been ill suited for protecting a diverse population of real investors.[87] Most real investors simply do not behave like theoretical reasonable investors.[88] While they are not "nitwits" or "child-like," as the Supreme Court noted,[89] real investors nonetheless do not have perfect rationality and cannot process all disclosed information properly to make optimal investment decisions.[90] Many real investors price an investment on factors unrelated to the fundamental value of the company or the macroeconomic realties of the marketplace.[91] During the Internet bubble of the

compensation rates).

[85] *See, e.g.*, Henry T. C. Hu, *Disclosure Universe and Modes of Information: Banks, Innovation, and Divergent Regulatory Quests*, 31 YALE J. REG. 565, 571 (2014) (discussing the growing size of regulatory disclosure documents relating to financial institutions).

[86] Jeffrey N. Gordon, *The Rise of Independent Directors in the United States, 1950–2005: Of Shareholder Value and Stock Market Prices*, 59 STAN. L. REV. 1465, 1547 (2007).

[87] *See* Hazen, *supra* note 71, at 1024 ("[T]he vast majority of current market regulation is premised upon the ill-founded assumption of investor rationality and the related notion of market efficiency on a macro-economic scale."); Winter, *supra* note 2, at 882-83 (asserting that there is "a tendency to ignore the fact that investors are not fungible, that some investors have goals quite different from others, that some investors are less exposed to particular kinds of risks than others, and, most important, that some perform different market functions than others").

[88] *See, e.g.*, ROBERT J. SHILLER, IRRATIONAL EXUBERANCE 153 (2000); Malkiel, *supra* note 73, at 61 ("Individuals see a stock price rising and are drawn into the market in a kind of 'bandwagon effect' . . . the result of psychological contagion leading to irrational exuberance."); Jennifer O'Hare, *Retail Investor Remedies Under 10B-5*, 76 U. CIN. L. REV. 521, 526 (2008) ("[I]ndividual investors, rather than behaving as rational actors, are heavily influenced by a variety of biases that can lead to bad investment decisions.").

[89] Basic Inc. v. Levinson, 485 U.S. 224, 234 (1988) (quoting Flamm v. Eberstadt, 814 F.2d 1169, 1175 (7th Cir. 1987)).

[90] *See generally* 2 ADVANCES IN BEHAVIORAL FINANCE (Richard H. Thaler ed., 2005); SHLEIFER, *supra* note 73, at 8; Langevoort, *supra* note 2, at 1043 (challenging the regulatory assumption that investors can process all disclosed information well); Robert J. Shiller & John Pound, *Survey Evidence on Diffusion of Interest and Information Among Investors*, 12 J. ECON. BEHAV. & ORG. 47, 50 (1989); Lauren E. Willis, *Against Financial-Literacy Education*, 96 IOWA L. REV. 197, 211-52 (2008) (identifying "four intractable barriers" to financial-literacy education as informational asymmetry, low computing abilities amongst consumers, biased consumer decision-making behavior, and resource disparities).

[91] Donald G. MacGregor et al., *Imagery, Affect, and Financial Judgment*, 1 J. PSYCHOL. & FIN. MARKETS 104, 105 (2000) ("[F]actors other than technical fundamentals are often used by market participants to gauge the value of securities.").

late 1990s, many investors failed to read or comprehend the risks disclosed in voluminous securities filings and instead invested in companies based primarily on names that suggested technology or Internet affiliations.[92] During that time, a number of companies outperformed their peers by sixty-three percent simply by changing their names to include ".com," ".net," or "Internet."[93] In the years leading up to the recent financial crisis, average investors bought homes they could not afford with mortgages that they did not understand.[94] Around the same time, sophisticated investors such as investment banks overleveraged and overinvested in risky securities that caused significant stress to the global financial system despite many disclosed dangers.[95] The "smart money," which was supposed to protect the market from the "dumb money" tendencies of the masses with arbitrage and other market mechanisms,[96] turned out not to have been impervious to the behavioral biases afflicting ordinary investors.[97]

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[92] *See* ZWEIG, *supra* note 32, at 8.

[93] *Id.*

[94] *See, e.g.*, SENATE INVESTIGATION, *supra* note 4, at 48-51 (reporting on bad lending practices that led to the financial crisis); Oren Bar-Gill, *The Law, Economics and Psychology of Subprime Mortgage Contracts*, 94 CORNELL L. REV. 1073, 1081-82 (2009) (speculating on the irrationality of lenders, borrowers, and homeowners in the years prior to the financial crisis); Lander et al., *supra* note 33, at 4 ("Numerous borrowers say they didn't understand the loan structure and the escalating payments; in many cases, they couldn't afford them."); Tom C.W. Lin, *Too Big to Fail, Too Blind to See*, 80 MISS. L.J. 355, 367-71 (2010) (reviewing ANDREW ROSS SORKIN, TOO BIG TO FAIL: THE INSIDE STORY OF HOW WALL STREET AND WASHINGTON FOUGHT TO SAVE THE FINANCIAL SYSTEM—AND THEMSELVES (2009)) (critiquing the rational actor model in connection with the financial crisis).

[95] *See, e.g.*, Fisch, *supra* note 4, at 815-16 ("Investment, governance, and operational decisions were all tainted by the inability of decision-makers to evaluate complex financial transactions."); Steven L. Schwarcz, *Disclosure's Failure in the Subprime Mortgage Crisis*, 2008 UTAH L. REV. 1109, 1110 ("Most, if not all, of the risks giving rise to the collapse of the market for securities backed by subprime mortgages were disclosed, yet the disclosure was insufficient, in part because complexity made the risks very difficult to understand.").

[96] *See* Choi & Pritchard, *supra* note 5, at 3 ("[T]he unsophisticated therefore can rely on market efficiency to ensure that the price he pays for a security will be 'fair.' . . . [T]he overwhelming influence of smart money actually indirectly protects the interests of the poorly informed, as evidenced by the burgeoning popularity of index funds."); Langevoort, *supra* note 2, at 1064 ("As financial economics has long highlighted, the presence of smart money can neutralize the harms of noise traders through arbitrage.").

[97] *See* GARY BELSKY & THOMAS GILOVICH, WHY SMART PEOPLE MAKE BIG MONEY MISTAKES AND HOW TO CORRECT THEM 168-69 (2009) ("In fact, in most years the majority of these *professional* money managers actually perform worse than stocks in general. Indeed, over periods of a decade or more, roughly 75 percent of all stock funds underperform the market."); Choi & Pritchard, *supra* note 5, at 2 ("There is evidence that supposedly sophisticated institutional investors—mutual funds, pension funds, insurance companies—suffer from similar biases that impair their decisions."); *see also* JOHN C.

In the years since the financial crisis, many people, including some leading free-market thinkers, have expressed hesitation about wholesale subscription to the traditional reasonable investor model.[98] In the aftermath of the crisis, greater efforts have been made to tailor financial regulation to investors that do not match the monolithic reasonable investor model.[99] Despite these efforts, much of the regulatory framework remains designed to protect mythical, reasonable investors of a model marketplace.[100] Thus, much of this regulatory framework remains mismatched for the diverse investors of the real marketplace.

This discussion on mismatched regulations is not intended to suggest that the homogeneous reasonable investor paradigm is fatally flawed. Rather, this discussion suggests that the reasonable investor paradigm is incomplete and outdated as a fundamental basis for financial regulation in the twenty-first century.[101] Despite its many shortcomings, it is accepted that the contemporary financial regulatory framework spearheaded in part by the SEC remains one of the best in the world.[102] The reasonable investor paradigm, while flawed, has also predicated a regulatory framework that oversaw extended periods of robust economic growth for America and significant wealth creation for

BOGLE, COMMON SENSE ON MUTUAL FUNDS: NEW IMPERATIVES FOR THE INTELLIGENT INVESTOR 119 (1999) (charting the inferiority of actively managed mutual fund returns relative to the S&P 500 Index); Judith Chevalier & Glenn Ellison, *Career Concerns of Mutual Fund Managers*, 114 Q.J. ECON. 389, 389 (1999); M.P. Dunleavy, *That Rush to Beat the Market*, N.Y. TIMES, Apr. 12, 2009, at BU22 ("[N]umerous studies have shown that, despite investor willingness to pay higher fees and expenses for actively managed mutual funds, these funds rarely beat the market in the long term.").

[98] *See, e.g.*, GREENSPAN, *supra* note 41, at 6-9; Posner, *supra* note 44, at 34 ("We have learned . . . that the present generation of economists has not figured out how the economy works."). *But see* MILTON FRIEDMAN, *The Methodology of Positive Economics*, *in* ESSAYS IN POSITIVE ECONOMICS 3, 15 (1953).

[99] *See, e.g.*, Ron Lieber, *Consumer Watchdog Is All Ears for Ideas*, N.Y. TIMES, July 16, 2011, at B1.

[100] *See* Michael J. Kaufman, *Foreword: Behavioral Economics and Investor Protection*, 44 LOY. U. CHI. L.J. 1323, 1325 (2013) ("Despite [Daniel] Kahneman's transformative research, however, the presumption that individuals are rational utility-maximizers still permeates the law and policy governing the protection of investors from securities fraud.").

[101] *See* RANALD C. MICHIE, THE GLOBAL SECURITIES MARKET: A HISTORY 301-02 (2006) (discussing the enormous expansion of the investor population over time).

[102] *See, e.g.*, CHARLES R. MORRIS, MONEY, GREED, AND RISK: WHY FINANCIAL CRISES AND CRASHES HAPPEN 78 (1999) ("The securities regulatory system that evolved through the 1930s . . . has proven itself the most successful in the world."); Robert Prentice, *Whither Securities Regulation? Some Behavioral Observations Regarding Proposals for Its Future*, 51 DUKE L.J. 1397, 1400 (2002) (recognizing "a growing body of empirical evidence supporting the developing consensus that American securities regulation is the optimal system for governing capital markets"). *But see* Roberta Romano, *Empowering Investors: A Market Approach to Securities Regulation*, 107 YALE L.J. 2359, 2361 (1998) ("The U.S. securities laws have repeatedly been assailed as burdensome or ineffective.").

investors.[103] And it is partially because of such success that the reasonable investor paradigm has had so much regulatory endurance over the years. Nonetheless, in order to sustain and improve upon its successes, policymakers need to better recognize the fundamental mismatch between financial regulation's homogeneous investor population and financial reality's diverse investor population.

B. *Misplaced Expectations*

In addition to mismatched regulations, the disharmony between the homogeneity of the reasonable investor paradigm and the diversity of investors in financial markets has produced misplaced investment expectations. By asserting or implying that all investors are reasonable investors capable of generating similar investment returns in a well-regulated marketplace,[104] financial regulation and policymakers have distorted investor expectations in ways that may be harmful and frustrating to many investors.[105]

In theory, investment expectations under the homogeneous, reasonable investor paradigm are relatively straightforward: every investor has the same risk tolerance and can confidently expect to have the same opportunity to generate good returns on investments made in a well-regulated marketplace.[106] The SEC pronouncements and actions over the last few decades endorse this

[103] *See* CHARLES ROXBURGH ET AL., MCKINSEY GLOBAL INST., GLOBAL CAPITAL MARKETS: ENTERING A NEW ERA 9 (2009) (charting the growth of U.S. capital markets); OFFICE OF MGMT. & BUDGET, EXEC. OFFICE OF THE PRESIDENT, BUDGET OF THE UNITED STATES GOVERNMENT, FISCAL YEAR 2006, at 20-21 (2005) (detailing the rise of the U.S. gross domestic product since 1940); Bengt Holmstrom & Steven N. Kaplan, *The State of U.S. Corporate Governance: What's Right and What's Wrong?*, 15 J. APPLIED CORP. FIN. 8, 8 (2003) ("Despite the alleged flaws in its governance system, the U.S. economy has performed very well, both on an absolute basis and particularly relative to other countries. U.S. productivity gains in the past decade have been exceptional, and the U.S. stock market has consistently outperformed other world indices over the last two decades . . . .").

[104] *See* Henry T. C. Hu, *Faith and Magic: Investor Beliefs and Government Neutrality*, 78 TEX. L. REV. 777, 840-42 (2000) (discussing how the SEC encourages individuals to invest in the stock market); Langevoort, *supra* note 2, at 1025.

[105] *See* Hu, *supra* note 104, at 883-84 (discussing how regulators distort investor expectations about returns on equities); Stout, *supra* note 5, at 625-28 (arguing that imperfect information results in heterogeneous expectations and thus a "mistaken market"); Willis, *supra* note 90, at 272-75 (explaining that regulation through financial-literacy education can often produce more harm than good due to overconfidence and overoptimism).

[106] *See*, *e.g.*, Eugene F. Fama & James D. MacBeth, *Long-Term Growth in a Short-Term Market*, 29 J. FIN. 857, 859 (1974) (positing that investors theoretically have "homogenous expectations"); Merton H. Miller, *The History of Finance: An Eyewitness Account*, 25 J. PORTFOLIO MGMT. 95, 97 (1999) (explaining that conventional modern portfolio theory assumes that "investors all share the same expectations as to returns, variances, and covariances").

perspective, particularly with regard to the stock market.[107] This is because reasonable investors, perfectly rational individuals that invest passively for the long term, can flawlessly process all the disclosed information relating to an investment and act accordingly to maximize their returns as there are supposedly no barriers to exit and entry.[108] In the theoretical world of reasonable investors and efficient capital markets, everyone has the same opportunities and the same capacities to generate positive returns. In the theoretical world of homogeneous reasonable investors, there are no meaningful differences among investors that are college students, day-traders, hedge fund managers, billionaire tycoons, or average retirees when the marketplace is well regulated.[109]

In reality, investment expectations of the homogeneous, reasonable investor paradigm simply do not comport with the expectations of diverse investors in the real world. A diverse population of investors necessarily means that investors having asymmetrical information, varying sophistication, and disparate resources exist in the market.[110] Real world investors have varying levels of risk tolerance.[111] Real world investors cannot reasonably expect to have the same opportunity and capacity as every other investor to generate successful returns. The average investor cannot plausibly expect to have the same opportunities, fluency, and returns as the more insightful, more sophisticated, and more resourceful investor.[112] After all, it is difficult to believe that investment banks and hedge funds, with armies of research analysts, sophisticated forecasting models, and high-speed trading platforms, are investing on the same level as the average investor who simply watches *CNBC*, reads *The Wall Street Journal*, and trades with his online brokerage account.[113]

Despite significant evidence validating the sensibility of diverse investor profiles with diverging expectations,[114] regulation and regulators continue to suggest that all investors have similar capabilities and thus should have similar

[107] *See* Donald C. Langevoort, *Rereading* Cady*,* Roberts*: The Ideology and Practice of Insider Trading Regulation*, 99 COLUM. L. REV. 1319, 1320-29 (1999).

[108] BECKER, *supra* note 76, at 14.

[109] *See* Winter, *supra* note 2, at 822-83 (explaining that despite a common tendency to the contrary, investors should not regarded as "fungible").

[110] Stout, *supra* note 5, at 672-76.

[111] *See* PAUL SLOVIC, THE PERCEPTION OF RISK 395-402 (2000) (suggesting risk variances among different demographic groups).

[112] *See, e.g.*, Andrea Frazzini & Owen A. Lamont, *Dumb Money: Mutual Fund Flows and the Cross-Section of Stock Returns*, 88 J. FIN. ECON. 299, 319 (2008) ("[I]ndividual investors have a striking ability to do the wrong thing.").

[113] *See, e.g.*, Barber & Odean, *supra* note 53, at 785-88; Don A. Moore & Terri R. Kurtzberg, *Positive Illusions and Forecasting Errors in Mutual Fund Investment Decisions*, 79 ORG. BEHAV. & HUM. DECISION PROCESSES 95, 97 (1999).

[114] *See supra* Part I.

expectations.[115] Regulation Fair Disclosure ("Regulation FD"), for instance, is designed to ensure that all material, nonpublic information is disclosed to all investors simultaneously.[116] The rule implies that all investors are capable of acting on the disclosed information, and that regulators are capable of eliminating material informational asymmetries among investors so that all investors can expect to compete on "a level playing field."[117] In a marketplace of homogeneous reasonable investors, a level playing field is easier to achieve and can serve as a predicate for all investors to compete equally.

However, in a marketplace of diverse investors (like the one in the real world), a level playing field is harder to achieve and less important because, even if the playing field is level, some investors will nonetheless remain superior to other investors. In the sea of investors, not all investors are minnows. There are minnows swimming with sharks, whales, and a host of other species. Thus, even with rules like Regulation FD, certain investors will invariably have more access, more information, more fluency, and more capabilities than other investors. The chief executive officer of Apple would not meet with the average investor who is concerned about the company's policies, but he would meet with a sophisticated activist investor like Carl Icahn if that investor expressed similar concerns.[118] This stark and inconvenient reality runs counter to the frequent, lofty rhetoric of policymakers, which perpetuates the myth that all investors are similar and can confidently expect to compete in a properly regulated marketplace.[119] This incongruence between investment expectations and investment reality has resulted in discontent and dissatisfaction for investors when their investment returns do not meet their investment expectations.

This discussion on misplaced expectations is not to suggest that retail investors should not invest in a marketplace built on the reasonable investor paradigm. Retail investors provide billions of dollars in significant capital to the marketplace and should continue to do so.[120] Rather than advocating for a

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[115] *See, e.g.*, Selective Disclosure and Insider Trading, Securities Act Release No. 7881, Exchange Act Release No. 43,154, Investment Company Act Release No. 24,599, 73 SEC Docket 3 (Aug. 15, 2000) [hereinafter Selective Disclosure and Insider Trading] (suggesting that all investors should be on a "level playing field with market insiders"); Langevoort, *supra* note 2, at 1026 (discussing the SEC's long history of efforts to "level the playing field between the meek and the powerful").

[116] *See* SEC Regulation FD, 17 C.F.R § 243.100 (2014); Selective Disclosure and Insider Trading, *supra* note 115.

[117] Selective Disclosure and Insider Trading, *supra* note 115.

[118] Foroohar, *supra* note 49, at 20 (discussing Apple CEO Tim Cook's consideration of Icahn's suggestion of Apple share buybacks).

[119] *See, e.g.*, Langevoort, *supra* note 2, at 1025.

[120] *See* U.S. CENSUS BUREAU, *supra* note 1, at 1025; Alicia Davis Evans, *A Requiem for the Retail Investor?*, 95 VA. L. REV. 1105, 1117 (2009) ("[R]etail investor market participation, though declining relative to that of institutions, is growing on an absolute basis. Thus, individuals represent an important source of capital for U.S. corporations.").

complete withdrawal of retail investing, this discussion suggests that retail investors should temper their investment expectations and invest accordingly. By recognizing both their own cognitive limitations and the advantages of other investors, retail investors should not try to pick individual securities to beat the market.[121] Numerous studies have suggested that investors are generally incapable of consistently beating the market through personal research and trading.[122] As famed investor John Bogle once stated: "beating the market is inevitably a game for losers."[123] Instead of trying to beat the market or better-positioned investors, ordinary investors should invest passively over the long term using low-cost index funds and mutual funds that track the market widely.[124] Consistent with modern portfolio theory,[125] this broad-based diversification, coupled with low transaction costs, will allow ordinary investors to minimize the risks of investing and maximize the benefits of compounding returns.[126] Ample evidence from finance suggests that this passive approach is most likely to yield the best returns for most investors.[127]

[121] *See* HERSH SHEFRIN, BEYOND GREED AND FEAR: UNDERSTANDING BEHAVIORAL FINANCE AND THE PSYCHOLOGY OF INVESTING 5 (2002); Shlomo Benartzi & Richard H. Thaler, *Naive Diversification Strategies in Defined Contribution Saving Plans*, 91 AM. ECON. REV. 79, 79 (2001) (finding poor investment practices by individual investors in mutual fund selection); Jill E. Fisch & Tess Wilkinson-Ryan, *Why Do Retail Investors Make Costly Mistakes? An Experiment on Mutual Fund Choice*, 162 U. PA. L. REV. 605, 606 (2014) ("Mounting evidence demonstrates that retail investors make predictable, costly mistakes.").

[122] *See, e.g.*, Barber & Odean, *supra* note 53, at 785-88; Nicolas P. B. Bollen & Jeffrey A. Busse, *Short-Term Persistence in Mutual Fund Performance*, 18 REV. FIN. STUD. 569, 594-95 (2004) ("After taking into account transaction costs and taxes, investors may generate superior returns by following a naive buy-and-hold approach rather than a performance-chasing strategy, even if short-term performance is predictable."); Ronald C. Lease et al., *The Individual Investor: Attributes and Attitudes*, 29 J. FIN. 413, 429-31 (1974); Moore & Kurtzberg, *supra* note 113, at 110-12; Felix Salmon, *Stop Selling Bonds to Retail Investors*, 35 GEO. J. INT'L L. 837, 837 (2004).

[123] JOHN C. BOGLE, THE LITTLE BOOK OF COMMON SENSE INVESTING: THE ONLY WAY TO GUARANTEE YOUR FAIR SHARE OF STOCK MARKET RETURNS, at xv (2007).

[124] *Id.* at 45-53.

[125] *See* Edwin J. Elton & Martin J. Gruber, *Modern Portfolio Theory, 1950 to Date*, 21 J. BANKING & FIN. 1744, 1744 (1997); Harry Markowitz, *Portfolio Selection*, 7 J. FIN. 77, 87-91 (1952).

[126] *See* IAN AYRES & BARRY NALEBUFF, LIFECYCLE INVESTING: A NEW, SAFE, AND AUDACIOUS WAY TO IMPROVE THE PERFORMANCE OF YOUR RETIREMENT PORTFOLIO 1-3 (2010) (analyzing the importance of asset and time diversification); BELSKY & GILOVICH, *supra* note 97, at 250-51; BOGLE, *supra* note 123, at xvi, 11 (explicating on the "magic of compounding returns"); Leo E. Strine, *Can We Do Better by Ordinary Investors? A Pragmatic Reaction to the Dueling Ideological Mythologists of Corporate Law*, 114 COLUM. L. REV. 449, 480-82 (2014) (discussing how index funds and mutual funds can protect ordinary investors); *see also* NAT'L CONFERENCE OF COMM'RS ON UNIF. STATE LAWS, UNIFORM PRUDENT INVESTOR ACT (1995) (advocating a similar investment approach for

III. A NEW WAY FORWARD

The dissonance between the singular paradigm of homogeneous reasonable investors and the diverse profiles of real investors has created significant discontent in financial markets that requires a fundamental reexamination of investors and investor protection. The marked transformation of the financial marketplace and its participants over the last few decades makes the present moment an opportune time to rethink and reimagine a new way forward.

A. *A New Marketplace*

The modern financial marketplace is a new frontier for contemporary investors. Complimentary and symbiotic advances in information technology and financial regulation over the last three decades have fundamentally changed finance.[128] Regulatory changes like the introduction of Regulation Alternative Trading System,[129] Regulation National Market System,[130] and decimalization[131] spurred the growth of electronic communication networks

trustees). *But see* GERALD M. LOEB, THE BATTLE FOR INVESTMENT SURVIVAL 103-04 (John Wiley & Sons 2007) (espousing the virtues of concentrated investments over diversified investments).

[127] *See* LARRY E. SWEDROE ET AL., THE ONLY GUIDE YOU'LL EVER NEED FOR THE RIGHT FINANCIAL PLAN: MANAGING YOUR WEALTH, RISK, AND INVESTMENTS 82-93 (2010) (summarizing evidence in support of passive investing); Barber & Odean, *supra* note 53, at 785-88; Ben Hall, *The Importance of Asset Allocation and ETFs*, 4 J. INDEX INVESTING 24, 24-26 (2013); Burton G. Malkiel, *Returns From Investing in Equity Mutual Funds*, 50 J. FIN. 549, 549-72 (1995); *see also* Christopher Carosa, *Passive Investing: The Emperor Exposed*, 18 J. FIN. PLANNING 54, 54-62 (2005) (critiquing the superiority of passive investing).

[128] For a general discussion about the evolution of modern finance, see Robert DeYoung, *Safety, Soundness, and the Evolution of the U.S. Banking Industry*, 92 FED. RES. BANK ATLANTA ECON. REV. 41, 41 (2007); Tom C.W. Lin, *The New Financial Industry*, 65 ALA. L. REV. 567, 572-76 (2014); Loretta J. Mester, Commentary, *Some Thoughts on the Evolution of the Banking System and the Process of Financial Intermediation*, 92 FED. RES. BANK ATLANTA ECON. REV. 67, 67-72 (2007); Arthur E. Wilmarth, Jr., *The Transformation of the U.S. Financial Services Industry, 1975–2000: Competition, Consolidation, and Increased Risks*, 2002 U. ILL. L. REV. 215, 215.

[129] *See* Regulation ATS, 17 C.F.R. § 242.300(a) (2014); ARNUK & SALUZZI, *supra* note 4, at 68-78; BRIAN R. BROWN, CHASING THE SAME SIGNALS: HOW BLACK-BOX TRADING INFLUENCES STOCK MARKETS FROM WALL STREET TO SHANGHAI 2 (2010); DAVID J. LEINWEBER, NERDS ON WALL STREET: MATH, MACHINES, AND WIRED MARKETS 31-64 (2009).

[130] *See* 17 C.F.R. § 242.601 (2014); Regulation NMS, Exchange Act Release No. 49,325, 69 Fed. Reg. 11126, 11160 (proposed Mar. 9, 2004) (codified at 17 C.F.R. 200, 230, 240, 242, 249); *see also* PATTERSON, *supra* note 4, at 49; Laura Nyantung Beny, *U.S. Secondary Stock Markets: A Survey of Current Regulatory and Structural Issues and a Reform Proposal to Enhance Competition*, 2002 COLUM. BUS. L. REV. 399, 426 ("[T]he express purpose of the NMS [is] to promote efficiency and competition across secondary markets.").

[131] *See* SEC, REPORT TO CONGRESS ON DECIMALIZATION 4 (2012), *available at*

and alternative trading platforms.[132] At the same time, advances in information technology and computer science have led to more computerization and artificial intelligence in the financial industry.[133] For instance, new financial technology spawned the growth of online brokerages and other intermediaries that gave an increased number of investors greater access to a greater number of investments. The net impact of these changes is a new marketplace that is fundamentally different than its previous iterations in terms of speed, information, transparency, and complexity. [134]

First, in terms of speed, the new marketplace is much, much faster than its previous iterations. Investment decisions that previously took many people days, hours, or minutes to study and execute now only take a single computer mere seconds to analyze and execute. Powered by supercomputers, billions of dollars of trades and transactions crisscross the world through cables and spectra in milliseconds in the modern financial marketplace.[135] It has been estimated that average investment periods have moved from years to months to seconds over the last five decades.[136] And the velocity of the new marketplace

http://www.sec.gov/news/studies/2012/decimalization-072012.pdf, *archived at* http://perma.cc/85XG-K53V ("Prior to implementing decimal pricing in April 2001, the U.S. equity market used fractions as pricing increments, and had done so for hundreds of years."); CHRISTOPHER STEINER, AUTOMATE THIS: HOW ALGORITHMS CAME TO RULE OUR WORLD 185 (2012) (discussing how decimalization bolsters electronic trading volumes and profits).

[132] ARNUK & SALUZZI, *supra* note 4, at 68-78.

[133] *See* RAY KURZWEIL, THE AGE OF SPIRITUAL MACHINES: WHEN COMPUTERS EXCEED HUMAN INTELLIGENCE 70 (2000) ("Not only were the stock, bond, currency, commodity, and other markets managed and maintained by computerized networks, but a majority of buy-and-sell decisions were initiated by software programs."); ORG. FOR ECON. CO-OPERATION & DEV., 21ST CENTURY TECHNOLOGIES: PROMISES AND PERILS OF A DYNAMIC FUTURE 9 (1998) (stating that "[f]aster, cheaper, [and] smaller" are the key objectives of the technology industry); Markku Malkamäki & Jukka Topi, *Future Challenges for Securities and Derivative Markets*, *in* 3 RESEARCH IN BANKING AND FINANCE 382 (Iftekhar Hasan & William C. Hunter eds., 2003) ("At the end of the 1990s, between 30% and 40% of all U.S. securities were channeled through the Internet and about 15% of all the U.S. equity trades were done on-line."); William M. Bulkeley, *Computers Take on New Role as Experts in Financial Affairs*, WALL ST. J., Feb. 7, 1986, at 1.

[134] *See* PATTERSON, *supra* note 4, at 233-78; Andrew G. Haldane, Exec. Dir., Fin. Stability, Bank of Eng., Speech at the International Economic Association Sixteenth World Congress: The Race to Zero (July 8, 2011) (transcript available at http://www.bankofengland.co.uk/publications/speeches/2011/speech509.pdf, *archived at* http://perma.cc/29QR-U85B) (summarizing fundamental changes in the finance over the last century).

[135] Frank J. Fabozzi et al., *High-Frequency Trading: Methodologies and Market Impact*, 19 REV. FUTURES MARKETS 7, 8-10 (2011).

[136] PATTERSON, *supra* note 4, at 46 ("At the end of World War II, the average holding period for a stock was four years. By 2000, it was eight months. By 2008, it was two months. And by 2011 it was *twenty-two seconds* . . . .").

continues to accelerate as technology pushes financial speeds towards the speed of light.[137] In the new marketplace, many investors use high-frequency trading programs to move significant sums of global equities and foreign currencies in milliseconds with volumes and values in the billions. [138] In fact, in recent years, high-frequency trading accounted for about thirty percent of all foreign-exchange transactions, sixty percent of U.S. equity trading,[139] and forty percent of European equity trading.[140]

The emphasis on financial speed in the new marketplace has given considerable advantages to investors who can afford better technology and better real estate so as to reduce the latency of their trade executions or informational access through colocation or accelerated connection.[141] Latency, in the context of financial transactions, generally refers to the period between an order submission and the receipt of an order acknowledgement.[142] In terms of better technology, if an investor acquired superior informational access, then that investor would be able act on market-moving information before all other investors. For instance, in 2014, it was discovered that certain hedge funds had acquired earlier access to SEC filings than the general public by paying a subscription fee for a faster informational feed allowing them to act on market moving information before investors without the faster feed.[143] In terms of

[137] *See* A.D. Wissner-Gross & C.E. Freer, *Relativistic Statistical Arbitrage*, 82 PHYSICAL REV. E 056104-1, 056104-1 (2010) (studying arbitrage opportunities as trading nears the speed of light); David Schneider, *Trading at the Speed of Light*, IEEE SPECTRUM, Oct. 2011, at 11-12.

[138] *See* Fabozzi et al., *supra* note 135, at 8; Charles R. Korsmo, *High-Frequency Trading: A Regulatory Strategy*, 48 U. RICH. L. REV. 523, 538-42 (2014) (describing the importance of high-frequency trading in equity markets); Eric Dash & Christine Hauser, *As Dizzying Week Ends on Wall St., Dangers Linger*, N.Y. TIMES, Aug. 13, 2011, at A1.

[139] Graham Bowley, *Fast Traders, in Spotlight, Battle Rules*, N.Y. TIMES, July 18, 2011, at A1.

[140] Fabozzi et al., *supra* note 135, at 8; Neil Shah, *High-Speed Traders Dive Into Forex Despite Doubts,* WALL ST. J., Apr. 25, 2011, http://online.wsj.com/article/SB10001424052748704677404576284921020282968.html, *archived at* http://perma.cc/B7PB-L4B3.

[141] *See* Concept Release on Equity Market Structure, Exchange Act Release No. 61,358, 75 Fed. Reg. 3594, 3610 (proposed Jan. 21, 2010) (codified at 17 C.F.R. pt. 242) ("Co-location is one means to save micro-seconds of latency. . . . The trading center or third party rents rack space to market participants that enables them to place their servers in close proximity to a trading center's matching engine."); BROWN, *supra* note 129, at 63 ("Co-location is a hosting service in which asset managers can run their algorithms on computer servers that reside at the stock exchange's data center."); PATTERSON, *supra* note 4, at 230 ("The new hierarchy would be all about who owned the most powerful computers, the fastest links between markets, the most sophisticated algorithms—and the inside knowledge of how the market's plumbing was put together.").

[142] BROWN, *supra* note 129, at 64.

[143] *See* Ryan Tracy & Scott Patterson, *Fast Traders Are Getting Data From SEC Seconds Early*, WALL ST. J., Oct. 29, 2014, http://www.wsj.com/articles/fast-traders-are-getting-data-

better real estate, if an investor is located closer to the server of an exchange or other relevant intermediary, then that investor can lower his latency period and increase his execution speed even if all investors receive actionable information simultaneously (which is almost never the case).[144] As such, investors with more resources can regularly outperform other investors in the marketplace through better technology and better real estate.[145] While better-resourced investors have always had advantages over other investors,[146] the differences in the new marketplace may be differences in kind rather than degree. In the new marketplace, the competition among investors is no longer a race among horses of varying speeds, but a race among horses, hares, cheetahs, and a host of other different species running with different equipment and racing from different starting points.[147]

Second, in terms of information, the new marketplace contains much more information than its previous iterations. Advances in computing power and digital storage have led to the creation and collection of more data.[148] It has been estimated in 2013 that "more than 98 percent of the world's information is now stored digitally, and the volume of that data has quadrupled since 2007."[149] Massive data aggregation and analysis, colloquially referred to as "Big Data," has fundamentally changed the amount of information available to investors.[150] Beyond granular information, investors today have access to high-

from-sec-seconds-early-1414539997, *archived at* http://perma.cc/9ZW8-S6ZW; Robert Jackson, Jr. & Joshua Mitts, *How the SEC Helps Speedy Traders*, Colum. L. & Econ. Working Paper No. 501, *available at* http://ssrn.com/abstract=2520105.

[144] *See* Fabozzi et al., *supra* note 135, at 10 ("[I]t is estimated that for each 100 miles the server is located away from the matching engine, 1 millisecond of delay is added to the [transmittal and execution time] . . . .").

[145] *See* Matthew Baron et al., The Trading Profits of High Frequency Traders (Nov. 2012) (unpublished draft), *available at* conference.nber.org/confer//2012/MMf12/Baron_Brogaard_Kirilenko.pdf, *archived at* http://perma.cc/QYG8-ZEL3 (finding that high-frequency traders profit at the expense of ordinary investors).

[146] STEINER, *supra* note 131, at 121.

[147] Bart Chilton, Comm'r, U.S. Commodity Futures Trading Comm'n, Address to Soybean Association Legislative Forum: Caging the Financial Cheetahs (July 12, 2011) (transcript available at http://www.cftc.gov/PressRoom/SpeechesTestimony/opachilton-50, *archived at* http://perma.cc/9MCP-DFFA).

[148] NICHOLAS CARR, THE SHALLOWS: WHAT THE INTERNET IS DOING TO OUR BRAINS 83 (2011) ("[T]he price of a typical computing task has dropped by 99.9 percent since the 1960s."); Chip Walter, *Kryder's Law*, SCI. AM., Aug. 2005, at 32.

[149] Don Peck, *They're Watching You at Work*, ATLANTIC, Nov. 20, 2013, at 72.

[150] *See, e.g.*, VIKTOR MAYER-SCHONBERGER & KENNETH CUKIER, BIG DATA: A REVOLUTION THAT WILL TRANSFORM HOW WE LIVE, WORK, AND THINK 6-10 (2013); NATE SILVER, THE SIGNAL AND THE NOISE: WHY SOME PREDICTIONS FAIL—BUT SOME DON'T 9-10 (2012); Andrew McAfee & Erik Brynjolfsson, *Big Data: The Management Revolution*, HARV. BUS. REV., Oct. 2012, at 61, 62-68 (discussing Big Data's impact on corporations); Ashlee Vance, *The Data Knows*, BLOOMBERG BUSINESSWEEK, Sept. 12, 2011, at 71

quality, customizable, and user-friendly information through a variety of mediums such as television, radio, satellite radio, websites, Twitter feeds, and other forms of social media.[151] Today, any investor with a smartphone can instantly access every SEC filing and a variety of rich analyses of those filings.

A leading advent resulting from this plethora of information is algorithmic investing programs. These programs use computers to analyze investment opportunities based on feeding deluges of information into complex mathematical models.[152] They can analyze massive volumes of data, spot opportunities, and invest accordingly.[153] Today, almost every entity investor that manages significant amounts of capital employs algorithmic programs in managing its investments.[154] For instance, BlackRock, the world's largest asset management firm, uses a proprietary program called Aladdin, which is capable of analyzing a variety of investment instruments, to manage over $14 trillion of investments.[155]

Third, in terms of transparency, the new marketplace is in many ways much less transparent than its previous iterations. Transparent financial forums like traditional, well-regulated public stock exchanges are less relevant in the new marketplace.[156] Significant and growing volumes of trading occur in less

(reporting on the impact of data analysis on individual and societal behavior).

[151] *See, e.g.*, Patricia Sánchez Abril, *The Evolution of Business Celebrity in American Law and Society*, 48 AM. BUS. L.J. 177, 178 (2011) (describing the digital communication on business information); Tom C.W. Lin, *Executive Trade Secrets,* 87 NOTRE DAME L. REV. 911, 926 (2012) (discussing the increase in mediums for business information).

[152] *See* BROWN, *supra* note 129, at 8; FIN. CRISIS INQUIRY COMM'N, THE FIN. CRISIS INQUIRY REPORT: FINAL REPORT OF THE NATIONAL COMMISSION ON THE CAUSES OF THE FINANCIAL AND ECONOMIC CRISIS IN THE U.S. 44 (2011), *available at* http://www.gpo.gov/fdsys/pkg/GPO-FCIC/pdf/GPO-FCIC.pdf, *archived at* http://perma.cc/3D6S-UDXP; ROBERT A. G. MONKS & ALEXANDRA REED LAJOUX, CORPORATE VALUATION FOR PORTFOLIO INVESTMENT: ANALYZING ASSETS, EARNINGS, CASH FLOW, STOCK PRICE, GOVERNANCE, AND SPECIAL SITUATIONS 229 (2011); PATTERSON, *supra* note 4, at 36-38 (describing the proliferation of powerful, high-speed computers in the financial industry); SENATE INVESTIGATION, *supra* note 4.

[153] *See* Charles Duhigg, *Stock Traders Find Speed Pays, in Milliseconds*, N.Y. TIMES, July 24, 2009, at A1 ("[Algorithmic computer programs] can spot trends before other investors can blink, changing orders and strategies within milliseconds.").

[154] *See* BROWN, *supra* note 129, at 11; Erik F. Gerding, *Code, Crash, and Open Source: The Outsourcing of Financial Regulation to Risk Models and the Global Financial Crisis*, 84 WASH. L. REV. 127, 130-35 (2009).

[155] *See* Sheelah Kolhatkar & Sree Vidya Bhaktavatsalam, *The Colossus of Wall Street*, BLOOMBERG BUSINESSWEEK, Dec. 9, 2010, at 62, 66 ("Aladdin can analyze stocks, bonds, and derivatives, though what makes it particularly valuable is the work it can do on mortgage-related bonds . . . ."); *The Rise of BlackRock*, ECONOMIST, Dec. 7, 2013, at 13.

[156] *See* Donald C. Langevoort & Robert B. Thompson, *"Publicness" in Contemporary Securities Regulation After the JOBS Act*, 101 GEO. L.J. 337, 347 (2013) ("Today, liquidity is now much more possible outside of traditional exchanges. In the new millennium, cheap information and low communication costs have expanded markets . . . ."); Jacob Bunge,

regulated, private exchanges and "dark pools,"[157] which are institutional electronic networks that operate outside of the public view.[158] In fact, most equities, including those listed on the New York Stock Exchange and the NASDAQ, are traded in opaque private exchanges.[159] These opaque forums are appealing to many investors because they allow investors to make investments without losing much of their informational edge to other investors in the marketplace.[160] Additionally, because these forums are regulated and scrutinized differently than public exchanges, they also facilitate complex and innovative investment transactions.[161]

A paradox of the new marketplace is that even though more information is available, more information is not necessarily making its way into the light for many investors. Market transparency, a hallmark of investor protection, has become in many ways a misnomer for market translucency because so much of the market activity is happening in the shadows, away from the light of the public.[162] In recent years, instead of defending the virtues of transparent,

BATS, Direct Edge in Talks to Merge, WALL ST. J., Aug. 24, 2013, at B1 (reporting on the merger of two large electronic exchanges); Ben Paynter, *One Year Later, BATS is Doing Just Fine*, BLOOMBERG BUSINESSWEEK, Mar. 14, 2013, at 56.

[157] *See* Regulation of Non-Public Trading Interest, Exchange Act Release No. 34-60997, 97 SEC Docket 472 (Nov. 13, 2009) ("[T]rading interest is considered non-public, or 'dark,' primarily because it is not included in the consolidated quotation data for NMS stocks that is widely disseminated to the public."); ARNUK & SALUZZI, *supra* note 4, at 62 ("The number of dark pools and ATSs has also skyrocketed over the past decade. Today, nearly one in every three shares trades off-exchange. There are currently approximately 40 such dark pools, where stocks trade without their orders displayed to the public."); LEINWEBER, *supra* note 129, at 62, 79 (discussing the growth of dark pools and alternative trading systems in recent years); PATTERSON, *supra* note 4, at 61-62; Matthew Phillips, *Where Has All The Trading Gone*?, BLOOMBERG BUSINESSWEEK, May 10, 2012, at 49 (reporting on the migration of trading from public exchanges to dark pools); Mary L. Schapiro, Chairman, Sec. & Exch. Comm'n, Statement on Dark Pool Regulation Before the Commission Open Meeting (Oct. 21, 2009) (transcript available at http://www.sec.gov/news/speech/2009/spch102109mls.htm, *archived at* http://perma.cc/LJ87-MYM8).

[158] BROWN, *supra* note 129, at 116.

[159] *See* Nathaniel Popper, *Public Exchanges Duel with Newcomers over Trade Transparency*, N.Y. TIMES, June 27, 2012, at B1; Nelson D. Schwartz & Louise Story, *Surge of Computer Selling After Apparent Glitch Sends Stocks Plunging*, N.Y. TIMES, May 7, 2010, at B7.

[160] BROWN, *supra* note 129, at 116.

[161] *See* Steven L. Schwarcz, *Regulating Shadow Banking*, 31 REV. BANKING & FIN. L. 619, 627-31 (2012).

[162] *See, e.g.*, GARY B. GORTON, SLAPPED BY THE INVISIBLE HAND: THE PANIC OF 2007, at 6-9 (2010) (highlighting the growing importance of the shadow banking system); DAVID SKEEL, THE NEW FINANCIAL DEAL 62 (2011) (discussing deregulation and financial innovation in connection to shadow banking); Lo, *supra* note 4, at 13-18 (describing the expansive shadow banking system); Schwarcz, *supra* note 161, at 620-25.

traditional exchanges, those very exchanges have begun to create opaque electronic networks to capture the growing preference by some market participants for opacity in the new marketplace.[163] Many investors in the marketplace are thus left with a dimmed and limited perspective of an expanding ocean of market information.

Fourth, in terms of complexity, the new marketplace is much more complex than its previous iterations. The accelerated speed, the increased amount of information, and the reduced transparency in the marketplace have collectively contributed to more complexity for investors.[164] In addition to those considerable systemic changes, there also exists greater complexity in the substantially larger panoply of investment opportunities and strategies available to investors.[165] Sophisticated and ordinary investors now have ample opportunities to invest beyond publicly traded securities—in riskier private offerings made in secondary markets, which were historically available only to a small population of wealthy investors.[166] In addition to bonds and stocks, many investors today can readily invest in commodities, foreign currencies, exchange-traded funds, options, derivatives, and swaps with a basic online brokerage account from the comforts of their couch.[167] Furthermore, many of these new investment opportunities are linked in a complex, global web of interdependent institutions and instruments frequently governed by

[163] Popper, *supra* note 159 ("In the past, the exchanges have pushed regulators to force the dark markets to become better lit, but James Allen, the head of capital markets policy for the CFA Institute, said that with the new proposals the exchanges are acknowledging 'that if you can't beat them, join them.'").

[164] *See, e.g.*, Judge, *supra* note 4, at 701; Schwarcz, *supra* note 4, at 212-13 (discussing complexity "as the greatest financial-market challenge of the future").

[165] *See, e.g.*, MICHIE, *supra* note 101, at 300 (commenting on the "enormous expansion" of investment offerings in recent years); Hu, *supra* note 4, at 1713 ("The modern process of financial innovation has resulted in financial strategies and other products, as well as major financial institutions, that are far more complex than in the past."); Nathaniel Popper, *Complex Investments Prove Risky as Savers Chase Bigger Payoff*, N.Y. TIMES, Feb. 11, 2013, at A1.

[166] *See* Jill E. Fisch, *Can Internet Offerings Bridge the Small Business Capital Barrier?*, 2 J. SMALL & EMERGING BUS. L. 57, 58 (1998) ("[R]egulators have identified small businesses as some of the riskiest investment opportunities."); Langevoort & Thompson, *supra* note 156, at 349 (discussing the emergence of markets for private company stock); Elizabeth Pollman, *Information Issues on Wall Street 2.0*, 161 U. PA. L. REV. 179, 180 (2012) ("A new generation of securities markets is emerging. Shares in private companies, previously regarded as an illiquid, out-of-reach asset class, are being traded on websites resembling stock markets.").

[167] *See, e.g.*, Houman B. Shadab, *Fending for Themselves: Creating a U.S. Hedge Fund Market for Retail Investors*, 11 N.Y.U. J. LEGIS. & PUB. POL'Y 251, 277 (2008) ("Finally, with the development of sophisticated at-home trading tools and publicly registered exchange traded funds (ETFs), retail investors can implement hedge fund trading strategies on their own, at low cost.").

crosscutting bodies of law that span multiple jurisdictions and regulators.[168] The technological advances in the last few decades have reduced and eliminated many of the geographic concerns of past marketplaces.[169] This development towards a globalized marketplace has introduced greater opportunities for investors as well as greater complexities and risks.[170]

An ironic truth of the new marketplace is that some of the regulatory attempts to address the risks of new complexities facing investors may in fact lead to more complexity and greater risks for investors.[171] This is because financial innovation frequently grows from attempts to evade or arbitrage new regulations.[172] Entrepreneurs often find fertile ground for financial innovation in the shadowy apertures of regulations.[173] For instance, many credit default swaps and derivatives, which played such a pernicious role in the last financial

[168] *See* HAL S. SCOTT, INTERCONNECTEDNESS AND CONTAGION 2-7 (2012) (exploring the extent of asset and liability interconnectedness among the major financial institutions); Markus K. Brunnermeier, *Deciphering the Liquidity and Credit Crunch 2007-2008*, 23 J. ECON. PERSP. 77, 96 (2009) (discussing the "interwoven network of financial obligations"); Tafara & Peterson, *supra* note 59, at 31 ("Investors now search beyond their own borders for investment opportunities and, unlike the past, many of these investors are not large companies, financial firms, or extremely wealthy individuals."); Robin Greenwood & David S. Scharfstein, *How To Make Finance Work*, HARV. BUS. REV., Mar. 2013, at 107.

[169] *See* MICHIE, *supra* note 101, at 307 ("[T]he global securities market had undergone a technological revolution during the 1990s, which eliminated geography as a factor supporting separate securities markets.").

[170] *See, e.g.*, Guillermo A. Calvo & Enrique G. Mendoza, *Rational Contagion and the Globalization of Securities Markets*, 51 J. INT'L ECON. 79, 80-83 (2000); Mariassunta Giannetti & Yrjö Koskinen, *Investor Protection, Equity Returns, and Financial Globalization*, 45 J. FIN. & QUANTITATIVE ANALYSIS 135, 135-38 (2010).

[171] *See* Whitehead, *supra* note 4, at 1270 (opining that there is "a real risk that new rules will have unanticipated consequences, particularly in a system as complex as today's financial markets").

[172] *See, e.g.*, Annelise Riles, *Managing Regulatory Arbitrage: A Conflicts of Laws Approach*, 47 CORNELL INT'L L.J. 63, 77-83 (2014); *see also* Charles W. Calomiris, *Financial Innovation, Regulation, and Reform*, 29 CATO J. 65, 65 (2009) (explaining how financial innovation is often borne out of "sidestepping regulatory restrictions"); Frank Partnoy, *Financial Derivatives and the Costs of Regulatory Arbitrage*, 22 J. CORP. L. 211, 227 (1997) ("Regulatory arbitrage consists of those financial transactions designed specifically to reduce costs or capture profit opportunities created by differential regulations or laws.").

[173] *See, e.g.*, Victor Fleischer, *Regulatory Arbitrage*, 89 TEX. L. REV. 227, 229 (2010) ("Regulatory arbitrage exploits the gap between the economic substance of a transaction and its legal or regulatory treatment, taking advantage of the legal system's intrinsically limited ability to attach formal labels that track the economics of transactions with sufficient precision."); Edward F. Greene & Elizabeth L. Broomfield, *Promoting Risk Mitigation, Not Migration: A Comparative Analysis of Shadow Banking Reforms by the FSB, USA and EU*, 8 CAPITAL MARKETS J. 6, 14-15 (2013).

crisis, were created to circumnavigate commodities and securities regulations.[174]

In summary, a diverse population of contemporary investors resides in a new marketplace that is markedly different in terms of speed, information, transparency, and complexity. Specifically, the new marketplace operates at much accelerated speeds with much more information, much less transparency, and much greater complexity.

B. *A New Participant*

A new participant, the cyborg, has emerged from the sea of change in the marketplace. Smart machines powered by complex algorithmic programs run much of the modern financial marketplace.[175] Human analysis and human execution have been replaced in many ways with artificial intelligence and computerized automation.[176] A financial industry once dominated by humans has evolved into one where humans and machines share dominion. The modern financial marketplace is becoming a place where the new key participants are cyborgs: part human and part machine.[177] Modern finance is transforming into "cyborg finance."[178] Furthermore, advances in

[174] *See* GILLIAN TETT, FOOL'S GOLD: HOW THE BOLD DREAM OF A SMALL TRIBE AT J.P. MORGAN WAS CORRUPTED BY WALL STREET GREED AND UNLEASHED A CATASTROPHE 39-47 (2009) (discussing how the derivatives market grew from regulatory evasion); John C. Coffee, Jr. & Hillary A. Sale, *Redesigning the SEC: Does the Treasury Have a Better Idea?*, 95 VA. L. REV. 707, 727, 731-37 (2009).

[175] *See, e.g.*, LEINWEBER, *supra* note 129, at 31-64 (chronicling the rise of electronic financial markets and alternative trading systems); Jonathan R. Macey & Maureen O'Hara, *From Markets to Venues: Securities Regulation in an Evolving World*, 58 STAN. L. REV. 563, 565 (2005) ("Advances in technology, combined with the dramatic decrease in the cost of information processing, have conspired to change the way that securities transactions occur."); Omarova, *supra* note 4, at 430 (describing finance as "[a]n increasingly complex marketplace, [with] dependence on fast-changing technology"); Felix Salmon & Jon Stokes, *Bull vs. Bear vs. Bot*, WIRED, Jan. 2011, at 90, 93 ("It's the machines' market now; we just trade in it.").

[176] *See* Fabozzi et al., *supra* note 135, at 9-10 (describing the essential role of computerization in financial trading); Jonathan Keats, *Thought Experiment*, WIRED, June 2013, at 164, 164 (reporting on plans to "build a supercomputer replica of the human brain"); Salmon & Stokes, *supra* note 175, at 91 ("Algorithms have become so ingrained in our financial system that the markets could not operate without them.").

[177] *See, e.g.*, SHERRY TURKLE, THE SECOND SELF: COMPUTERS AND THE HUMAN SPIRIT 152 (2005) ("We are all cyborgs now."); David J. Hess, *On Low-Tech Cyborgs*, *in* THE CYBORG HANDBOOK 371, 373 (Chris Hables Gray et al. eds., 1995) ("[A]lmost everyone in urban societies could be seen as a low-tech cyborg, because they spend large parts of the day connected to machines such as cars, telephones, computers, and, of course, televisions.").

[178] *See* Tom C.W. Lin, *The New Investor*, 60 UCLA L. REV. 678, 682 (2013) (introducing the term "cyborg finance"); Salmon & Stokes, *supra* note 175, at 90 (reporting on the growing prevalence of automated, computerized systems in finance); *see also*

neuroeconomics, artificial intelligence, and brain science suggest that this transformation is only in its very early stages.[179]

The new cyborg participant in the marketplace is less human than the traditional investor, and capable of being faster, better informed, and more rational. While the emergence of the cyborg participant is most prominent in the areas of trading, its emergence pervades much of the financial industry. In fact, advances in financial technology have made it possible for many complex, algorithmic programs to operate exclusively on artificial intelligence, devoid of any human input after initial installation for functions beyond mere trading.[180] Many of these programs are capable of executing investment decisions faster than the blink of an eye.[181] Moreover, those decisions are better informed than those of purely human participants given the unparalleled volumes of data available in the new marketplace and the programs' unparalleled capacity to process that information.[182] Such faster and better-informed executions can also be more rational than those of purely human participants.[183] After all, smart machines operated by complex algorithms are

TURKLE, *supra* note 177, at 152; Donna J. Haraway, *A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century*, *in* READINGS IN THE PHILOSOPHY OF TECHNOLOGY 161, 161 (David M. Kaplan ed., 2004) ("A cyborg is a cybernetic organism, a hybrid of machine and organism, a creature of social reality as well as a creature of fiction.").

[179] *See* ERIK BRYNJOLFSSON & ANDREW MCAFEE, THE SECOND MACHINE AGE: WORK, PROGRESS AND PROSPERITY IN A TIME OF BRILLIANT TECHNOLOGIES 57-71 (2014); Russell N. James III, *Brain Activity Suggests Planning Designation Helps Calm Investors*, 26 J. FIN. PLANNING 52, 52-59 (2013); Sharon Begley & Jean Chatzky, *Stop! You Can't Afford It*, NEWSWEEK, Nov. 14, 2011, at 50 (reporting on developments in transcranial magnetic stimulation technology that can improve financial judgments).

[180] *See* PATTERSON, *supra* note 4, at 128-30; David M. Serritella, *High Speed Trading Begets High Speed Regulation: SEC Response to Flash Crash, Rash*, 2010 U. ILL. J.L. TECH. & POL'Y 433, 436 (discussing the automated systems of financial algorithmic programs); Brody Mullins et al., *Traders Pay for an Early Peek at Key Data*, WALL ST. J., June 13, 2013, at A1 (reporting the value of seconds to traders using computerized programs).

[181] *See, e.g.*, Graham Bowley, *The New Speed of Money*, N.Y. TIMES, Jan. 2, 2011, at BU1 (discussing on the astounding velocity of modern finance).

[182] *See, e.g.*, CLIVE THOMPSON, SMARTER THAN YOU THINK: HOW TECHNOLOGY IS CHANGING OUR MINDS FOR THE BETTER 6 (2013) ("At their best, today's digital tools help us see more, retain more, communicate more."). *But see* JAMES BARRAT, OUR FINAL INVENTION: ARTIFICIAL INTELLIGENCE AND THE END OF THE HUMAN ERA 16 (2013).

[183] *See* Donald C. Langevoort, *Selling Hope, Selling Risk: Some Lessons for Law from Behavioral Economics About Stockbrokers and Sophisticated Customers*, 84 CALIF. L. REV. 627, 635 (1996); Troy A. Paredes, *On the Decision to Regulate Hedge Funds: The SEC's Regulatory Philosophy, Style, and Mission*, 2006 U. ILL. L. REV. 975, 1026 (espousing the use of default rules to enhance financial regulation); David H. Freedman, *The Perfected Self*, ATLANTIC, June 2012, at 42. *See generally* BELSKY & GILOVICH, *supra* note 97, at 250-51 (suggesting various behavioral methods to improve human investment decisions).

not subject to the cognitive flaws, emotional sways, and mental strains that plague the human participants of the marketplace.[184]

Mindful of the advantages of cyborgs as a new participant in finance, many in the marketplace have begun substituting away from traditional, human frameworks towards more artificial, algorithmic frameworks. Many hedge funds, for instance, have moved away from using human analysts and traders towards using automated computer programs in terms of operational efforts like order fulfillment.[185] Stock exchanges have also made similar changes.[186] Advances in financial technology have rendered exchanges operated largely by humans antiquated forums of a bygone era.[187] The world famous New York Stock Exchange on Wall Street has moved more and more into electronic trading.[188] In 2013, it even made preparations to operate entirely without human traders.[189] Beyond the spheres of high finance and sophisticated investors, new technology's impact can also be felt by ordinary investors. Firms like Charles Schwab, Betterment, and Wealthfront now offer algorithmic tools to help ordinary investors allocate their investments completely devoid of human interactions, and at much lower fees.[190]

It should be noted that while the emergence of new cyborg participants presents many advantages, it also presents many perils. The growing reliance on technology means that the new marketplace and its participants are more

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[184] *See, e.g.*, IAN AYRES, SUPER CRUNCHERS: WHY THINKING BY NUMBERS IS THE NEW WAY TO BE SMART 115 (2007) ("Unlike self-involved experts, statistical regressions don't have egos or feelings."); MONKS & LAJOUX, *supra* note 152, at 229 ("The goal of algorithmic trading is to take the human factor out of trading as much as possible to avoid the irrational aspects of fear (economic panics) and greed (irrational exuberance)."); RISHI K. NARANG, INSIDE THE BLACK BOX: THE SIMPLE TRUTH ABOUT QUANTITATIVE TRADING, at xii (2009); Daniel Beunza & David Stark, *From Dissonance to Resonance: Cognitive Interdependence in Quantitative Finance*, 41 ECON. & SOCIETY 383, 394 (2012); Andrew W. Lo & Dmitry V. Repin, *The Psychophysiology of Real-Time Financial Risk Processing*, 14 J. COGNITIVE NEUROSCIENCE 323, 323 (2002); Anandi Mani et al., *Poverty Impedes Cognitive Function*, 341 SCI. MAG. 976, 976-77 (2013).

[185] *See, e.g.*, BROWN, *supra* note 129, at 11; Nathaniel Popper, *Shouts on Bond-Trading Floor Yield to Robot Beeps*, N.Y. TIMES, Oct. 20, 2014, at B1.

[186] Tafara & Peterson, *supra* note 59, at 33-34.

[187] *See, e.g.*, Jerry W. Markham & Daniel J. Harty, *For Whom the Bell Tolls: The Demise of Exchange Trading Floors and the Growth of ECNs*, 33 J. CORP. L. 865, 866 (2008) ("Exchange trading floors are fast fading into history as the trading of stocks and derivative instruments moves to electronic communications networks (ECNs) that simply match trades by computers through algorithms.").

[188] *See* Ben Protess & Nathaniel Popper, *Exchange Sale Reflects New Realities of Trading*, N.Y. TIMES, (Dec. 20, 2012, 9:35 PM), http://dealbook.nytimes.com/2012/12/20/exchange-sale-reflects-new-realities-of-trading/?_r=0, *archived at* http://perma.cc/4G7D-Q38H.

[189] Jacob Bunge, *NYSE Revamps Disaster Plan*, WALL ST. J., Mar. 9, 2013, at B1.

[190] *See* ANN C. LOGUE, DAY TRADING FOR DUMMIES 196 (2d ed. 2011); John F. Wasik, *Sites to Manage Personal Wealth Gaining Ground*, N.Y TIMES, Feb. 11, 2014, at F10.

vulnerable to cyber threats, cybercrimes, and technical crashes.[191] In 2010, the world witnessed the Flash Crash, which destroyed over $1 trillion in market value in a few minutes before bouncing back.[192] Since then, a number of smaller, less volatile crashes have also occurred,[193] including a crash in 2013 that led the NASDAQ to suspend trading for three hours during an otherwise normal trading day.[194] Given these emerging dangers, humans are needed more than ever to better design the algorithms and programs behind these artificially intelligent systems, in order to prevent materially damaging flaws and failures.[195] Notwithstanding their advanced capabilities, artificially intelligent machines, driven by data and algorithms, still lack some of the more

[191] *See* Duncan B. Hollis, *Why States Need an International Law for Information Operations*, 11 LEWIS & CLARK L. REV. 1023, 1042 (2007) (speculating about computer viruses that paralyze financial markets); Michael Riley & Ashlee Vance, *The Code War*, BLOOMBERG BUSINESSWEEK, July 25, 2011, at 52; Michael Riley, *How Russian Hackers Stole the NASDAQ*, BLOOMBERG BUSINESSWEEK, July 20, 2014, at 40.

[192] *See* COMMODITY FUTURES TRADING COMM'N & SEC. & EXCH. COMM'N, FINDINGS REGARDING THE MARKET EVENTS OF MAY 6, 2010, 1-6 (Sept. 30, 2010), *available at* http://www.sec.gov/sec-cftc-prelimreport.pdf, *archived at* http://perma.cc/R3V8-99B5 (summarizing the Flash Crash); Ben Rooney, *Trading Program Sparked May 'Flash Crash,'* CNN MONEY (Oct. 1, 2010), http://money.cnn.com/2010/10/01/markets/SEC_CFTC_flash_crash/, *archived at* http://perma.cc/8JZP-D7DC.

[193] *See, e.g.*, Graham Bowley, *The Flash Crash, in Miniature*, N.Y. TIMES, Nov. 9, 2010, at B1 (reporting on the occurrences of smaller flash crashes); Jacob Bunge et al., *Goldman Misfire Rattles Options*, WALL ST. J., Aug. 21, 2013, at C1; Amy Chozick & Nicole Perlroth, *Twitter Speaks, Markets Listen, and Fear*, N.Y. TIMES, Apr. 29, 2013, at A1 (describing the stock market crash caused by a false tweet); Shen Hong, *Global Finance: Everbright Fiasco Casting a Shadow*, WALL ST. J., Aug. 21, 2013, at C3; Edward E. Kaufman, Jr. & Carl M. Levin, *Preventing the Next Flash Crash*, N.Y. TIMES, May 6, 2011, at A27 (discussing mini-crashes since the Flash Crash); Nathaniel Popper, *BATS Flaw Not So Rare, Data Shows*, N.Y. TIMES, Mar. 29, 2012, at B1 (reporting on the volatility surrounding the initial public offering of BATS Global Markets, an electronic stock exchange pioneer); Nathaniel Popper, *Flood of Errant Trades Is a Black Eye for Wall Street*, N.Y. TIMES, Aug. 1, 2012, at A1 (examining market instability caused by computerized trading relating to Facebook's initial public offering and a rogue computer program related to Knight Trading).

[194] E.S. Browning & Scott Patterson, *Complex Systems Get Blame*, WALL ST. J., Aug. 23, 2013, at C1; Nathaniel Popper, *Pricing Problem Suspends NASDAQ for Three Hours*, N.Y. TIMES, Aug. 23, 2013, at A1.

[195] *See* AYRES, *supra* note 184, at 126 ("[T]he machines still need us. Humans are crucial not only in deciding what to test, but also in collecting and, at times, creating the data."); NARANG, *supra* note 184, at xi; Daniel Beunza et al., *Impersonal Efficiency and the Dangers of a Fully Automated Securities Exchange*, FORESIGHT DRIVER REVIEW, DR11 13-18 (2010); Steve Lohr, *Google Schools Its Algorithm*, N.Y. TIMES, Mar. 6, 2011, at WK 4 ("Computers are only as smart as their algorithms — man-made software recipes for calculation . . . .").

cognitively complex and nuanced capabilities of human judgment.[196] After all, the human brain with its billions of neurons and trillions of synaptic connections remains one of the most intelligent and powerful of machines despite its many flaws.[197]

C. *A New Typology*

The new marketplace—with its new cyborg participants—demands novel legal conceptions in order to better serve and protect investors in the same way that law has responded to historical, social, technological, and economic changes over time.[198] In fact, in 2014, the SEC adopted Regulation Systems Compliance and Integrity in recognition of the rapid technological shifts in the financial marketplace and its effects for issuers.[199] Similarly, in light of these fundamental changes in the contemporary investment landscape, policymakers should introduce a new investor typology, *the algorithmic investor*, to better match financial regulation with financial reality for investors. Rather than prescribe detailed technological and financial specifics for the proposed typology here that will quickly and inevitably become outdated and obsolete, this Article suggests that policymakers begin thinking and acting towards promulgating a new typology in regulation based on a few general parameters and principles.

The algorithmic investor typology should be designed and defined in a manner that appropriately captures the artificial, automated, and accelerated characteristics of many investors in the new marketplace. Policymakers should work with proper evidence and key industry stakeholders to set definitional standards relating to computing power, execution speed, financial sophistication, algorithmic strategy, assets under management, and intended end-users in creating a meaningful, initial profile of this new typology.

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[196] *See* STEPHEN BAKER, FINAL JEOPARDY: MAN VS. MACHINE AND THE QUEST TO KNOW EVERYTHING 148-69 (2011) (discussing the limitations of artificial intelligence); Tom C.W. Lin, *National Pastime(s)*, 55 B.C. L. REV. 1197, 1210 (2014) ("[D]espite the emergence of smart machines, the human element, while different in role, remains a critical component in finance."); Felix Salmon, *Numbed by Numbers*, WIRED, Jan. 2014, at 27, 28 (reporting on the importance of synthesizing human intuition with computerized analysis driven by Big Data).

[197] ELLEN E. PASTORINO & SUSANN M. DOYLE-PORTILLO, WHAT IS PSYCHOLOGY? 355 (2011).

[198] *See* Gregory N. Mandel, *History Lessons for a General Theory of Law and Technology*, 8 MINN. J.L. SCI. & TECH. 551, 553 (2007); O.W. Holmes, *The Path of the Law*, 10 HARV. L. REV. 457, 474-75 (1897) (articulating the necessity of law to adapt itself to novel technology); Sachs, *supra* note 12, at 474 ("Social change has long driven change in securities law."); Samuel D. Warren & Louis D. Brandeis, *The Right to Privacy*, 4 HARV. L. REV. 193, 193 (1890) ("Political, social, and economic changes entail the recognition of new rights, and the common law, in its eternal youth, grows to meet the demands of society.").

[199] Regulation Systems Compliance and Integrity, Exchange Act Release No. 34-73639, 79 Fed. Reg. 72251 (Dec. 5, 2014) (to be codified at 17 C.F.R pt. 240, 242 & 249).

Additionally, policymakers should continually monitor the need to update the profile to meet the demands of a rapidly changing marketplace.

The formal introduction of a new investor typology is neither unique nor radical in financial regulation. In 1982, the SEC formally introduced a unified definition of "accredited investors" when it adopted Regulation D to better comport financial regulation with the market realities of the increasing number of offerings to sophisticated investors.[200] In the years since then, the SEC has continued to refine the accredited investor conception to reflect changes in the marketplace.[201] Regulation D offerings in recent years have accounted for trillions of dollars of investment and capital.[202] Similarly, in 1990, the SEC adopted Rule 144A to permit the resale of unregistered securities to "qualified institutional buyers" under the rationale that such investors require less protection than other investors.[203]

While the dominant, singular typology of the reasonable investor has grounded decades of robust growth and investor protection in American capital markets,[204] it has also become quaint in the face of the new participants in a fundamentally different marketplace. Similar to how the SEC introduced and refined the accredited investor conception to meet the realities of the marketplace, it should do the same with the introduction of an algorithmic investor typology to meet the new realities of the new marketplace. In fact, the algorithmic investor typology may be defined as a subset of accredited investors and qualified institutional investors, depending on the appropriateness of such an approach. Ultimately, the introduction of a new typology of algorithmic investors can serve as an important catalyst in moving

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[200] Revision of Certain Exemptions from Registration for Transactions Involving Limited Offers and Sales, Securities Act Release No. 6389, 24 SEC Docket 1166 (Mar. 8, 1982); *see* U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-13-640, SECURITIES AND EXCHANGE COMMISSION: ALTERNATIVE CRITERIA FOR QUALIFYING AS AN ACCREDITED INVESTOR SHOULD BE CONSIDERED (2013).

[201] *See* 17 C.F.R. § 230 (amending the accredited investor standard); *see also* Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, § 413(b)(2)(A) (2010) (mandating SEC review of "accredited investor" standard).

[202] VLADIMIR IVANOV & SCOTT BAUGUESS, SEC. & EXCH. COMM'N, CAPITAL RAISING IN THE U.S.: AN ANALYSIS OF UNREGISTERED OFFERINGS USING THE REGULATION D EXEMPTION, 2009-2012, at 4-10 (2013).

[203] 17 C.F.R. § 230.144A (2014); *see also* Sec. & Exch. Comm'n v. Ralston Purina Co., 346 U.S. 119, 127 (1953) (finding that sophisticated institutional investors need less protection than a novel investor).

[204] *See, e.g.*, ROXBURGH ET AL., *supra* note 103, at 9 (depicting the growth of U.S. capital markets); OFFICE OF MGMT. & BUDGET, EXEC. OFFICE OF THE PRESIDENT, BUDGET OF THE UNITED STATES GOVERNMENT, FISCAL YEAR 2006, 20-21 (2005), *available at* http://www.gpo.gov/fdsys/pkg/BUDGET-2006-BUD/pdf/BUDGET-2006-BUD-7.pdf, *archived at* http://perma.cc/AXV3-MRNQ; Holmstrom & Kaplan, *supra* note 103, at 8 ("Despite the alleged flaws in its governance system, the U.S. economy has performed very well, both on an absolute basis and particularly relative to other countries.").

a dated regulatory understanding of homogeneous reasonable investors towards a more honest, pragmatic understanding of diverse investors, which will better serve and protect all investors in the new marketplace.

IV. KEY IMPLICATIONS

The introduction of an algorithmic investor typology and its accompanying shift in better understanding and recognizing contemporary investor diversity can have profound conceptual and practical implications. In general, it can impact the future design of financial regulation. In particular, it can affect disclosure and materiality, two core concepts of financial regulation.

A. *On Regulation*

The introduction of a new algorithmic investor typology with its accompanying conceptual shift towards better recognizing investor diversity can have a profound impact on the design and pathology of financial regulation. Particularly, the pivot away from a singular, homogeneous model of investors towards a diverse, heterogeneous model of investors can help shift preferences from broad, one-size-fits-all regulation towards more narrowly tailored, customized regulation; encourage more private regulation; promote more time-sensitive rulemaking; and allow for more policy experimentation.

Financial regulation and investor protection efforts frequently find root following market downturns and corporate scandals.[205] Because policymakers are responding to the widespread fears of a marketplace supposedly populated by homogeneous reasonable investors, they tend to react (and overreact) in a broad, omnibus manner.[206] Policymakers, like most individuals, are not good judges of risks, particularly in the aftermath of a scary experience or traumatic event, like a financial crisis or corporate scandal.[207] Nonetheless, in order to

[205] *See* Stuart Banner, *What Causes New Securities Regulation? 300 Years of Evidence*, 75 WASH. U. L.Q. 849, 850 (1997); Erik F. Gerding, *The Next Epidemic: Bubbles and the Growth and Decay of Securities Regulation*, 38 CONN. L. REV. 393, 418-24 (2006) ("The historical surveys . . . reveal[] a clear correlation between deregulation during the rise of a bubble and a sharp political reaction re-regulation in the aftermath of a bubble."); Joseph A. Grundfest, *Punctuated Equilibria in the Evolution of United States Securities Regulation*, 8 STAN. J.L. BUS. & FIN. 1 (2003); Charles K. Whitehead, *Reframing Financial Regulation*, 90 B.U. L. REV. 1, 2 (2010) ("Financial regulation is often reactive. New regulation seals up leaks in the financial system – usually following a crisis, a shift in the markets, or other change that threatens financial stability.").

[206] *See* Gerding, *supra* note 205, at 418-24 (finding correlation between deregulation, economic bubbles, sharp price declines, and regulation); Grundfest, *supra* note 205, at 1 ("[E]very dramatic change in the structure of securities laws has been provoked by a perceived failure in the capital markets that stimulated a regulatory response."); Tom C.W. Lin, *Vistas of Finance*, 61 UCLA L. REV. DISCOURSE 78, 85 (2013).

[207] *See* Daniel Kahneman & Amos Tversky, *Prospect Theory: An Analysis of Decision Under Risk*, *in* CHOICES, VALUES, AND FRAMES 17, 20 (2000); Ali Siddiq Alhakami & Paul Slovic, *A Psychological Study of the Inverse Relationship Between Perceived Risk and*

swiftly assuage the fears of their constituents and the investing public, policymakers frequently used sledgehammers rather than scalpels to craft rules for financial regulation and investor protection.[208] The Great Depression of 1929 served as the catalyst for the Securities Act of 1933 and the Securities Exchange Act of 1934.[209] The financial scandals of Enron and WorldCom spawned the Sarbanes-Oxley Act.[210] And the recent financial crisis led to the Dodd-Frank Wall Street Reform and Consumer Protection Act ("Dodd-Frank").[211]

This broad-based, monolithic approach, while understandable and psychologically satisfying, may not necessarily be the most effective and sensible way to protect a diverse population of investors in the modern marketplace.[212] Mandating that a diverse population of investors all adhere to the same rules, irrespective of their differences, can cause regulation management to trump risk management, thereby reducing institutional and systemic welfare.[213] Moreover, broad-based, monolithic investor protection regulations promulgated in downtimes frequently become deregulated in boom times—creating a consequential and costly cycle of over-regulation, deregulation, and re-regulation.[214] Additionally, a "one-size-fits-all" approach

Perceived Benefit, 14 RISK ANALYSIS 1085, 1094-95 (1994); Timur Kuran & Cass R. Sunstein, *Availability Cascades and Risk Regulation*, 51 STAN. L. REV. 683, 713 (1999); Cass R. Sunstein, *Probability Neglect: Emotions, Worst Cases, and Law*, 112 YALE L.J. 61, 70-82 (2002); W. Kip Viscusi, *Alarmist Decisions with Divergent Risk Information*, 107 ECON. J. 1657, 1657-59 (1997).

[208] *See* Brett McDonnell, *Dampening Financial Regulatory Cycles*, 65 FLA. L. REV. 1597, 1606-07 (2013) ("Frauds committed during the boom typically come to light during the bust, many people feel deep pain due to the crisis, and ordinary people expect politicians to react. Politicians are quite aware of this pressure to act.").

[209] *See* JACK E. KIGER ET AL., ACCOUNTING PRINCIPLES 409 (1st ed. 1984).

[210] Larry E. Ribstein, Commentary, *Bubble Laws*, 40 HOUS. L. REV. 77, 83, 86 (2003).

[211] Kimberly D. Krawiec, *Don't "Screw Joe the Plummer": The Sausage-Making of Financial Reform*, 55 ARIZ. L. REV. 53, 59-61 (2013).

[212] *See* Bainbridge, *supra* note 4, at 1821; Roger G. Noll & James E. Krier, *Some Implications of Cognitive Psychology for Risk Regulation*, 19 J. LEGAL STUD. 747, 774-75 (1990); Romano, *supra* note 5, at 1528.

[213] *See* RAGHURAM G. RAJAN, FAULT LINES: HOW HIDDEN FRACTURES STILL THREATEN THE WORLD ECONOMY 174-75 (2010) (discussing the effect of regulation on systemic risk and financial actors); Greene & Broomfield, *supra* note 173, at 8 ("[The current regulatory approach] subjects diverse entities to a 'one-size-fits-all' regulatory approach, ignoring the different causes of risk, and also further complicating legal obligations for entities that are often already subject to other complex regulatory regimes."); William K. Sjostrom, Jr., *Carving a New Path to Equity Capital and Share Liquidity*, 50 B.C. L. REV. 639, 645 (2009) (discussing the high costs associated with being a public company).

[214] *See* NOLAN MCCARTHY ET AL., POLITICAL BUBBLES: FINANCIAL CRISIS AND THE FAILURE OF AMERICAN DEMOCRACY 14-15 (2013) (discussing the role of regulation in amplifying market behaviors); Coffee, *supra* note 4, at 1029 (calling this phenomenon, the "Regulatory Sine Curve"); Patricia A. McCoy et al., *Systemic Risk Through Securitization:*

may result in risk migration rather than risk mitigation, as investors and institutions seek ways to generate higher returns by sidestepping ill-fitting regulation.[215] When new rules on futures and swaps were promulgated, some institutions simply "futurized" swaps by converting them into futures to receive more favorable regulatory treatment.[216] Similarly, new capital standards rules from Dodd-Frank and the Basel Committee on Banking Supervision shifted corporate bond risks from large investment banks to smaller banks and hedge funds without mitigating the overall risks to fixed-income investors and the financial system.[217]

The introduction of a new algorithmic investor typology by policymakers can impact the very posture of regulatory design because it encourages policymakers to formally reexamine antiquated assumptions about a homogeneous investor population in favor of one that recognizes the unprecedented diversity of investors in the modern marketplace. Rather than continue to paint the marketplace and its investors with a "broad brush,"[218] that recognition could serve as the first act in a gradual policy shift away from broad categorical rules towards narrower, targeted rules to better protect investors in accordance with their distinct vulnerabilities and profiles. While it is important to protect every investor, it is also important to acknowledge that not every investor is the same, and thus not every investor needs the same type of protection.[219]

The Result of Deregulation and Regulatory Failure, 41 CONN. L. REV. 1327, 1333 (2009); Omarova, *supra* note 4, at 416 (discussing the "never-ending spiral of rulemaking and rule evading"); Susan Rose-Ackerman, *Defending the State: A Skeptical Look at "Regulatory Reform" in the Eighties*, 61 U. COLO. L. REV. 517, 520-22 (1990); JPMORGAN CHASE & CO., ANNUAL REPORT 12-13 (Feb. 20, 2014) (highlighting the billions of dollars in expenses and effort spent to comply with new regulations between 2012 and 2014).

[215] *See, e.g.*, John C. Coffee, Jr., *Extraterritorial Financial Regulation: Why E.T. Can't Come Home*, 99 CORNELL L. REV. 1259, 1260 (2014) (discussing financial risk migration and regulatory arbitrage); Greene & Broomfield, *supra* note 173, at 8; James Fanto, *Anticipating the Unthinkable: The Adequacy of Risk Management in Finance and Environmental Studies*, 44 WAKE FOREST L. REV. 731, 739-41 (2009) (discussing various failures of risk management).

[216] Katy Burne, *Traders Seek Harmonization in New Futures, Swap Rules*, WALL ST. J., (Jan. 30, 2013; 10:27 PM), http://online.wsj.com/articles/SB10001424127887323701904578274704132048858, *archived at* http://perma.cc/C3SN-DUST.

[217] Lisa Abramowicz, *Leaner Times for Wall Street Bond Traders*, BLOOMBERG BUSINESSWEEK (Dec. 23, 2013), http://www.businessweek.com/articles/2013-12-19/wall-street-bond-traders-face-leaner-times, *archived at* http://perma.cc/M353-4HFH.

[218] *See* Reves v. Ernst & Young, 494 U.S. 56, 60 (1990) ("In defining the scope of the market that it wished to regulate, Congress painted with a broad brush.").

[219] *See* Choi, *supra* note 5, at 304 ("One size does not fit all in investor protections . . . ."); Winter, *supra* note 2, at 882-83 (advocating for more nuanced investor protection efforts).

In a financial marketplace where investors come in all forms, policymakers should prefer narrowly tailored, customized investor protection rules whenever possible and favor broadly construed, categorical rules only when necessary. Customization would help minimize the harmful, unintended, and unanticipated consequences of one-size-fits-all, omnibus regulation.[220] Customization would also allow policymakers to carefully craft investor protection rules for more vulnerable investors without inhibiting the investment efforts of less vulnerable investors.[221] Admittedly, customization may require more diligence and may be less politically satisfying, but in the long run, it may ultimately prove to be a more sensible and effective approach for protecting investors.

This targeted regulatory approach is neither unique nor revolutionary for financial regulators like the SEC. In 2005, the SEC formally adopted the Securities Offering Reform to modernize the public offering process for businesses.[222] As part of that reform, the SEC created a typology of issuers: well-known seasoned issuers, seasoned issuers, unseasoned reporting issuers, and non-reporting issuers.[223] The SEC then tailored the rules for each type of issuer based on that issuer's needs and status, so as to better remake the capital markets for a modern economy of diverse issuers with diverse concerns.[224] In 2012, the passage of the Jumpstart Our Business Startups (JOBS) Act again introduced new rules for a new type of issuer—emerging growth companies—to better balance the needs of businesses with the desire to protect investors.[225] Therefore, analogous to the reforms for issuers on the sell-side over the last decade or so, the introduction of a new investor typology can serve as an important first step towards similar reforms for more targeted regulations aimed at protecting investors on the buy-side of the marketplace.

In practice, this targeted regulatory approach would likely promote more private regulation, more time-sensitive rulemaking, and more policy

[220] *See* J.B. Ruhl & James Salzman, *Mozart and the Red Queen: The Problem of Regulatory Accretion in the Administrative State*, 91 GEO. L.J. 757, 814 (2003) ("The unintended consequences of a rule thus emerge from the complex interactions between the full set of rules and the human behaviors they motivate."); Whitehead, *supra* note 4, at 1270 (opining that there is "a real risk that new rules will have unanticipated consequences, particularly in a system as complex as today's financial markets").

[221] *See* Choi & Pritchard, *supra* note 5, at 17 ("[I]f behavioral biases vary across investors, perhaps regulations could be tailored to address the needs of the specific groups of investors while letting market forces work in other areas."); Judge, *supra* note 4, at 724 (advocating the need for customization in financial reform).

[222] Securities Offering Reform, Securities Act Release No. 8,591, Exchange Act Release No. 52,056, Investment Company Act Release No. 26,993, 70 Fed. Reg. 44,722, 44,770 (Aug. 3, 2005).

[223] *Id.* at 44,726-31.

[224] *Id.*

[225] Jumpstart Our Business Startups (JOBS) Act, Pub. L. No. 112-106, 126 Stat. 306 (2012) (codified in scattered sections of 15 U.S.C.).

experimentation. First, a targeted approach would likely encourage policymakers to push for more private and internal regulations for investor protection since they are quicker to implement in a focused manner relative to omnibus, public regulation. Private regulation, when appropriately designed, can break through some of the structural limitations of jurisdiction, origination, and resource faced by government regulators.[226] Private regulation already plays a significant role in investor protection, so the threshold inquiry is not about permitting private regulation, but about how best to partner private regulation with government regulation to serve investors.[227] In contrast to government regulators, who at times wield broad, nebulous investor protection mandates, private regulators, in some cases, can be more knowledgeable and more attuned to varying contemporary practices of the marketplace.[228] This refined knowledge and attention by industry participants would likely manifest in more customized, targeted rules designed to fit the needs of various investors.

This discussion about more private regulation to protect investors is not a call for deregulation or the wholesale substitution of private regulation for government regulation. It is well understood that self-regulation alone is an insufficient mode of financial regulation given the myriad of issues relating to conflicts of interests, moral hazards, and human psychology.[229] Rather, this discussion suggests that private regulation can serve as a stronger complement

[226] *See* Lin, *supra* note 128, at 590-94 (discussing the limitations of public law in regulating modern finance).

[227] *See* William A. Birdthistle & M. Todd Henderson, *Becoming a Fifth Branch*, 99 CORNELL L. REV. 1, 12-24 (2013) (telling the story of FINRA's "dramatic transition from self-regulation to quasi-governmental regulation"); Roberta S. Karmel, *Should Securities Industry Self-Regulatory Organizations Be Considered Government Agencies?*, 14 STAN. J.L. BUS. & FIN. 151, 151-55 (2008).

[228] *See, e.g.*, Henry T. C. Hu, *Swaps, the Modern Process of Financial Innovation and the Vulnerability of a Regulatory Paradigm*, 138 U. PA. L. REV. 333, 412 (1989) (suggesting that regulators may not possess sufficient expertise to effectively regulate some complex financial products).

[229] *See, e.g.*, Brooksley Born, *Foreword: Deregulation: A Major Cause of the Financial Crisis*, 5 HARV. L. & POL'Y REV. 231, 242-43 (2011) ("The causative role of deregulation and inadequate regulation in the financial crisis demonstrates the fallacies of reliance on self-regulation in a field central to the American economy and the welfare of the American people."); Leo E. Strine, Jr., *Our Continuing Struggle with the Idea that For-Profit Corporations Seek Profit*, 47 WAKE FOREST L. REV. 135, 136 (2012) ("In the end, policy makers should not delude themselves about the corporation's ability to police itself; government still has a critical role in setting the rules of the game."); *Morgan Stanley's Mack: "We Cannot Control Ourselves,"* N.Y. TIMES, (Nov. 19, 2009, 8:47 AM), http://dealbook.blogs.nytimes.com/2009/11/19/morgan-stanleys-mack-we-cannot-control-ourselves/, *archived at* http://perma.cc/2EJQ-SEQC.

to government regulation in forming new modes of regulation and governance in efforts to protect investors.[230]

Second, this targeted regulatory approach towards investor protection would likely manifest in more timely rules as more targeted rules may be easier to pass relative to omnibus legislation.[231] Moreover, the focused, smaller nature of targeted rulemaking could encourage the use of timing mechanisms like sunset provisions to test new proposals, which can help mitigate the harms caused by permanent or "lasting" rules that are part of omnibus legislation.[232] Because of conventional and cognitive rulemaking pathologies,[233] financial rulemaking in response to the last crisis and scandal can quickly grow stale in a dynamic marketplace with an evolving population of diverse investors.[234] Absent sunsets and predetermined mechanisms for review, regulators and investors can incur significant costs enforcing and complying with broad, stale,

[230] *See, e.g.*, WILLIAM D. EGGERS & PAUL MACMILLAN, THE SOLUTION REVOLUTION: HOW BUSINESS, GOVERNMENT, AND SOCIAL ENTERPRISES ARE TEAMING UP TO SOLVE SOCIETY'S TOUGHEST PROBLEMS 3-16 (2013); Orly Lobel, *The Renew Deal: The Fall of Regulation and the Rise of Governance in Contemporary Legal Thought*, 89 MINN. L. REV. 342, 343-44 (2004); Lester M. Salamon, *The New Governance and the Tools of Public Action: An Introduction*, *in* THE TOOLS OF GOVERNMENT: A GUIDE TO NEW GOVERNANCE 1, 1-18 (Lester M. Salamon ed., 2002).

[231] *See* Tom Ginsburg et al., *Libertarian Paternalism, Path Dependence, and Temporary Law*, 81 U. CHI. L. REV. 291, 297 (2014) ("[T]emporary law is a form of political compromise that might decrease the costs of political struggles.").

[232] *See, e.g.*, Jacob E. Gersen, *Temporary Legislation*, 74 U. CHI. L. REV. 247, 298 (2007) ("Normatively, temporary legislation should not be globally eschewed, and at least in specific policy domains such as responses to newly recognized risk, there should be a presumptive preference in favor of temporary legislation."); Romano, *supra* note 5, at 1600-02 (arguing that temporary legislation is necessary because "[r]ecommending restraint, such as resisting an immediate legislative response . . . is simply not in the realm of the feasible"); George K. Yin, *Temporary-Effect Legislation, Political Accountability, and Fiscal Restraint*, 84 N.Y.U. L. REV. 174, 187-94 (2009) (espousing the benefits of temporary legislation for budgeting purposes). *But see* STEPHEN BREYER, REGULATION AND ITS REFORM 365-67 (1982) (disfavoring sunset provisions as a reform mechanism for administrative law); Coffee, *supra* note 4, at 1023-26 (arguing against sunset provisions in financial regulation); Rebecca M. Kysar, *Lasting Legislation*, 159 U. PA. L. REV 1007, 1009-10 (2011) (favoring lasting legislation over temporary legislation).

[233] *See, e.g.*, David A. Dana, *A Behavioral Economic Defense of the Precautionary Principle*, 97 NW. U. L. REV. 1315, 1324-25 (2003) (explaining cognitive biases towards recent losses and its effect on policymaking); John O. McGinnis & Michael B. Rappaport, *Symmetric Entrenchment: A Constitutional and Normative Theory*, 89 VA. L. REV. 385, 444 (2003) (suggesting that sunset provisions suffer less from the "special problems of public choice, aberrational majorities, partisanship, or imperfect psychological heuristics"); Rachlinski & Farina, *supra* note 5, at 603-06 (recommending ways to craft rules and legislation that better account for behavioral tendencies).

[234] Roberta Romano, *Regulating in the Dark*, *in* REGULATORY BREAKDOWN: THE CRISIS OF CONFIDENCE IN U.S. REGULATION 86, 88-95 (Cary Coglianese ed., 2012).

and sticky rules that no longer make sense in a changed marketplace.[235] In contrast, timely regulation allows regulators to better refine and customize investor protection rules to meet the demands and needs of market realities.[236] For example, the Commodities Exchange Act requires a periodic review and reauthorization of the Commodity Futures Trading Commission for similar reasons.[237]

Third, the promotion of more targeted private regulation and of more time-sensitive regulation can allow for more regulatory and policy experimentation and competition, which can lead to more flexible and better rulemaking for investor protection.[238] Diverse investor protection policies for different categories of investors can create natural regulatory and policy experimentation. Good and effective policies for protecting one typology of investors can generate valuable data that can inform investor protection efforts of another typology. For instance, in 2014, the SEC announced a pilot plan to study the impact of different stock market tick sizes given a diverse population of issuers through real-world experimentation after being spurred by industry participants. A move towards a more targeted and timely regulatory approach could perhaps encourage similar pilot programs and experimentation with regards for rules relating to investor protection for a diverse population of investors.

In sum, a key conceptual implication of the new algorithmic investor typology is a change in the fundamental postural default and design of financial regulation. In light of the many ongoing financial reform efforts, the

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[235] *See id.* at 95-98 (offering sunset provisions as a way to "mitigate the effect of legislative and regulatory failure"); Bruce Adams, *Sunset: A Proposal for Accountable Government*, 28 ADMIN. L. REV. 511, 519-21 (1976) (opining that sunset provisions can create more government accountability); Lewis Anthony Davis, *Review Procedures and Public Accountability in Sunset Legislation: An Analysis and Proposal for Reform*, 33 ADMIN. L. REV. 393, 407-08 (1981) (suggesting methods to design better sunset provisions); *see also* PAUL ROSE & CHRISTOPHER J. WALKER, THE IMPORTANCE OF COST-BENEFIT ANALYSIS IN FINANCIAL REGULATION (2013) (reviewing assessments of the costs of financial regulation in the context of cost-benefit analyses).

[236] Whitehead, *supra* note 4, at 1295 ("Permitting new rules to be adjusted to reflect market feedback can assist in minimizing uncertainty over the rules' benefits, as well as lower the likelihood that regulation will be ineffective or result in unanticipated costs.").

[237] *See* 7 U.S.C. §§ 1-22 (2012); CFTC Reauthorization Act of 2008 (CRA), Pub. L. No. 110-246, tit. 13, 122 Stat. 1651, 2189-2204 (codified at 7 U.S.C. § 2 (2012)).

[238] For a general discussion of regulatory and policy experimentation, see, e.g., ZAID HASSAN, THE SOCIAL LABS REVOLUTION 1-15, 111-23 (2014); JIM MANZI, UNCONTROLLED: THE SURPRISING PAYOFF OF TRIAL-AND-ERROR FOR BUSINESS, POLITICS, AND SOCIETY 209-11 (2012); Michael Abramowicz et al., *Randomizing Law*, 159 U. PA. L. REV. 929, 933-34 (2011); Zachary J. Gubler, *Experimental Rules*, 55 B.C. L. REV. 129, 136-39 (2014); James J. Heckman and Jeffrey A. Smith, *Assessing the Case for Social Experiments*, 9 J. ECON. PERSP. 85 (1995); Yair Listokin, *Learning Through Policy Variation*, 118 YALE L.J. 480, 483-86 (2008); Charles F. Sabel & William H. Simon, *Minimalism and Experimentalism in the Administrative State*, 100 GEO. L.J. 53, 60-61, 78 (2011).

new typology can serve as an important catalyst for a redesign and re-imagination of regulation aimed at investor protection. Specifically, it can lead to more targeted rulemaking, more private regulation, and more opportunities for regulatory experimentation to safeguard the varying interests of a diverse population of investors.

B. *On Disclosure*

The introduction of a new algorithmic investor typology with its accompanying conceptual shift towards better recognizing investor diversity can have significant practical implications on securities disclosures. Particularly, the pivot away from a singular, homogeneous model of investors towards a diverse, heterogeneous model of investors can result in a departure from longstanding disclosure practices towards more varied and more meaningful disclosures for all investors.

Because "sunlight is said to be the best of disinfectants,"[239] disclosure has long been at the bedrock of the modern securities regulation framework.[240] This bedrock motivation is implicitly driven by a belief that investors can see the light. Policymakers have long operated under the assumption that all investors are reasonable investors, rational human beings of average wealth and financial sophistication that invest passively for the long term.[241] Investor protection for a mythical population of reasonable investors is fairly straightforward: equip them with the requisite information, and they will perfectly process that information and make utility-maximizing investment decisions.[242] As such, over the years, disclosure has been a frequent and convenient tool used by policymakers to protect investors and govern firms.[243]

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[239] LOUIS D. BRANDEIS, *What Publicity Can Do*, *in* OTHER PEOPLE'S MONEY AND HOW THE BANKERS USE IT 92, 92 (1914).

[240] *See* SEC v. Capital Gains Research Bureau, Inc., 375 U.S. 180, 186 (1963) (stating that a core principle of modern securities regulation is to "substitute a philosophy of full disclosure for the philosophy of *caveat emptor*"); JOEL SELIGMAN, THE TRANSFORMATION OF WALL STREET: A HISTORY OF THE SECURITIES AND EXCHANGE COMMISSION AND MODERN CORPORATE FINANCE 39-40 (3d ed. 2003).

[241] *See* Regulation NMS, Exchange Act Release No. 51,808, 70 Fed. Reg. 37,496, 37,500 (June 29, 2005) ("Indeed, the core concern for the welfare of long-term investors . . . was first expressed in the foundation documents of the Exchange Act itself."); Heminway, *supra* note 14, at 297; Hoffman, *supra* note 5, at 537-39; Sachs, *supra* note 12, at 475-76.

[242] *See, e.g.*, Adoption of Rule 144, Securities Act Release No. 5223, [1971-1972 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 78,487, at 81,052 (Jan. 11, 1972) (stating that disclosure allows investors "to make an informed judgment"); Choi, *supra* note 5, at 282-83 (2000) ("[R]egulation of any sort may be unnecessary for rational investors with good information on the risks and returns offered through particular issuers.").

[243] *See, e.g.*, Steven M. Davidoff & Claire A. Hill, *Limits of Disclosure*, 36 SEATTLE U. L. REV. 599, 604 (2013) ("[D]isclosure is too often a convenient path for policymakers and many others looking to take action and hold onto comforting beliefs in the face of a bad outcome."); Arthur Fleischer, Jr., *"Federal Corporation Law": An Assessment*, 78 HARV. L.

Disclosure has been used in recent years to address issues as varied as executive compensation, conflict minerals, and cybersecurity.[244]

The introduction of a new algorithmic investor typology and its accompanying recognition of investor diversity can thoughtfully bridge and update existing disclosure rules and practices with new technology and new market realities to create a familiar, yet smarter, disclosure framework for investors.[245] More specifically, the recognition of diverse investors in a new, complex marketplace can change the volume and variety of information disclosed relative to the current framework.[246]

The existing disclosure practice is built on the disclosure of material information written in "plain English" by issuers.[247] While informative for a

REV. 1146, 1148-49 (1965) ("Because disclosure is designed to provide investors with the data necessary to make informed judgments, the information required may encompass all aspects of corporate life, and consequently all aspects of corporate life may be affected." (footnote omitted)); Hu, *supra* note 4, at 1606 ("[T]he federal government's totemic philosophy as to markets and corporations has been to help ensure a robust informational foundation for private decision makers.").

[244] *See, e.g.*, Executive Compensation and Related Person Disclosure, Securities Act Release No. 8732, Exchange Act Release No. 54,302, Investment Company Act Release No. 27,444, 71 Fed. Reg. 53,158, 53,159-60 (Sept. 8, 2006); *see also* Conflict Minerals, Exchange Act Release No. 67,716, 77 Fed. Reg. 56,274, 56,275-76 (Sept. 12, 2012) ("Congress chose to use the securities laws disclosure requirements to bring greater public awareness of the source of issuers' conflict minerals and to promote the exercise of due diligence on conflict mineral supply chains."); *CF Disclosure Guidance: Topic No. 2 - Cybersecurity*, SEC. & EXCH. COMM'N., http://www.sec.gov/divisions/corpfin/guidance/cfguidance-topic2.htm (last visited Nov. 14, 2014), *archived at* http://perma.cc/K7ZA-ZS7U (advising corporations how to balance their disclosure requirements with the need for confidentiality in cybersecurity breaches).

[245] *See, e.g.*, Robert P. Bartlett, III, *Making Banks Transparent*, 65 VAND. L. REV. 293, 369-82 (2012) (advocating for enhanced disclosure as a tool for better financial regulation); Henry T. C. Hu & Bernard Black, *Debt, Equity and Hybrid Decoupling: Governance and Systemic Risk Implications*, 14 EUR. FIN. MGMT. 663, 693 (2008) (concluding that "better overall disclosure" about holdings and risk levels will help different levels of investors and regulators); Hu, *supra* note 4, at 1607-12 (suggesting a new disclosure paradigm based on "pure information" and new technology); Steven L. Schwarcz, *Rethinking the Disclosure Paradigm in a World of Complexity*, 2004 U. ILL. L. REV. 1, 16-17; Jose A. Lopez, *Disclosure as a Supervisory Tool: Pillar 3 of Basel II*, FED. RESERVE BANK OF S.F. ECONOMIC LETTER, Aug. 1, 2003, at 1, *available at* http://www.frbsf.org/publications/economics/letter/2003/el2003-22.pdf, *archived at* http://perma.cc/2P68-3B9V ("[I]mproved public disclosure of relevant information should enhance market discipline and hence its potential usefulness to bank supervisors.").

[246] Davidoff & Hill, *supra* note 243, at 604.

[247] *See* Plain English Disclosure, 17 C.F.R. § 230.421(b) (2014) ("You must present the information in a prospectus in a clear, concise and understandable manner."); Plain English Disclosure, Securities Act Release No. 7497, Exchange Act Release No. 39,593, Investment Company Release Act No. 23,011, 63 Fed. Reg. 6370, 6370-71 (Feb. 6, 1998); OFFICE OF INVESTOR EDUC. & ASSISTANCE, SEC. & EXCH. COMM'N, A PLAIN ENGLISH HANDBOOK: HOW

simple marketplace with homogeneous investors and straightforward investments, the current practice may be inadequate to convey the complex risks, rewards, and realities of the new marketplace.[248] Warren Buffett, one of the most astute consumers of corporate disclosures, has said that "[f]or more than forty years, I've studied the documents that public companies file. Too often, I've been unable to decipher just what is being said."[249] In the new marketplace of diverse investors with an unprecedented variety of financial products, most investors have less expertise than Mr. Buffett and may be seriously underinformed or misinformed by the current disclosure paradigm.[250] The current framework, based largely on firm-by-firm disclosures, cannot fully depict the complexity and interconnectedness of many of today's investment instruments and corporations.[251] At best, current disclosures only depict one piece of a much larger mosaic for investors.[252]

The introduction of the algorithmic investor typology may spur policymakers to move faster beyond quaint beliefs that disclosures are

TO CREATE CLEAR SEC DISCLOSURE DOCUMENTS (1998), *available at* https://www.sec.gov/pdf/handbook.pdf, *archived at* https://perma.cc/C69C-LNF2.

[248] *See* Hu, *supra* note 4, at 1608 (arguing that conventional disclosure methods are inadequate for "modern financial science").

[249] Warren E. Buffett, *Preface* to A PLAIN ENGLISH HANDBOOK *supra* note 247, at 1 (1998).

[250] *See* Judge, *supra* note 4, at 690-96 (commenting on how financial complexity leads to information loss and dangerous consequences); Omri Marian, *Reconciling Tax Law and Securities Regulation*, 48 U. MICH. J.L. REFORM 1, 19-24 (2014) (highlighting the problems of tax-related disclosures for investors); James A. Fanto, *We're All Capitalists Now: The Importance, Nature, Provision and Regulation of Investor Education*, 49 CASE W. RES. L. REV. 105, 70 (1998) ("[Investors] do not read lengthy disclosure documents, no matter how plainly written, and it makes no sense to encourage them to do so.").

[251] *See* Donald C. Langevoort, *Organized Illusions: A Behavioral Theory of Why Corporations Mislead Stock Market Investors (and Cause Other Social Harms)*, 146 U. PA. L. REV. 101, 135-46 (1997); Tafara & Peterson, *supra* note 59, at 32 ("Our markets are now interconnected and viewing them in isolation—as we have for so long—is no longer the best approach to protecting our investors, promoting an efficient and transparent U.S. market, or facilitating capital formation for U.S. issuers."); Thompson, *supra* note 4, at 329 ("In modern securities markets, a focus on disclosure by issuers alone has come up short."); Hu, *supra* note 85, at 569 (arguing that current disclosure systems are "structurally insufficient to address the informational challenges posed by modern financial innovation").

[252] *See, e.g.*, BD. OF GOVERNORS OF THE FED. RESERVE SYS., REPORT TO THE CONGRESS ON RISK RETENTION 41 (2010), *available at* http://federalreserve.gov/boarddocs/rptcongress/securitization/riskretention.pdf, *archived at* http://perma.cc/KJ4Z-3WJ9 ("Participants in securitization markets—originators, securitizers, rating agencies, and investors—have come to recognize that investors may have less information than other members of the securitization chain, particularly about the credit quality of the underlying assets."); Schwarcz, *supra* note 4, at 221 ("Complexity can deprive investors and other market participants of the understanding needed for markets to operate effectively.").

intended to be read by average, reasonable investors.[253] The reality is that most investors do not and cannot educate themselves through raw, regulated disclosures, which at times can amount to information overload for many ordinary investors.[254] Rather, in the new marketplace, many investors use artificial intelligence programs to process regulated disclosures in ways previously unimaginable.[255] Advances in information technology have made it possible for market participants to process information that is more voluminous, more complex, and more unfiltered at faster rates than ever before.[256] Many modern investors may need to depend less on the depicted disclosures of issuers.[257] As such, policymakers can reform the volume and variety of information disclosed to include more unfiltered data so that investors can benefit from that information. Sophisticated investors can benefit directly from the better information, and unsophisticated investors can indirectly benefit from the more accurate prices and better efficiencies of the marketplace.[258] Additionally, entrepreneurs can repackage and deliver the new information to better serve the diverse needs of various investors through mediums like new software applications and tools.[259]

This key implication of the new algorithmic investor typology is consistent with current post-financial crisis reform efforts. In the aftermath of the financial crisis, many policymakers and commentators have suggested that more and better disclosure and information prior to the crisis would have been beneficial for investors and regulators.[260] Policymakers have started to

[253] *See supra* note 247.

[254] *See* Choi, *supra* note 5, at 318 ("The present regulatory regime relies primarily on disclosure and therefore is equally vulnerable to cognitive problems investors face in processing the disclosed information."); Paredes, *supra* note 77, at 418-19 (discussing studies that indicate that, after a certain point, disclosure of information turns into information overload, leading individuals to less than optimal decisionmaking).

[255] *See* Hu, *supra* note 4, at 1607 (suggesting that a new disclosure paradigm can be "facilitated by innovations in computer and Internet technologies").

[256] *See id.*

[257] *See id.* at 1610 ("If the investor is given the opportunity to see reality itself with his own eyes, he could come much closer to pure information, the objective truth in all of its quantitative and qualitative dimensions.").

[258] Goshen & Parchomovsky, *supra* note 5, at 714-15.

[259] *See* Choi, *supra* note 5, at 283 (advocating for regulation that would "allow regulators to provide protections tailored to the informational needs of specific segments of investors"). For a sampling of customizable investment research tools, see BLOOMBERG, http://www.bloomberg.com/mobile/bloomberg/ (last visited Sept. 23, 2014), *archived at* http://perma.cc/FXZ7-KZM5; WEALTHFRONT, https://www.wealthfront.com/ (last visited Sept. 23, 2014), *archived at* https://perma.cc/LT5L-6D3Z; SIGFIG, https://www.sigfig.com/ (last visited Feb. 5, 2014), *archived at* https://perma.cc/NC7F-ZTW3.

[260] *See* CONG. OVERSIGHT PANEL, SPECIAL REPORT ON REGULATORY REFORM: MODERNIZING THE AMERICAN FINANCIAL REGULATORY SYSTEM: RECOMMENDATIONS FOR IMPROVING OVERSIGHT, PROTECTING CONSUMERS, AND ENSURING STABILITY 13-15 (2009),

examine ways to better leverage information technology to enhance disclosure as a tool to serve and protect investors.[261] The SEC recently adopted a "consolidated audit trail" rule to make it easier for regulators to monitor and track the complex securities clearinghouse infrastructure.[262] The SEC has also developed quantitative capibilities and initiatives like the Center for Risk and Quantitative Analytics, National Exam Analytics Tool ("NEAT"), and Market Information Data Analytics System ("MIDAS") to examine the massive amounts of data being generated in the marketplace.[263] The Commodities Futures Trading Commission now requires the disclosure of swap prices and volume data "as soon as technologically practicable."[264] Issuers are even permitted to make disclosures via social media tools like Facebook and Twitter.[265] And policymakers continue to examine new ways to improve disclosure in light of new market and technological realities.[266]

available at http://cybercemetery.unt.edu/archive/cop/20110402010517/ http://cop.senate.gov/documents/cop-012909-report-regulatoryreform.pdf, *archived at* http://perma.cc/DG32-9VJX; Ronald J. Gilson & Reiner Kraakman, *Market Efficiency After the Financial Crisis: It's Still A Matter of Information Costs*, 100 VA. L. REV. 313, 350-62 (2014) (discussing the policy implications of informational challenges arising from the financial crisis of 2008).

[261] *See, e.g.*, Mary Jo White, Chairwoman, Sec. & Exch. Comm'n, Speech at the National Association of Corporate Directors Leadership Conference: The Path Forward on Disclosure (Oct. 15, 2013) (transcript available at http://www.sec.gov/News/Speech/Detail/Speech/1370539878806#.UmanZvmshca, *archived at* http://perma.cc/5D7M-LEHZ).

[262] 17 C.F.R. § 242.613 (2014).

[263] *See* Mary Jo White, Chair, Sec. & Exch. Comm'n, Speech at the 41st Annual Securities Regulation Institute: The SEC in 2014 (Jan. 27, 2014) (transcript available at http://www.sec.gov/News/Speech/Detail/Speech/1370540677500#.UvUmcPldV8E, *archived at* http://perma.cc/T35E-YJR7); Press Release, Sec. & Exch. Comm'n, SEC Announces Enforcement Initiatives to Combat Financial Reporting and Microcap Fraud and Enhance Risk Analysis, July 2, 2013, *available at* http://www.sec.gov/News/PressRelease/Detail/PressRelease/1365171624975#.VJm7DEAQEU, *archived at* http://perma.cc/3VE9-ZBLP; Scott Patterson, *Meet the SEC's Brainy New Crime Fighters*, WALL ST. J., Dec. 14, 2014, *available at* http://www.wsj.com/articles/meet-the-secs-brainy-new-crime-fighters-1418601581, *available at* http://perma.cc/2ANB-35XY.

[264] *See* Interpretive Guidance and Policy Statement Regarding Compliance with Certain Swap Regulations, 78 Fed. Reg. 45,292, 45,352 n.527 (July 26, 2013).

[265] *See* Report of Investigation Pursuant to Section 21(a) of the Securities Exchange Act of 1934: Netflix, Inc., and Reed Hastings, Exchange Act Release No. 69,279, 2013 WL 5138514 (Apr. 2, 2013); Press Release, Sec. & Exch. Comm'n, SEC Says Social Media OK for Company Announcements If Investors Are Alerted (Apr. 2, 2013), *available at* http://www.sec.gov/news/press/2013/2013-51.htm, *archived at* http://perma.cc/84GQ-JEH9.

[266] *See, e.g.*, Kristin N. Johnson, *Clearinghouse Governance: Moving Beyond Cosmetic Reform*, 77 BROOK. L. REV. 681, 683 (2012) (discussing legislative efforts to impose "greater transparency in the OTC [over-the-counter] derivatives market"); White, *supra* note 261 (suggesting potential disclosure reforms).

This suggestion that disclosure can be enhanced with the adoption of an algorithmic investor typology to better serve many investors is not to suggest that disclosure is the cure-all for every risk faced by every investor. It is understood that securities disclosure, even at its most optimal level, is a limited tool for investor protection.[267] It is nonetheless important to recognize that the current disclosure practices seriously underserve many investors and can be greatly improved upon.

In sum, a key practical implication of a new algorithmic investor typology is an improvement and update of traditional disclosure practices. Consistent with ongoing disclosure reform efforts, a new algorithmic investor typology can serve as an important additional catalyst for updating and enhancing the critical investor protection tool of disclosure.

C. *On Materiality*

The introduction of an algorithmic investor typology with its accompanying regulatory shift towards better recognizing investor diversity can have significant practical implications on materiality, one of financial regulation's most important legal concepts. This pivot away from a singular, homogeneous model of investors towards a diverse, heterogeneous model of investors can lead to a less arbitrary and more workable understanding of materiality, particularly in the context of securities litigation.

The conventional understanding of materiality is largely rooted in a singular view of the homogeneous reasonable investor.[268] For the purposes of securities regulation, under a philosophy of "full disclosure," policymakers require issuers to disclose line-item information pursuant to Regulation S-K[269] and all material information pursuant to the gap-filling and antifraud rules.[270] The U.S. Supreme Court, in the landmark case *TSC Industries, Inc. v. Northway, Inc.*,[271] held that a disclosure or omission is material if there is "a substantial likelihood that the disclosure of the omitted fact would have been viewed by *the reasonable investor* as having significantly altered the 'total mix' of

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[267] *See* Omri Ben-Shahar & Carl E. Schneider, *The Failure of Mandated Disclosure*, 159 U. PA. L. REV. 647, 651 (2011) ("[Mandated disclosure] chronically fails to accomplish its purpose."); Davidoff & Hill, *supra* note 243, at 603 ("Indeed, the role of disclosure in investment decisions is far more limited, and far less straightforward, than is typically assumed.").

[268] *See, e.g.*, Choi & Pritchard, *supra* note 5, at 61 ("Current securities regulations take an objective approach, defining materiality in terms of what information a reasonable investor would want . . . ."); Hoffman, *supra* note 5, at 545 ("The entire construct (courts' presumptions, the scope of immateriality, and a resulting investor duty to be rational) seems in turn to be based on the courts' need to harmonize securities law with the foundational assumption of corporate law: that all parties to the corporate form act rationally.").

[269] 17 C.F.R. § 229.401-404 (2014).

[270] 17 C.F.R. § 240.10b-5 (2014).

[271] 426 U.S. 438 (1976).

information made available."[272] Subsequently, in *Basic Inc. v. Levinson*,[273] the Supreme Court would expressly adopt this definition of materiality for securities litigation under the antifraud provisions of Section 10 and Rule 10b-5,[274] which is one of the most important investor protection measures in all of financial regulation.[275]

Because of the predominant, regulatory vision of investor homogeneity and the reality of investor heterogeneity, materiality presents one of the most vexing and challenging issues in securities regulation and securities litigation.[276] Despite guidance from court rulings, materiality can nonetheless be quite challenging.[277] This is because determinations of materiality usually require judges, jurors, and issuers to make "delicate assessments" based on how a disclosure or omission would affect an undefined, amorphous reasonable investor.[278] For instance, the Ninth Circuit Court of Appeals

[272] *Id.* at 449 (emphasis added).

[273] 485 U.S. 224 (1988).

[274] *Id.* at 231-32.

[275] *See* Julie A. Herzog, *Fraud Created the Market: An Unwise and Unwarranted Extension of Section 10(b) and Rule 10b-5*, 63 GEO. WASH. L. REV. 359, 367-70 (1995) (examining the breadth and impact of Rule 10b-5); James J. Park, *Rule 10b-5 and the Rise of the Unjust Enrichment Principle*, 60 DUKE L.J. 345, 351-52 (2011) (highlighting the historical importance of Rule 10b-5 in preventing securities fraud).

[276] *See, e.g.*, Stephen M. Bainbridge & G. Mitu Gulati, *How Do Judges Maximize? (The Same Way Everybody Else Does–Boundedly): Rules of Thumb in Securities Fraud Opinions*, 51 EMORY L.J. 83, 119-26 (2002); John M. Fedders, *Qualitative Materiality: The Birth, Struggles, and Demise of an Unworkable Standard*, 48 CATH. U. L. REV. 41, 45-49 (1998); Joan MacLeod Heminway, *Personal Facts About Executive Officers: A Proposal for Tailored Disclosures to Encourage Reasonable Investor Behavior*, 42 WAKE FOREST L. REV. 749, 761 (2007) ("Materiality determinations are open-textured; the wording of the relevant antifraud rules is quite broad and susceptible to multiple interpretations, even with SEC and federal court guidance."); Hoffman, note 5, at 596-605; Huang, *supra* note 5, at 128 (calling for a "rethinking [of] the central notions of materiality of information and reasonableness of investors"); Glenn F. Miller, *Staff Accounting Bulletin No. 99: Another Ill-Advised Foray into the Murky World of Qualitative Materiality*, 95 NW. U. L. REV. 361, 384 (2000) ("The Supreme Court's definition of what is material in the context of financial disclosure invites the question of who is a reasonable investor.").

[277] *See, e.g.*, Chambers v. AMDOCS Ltd. (*In re* AMDOCS Ltd. Sec. Litig.), 390 F.3d 542, 548 (8th Cir. 2004) ("Alleged misrepresentations can be immaterial as a matter of law if they . . . are so vague and of such obvious hyperbole that no reasonable investor would rely upon them . . . ."); Recupito v. Prudential Sec., Inc., 112 F. Supp. 2d 449, 454 (D. Md. 2000) ("[I]f the alleged misstatements or omissions 'are so obviously unimportant to an investor that reasonable minds cannot differ on the question of materiality, the court may rule them immaterial as a matter of law.'" (quoting Klein v. Gen. Nutrition Cos., 186 F.3d 338, 342 (3d Cir. 1999))); Padfield, *supra* note 14, at 345 ("Any definition of the reasonable investor that goes beyond this 'average' investor conceptualization places the courts in direct conflict with the SEC.").

[278] *See Basic*, 485 U.S. at 236; TSC Indus., Inc. v. Northway, Inc., 426 U.S. 438, 450

recently opined, "The term 'reasonable investor' is a concept within the jury's ordinary experience and understanding."[279] Yet, it is difficult to believe that most ordinary individuals and jurors would conceive of reasonable investors to include automated computerized systems, the federal government, or hedge funds. Nonetheless, with the current conventional understanding of investors, materiality determinations frequently operate with the assumption that the computerized system, the federal government, the hedge fund, and the average middle-class investor are all similarly reasonable investors; and what is important to one of them is important to all of them.[280] Given this dissonance between financial regulation and financial reality, a new understanding of modern investors is necessary for more meaningful assessments of materiality.

The introduction of the algorithmic investor typology can lead to a better conception and application of materiality, particularly in the context of securities litigation. It would encourage courts and policymakers to better recognize the diversity of contemporary investors, which would lead to more meaningful assessments of materiality as regulators and courts offer new guidance in response to the formal recognition of investor diversity. While all investors should receive high-quality, mandated information, information that is profoundly insightful for one type of investor may be prosaically uninformative to another type of investor.[281] Instead of comparing the effects of a disclosure or an omission on an amorphous, idealized investor, the recognition of diverse investors would better recognize conflicts among investors and allow for more honest and dynamic comparisons based on shared characteristics and shared interests of comparable investors.[282] For example, if a hedge fund alleges that an issuer failed to disclose material information in a private offering of complex securities or financial instruments, rather than assess the materiality of that information based on any reasonable investor, assessment would be made based primarily on an investor that is of the sophisticated investor typology.[283] Additionally, as algorithmic investing

(1976); Barbara Black, *Behavioral Economics and Investor Protection: Reasonable Investors, Efficient Markets*, 44 LOY. U. CHI. L.J. 1493, 1505 (2013).

[279] United States v. Sayre, 434 F. App'x 622, 624 (9th Cir. 2011) (citation omitted).

[280] *See* C. Edward Fletcher, III, *Sophisticated Investors Under the Federal Securities Laws*, 1988 DUKE L.J. 1081, 1097-98 (explaining that courts have used have an "objective standard" investor in evaluating materiality).

[281] *See* Hu, *supra* note 104, at 850 ("The signs of health seen by an ordinary investor might be viewed with alarm by the professional.").

[282] *See, e.g.*, Miller, *supra* note 276, at 384 (advocating for a more nuanced definition of materiality); Webber, *supra* note 48, at 182-210 (outlining various conflicts between individual investors and institutional investors in the context of class-action securities litigation).

[283] In recent years, there have been a number of prominent cases involving sophisticated investors, complex securities, and material disclosures. *See, e.g.*, Richman v. Goldman Sachs Grp., Inc., 868 F. Supp. 2d 261, 284 (S.D.N.Y. 2012); Epirus Capital Mgmt., L.L.C. v. Citigroup, Inc., No. 09 Civ. 2594(SHS), 2010 WL 1779348, at *5-6 (S.D.N.Y. Apr. 29,

proliferates and modes of disclosure change, more nuanced understandings of materiality may be necessary. For instance, misstatements or omissions in disclosed lines of codes and volumes of audit trails may be material for algorithmic investors but not for ordinary investors who are unable and unexpected to process such disclosures.[284]

It is important to note that this conceptual shift of materiality does not readily overturn decades of law and practice. Instead, it augments that rich legal history for cases and controversies where narrow, typology-based assessments are more appropriate than broad, universal assessments. Because of the fraud-on-the-market presumption adopted by the Supreme Court in *Basic*, class action controversies involving securities offered to large, diverse populations of investors will likely proceed in the near-term in largely the same manner as they have in the past.[285] Over time, this more nuanced approach towards materiality may help alleviate some of the long-held uneasiness surrounding the breadth of the fraud-on-the-market presumption and provide richer and better precedents for courts and regulators when assessing materiality by moving towards a more discerning and dynamic standard.[286]

2010); Basis Yield Alpha Fund (Master) v. Goldman Sachs Grp., Inc., No. 652996 (N.Y. Sup. Ct. Oct. 18, 2012); Complaint, SEC v. Goldman Sachs & Co., 790 F. Supp. 2d 147 (S.D.N.Y. 2011) (No. 10 Civ. 3229(BSJ)(MHD)); Edward Wyatt, *Citigroup to Pay Millions to Close Fraud Complaint*, N.Y. TIMES, Oct. 20, 2011, at A1; Press Release, Sec. & Exch. Comm'n, Goldman Sachs to Pay Record $550 Million to Settle SEC Charges Related to Subprime Mortgage CDO (July 15, 2010), *available at* http://www.sec.gov/news/press/2010/2010-123.htm, *archived at* http://perma.cc/H6BV-ZRUT.

[284] *See, e.g.*, ARIEL MARKELEVICH, THE QUALITY OF XBRL FILINGS (2014) (discussing the significant data and coding in XBRL filings with the SEC), *available at* http://www.calcbench.com/xbrldataquality, *archived at* http://perma.cc/PV6V-B56V.

[285] The Supreme Court recently upheld *Basic* in 2014. *See* Halliburton Co. v. Erica P. John Fund, Inc., 134 S. Ct. 2398 (2014). In the absence of any change in law, class action securities litigation in many contexts will likely proceed, as it has, with the view of equalizing diverse investors. *See, e.g.*, *In re* Gemstar—TV Guide Int'l, Inc. Sec. Litig., 209 F.R.D. 447, 453 (C.D. Cal. 2002) ("However, '[e]very class member shares an overriding common interest in establishing the existence and materiality of misrepresentations.'" (quoting Blackie v. Barrack, 524 F.2d 891, 910 (9th Cir. 1975))).

[286] There has long been discomfort among scholars, policymakers, and market participants about the fraud-on-the-market presumption. *See* Basic Inc. v. Levinson, 485 U.S. 224, 254 (1988) (White, J., concurring in part and dissenting in part) ("[W]hile the economists' theories which underpin the fraud-on-the-market presumption may have the appeal of mathematical exactitude and scientific certainty, they are—in the end—nothing more than theories which may or may not prove accurate upon further consideration."); Ian Ayres, *Back to* Basics*: Regulating How Corporations Speak to the Market*, 77 VA. L. REV. 945, 967 (1991); M.C. Findlay & E.E. Williams, *A Fresh Look at the Efficient Market Hypothesis: How the Intellectual History of Finance Encouraged a Real "Fraud-On-The-Market,"* 23 J. POST KEYNESIAN ECON. 181, 181-82 (2001); Joseph A. Grundfest, *Damages*

In sum, a key practical implication of a new algorithmic investor typology is a new and better conception of materiality in the context of securities litigation. In particular, the recognition of an algorithmic investor typology and the diversity of investors can lead to a more nuanced, more honest, and more workable understanding of materiality, a core legal concept of investor protection.

* * *

The introduction of an algorithmic investor typology can serve as a significant motivation in moving policymakers towards better acknowledging the unprecedented investor diversity in the modern marketplace. This shift in understanding can have important conceptual and practical implications for regulatory design, disclosure, and materiality so as to hopefully better protect all investors in a new, complex marketplace.

CONCLUSION

Investor protection will be one of the most daunting challenges for policymakers in the coming years. Investors of all types will be presented with unparalleled opportunities and unprecedented risks in the new financial marketplace. Perfect investor protection, devoid of fraud and loss, is a noble, but elusive goal in a new marketplace still subject to the timeless inevitabilities of business cycles, financial crises, and systemic risks.[287] While perfect investor protection is unfortunately unattainable, better investor protection is certainly achievable.

This Article offers a new and better way for thinking about investor protection and investors, for harmonizing financial regulation with financial reality. It explains that the simple paradigm of perfectly reasonable investors, while profoundly seductive, is an inadequate foundation for designing investor protection policies in a changed marketplace. Instead of continuing to build protections based on the elegant fiction of identically reasonable investors, it

and Reliance Under Section 10(b) of the Exchange Act, 69 BUS. LAW. 307, 310-13 (2014); Jonathan R. Macey & Geoffrey P. Miller, *Good Finance, Bad Economics: An Analysis of the Fraud-On-The-Market Theory*, 42 STAN. L. REV. 1059, 1077-91 (1990); Jonathan R. Macey et al., *Lessons from Financial Economics: Materiality, Reliance, and Extending the Reach of* Basic v. Levinson, 77 VA. L. REV. 1017, 1018 (1991).

[287] *See* CARMEN M. REINHART & KENNETH S. ROGOFF, THIS TIME IS DIFFERENT: EIGHT CENTURIES OF FINANCIAL FOLLY, at xxvi (2009) ("Of course, financial crises are nothing new. They have been around since the development of money and financial markets."); Iman Anabtawi & Steven L. Schwarz, *Regulation* Ex Post*: How Law Can Address the Inevitability of Financial Failure*, 92 TEX. L. REV. 75, 96 (2013) ("Normal accident theory, in the context of the financial system, holds that even the most rigorously constructed ex ante regulatory measures cannot prevent the financial system from experiencing periodic crises.").

calls for more nuanced, more honest, and more workable conceptions of investors and investor protection.

To that end, this Article makes a general positive claim and a specific normative one. The general positive claim contends that the fundamental discord between investor heterogeneity in reality and investor homogeneity in regulation has resulted in mismatched regulations and misplaced expectations that harms both regulators and investors. The specific normative claim submits that policymakers should formally recognize a new algorithmic investor typology as an important first step towards better acknowledging investor diversity and addressing current harms arising from subscribing widely to a flawed, homogenous investor paradigm. Both claims seek to forge more effective investor protection policies in a fundamentally changed marketplace. Both claims recognize the comforts of ignoring investor diversity and the complexities of embracing it. And both claims, ultimately, emanate from a reasoned belief that, in order to better protect all investors, financial regulation should shift from an elegantly fictitious, singular view of reasonable investors towards a more truthful, pluralistic view of diverse investors. In the end, this is how we can begin to create a new investor protection, one that moves from protecting one type of reasonable investors towards one that better protects all types of reasonable investors.