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Preserving Human Agency in Automated Compliance

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PRESERVING HUMAN AGENCY IN AUTOMATED COMPLIANCE

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ABSTRACT

As technology transforms financial services, so too must it transform the regulation of financial markets and intermediaries. The imperative of real-time, prophylactic regulation increasingly compels reallocation of regulatory and compliance budgets to surveillance and enforcement technology. At the same time, in light of the well-known weaknesses of automated systems, securities firms (and their regulators) must temper investment in automation with efforts to augment the agency of compliance professionals. This symposium contribution considers how investment in the professional development of compliance personnel can better integrate automated tools within established compliance and supervisory structures and thereby advance regulatory and operational objectives.

INTRODUCTION

As technology transforms financial services, so too must it transform the regulation of financial markets and intermediaries. Technology and automation have enabled investment banks and brokerage firms to offer financial services to investors of all wealth and income levels and has made participation in the financial market possible for millions of households, whether in planning for college, retirement, or other major financial life events.[1] As with other professional services,[2] the automation of securities brokerage—and the prospect of automating investment advice—has led commentators to speculate whether human traders and advisers have the skill and intuition to "beat the machines" or whether the rise of the "robots" will

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1. *See, e.g.*, ALAN D. MORRISON & WILLIAM J. WILHELM, JR., INVESTMENT BANKING: INSTITUTIONS, POLITICS, AND LAW 238–42, 276–80 (2007) (arguing that automation and real-time computation reduced the cost of account management).

2. *See generally* DAVID A. MINDELL, OUR ROBOTS, OURSELVES: ROBOTICS AND THE MYTHS OF AUTONOMY (2016); Carl Benedikt Frey & Michael A. Osborne, *The Future of Employment: How Susceptible Are Jobs to Computerisation?* 36–42 (Oxford Martin Sch., Working Paper, Sept. 17, 2013), http://www.oxfordmartin.ox.ac.uk/downloads/academic/The_Future_of_Employment.pdf (forecasting the probability that tasks performed by different professions—including legal and financial services—may be partially or fully automated within the next few decades).

ultimately displace securities professionals for all but the most complex trading and investment strategies.[3]

Perhaps less glamorously, technology has also transformed the way we approach the regulation of traditional securities brokerage, dealing, and advisory services.[4] The complexity of algorithmic trading has forced regulatory agencies and self-regulatory organizations (SROs) to respond with new tools for gathering information and surveilling markets. As algorithms increasingly manage trading books and securities accounts, individual firms have proposed and developed automated tools to support—and, some fear, to supplant—compliance personnel. More generally, the imperative of real-time, prophylactic regulation in the wake of the serial crashes and panics of the twenty-first century will increasingly compel reallocation of regulatory and compliance budgets to surveillance and enforcement technology.[5]

Senior regulators and compliance officers must therefore make difficult decisions as to how to integrate automated tools within established compliance and supervisory structures. Algorithms can efficiently process vast amounts of information and draw causal inferences that predict incipient trends or threats.[6] At the same time, automated systems have well-known weaknesses, including their propensity to homogenize and sterilize controls, as well as to trigger cascading failures resulting from programming errors, inadequate training, or the interaction of automated systems.[7] When automated systems rely on structured or unstructured information, operations and compliance personnel must dedicate time, resources, and judgment to information management.[8] Moreover, automation may subtly undermine efforts to inculcate a culture of compliance within firms and thereby devalue the "seat at the table" to which compliance officers have long aspired.[9]

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3. *See generally* Nathaniel Popper, *Stocks & Bots: The Robots Are Coming for Wall Street*, N.Y. TIMES, Feb. 28, 2016, at MM56 (discussing the extent of potential job loss in the financial industry due to automation); Miles Johnson, *How Human Traders Will Beat the Machines*, FIN. TIMES (Jan 25, 2016, 11:11 AM), https://www.ft.com/content/9c3a1b1a-c33f-11e5-b3b1-7b2481276e45 (discussing the limitations of computers in the financial industry).

4. *See, e.g.*, Concept Release on Risk Controls and System Safeguards for Automated Trading Environments, 78 Fed. Reg. 56,542, 56,543 (Sept. 12, 2013) (codified at 17 C.F.R. ch. 1) (providing "an overview of the automated trading environment" in the futures and derivatives industry, "including its principal actors, potential risks, and preventative measures designed to promote safe and orderly markets"); Concept Release on Equity Market Structure, Exchange Act Release No. 61,358, 75 Fed. Reg. 3594, 3596 (Jan. 21, 2010) (conducting "a comprehensive review of equity market structure" to assess "whether market structure rules have kept pace with, among other things, changes in trading technology and practices").

5. SEC. INDUS. ASS'N, THE COSTS OF COMPLIANCE IN THE U.S. SECURITIES INDUSTRY (2006) [hereinafter SIA 2006 STUDY], https://www.sifma.org/uploadedfiles/research/surveys/costofcompliancesurveyreport(1).pdf.

6. *See infra* Part II.

7. *See infra* Part III.A–C.

8. *See infra* Part III.D.

9. James A. Fanto, *The Vanishing Supervisor*, 41 J. CORP. L. 117, 123–24 (2015); *see infra* Part III.E.

To achieve such integration, securities firms (and their regulators) must therefore temper investment in automation with efforts to augment the agency of compliance professionals. In essence, compliance personnel must aspire to see themselves as—and to be seen as—"architects and engineers" of compliance systems,[10] who add value by building stronger relationships with rank-and-file sales representatives, supervisors, senior business personnel, and regulators. Part I of this article surveys efforts by federal and SRO regulators to automate information and surveillance, while Part II discusses the reasons why such efforts are both constructive and necessary. Part III discusses, from the perspective of compliance personnel, the challenges that automation poses in interfacing between the business imperatives of firms and regulatory compliance. Part IV considers how investment in the professional development of compliance personnel can advance regulatory and operational objectives.

I. THE AUTOMATION OF INFORMATION GATHERING AND SURVEILLANCE

The automation of communications and trading activity has unquestionably revolutionized financial markets. Exchanges and other trading venues use state-of-the-art communication networks and computational power to route and match order flow, while institutional and proprietary traders have automated the analysis of information, investment management, the generation of trading interest, and the execution of trading decisions.[11] Firms have also begun to experiment with the automation of investment advice, such as through automated portfolio reallocation.[12] One may debate the implications of these developments for the fairness and efficiency of markets, but there seems to be little to stem the tide.[13]

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10. Larry Ribstein, *Delawyering the Corporation*, 2012 WIS. L. REV. 305, 316 (2012); *see, e.g.*, Dana Remus & Frank Levy, *Can Robots Be Lawyers?: Computers, Lawyers, and the Practice of Law* 66–67 (Dec. 30, 2015), http://ssrn.com/abstract=2701092 (distinguishing the services that legal software can provide from the values that lawyers "uniquely insure and support," such as "respect for the autonomy and dignity of citizens, including their self-defined interests," the ability to provide reasons for legal outcomes, "both as a resource for stability and a mechanism for change," and "participation in the development and application of law, and its evolution over time").

11. *See, e.g.*, ONNIG H. DOMBALAGIAN, CHASING THE TAPE 164–66 (2015).

12. *See, e.g.*, FIN. INDUS. REGULATORY AUTH., REPORT ON DIGITAL INVESTMENT ADVICE (2016), https://www.finra.org/sites/default/files/digital-investment-advice-report.pdf (discussing the advantages and disadvantages of automating the provision of investment advice to retail customers); Sec'y of State of the Commonwealth of Mass., Sec. Div., Policy Statement: Robo-Advisers And State Investment Adviser Registration (Apr. 1, 2016), https://www.sec.state.ma.us/sct/sctpdf/Policy-Statement—Robo-Advisers-and-State-Investment-Adviser-Registration.pdf; *see also* Melanie Fein, *FINRA's Report on Robo-Advisors: Fiduciary Implications* (Apr. 1, 2016), http://ssrn.com/abstract=2768295.

13. Some commentators suggest that algorithmic trading has the potential to disrupt traditional securities intermediation, often with negative externalities. Chris Brummer, *Disruptive Technology and Securities Regulation*, 84 FORDHAM L. REV. 977, 1051–52 (2015) (describing how "deep microstructural changes in twenty-first-century capital markets are transforming the regulatory

In this environment, policy makers must respond in kind. Regulators must upgrade their tools not only to monitor markets for fraudulent, unfair, and unethical conduct, but also to parse new trading practices and strategies and make educated guesses about their impact on market efficiency and public price discovery. To this end, regulators are pursuing three basic strategies. First, regulators have promoted, through automated systems, the public dissemination of quantitative and qualitative information—such as news, data feeds, position reports, and other macroeconomic information. Second, regulators have enhanced recordkeeping and reporting requirements for market intermediaries in order to capture more information regarding business conduct and trading activity. Finally, regulators have begun the process of automating the analysis of these information streams as part of their surveillance, compliance inspection, and examination functions.

A. ENHANCED INFORMATION DISSEMINATION

The most prominent regulatory efforts to date involve enhancing the public dissemination of information by improving the automated accessibility of public disclosures. These initiatives are intended to benefit all market participants by making more structured information available to the public on a fair and nondiscriminatory basis. For example, the Securities and Exchange Commission (SEC) has undertaken an initiative to require reporting companies to make certain financial data available in the eXtensible Business Reporting Language (XBRL),[14] and to require sponsors of asset-backed securities to provide XBRL asset-level or loan-level data "necessary

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ecosystem across issue areas" and "changing the incentives for market participants and gatekeepers in ways that may not always bolster financial stability or investor protection"); Yesha Yadav, *How Algorithmic Trading Undermines Efficiency in Capital Markets*, 68 VAND. L. REV. 1607, 1611 (2015) (arguing that while "algorithms help markets make gains on several measures of informational efficiency, they also create costs for their ability to allocate capital productively"). Others argue that automated trading merely reflects the ongoing challenge of managing the role of information technology in securities markets. *See* Merritt B. Fox et. al., *The New Stock Market: Sense and Nonsense*, 65 DUKE L.J. 191, 195–97 (2015) (questioning "the growing furor over the new stock market" in policy circles and concluding that "no emergency exists requiring immediate, less-than-fully-considered action"); Jerry W. Markham, *High-Speed Trading on Stock and Commodity Markets—From Courier Pigeons to Computers*, 52 SAN DIEGO L. REV. 555, 618 (2015) (concluding that "the use of high-speed methods for the transmittal of information in order to obtain an edge on trading over other traders is a practice that is as old as the markets themselves").

14. *See* Interactive Data to Improve Financial Reporting, Securities Act Release No. 9002, 74 Fed. Reg. 6776 (Feb. 10, 2009) (codified at 17 C.F.R. pts. 229, 230, 232, 239, 240, 249). When fully implemented, issuers would tag not only specific line item descriptions and amounts presented in the firm's financial statements (whether prepared in accordance with US GAAP or IFRS) but also significant accounting policies, tables, and other monetary or numerical values in the accompanying footnotes. The European Securities and Market Authority (ESMA) is charged with developing similar technical standards pursuant to the Transparency Directive's mandate that all annual financial reports be prepared in a single electronic reporting format by January 1, 2020. Directive 2013/50/EU, of the European Parliament and of the Council of 22 October 2013. Among other "current and future technological options," ESMA is instructed to consider XBRL. *Id.* at recit. 26.

for investors to independently perform due diligence" into creditworthiness.[15] At the same time, the SEC has encouraged firms to be thoughtful in using alternative information channels—such as social media—to broadcast breaking information consistent with principles of fair disclosure.[16]

Many policy makers have expressed the hope that the availability of easily retrievable information will encourage participants to make productive use of it.[17] Academics and policy makers may of course use formatted disclosures to identify trends in sales and trading practices, with a view to informing further policymaking. For institutional investors, regulatory standardization may well reduce the cost of information products they already use; at the same time, their fiduciary obligations often require them to integrate each new source of information into their operational and compliance systems regardless of cost or utility.[18] More ambitious is the hope that retail investors will benefit from these enhancements, if financial service providers develop accessible tools that allow investors to manipulate publicly available data with greater precision.[19]

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15. Asset-Backed Securities Disclosure and Registration, Securities Act Release No. 9638, 79 Fed. Reg. 57,184, 57,241 (Sept. 24, 2014) (codified at 17 C.F.R. pts. 229, 230, 232, 239, 240, 243, 249). These disclosures include standardized asset data points for specific asset classes, similar to the information imperfectly gathered in loan tapes, summarized in spreadsheets, and made available for (if not actually used by) prospective investors. *Id.* at 57,246–48.

16. For purposes of the fair disclosure requirement of Regulation FD, 17 C.F.R. § 243.101, the SEC has advised issuers to consider

> whether and when: (1) [a] company web site is a recognized channel of distribution; (2) posting of information on a company web site disseminates the information in a manner making it available to the securities marketplace in general; and (3) there has been a reasonable waiting period for investors and the market to react to the posted information.

Commission Guidance on the Use of Company Web Sites, Exchange Act Release No. 58,288, 73 Fed. Reg. 45,862, 45,867 (Aug. 7, 2008) (codified at 17 C.F.R. pts. 241, 271). Social media channels with limited distribution—such as a corporate officer's personal site or feed—may not, for example, satisfy these criteria. *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, 105 SEC Docket 4327 (Apr. 2, 2013).

17. *See, e.g.*, Barbara Black, *Are Retail Investors Better Off Today?*, 2 BROOK. J. CORP. FIN. & COM. L. 303, 318–19 (2008) (questioning the premise of SEC Chairman Levitt's "plain English" initiative and Chairman Cox's interactive data initiatives).

18. Roger D. Blanc, *Intermarket Competition and Monopoly Power in the U.S. Stock Markets*, 1 BROOK. J. CORP. FIN. & COM. L. 273, 290–91 (2007) (noting that federalization of the duty of best execution has "deprived exchange members and their fiduciary customers of the ability to control market data prices" because they are "ill-equipped to decline to buy the market data the exchanges sell").

19. *See, e.g.*, Christopher Cox, Chairman, U.S. Sec. & Exch. Comm'n, Speech before the American Enterprise Institute: The Interactive Data Revolution: Improved Disclosure for Investors, Less Expensive Reporting for Companies (May 30, 2006), https://www.sec.gov/news/speech/2006/spch053006cc.htm.

B. ENHANCING DATA COLLECTION FOR REPORTING AND RECORDKEEPING

Other initiatives seek to make more information available and more easily manipulable for regulatory and compliance purposes. Since 2001, the SEC has standardized the compilation of detailed transaction information by SROs for intermarket surveillance purposes.[20] The SEC's proposed Consolidated Audit Trail would build upon these audit-trail and broker-dealer recordkeeping requirements—as well as existing quotation and last-sale reporting mechanisms for equity securities—to permit real-time surveillance and investigation of order routing, display, and execution.[21] The Dodd-Frank Wall Street Reform and Consumer Protection Act's (Dodd-Frank) mandate to encourage centralized clearance, trade execution, and public reporting of swaps will likewise require regulators and industry repositories to capture trading activity and exposure in institutional derivatives.[22] While not all such information will be available to the public, these reporting and recordkeeping requirements will create a virtual database for monitoring trading activity.

These efforts have paved the way for even more intrusive data collection. The Financial Industry Regulatory Authority's (FINRA) proposed Comprehensive Automated Risk Data System (CARDS), though tabled for the moment,[23] envisioned the collection of account information, account activity, and security identification information on an automated and regular basis.[24] The new Office of Financial Research (OFR) within the Treasury Department likewise has broad authority to collect financial transaction data and position data from financial companies as part of its mandate to monitor financial stability.[25] Moreover, the OFR is authorized to share such data and

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20. Annette L. Nazareth & Margaret E. Tahyar, *Transparency and Confidentiality in the Post Financial Crisis World—Where to Strike the Balance?*, 1 HARV. BUS. L. REV. 145, 158–75 (2011).

21. Commodity and Securities Exchanges, 77 Fed. Reg. 45,808 (Aug. 1, 2012) (codified at 17 C.F.R. § 242.613 (2016)) (requiring a plan to "govern the creation, implementation, and maintenance of a consolidated audit trail and central repository"); Notice of Filing of the National Market System Plan Governing the Consolidated Audit Trail, Exchange Act Release No. 77,724, 81 Fed. Reg. 30,614 (May 17, 2016) (establishing a plan to develop the consolidated audit trail).

22. *See* Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank), Pub. L. No. 111-203, 124 Stat. 1376 (2010) (codified, at 7 U.S.C. § 2(a)(13) (2012)) (requiring both "real-time public reporting" and reporting to a "registered swap data repository" of certain swap transaction data); *see also id.*, 15 U.S.C. § 78m(m) (2012) (requiring the same for security-based swap transaction data).

23. *FINRA's CARDS Plan Dead on Table: Axelrod*, THINK ADVISOR (Nov. 3, 2015), http://www.thinkadvisor.com/2015/11/03/finras-cards-plan-dead-on-table-axelrod.

24. FIN. INDUS. REGULATORY AUTH., REGULATORY NOTICE 13-42 COMPREHENSIVE AUTOMATED RISK DATA SYSTEM CONCEPT PROPOSAL (Dec. 2013) [hereinafter CARDS CONCEPT PROPOSAL]; *see also* FIN. INDUS. REGULATORY AUTH., REGULATORY NOTICE 14-37 COMPREHENSIVE AUTOMATED RISK DATA SYSTEM RULE PROPOSAL (Sept. 2014) [hereinafter CARDS RULE PROPOSAL].

25. Dodd-Frank, §§ 153(a), 154(b), 12 U.S.C. §§ 5343(a), 5344(b).

information with individual financial regulators, such as the SEC and the Commodity Futures Trading Commission (CFTC).[26]

C. DEVELOPING ANALYTIC TOOLS

Equipped with such information flows, regulators are launching several initiatives to automate analysis of the activities of issuers, markets, and intermediaries. The SEC's Accounting Quality Model (AQM) mines information from issuer filings to assess the degree to which "registrants' financial statements appear anomalous" in relation to firms within their industry and the accounting characteristics and approaches they share.[27] The Market Information Data Analytics System (MIDAS) collects and processes both public consolidated and proprietary feeds from equity markets, as well as information from related options and futures markets, to monitor and analyze market disruptions, reconstruct market events, and anticipate other trends in trading.[28] The CFTC likewise is currently developing a new electronic trade surveillance system to more efficiently process and analyze the trade data it collects.[29]

The SEC has also developed analytic tools to monitor the business conduct of registered securities intermediaries. The National Exam Analytics Tool (NEAT) systematically analyzes trading activity with a view to detecting insider trading, front running, improper investment allocations, and other kinds of fraudulent or unethical conduct.[30] FINRA's Securities Observation, News Analysis, and Regulation (SONAR) system similarly

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26. 12 U.S.C. § 5343(b)(1).

27. Craig M. Lewis, Chief Economist & Dir., Div. of Risk Strategy & Fin. Innnovation, U.S. Sec. & Exch. Comm'n, Speech before the Financial Executives International Committee on Finance and Information Technology: Risk Modeling at the SEC: The Accounting Quality Model (Dec. 13, 2012), http://www.sec.gov/News/Speech/Detail/Speech/1365171491988#.UxoXCPldWSo.

28. Information gathered by MIDAS and relevant studies of market activity are available at https://www.sec.gov/marketstructure/midas.html#.WCuNPWVNHww. *See, e.g.*, SEC v. One or More Unknown Traders in Sec. of Onyx Pharm., Inc., No. 13-CV-4645 JPO, 2014 WL 5026153, at *8 (S.D.N.Y. Sept. 29, 2014), *reconsideration denied sub nom*. SEC v. Jafar, No. 13-CV-4645 JPO, 2015 WL 3604228 (S.D.N.Y. June 8, 2015) (citing SEC's use of MIDAS to infer insider trading activity in the options market by unknown traders). The SEC has suggested that MIDAS could be further extended to include deeper and broader information beyond exchange data. *See* Kara M. Stein, Comm'r, U.S. Sec. & Exch. Comm'n, Remarks before the Securities Traders Association's 82nd Annual Market Structure Conference: Market Structure in the 21st Century: Bringing Light to the Dark (Sept. 30, 2015), https://www.sec.gov/news/speech/stein-market-structure.html (noting, in particular, the need to gather information such as firm attributions, participant IDs, and hidden orders in dark pools).

29. *See, e.g.*, U.S. COMMODITY FUTURES TRADING COMM'N, STRATEGIC PLAN FY 2011-2015 STRATEGY 1.1.1 11 (2011), http://www.cftc.gov/reports/strategicplan/2015/2015strategicplan0702.html (setting forth Commission's strategic goal of "develop[ing] automated surveillance systems to monitor market conditions and trader activity, and develop an alert and case management system to identify and track potential trading violations").

30. Mary Jo White, Chair, U.S. Sec. & Exch. Comm'n, Keynote Address before the 41st Annual Securities Regulation Institute: The SEC In 2014 (Jan. 27, 2014), https://www.sec.gov/News/Speech/Detail/Speech/1370540677500.

monitors for anomalous trading activity before major financial developments.[31] FINRA's CARDS proposal would have likewise "utiliz[ed] automated analytics on brokerage data to identify problematic sales practice activity," such as "churning, excessive commissions, pump and dump schemes, markups, [and] mutual fund switching."[32]

Beyond individual surveillance and enforcement tools, federal financial regulators actively tout a "reimagining" of the role of disclosures, information gathering, and analysis in financial markets.[33] Within the SEC, the Division of Economic and Risk Analysis (DERA) seeks "to integrate financial economics and rigorous data analytics into the core mission of the SEC," with a view to "promoting collaborative efforts throughout the agency and breaking through silos that might otherwise limit the impact of the agency's institutional expertise."[34] DERA is credited with developing many of the SEC's new analytic tools in collaboration with enforcement and surveillance programs in other divisions or offices.[35] Meanwhile, the OFR is undertaking the development of a suite of monitoring products to interpret developments in financial markets and identify vulnerabilities in the financial system.[36]

II. THE INEVITABILITY OF AUTOMATED SURVEILLANCE

The automated surveillance of financial markets—and automated compliance in financial firms—is overdue. Commentators have long

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31. Suzanne Barlyn, *Wall Street Regulator Tries Its Own Algorithm*, WALL ST. J. (Dec. 22, 2010, 4:02 PM), http://www.wsj.com/articles/SB10001424052748703814804576035950655394730.

32. CARDS CONCEPT PROPOSAL, *supra* note 24, at 2; *see also* CARDS RULE PROPOSAL, *supra* note 24.

33. *See, e.g.*, Rob Tricchinelli, *SEC Should Reimagine Disclosure, Stein Says*, BLOOMBERG BNA (May 16, 2016), http://news.bna.com/sdln/display/batch_print_display.adp?searchid=282.

34. *About the Division of Economic and Risk Analysis*, U.S. SEC. & EXC. COMM'N, https://www.sec.gov/dera/about (last visited June 30, 2016).

35. *See, e.g.*, Richard Hill, *SEC Economic Division Innovating Risk Models*, BLOOMBERG BNA (Feb. 19, 2016), http://news.bna.com/sdln/display/batch_print_display.adp?searchid=282 (describing DERA initiatives to integrate predictive analytics in its broker-dealer risk-assessment model, such as "topic modeling" to extract themes from corporate narrative disclosures); Memorandum from the Risk Strategy Fin. Innovation & Office of the Gen. Counsel to the Staff of the Rulewriting Divisions and Offices, U.S. Sec. & Exch. Comm'n 4 (Mar. 16, 2012) [hereinafter Best Practices Memorandum], https://www.sec.gov/divisions/riskfin/rsfi_guidance_econ_analy_secrulemaking.pdf (providing best practices for using DERA in SEC rulemaking); Press Release, U.S. Sec. & Exch. Comm'n, SEC Charges Multiple Hedge Fund Managers With Fraud in Inquiry Targeting Suspicious Investment Returns (Dec. 1, 2011), https://www.sec.gov/news/press/2011/2011-252.htm (outlining actions brought against hedge fund managers using DERA tools); Use of Derivatives by Registered Investment Companies and Business Development Companies, 80 Fed. Reg. 80,883, 80,892 (Dec. 28, 2015) (using data procured by DERA to create SEC rules); Press Release, U.S. Sec. & Exch. Comm'n, SEC Announces Creation of New Office Within its Division of Economic and Risk Analysis (Sept. 11, 2014), https://www.sec.gov/News/PressRelease/Detail/PressRelease/1370542914800 (outlining the traditional role and new responsibilities of DERA).

36. *See* OFFICE OF FIN. RESEARCH, 2015 ANNUAL REPORT TO CONGRESS 9–18 (2015) [hereinafter 2015 ANNUAL REPORT TO CONGRESS], https://financialresearch.gov/annual-reports/files/office-of-financial-research-annual-report-2015.pdf.

criticized Congress and federal market regulators for their reactive posture toward market regulation, particularly in contrast with federal banking regulators, who take a more collaborative (albeit resource-intensive) approach to monitoring the activities of financial firms.[37] Such critics have urged the SEC and other business-conduct regulators to marshal empirical analysis in order to identify marketplace risks for financial transactions and services and to focus on preventative measures, rather than rely on "regulation by enforcement" and its inevitable evidentiary and distributive implications.[38] Moreover, as regulatory requirements proliferate and the complexity of financial services deepens, automated surveillance may be the only effective means of performing the kind of oversight necessary to advance these goals.

A. THE NEED FOR REAL-TIME REGULATION

The chief virtue of automation is its ability to collect and process information in real time.[39] Automated surveillance can observe patterns of routing and execution behavior with a view to detecting and preventing violations, rather than assembling and interpreting information after the fact as part of a civil or administrative proceeding. Indeed, exchanges and other trading venues have long used automated technology to monitor their trading facilities both for operational and regulatory purposes.[40] As the number of trading venues has increased in recent years, trading activity that involves execution or routing across multiple venues has become increasingly difficult to monitor. Accordingly, regulators have adopted rules to standardize

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37. *See, e.g.*, Jonathan G. Katz, *Reviewing the SEC, Reinvigorating the SEC*, 71 U. PITT. L. REV. 489, 489–96 (2010) (noting the historical context of inadequate SEC surveillance); John I. Sanders, *Spoofing: A Proposal for Normalizing Divergent Securities and Commodities Futures Regimes*, 51 WAKE FOREST L. REV. 517, 528–29 (2016) (discussing the SEC's reliance on dated enforcement authority to combat modern issues in financial regulation); Nathaniel E. Sokol, *High Frequency Litigation: SEC Responses to High Frequency Trading as a Case Study in Misplaced Regulatory Priorities*, 17 COLUM. SCI. & TECH. L. REV. 402, 452–54 (2016) (discussing the "glacial pace" at which SEC advancements occur); Steven L. Schwarcz, *Regulating Financial Change: A Functional Approach*, 100 MINN. L. REV. 1441, 1441–42 (noting the misplaced priorities of the Dodd-Frank Act).

38. *See* Katz, *supra* note 37.

39. Of course, regulators have long experience with adapting regulatory methods to deal with advances in communications technology. *See, e.g.*, Markham, *supra* note 13, at 567–601 (discussing the history of the quest for technological advantages in financial markets).

40. The efficacy of SRO surveillance may nevertheless be bounded by jurisdictional limitations, commercial incentives to maximizing listing and trading volume revenue, and the conflicting interests of their members or principal trading participants. *See, e.g.*, Stavros Gadinis & Howell E. Jackson, *Markets as Regulators: A Survey*, 80 S. CAL. L. REV. 1239, 1243 (2007) (noting the limits of SRO independence); Ernest E. Bradway & Jonathan M. Busch, *Ending Securities Industry Self-Regulation as We Know It*, 57 RUTGERS L. REV. 1351, 1354–56 (2005) (offering examples of limitations placed on SRO independence); Marianne K. Smythe, *Government Supervised Self-Regulation in the Securities Industry and the Antitrust Laws: Suggestions for an Accommodation*, 62 N.C. L. REV. 475, 480–83 (1984) (discussing the limits placed on the SEC by the Securities Exchange Act).

monitoring and recordkeeping within individual markets, and to build marketwide surveillance systems that use standardized information to track trading activity across exchanges and other trading systems.[41]

Regulators have also shifted resources to real-time regulation as concerns mount over market disruptions, operational integrity, and systemic risk. Real-time monitoring of trading activity is critical to timely deploying of circuit breakers, calibrating trading facilities and proprietary market-making systems, and taking other prophylactic measures in the face of trading errors, algorithmic snafus, or temporary imbalances in supply or demand.[42] To anticipate market disruptions caused by systems failures and other threats to the operational stability and integrity of markets, regulators must also be able to identify weaknesses in communications of trading systems or contagion across markets.[43] To monitor financial stability, regulators must be able to gather and analyze information from an even broader range of sources in order to identify conditions that may forewarn economic shock or the cascading failure of institutions.[44]

As regulators heighten real-time monitoring, individual firms must follow through with real-time operational and compliance controls as well. Automated compliance controls can trigger the kind of warnings about market and credit risk that may escape the notice of human supervisors. For example, capital adequacy rules—which ensure that financially troubled firms may be liquidated in an orderly manner—generally apply on a "moment-to-moment" basis.[45] Similarly, liquidity provision by market makers is increasingly driven by algorithms that rely on real-time data.[46] Moreover, without real-time compliance systems, it would be difficult for firms and their correspondents to detect, prevent, and effectively remediate trading patterns that could not only result in intraday violations, but lead to potentially catastrophic consequences for the firm and the market.[47]

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41. DOMBALAGIAN, *supra* note 11, at 155–59.

42. U.S. COMMODITY FUTURES TRADING COMM'N & U.S. SEC. & EXCH. COMM'N, FINDINGS REGARDING THE MARKET EVENTS OF MAY 6, 2010: REPORT OF THE STAFFS OF THE CFTC AND SEC TO THE JOINT ADVISORY COMMITTEE ON EMERGING REGULATORY ISSUES 6–8 (2010) [hereinafter FLASH CRASH REPORT].

43. *See, e.g.*, Regulation Systems Compliance and Integrity, Exchange Act Release No. 69,077, 78 Fed. Reg. 18,084, 18,090–91 (Mar. 25, 2013).

44. *See, e.g.*, 2015 ANNUAL REPORT TO CONGRESS, *supra* note 36, at 9–12 (outlining the tools the OFR uses to monitor the markets).

45. *See* sources cited *infra* note 65; *see also* Net Capital Requirements for Brokers or Dealers, 17 C.F.R. § 240.15c3-1(a) (2016) (providing that "[e]very broker or dealer must at all times have and maintain" its minimum required net capital under the rule).

46. FLASH CRASH REPORT, *supra* note 42, at 39.

47. *See, e.g.*, Nathaniel Popper, *Knight Capital Says Trading Glitch Cost It $440 Million*, N.Y. TIMES (Aug. 2, 2012, 4:01 PM), http://dealbook.nytimes.com/2012/08/02/knight-capital-says-trading-mishap-cost-it-440-million/ (providing an overview of the effects of the Knight Capital crash); Jenny Strasburg & Jacob Bunge, *Loss Swamps Trading Firm*, WALL ST. J. (Aug. 2, 2012, 8:10 PM), http://www.wsj.com/articles/SB10000872396390443866404577564772083961412 (discussing the fallout of the Knight Capital crash).

B. A SHIFT IN EMPHASIS TO PROPHYLACTIC REGULATION

Several former SEC commissioners and officials have also questioned whether the current enforcement model of regulation serves the goal of investor protection.[48] Upholding standards of business conduct—such as suitability or fiduciary standards, order handling requirements, or guidance on markups and commissions—requires detailed supervision of customer accounts, communications, and proprietary trading activity.[49] Because securities regulators have lacked the financial resources to engage in ongoing supervision of firms, they have traditionally relied on civil and administrative proceedings, as well as private litigation and arbitration, to enforce their rules after the fact.[50] As a consequence, firms themselves have borne the expense of maintaining supervisory hierarchies and internal compliance controls to ensure adherence to business conduct standards.[51]

This "regulation by enforcement" model, however, has notable flaws. First, overreliance on after-the-fact enforcement, rather than prevention, may disproportionately affect smaller firms. Stavros Gadinis's study of broker-dealer enforcement actions prior to the recent financial crisis, for example, reinforces the perception that larger firms are much less likely than smaller firms to face enforcement actions, liability for individual principals and associated persons, and potent sanctions by virtue of their superior defensive resources.[52] Second, it may create perverse incentives for enforcement personnel. Urska Velikronja's study of securities enforcement actions

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48. *See, e.g.*, Harvey L. Pitt, *Bringing Financial Services Regulation into the Twenty-First Century*, 25 YALE J. ON REG. 315, 323 (2008) (arguing that "[i]t is more effective to induce compliance with law in the first instance than to utilize the club of enforcement after the fact to punish those who have violated the law"); Katz, *supra* note 37, at 500–10 (advocating the use of empirical analysis and "forward-looking" regulation in lieu of traditional enforcement approaches); Steven M.H. Wallman, *Commentary on Redesigning the SEC: Does the Treasury Have a Better Idea?*, 95 VA. L. REV. 825, 827 n.4 (2009) (observing that "too much of FINRA's effort focuses on enforcement that results in fine-generating activities that have only a modest connection to real investor protection").

49. The SEC traditionally has not enjoyed the authority to adopt ethical or business conduct standards for broker-dealers, certain registration, examination, and financial responsibility requirements. As a result, it has largely left that task to SROs, while adopting certain baseline standards of conduct through its antifraud enforcement authority. *See, e.g.*, Norman S. Poser, *Reflections on the Securities Broker as a Fiduciary*, 68 SMU L. REV. 845, 850 (2015). In recent years, however, Congress has expanded the SEC's authority in this regard. *See, e.g.*, Securities Exchange Act of 1934, (Exchange Act), Pub. L. No. 94-29, § 11, 89 Stat. 97 (1975) (codified as amended at 15 U.S.C. §§ 78o(k)(1), 80b-11(g) (2012)) (conferring authority to promulgate a uniform fiduciary standard for broker-dealers and investment advisers in connection with "personalized investment advice about securities to a retail customer").

50. Eric J. Pan, *Understanding Financial Regulation*, 2012 UTAH L. REV. 1897, 1941 (2012) (noting the effect of a lack of resources on regulatory decision making); *but see, e.g.*, John C. Coffee, Jr. & Hillary A. Sale, *Redesigning the SEC: Does The Treasury Have A Better Idea?*, 95 VA. L. REV. 707, 728–29 (2009) (attributing the SEC's strong tradition of enforcement to "higher level of individual ownership" and "deep-seated Populist skepticism of Wall Street").

51. Katz, *supra* note 37, at 510.

52. Stavros Gadinis, *The SEC and the Financial Industry: Evidence from Enforcement Against Broker-Dealers*, 67 BUS. LAW. 679, 701 (2012).

suggests that the SEC has increasingly sought to plump its enforcement statistics by "double- or triple-count[ing]" enforcement violations, inflating penalties, and favoring "easier-to-prosecute strict-liability violations."[53] FINRA's disciplinary actions display similar trends.[54]

By contrast, an automated system of regulatory supervision—coupled with more flexible use of cease-and-desist tools—may ensure more uniform application of rules. SEC and SRO examinations often focus on selected priorities—in the form of "sweep exams" targeted at specific conduct or relating to a specific rule[55]—while relying on relatively infrequent examinations, self-reporting by firms, and tips for more routine matters. Moreover, even when violations are established, the time and resources necessary to investigate and litigate a criminal, civil, or disciplinary proceeding may frustrate efforts to remediate investor harm.[56]

Perhaps most importantly, the securities industry and the federal courts have forced securities regulators toward a more data-driven approach to prophylactic regulation.[57] In recent years, industry advocates have persuaded the U.S. Court of Appeals for the D.C. Circuit to impose the equivalent of a cost-benefit analysis on SEC and CFTC rulemaking.[58] Having challenged the

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53. Urska Velikonja, *Reporting Agency Performance: Behind the SEC's Enforcement Statistics*, 101 CORNELL L. REV. 901, 933–39 (2016).

54. Jean Eaglesham, *Finra Weighs Tougher Stance*, WALL ST. J. (June 19, 2014, 10:56 PM), http://www.wsj.com/articles/wall-street-watchdog-finra-under-pressure-to-toughen-sanctions-1403219509 (discussing the disparity between FINRA enforcement actions and the total sanctions as a result of those actions).

55. Bruce M. Bettigole & Shanyn L. Gillespie, *"Defending Clients in Financial Regulatory Authority Investigations,"* § 10:8, *in* DANIEL J. FETTERMAN AND MARK P. GOODMAN, DEFENDING CORPORATIONS AND INDIVIDUALS IN GOVERNMENT INVESTIGATIONS (2014-2015) (discussing the use of sweeps in FINRA investigations); *see, e.g.*, U.S. SEC. & EXCH. COMM'N, OFFICE OF COMPLIANCE INSPECTIONS & EXAMINATIONS, EXAMINATION PRIORITIES FOR 2016, https://www.sec.gov/about/offices/ocie/national-examination-program-priorities-2016.pdf; Letter from Richard G. Ketchum, Chairman & Chief Exec. Officer, Fin. Indus. Regulatory Auth., 2016 Regulatory and Examination Priorities Letter (Jan. 5, 2016), http://www.finra.org/industry/2016-regulatory-and-examination-priorities-letter. *See also* Urska Velikonja, *Politics in Securities Enforcement*, 50 GA. L. REV. 17, 31 (2015) (discussing the SEC's use of sweep exams).

56. *See, e.g.*, U.S. SEC. & EXCH. COMM'N, OFFICE OF INVESTIGATIONS, INVESTIGATION OF FAILURE OF THE SEC TO UNCOVER BERNARD MADOFF'S PONZI SCHEME NO. OIG-509 (2009), https://www.sec.gov/news/studies/2009/oig-509.pdf; U.S. SEC. & EXCH. COMM'N, OFFICE OF THE INSPECTOR GENERAL, INVESTIGATION OF THE SEC'S RESPONSE TO CONCERNS REGARDING ROBERT ALLEN STANFORD'S ALLEGED PONZI SCHEME NO. OIG-526 (2010), http://www.sec.gov/news/studies/2010/oig-526.pdf.

57. *See* Alan Schwartz, *Regulating for Rationality*, 67 STAN. L. REV. 1373, 1409–10 (2015) (arguing that regulators ought to seek "evidence of how actual consumers behave"—such as "survey data, field tests, or experiments"—when attempting to distinguish "rational from irrational contracting choices" through regulation).

58. *See, e.g.*, Am. Equity Inv. Life Ins. Co. v. SEC, 613 F.3d 166, 178–79 (D.C. Cir. 2010) (holding the SEC's analysis of the effect of a proposed rule on efficiency, competition, and capital formation was arbitrary and capricious); Chamber of Commerce v. SEC, 412 F.3d 133, 144–45 (D.C. Cir. 2005) (holding the SEC failed to adequately consider the costs of proposed legislation); Bus. Roundtable v. SEC, 647 F.3d 1144, 1150 (D.C. Cir. 2011) (holding the SEC framed the cost-benefit analysis of a proposed rule inconsistently and failed to adequately quantify costs). In the

SEC to make an empirical case for regulatory initiatives, the industry has all but invited the SEC and FINRA to deploy data-gathering and analytic tools to monitor issuer disclosure, account management, and trading practices.[59] Moreover, once these troves of data are available, regulators can mine them to detect, prevent, and sanction violations of rules otherwise rarely enforced or difficult to enforce.[60]

As a result, firms must also invest in technological approaches to deter or detect potential violations, in order to avoid triggering federal or SRO monitoring systems. For example, various financial institutions already use surveillance software to monitor the message traffic of their traders for purposes of detecting potentially unlawful trading activity.[61] Such systems may eventually evolve "to monitor all employee behavior [and] catch breaches of conduct rules."[62] Such systems of course remain in their infancy; compliance and supervisory personnel must still sift through flagged documents and exception reports to sort out false positives. Nevertheless, the effective integration of such compliance tools into human supervisory activity is unavoidable.

C. EXPANDING SCOPE AND COMPLEXITY OF COMPLIANCE OBLIGATIONS

The proliferation and increasing complexity of compliance mandates also require increasing automation of core compliance functions. Industry studies of the cost of compliance often lament the incremental costs of additional reporting, recordkeeping, and other internal controls imposed on public companies, their auditors, and securities intermediaries in the wake of successive scandals.[63] Dodd-Frank has only intensified this pressure by

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wake of these challenges, the SEC has adopted guidelines for cost-benefit analysis. *See* Best Practices Memorandum, *supra* note 35.

59. *See, e.g.*, Joshua T. White, *The Evolving Role of Economic Analysis in SEC Rulemaking*, 50 GA. L. REV. 293, 320–22 (2015) (detailing DERA's economic analysis of the SEC's risk retention regulatory proposal).

60. *See, e.g.*, Consolidated Audit Trail, Exchange Act Release No. 67,457, 77 Fed. Reg. 45,722, 45,737 n.127 (Aug. 1, 2012) (codified at 17 C.F.R. pt. 242) (noting concerns of commenters "about the costs of implementing a consolidated audit trail relative to the benefits to be gained," particularly insofar as it could be designed to detect violations such as frontrunning, spoofing, and layering).

61. John Detrixhe, *Robots Reading Trader Chats to Stop Next Wave of Bank Fines*, BLOOMBERG TECH. (Feb. 23, 2016, 9:04 AM), http://www.bloomberg.com/news/articles/2016-02-23/robots-are-reading-trader-chats-to-stop-next-wave-of-bank-fines.

62. *See, e.g.*, Jeffrey Voegeli, *Credit Suisse, CIA-Funded Palantir to Target Rogue Bankers*, BLOOMBERG, (Mar. 22, 2016, 12:15 PM), https://www.bloomberg.com/news/articles/2016-03-22/credit-suisse-cia-funded-palantir-build-joint-compliance-firm (discussing Signac, a Credit Suisse joint venture focused on detecting unauthorized trading within the firm).

63. *See, e.g.*, SIA 2006 STUDY, *supra* note 5, at 5–7; Susan Lorde Martin, *Compliance Officers: More Jobs, More Responsibility, More Liability*, 29 NOTRE DAME J.L. ETHICS & PUB. POL'Y 169, 181–83 (2015) (discussing the drastic increase in size of corporate compliance departments in the financial services industry); U.S. House of Representatives Comm. Fin. Servs., *Dodd-Frank Burden Tracker* (2016), http://financialservices.house.gov/uploadedfiles/dodd-frank_pra_spreadsheet_7-9-2012.pdf [hereinafter *Dodd-Frank Burden Tracker*] (providing data on the amount of hours of labor

introducing punishing new workloads for both regulators and compliance personnel.[64]

At the same time, the disintermediation and fragmentation of financial markets will compound the need for business and compliance personnel to scale up their diligence obligations. Gone are the days when broker-dealers satisfied their best-execution obligations by collecting three quotations: when margin requirements were calculated on the basis of simple trading strategies, when credit risk was determined based on nationally recognized statistical rating organization (NRSRO) ratings, or when market making consisted of posting continuous two-sided quotes. Today, rules and standards for the conduct of financial services are increasingly defined by algorithms that monitor order-execution conditions, portfolio valuation, creditworthiness of issuers, and market liquidity.[65]

As standards of care and loyalty are heightened, moreover, "fair dealing" in complex financial transactions may require disclosures and other communications that are increasingly user-driven.[66] For example, dealers and major participants in certain swap transactions must provide counterparties with scenario analyses describing the performance of certain bilateral swaps on request.[67] More ambitiously, the SEC proposed (but did not adopt) a requirement for sponsors of asset-backed securities offerings to "file," as part

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needed to meet the requirements imposed by Dodd-Frank); *see also* Mary Jo White, Chair, U.S. Sec. & Exch. Comm'n, Public Statement: Implementing the Dodd-Frank Wall Street Reform and Consumer Protection Act (July 16, 2015), https://www.sec.gov/spotlight/dodd-frank.shtml (reporting progress on rulemaking, studies, and other actions required of the SEC under the Act).

64. *Dodd-Frank Burden Tracker*, *supra* note 63 (providing data on the burdens imposed by Dodd-Frank).

65. *See, e.g.*, Stanislav Dolgopolov, *Wholesaling Best Execution: How Entangled Are Off-Exchange Market Makers?*, VA. L. & BUS. REV. (forthcoming 2016) (discussing best-execution practices of market-makers); Removal of Certain References to Credit Ratings Under the Securities Exchange Act of 1934, Exchange Act Release No. 71,194, 79 Fed. Reg. 1522, 1526–1527 (Jan. 8, 2014) (codified at 17 C.F.R. pts. 240, 249) (noting that "moment-to-moment" net capital compliance requires firms to adopt credit analysis processes "designed to ensure that its credit determinations are current, and address the frequency with which the broker-dealer reviews and reassesses its credit determinations").

66. Exchange Act, Pub. L. No. 94-29, § 11, 89 Stat. 97 (1975) (codified as amended at 15 U.S.C. § 78o-10 (2012)); 7 U.S.C. § 6s; *see also* Gregory Scopino, *Regulating Fairness: The Dodd-Frank Act's Fair Dealing Requirement for Swap Dealers and Major Swap Participants*, 93 NEB. L. REV. 31, 39 (2014) (offering an "in-depth analysis of the Dodd-Frank Act's fair dealing mandate for swap entities").

67. Commodity Futures Trading Commission, 77 Fed. Reg. 9822 (2012) (codified at 17 C.F.R. § 23.431 (2016)) (requiring CFTC-regulated swap dealers to provide a scenario analysis, upon request, to certain counterparties prior to entering into swaps not available for trading on an exchange or swap execution facility). The SEC has not adopted a requirement that security-based swap professionals provide a scenario analysis to counterparties on request as part of their obligation "to disclose the material risks and characteristics of the particular security-based swap" under Exchange Act Rule 15Fh–3(b)(1). 17 C.F.R. § 240.15Fh-3(b)(1). Nevertheless, the SEC has observed that nothing prohibits a counterparty from requesting such an analysis. Business Conduct Standards for Security-Based Swap Dealers and Major Security-Based Swap Participants, Exchange Act Release No. 77,617, 81 Fed. Reg. 29,960, 29,983–85 (May 13, 2016) (codified at 17 C.F.R. pt. 240).

of the registration statement, a waterfall computer program to facilitate analysis of the flow of funds.[68] To satisfy these standards, firms must develop tools to generate disclosures and responses to requests for information on demand.

III. STRIKING THE BALANCE

While the business imperative for automating compliance and supervisory functions may be clear, human beings cannot be entirely removed from the equation. As long as investing remains "an emotional process"—in which human beings provide investors with the "comfort and encouragement" necessary to embark upon and maintain a financial plan that meets important life events[69]—only human beings can anticipate and develop strategies to prevent exploitation of the cognitive biases that pervade human decision-making.[70] Firms, however, are not insensitive to the advantages of further automating compliance; personnel costs consume the vast majority of compliance budgets despite increases in information technology and other capital expenditures.[71] More importantly, business personnel lament that they spend a significant share of their time dealing with supervisory and compliance issues, when they would rather be developing new business.[72]

Investing further resources in technology, however, comes with drawbacks of its own. Excessive reliance on automated compliance systems may result in undue homogenization and sterilization of compliance practices across firms and could impair responsiveness to emerging threats. Automation of external surveillance and internal compliance also requires compliance and business personnel to make hard choices about how information is collected, maintained, and shared. From a cultural perspective, automated surveillance also threatens to erode much of the effort by regulators and firms to inculcate a culture of compliance among rank-and-file employees.

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68. Asset-Backed Securities, Securities Act Release No. 9117, 75 Fed. Reg. 23,328 (May 3, 2010) (codified at 17 C.F.R. pts. 200, 229, 230, 232, 239, 240, 243, 249) (proposing release). Such a program would have provided users with the "ability to programmatically input the user's own assumptions regarding the future performance and cash flows from the pool assets, including but not limited to assumptions about future interest rates, default rates, prepayment speeds, loss-given-default rates, and any other necessary assumptions" in order to generate, as output, the resulting cash flows under those assumptions. *Id.* at 23,378.

69. Andrew W. Lo, *Imagine if Robo Advisers Could Do Emotions*, WALL ST. J. THE EXPERTS (June 6, 2016, 6:15 AM), http://blogs.wsj.com/experts/2016/06/06/the-one-ability-robo-advisers-are-still-missing/.

70. 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) (discussing these cognitive biases).

71. SIA 2006 STUDY, *supra* note 5, at 29.

72. *Id.* at 30.

A. HOMOGENIZATION OF COMPLIANCE PRACTICES

One of the principal risks of automated surveillance is that it will result in an unhealthy homogeneity in compliance practices across firms. To the extent that compliance systems must be built to meet the specifications established by regulators or industry standards, automated surveillance and compliance practices run the risk of one-size-fits-all monitoring that fails to take into account the scale or size of a firm's operations or trading activity. Because automation may thereby frustrate the discretion of compliance personnel to "act on their own judgments of what ought to be done," the functional limitation of automated systems may come to be viewed as a normative limitation on the role of compliance.[73]

For example, the SEC's dissemination standards will constrain the manner in which issuer disclosures are produced and the related responsibilities of capital markets professionals and participants. XBRL tagging may enable professional traders, retail investors, and regulators to manipulate information more cheaply and effectively. At the same time, though, if institutional investors and analysts displace traditional comparable company analysis with automated strategies, XBRL formatting standards will effectively dictate how issuer information is parsed. For example, issuers' flexibility to exploit the innate extensibility of XBRL tagging might either facilitate or frustrate comparability, depending on the range of adequate, affordable, and customized software products and the SEC's efforts at monitoring, cataloging, and guiding extension use.[74]

Similarly, automation may not mesh well with ongoing efforts to heighten normative standards of conduct if regulators and compliance personnel try to mimic the application of standards with excessively granular data points or rules.[75] Automated systems still lack the intuition to identify what information is required to achieve the best outcome for a customer and

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73. Roger Brownsword, *Lost in Translation: Legality, Regulatory Margins, and Technological Management*, 26 BERKELEY TECH. L.J. 1321, 1324 (2011) (noting that in a shift "from a traditional legal order to a technologically managed order," the semantics of "ought and ought not becomes can and cannot").

74. Interactive Data to Improve Financial Reporting, Securities Act Release No. 9002, 74 Fed. Reg. 6776, 6783–84 (Feb. 10, 2009) (codified at 17 C.F.R. pts. 229, 230, 232, 239, 240, 249); *see also* Letter from the Disclosure Effectiveness Working Grp. of the Fed. Regulation of Sec. Comm. and the Law & Accounting Comm. of the Am. Bar Ass'n to the U.S. Sec. & Exch. Comm'n 3 (Feb. 15, 2016) (noting issuers' concerns regarding the time-consuming XBRL tagging process "versus its perceived utility for investors"). Commenters expressed similar reservations about locking in the use of a particular technical standards or programming in connection with the SEC's proposal to mandate Python under Regulation AB in light of the upfront cost of implementation and the uncertainty as to their utility. Asset-Backed Securities Disclosure and Registration, Securities Act Release No. 9638, 79 Fed. Reg. 57,184, 57,191 (Sept. 24, 2014) (codified at 17 C.F.R. pts. 229, 230, 232, 239, 240, 243, 249) (adopting release) (noting decision not to adopt this requirement).

75. For example, it is not difficult to imagine an automated protocol for comparing information about a customer's financial situation and stated preferences against a schedule of investments marketed by the firm to evaluate whether the sales representative has complied with a suitability requirement.

how to extract it. Such weaknesses are compounded when regulators seek to define by rule the customer-level or transaction-level data to be captured by compliance systems,[76] and thereby eliminate the flexibility of firms to experiment with competing implementations of suitability standards.

B. STERILIZATION OF COMPLIANCE PRACTICES

Once implemented, it may be difficult to upgrade automated surveillance or compliance systems on a regular basis to reflect changing market practices or conditions. Regulators, of course, take pains to disavow any kind of predictability with respect to regulatory standards; stress tests, circuit breakers, operational war games, and algorithms that search for anomalous market behavior must constantly be recalibrated to avoid reverse-engineering by regulated entities.[77] Moreover, even if materiality or fiduciary standards are primarily enforced through algorithmic detection, regulators reflexively reaffirm that such standards cannot be defined by quantitative means alone.[78] Enforcement personnel will continue to rely on customer complaints, whistleblowers, tips from competitors, and other sources of information to bring novel or unusual claims.

Not all firms, however, can replicate the resources or network of information available to regulators or larger firms. As a result, they remain at the mercy of the systems they can afford. Because of the frequent rush of mandates and implementation timeframes, firms may deploy new surveillance software without fully considering how to integrate it into their supervisory and business practices.[79] For smaller firms in particular, off-the-shelf third-party software may be the only way to adapt to new and complex regulatory requirements; compliance personnel thus may become minders rather than developers of automated systems and fail to appreciate how compliance mandates may affect their systems.[80] Moreover, because third-party software vendors are not necessarily responsible to regulators for the

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76. *See, e.g.*, 17 C.F.R. § 229.1125(d)–(e) (2016) (enumerating asset-level data points related to the property and to the obligor associated with mortgages underlying mortgage-backed securities); *see also* CARDS RULE PROPOSAL, *supra* note 24, at 9.

77. *See, e.g.*, Mehrsa Baradaran, *Regulation by Hypothetical*, 67 VAND. L. REV. 1247, 1283–88 (2014) (discussing the design and implementation of stress testing by bank regulators under Dodd-Frank); Bradley Hope & Dan Strumpf, *The Problem with Circuit Breakers*, WALL ST. J. (Jan. 7, 2016, 5:26 PM), http://www.wsj.com/articles/the-problem-with-circuit-breakers-1452205576 (discussing the design and implementation of circuit breakers).

78. Staff Accounting Bulletin No. 99, 64 Fed. Reg. 45,150, 45,151 (Aug. 19, 1999) (codified at 17 C.F.R. pt. 211) (reminding issuers and auditors that "exclusive reliance on [a 5%] or any percentage or numerical threshold" for materiality determinations "has no basis in the accounting literature or the law").

79. David Tilkin, *The Landscape of Broker-Dealer Compliance and Exception Reporting Systems*, 17 PIABA B.J. 65 (2010).

80. *See, e.g.*, FIN. INDUS. REGULATORY AUTHORITY, REGULATORY NOTICE 11-14 THIRD PARTY SERVICE PROVIDERS (March 2011) (requiring comment on proposed rule to clarify the scope of a firm's obligations and supervisory responsibilities for functions or activities outsourced to a third-party service provider).

quality of their product, there is a risk that compliance software may be ill-adapted to the needs of individual firms.[81]

There is also a risk that firms will pare down financial services as necessary to automate judgment, rather than adapt systems to accommodate product or service innovation. "Best interest" standards may be difficult to implement through automated systems that are not able to intuit conflicts of interest beyond their programming. As a result, firms may prefer (rightly or wrongly) to confine sales to a limited range of products that pose no conflicts rather than to encourage thoughtful advice.[82] Some "fintech" firms may seek to avoid broker-dealer or investment-adviser registration altogether by designing systems that provide limited ministerial services—leaving investors to their own devices to use them judiciously.[83]

C. OVERCOMING AUTOMATION ANXIETY

Automated trading and compliance may heighten the anxiety supervisory and compliance personnel already experience in anticipating and preventing regulatory violations. Legal and ethical commentators regularly debate the implications of ceding agency to algorithms and whether automated agents are legally competent to engage in such conduct,[84] particularly when automated agents cannot be held "responsible" for transcending their programming or for design flaws that imperil the viability of the firms that use them.[85] As with other front-line agents, the law therefore places a burden of supervision on specific human agents within the corporate hierarchy.[86] As a result, supervisory and compliance personnel may be held increasingly liable for failures to detect and prevent algorithmic malfeasance or misfeasance.

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81. *See, e.g.*, Michael Scott, *Tort Liability for Vendors of Insecure Software: Has the Time Finally Come?*, 67 MD. L. REV. 425, 428 (2008) (discussing strategies used by vendors to avoid tort liability for insecure or defective software).

82. For example, brokerage and advisory firms may increasingly waive 12b-1 fees for mutual fund sales to comply with "best interests" standards. Jason Zweig, *Mutual Fund Fees: A Bad Incentive Fades Away*, WALL ST. J. (Feb. 26, 2016, 10:25 AM), http://blogs.wsj.com/moneybeat/2016/02/26/mutual-fund-fees-a-bad-incentive-fades-away/.

83. *See, e.g.*, Robert Rosenblum et al., *5 of the Most Critical Securities Law Questions Facing FinTech Companies*, BLOOMBERG BNA (Mar. 23, 2016), https://www.wsgr.com/PDFSearch/fintech-0316.pdf.

84. *See, e.g.*, Lawrence B. Solum, *Legal Personhood for Artificial Intelligences*, 70 N.C. L. REV. 1231, 1245 (1992) (analyzing difficulty in holding artificial intelligences morally responsible).

85. *See, e.g.*, Yadav, *supra* note 13, at 1668; Dan Olds, *How One Bad Algorithm Cost Traders $440 M*, THE REGISTER (Aug. 3, 2012, 9:32), http://www.theregister.co.uk/2012/08/03/bad_algorithm_lost_440_million_dollars/.

86. 15 U.S.C. § 78o(b)(4)(E) (2012) (authorizing the SEC to sanction any person who "has failed reasonably to supervise . . . another person who commits" a violation of federal securities law); FINRA RULE 3110 (requiring member firms to "establish and maintain a system to supervise the activities of each associated person that is reasonably designed to achieve compliance with applicable securities laws and regulations, and with applicable FINRA rules").

1. Internal Threats

Traders and their supervisors may find it difficult to develop and maintain human intuition in trading as order routing and execution decisions are increasingly made by algorithms. As trading decisions are automated, price discovery increasingly takes place within a very short window surrounding periodic and episodic disclosures that is only accessible to technologically well-equipped investors.[87] Some have already expressed concern that, as a result of the proliferation of trading algorithms, traders are "gradually los[ing] the instincts and tacit knowledge developed in floor-based trading."[88] Such knowledge nevertheless becomes critical when automated systems require human intervention to resume normal operation after market disruption—a process that can take from "as short as a few seconds to as long as several hours" for human beings to detect, assess, and unravel.[89]

Compliance personnel are by definition even further removed from the business of trading and therefore need to take extra care to understand and evaluate the effectiveness of automated compliance programs in the face of both routine and novel trading strategies. Human traders and their supervisors may erroneously believe that automated compliance systems ensure full compliance with business conduct standards, thereby relieving them of the obligation to verify compliance independently.[90] Reflexive reliance on automated trading and monitoring may thus allow errors in programming or

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87. Joung W. Kim et al., *The Effect of Mandatory XBRL Reporting across the Financial Information Environment: Evidence in the First Waves of Mandated U.S. Filers*, J. INFO. SYS., Spring 2012, at 127 (finding "an increase in information efficiency, a decrease in event return volatility, and a reduction of change in stock returns volatility" in the post-XBRL disclosure of sampled firms); Elizabeth Blankespoor et al., *Initial Evidence on the Market Impact of the XBRL Mandate*, 20 REV. ACCT. STUDS. 1468, 1471 (2015) (finding wider abnormal bid–ask spreads, a reduction in abnormal liquidity, and a decrease in abnormal trading volume, particularly for small trades, in the market immediately following the introduction of XBRL tagging and concluding that these developments may reflect retail investors' heightened fears of adverse selection).

88. GOV'T OFFICE FOR SCI., LONDON, FORESIGHT: THE FUTURE OF COMPUTER TRADING IN FINANCIAL MARKETS 83 (2012) [hereinafter FUTURE OF COMPUTER TRADING], http://www.cftc.gov/idc/groups/public/@aboutcftc/documents/file/tacfuturecomputertrading1012.pdf.

89. *Id.* at 38.

90. *See, e.g.*, *In re* Goldman Sachs & Co., Exchange Act Release No. 76,899, 2016 WL 159331 (Jan. 14, 2016) (imposing remedial sanctions and a cease-and-desist order against respondent firm on the grounds that Goldman securities lending desk personnel used a faulty "fill from autolocate" function to handle approximately 98% of "locate" requests under Regulation SHO, relying "on their general belief that Goldman's automated model was conservative," without "check[ing] alternative sources of securities or perform[ing] a meaningful further review"); FINRA Letter of Acceptance, Waiver and Consent, Metlife Securities Inc., No. 2014040870001 (May 3, 2016) (consenting to sanctions for supervisory failures associated with the understatement of death benefits in connection with tens of thousands of hypothetical variable annuity replacement transaction disclosures due to a faulty calculation function that had not been tested for 12 years); Aruna Viswanatha et al., *Wall Street Firms under Investigation for Treatment of Retail Investors*, WALL ST. J. (May 10, 2016, 7:02 PM), http://www.wsj.com/articles/wall-street-firms-under-investigation-for-treatment-of-retail-investors-1462906454 (discussing federal and New York state criminal investigations into the order handling practices of retail orders by electronic market makers).

inputs to generate thousands of violations before detection.[91] In these cases, firms may be charged with violating their obligation to implement or administer compliance programs.[92]

A similar concern may arise with respect to the automation of diligence. The financial science behind some products or trading strategies may not be sufficiently developed for parties or regulators to appreciate and manage the variety of known and unknown risks entailed.[93] Humans may come to rely excessively on models—particularly when such models serve a particular business strategy—despite their known weaknesses, simplifying assumptions, and limited track records.[94] Contextual disclosures may also become increasingly irrelevant in a world of automated analysis.[95] Moreover, financial products with untested structures may pose legal risks and agency costs. Complex legal and accounting structures, for example, exacerbate the

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91. *See, e.g.*, *In re* AXA Rosenberg Grp. LLC et al., Securities Act Release No. 9181, Investment Advisers Act Release No. 3149, Investment Company Act Release No. 29,574, 2011 WL 334789 (Feb. 3, 2011) (censuring the firm and several affiliates after the firm delayed disclosure and failed to accurately account for a material error in computer code used in its quantitative investment model for managing client accounts); *In re* Citigroup Glob. Mkts., Inc., Exchange Act Release No. 75,729, Investment Advisers Act Release No. 4178, 2015 WL 4931787 (Aug. 19, 2015) (censuring the firm because its automated trade review processes failed to monitor certain principal trades and therefore failed to enforce rules against principal trading with advisory clients); *see also In re* Barclays Capital Inc., Exchange Act Release No. 73,183, Investment Advisers Act Release No. 3929, 2014 WL 4702595 (Sept. 23, 2014); *see* Jeffrey S. Puretz & Kimberly A. Church, *Compliance Rules as a New Enforcement Regime*, ALI-CLE Course Materials (SX003 ALI-CLE 159) (2015) (discussing these and other recent cases brought under the SEC's new Compliance Rule for investment advisers).

92. *See, e.g.*, 17 C.F.R. § 270.38a-1 (2016) (requiring registered investment companies to adopt certain compliance practices); Puretz & Church, *supra* note 91 (discussing the application of Rule 38a-1 to the cases discussed in note 91 supra).

93. FINRA has adopted a registration requirement for algorithmic developers with a view to ensuring jurisdiction over "associated persons that possesses knowledge of, and responsibility for, both the design of the intended trading strategy and the technological implementation of the strategy, sufficient to evaluate whether the resulting product is designed to achieve regulatory compliance in addition to business objectives." Order Approving Proposed Rule Change to Require Registration as Securities Traders of Associated Persons, Exchange Act Release No. 77,551, 81 Fed. Reg. 21,914, 21,914–16 (Apr. 13, 2016) (approving rule change requiring registration as "securities traders" of "associated persons who are (i) primarily responsible for the design, development or significant modification of algorithmic trading strategies, or (ii) responsible for the day-to-day supervision or direction of such activities"). Regulation Automated Trading, 80 Fed. Reg. 78,824, 78,847–48 (Dec. 17, 2015) (to be codified at 17 C.F.R. pts. 1, 38, 40) (proposing to require certain algorithmic traders to maintain "a source code repository to manage source code access, persistence, copies of production code, and changes to production code").

94. 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, 180 (2009) (citing evidence that risk and pricing models are often selected "to justify predetermined business strategies" rather than "based on their accuracy in measuring risk").

95. Accountants and regulators, for example, must consider how to assess the material accuracy of line item disclosures severed from the footnotes and other narrative discussion that qualify their presentation. *See, e.g.*, Jon Bartley et al., *A Comparison of XBRL Filings to Corporate 10-Ks—Evidence from the Voluntary Filing Program*, ACCT. HORIZONS, June 2011, at 232; J. Efrim Boritz & Won Gyun No, *The SEC's XBRL Voluntary Filing Program on EDGAR: A Case for Quality Assurance*, CURRENT ISSUES IN AUDITING, Dec. 2008, at A4.

cost of monitoring or insuring against the failure of intermediaries in the production chain.[96]

2. External Threats

The interaction of trading systems across firms can also pose undetectable threats to the stability of financial markets. Virtually all market centers and trading systems have responded to concerns about the impact of automated trading by fine-tuning circuit breakers and other types of trading pauses or trading halts to manage periods of high volatility.[97] Policy makers nevertheless struggle to develop protocols for uniform imposition of circuit breakers across jurisdictions and across related financial products, particularly when benchmarks or other triggers are vulnerable to manipulation.[98] Moreover, trading halts can trap investors in unwanted, unhedged positions, thus forcing traders to liquidate unrelated positions and spreading the impact of the event to otherwise unrelated markets.[99]

Efforts by individual firms to protect themselves or their clients against such external threats—for example, by adopting "kill switches" or other devices to shut off trading activity—may nevertheless result in cascading market disruptions.[100] For example, the trading and compliance systems of proprietary trading firms continuously screen market information for large,

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96. *See, e.g.*, Henry T.C. Hu, *Misunderstood Derivatives: The Causes of Informational Failure and the Promise of Regulatory Incrementalism*, 102 YALE L.J. 1457, 1492 (1993); Frank Partnoy & David A. Skeel, Jr., *The Promise and Perils of Credit Derivatives*, 75 U. CIN. L. REV. 1019, 1032 (2007); INST. OF INT'L FIN., FINAL REPORT OF THE IIF COMMITTEE ON MARKET BASED PRACTICES: PRINCIPLES OF CONDUCT AND BEST PRACTICE RECOMMENDATIONS 49–50, A1–A3 (2008) (describing the agency cost problems inherent in the "originate-to-distribute" model of mortgage underwriting).

97. Following the Flash Crash, the SEC approved proposed rule changes by the exchanges and FINRA that modified existing circuit breaker procedures related to market-wide trading halts and instituted a new "limit up–limit down" mechanism to address market volatility. *See, e.g.*, Order Granting Accelerated Approval of Proposed Rule Changes as Modified by Amendments No. 1, Relating to Trading Halts Due to Extraordinary Market Volatility, Exchange Act Release No. 67,090, 77 Fed. Reg. 33,531 (June 6, 2012); *see also* Concept Release on Risk Controls and System Safeguards for Automated Trading Environments, 78 Fed. Reg. 56,542, 56,547 (Sept. 12, 2013) (codifed at 17 C.F.R. ch. I).

98. *See, e.g.*, Nina Mehta, *NYSE Plans to End LRP Curbs as New Circuit Breakers Enacted*, BLOOMBERG NEWS (Apr. 2, 2013, 7:21 PM), http://www.bloomberg.com/news/articles/2013-04-02/nyse-plans-to-end-lrp-curbs-before-new-circuit-breakers-enacted (noting the NYSE's objections to eliminating its systems to slow trading at designated "liquidity replenishment points" so as not to interfere with intermarket circuit breakers). Benchmark-triggered circuit breakers can lead traders to trade more aggressively in anticipation of a halt or to trade unrelated instruments in the wake of a halt, which would jeopardize the integrity of the benchmark itself. For this reason some exchanges do not disclose the trigger points at which circuit breakers intervene. *Id.*

99. FUTURE OF COMPUTER TRADING, *supra* note 88, at 103–05.

100. Concept Release on Risk Controls and System Safeguards for Automated Trading Environments, 78 Fed. Reg. at 56,557. The interaction of such mechanisms could nevertheless pose unanticipated problems.

rapid price moves or discrepancies among multiple data sources.[101] In response to negative signals, their systems may trigger automated stops or "data-integrity pauses" to protect against the risk of ex-post cancellation of erroneous orders.[102] Such acts in the name of self-preservation may nevertheless contribute to marketwide imbalances.

The SEC's Regulation Systems Compliance and Integrity (Regulation SCI) has begun the process of formalizing security, capacity, and integrity rules for exchanges, alternative trading systems, and clearing facilities.[103] Among other provisions, Regulation SCI requires "SCI entities" to establish written policies and procedures reasonably designed to ensure that their systems maintain adequate levels of "capacity, integrity, resiliency, availability and security,"[104] and to take corrective action (including notice to the SEC and to the public) for certain events, such as systems disruptions, compliance issues, and intrusions.[105] These initiatives—and similar initiatives by FINRA and other SROs—will over time undoubtedly require compliance personnel to play a more active role in identifying inter-firm and market-wide threats to such facilities.[106]

D. CHALLENGES OF INFORMATION MANAGEMENT

Compliance personnel are also increasingly responsible for managing the collection and management of proprietary and customer information. As discussed above,[107] automated surveillance and new disclosure technologies rely extensively on structured information. Consequently, regulators have taken significant steps to standardize the format, as well as the content, of information maintained or reported by firms. Compliance personnel, however, must develop further strategies for managing information beyond specific regulatory standards, structured or otherwise, for purposes of maintaining internal compliance controls as well as to respond effectively to regulatory investigations.

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101. These might include, for example, discrepancies between last-sale data from individual exchanges, alternative trading systems, and other market centers and last-sale data reported through the consolidated feed. FLASH CRASH REPORT, *supra* note 42, at 36–37.

102. For example, high-volume trading can create the perception of deep liquidity in a financial instrument: if another market participant's automated trading strategy uses volume as an exclusive or primary heuristic for liquidity, it may trigger trading activity in a financial instrument for which long-term buying or selling interest is in fact limited. *Id.* at 15 (describing the "Sell Algorithm" of the "Fundamental Seller" that triggered the Flash Crash).

103. Regulation SCI-Systems Complaince and Integrity, 17 C.F.R. § 242.1000 (2016).

104. *Id.* § 242.1001(a)(1).

105. *Id.* § 242.1002(a)–(c).

106. *See, e.g.*, *id.* § 242.1004 (requiring certain designated participants in "SCI entities" to participate in "scheduled functional and performance testing" of the operation of their business continuity and disaster recovery plans, including the coordinated testing of such plans "on an industry-or sector-wide basis with other SCI entities").

107. *See supra* Part I.A.

For instance, compliance personnel must adapt recordkeeping and reporting practices with the evolving expectations of regulators and SROs. As regulators press for more structured information to facilitate automated surveillance, operations and compliance personnel may lose the flexibility to tailor their systems unless they can effectively negotiate information management. Moreover, as regulatory demands for unstructured information increase[108]—and the penalties for noncompliance become increasingly severe[109]—firms have been required to devote significant compliance hours to document production.[110] Accordingly, compliance personnel will need to work with federal, SRO, and state regulators to develop workable protocols for coordinating and streamlining information requests. [111]

At the same time, compliance personnel must also consider the cybersecurity and fiduciary implications of maintaining highly structured information. While critics of regulatory surveillance view centralized information gathering as "a hacker's dream and a civil libertarian's nightmare,"[112] firms are not immune to data security breaches.[113] Cybersecurity measures, moreover, do not necessarily preclude information from being released through lawful methods, such as the Freedom of Information Act,[114] or prevent rogue regulatory personnel or competitors from reverse-engineering proprietary trading algorithms.[115] As a result, part of the compliance officer's task must be to find ways to preserve control over information—including information shared with regulators—to tailor its utility to legitimate regulatory and operational purposes.

Compliance personnel must specifically develop protocols for recordkeeping, reporting, and disclosure obligations for sensitive customer

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108. SIA 2006 STUDY, *supra* note 5, at 23.

109. Under the FINRA Sanctions Guidelines, a bar is now standard for Rule 8210 violations if the individual fails to respond or "[w]here the individual provided a partial but incomplete response, . . . unless the person can demonstrate that the information provided substantially complied with all aspects of the request." FIN. INDUS. REGULATORY AUTH., SANCTIONS GUIDELINES 33 (2015) [hereinafter SANCTIONS GUIDELINES], http://www.finra.org/sites/default/files/Sanctions_Guidelines.pdf.

110. SIA 2006 STUDY, *supra* note 5, at 23.

111. In 2001, for example, the SEC required broker-dealers to compile detailed transaction information in a standardized format upon request for surveillance purposes. Nazareth & Tahyar, *supra* note 20, at 158–75.

112. *Oversight of the Office of Financial Research and the Financial Stability Oversight Council: Hearing before the Subcomm. on Oversight and Investigations of the H. Comm. on Fin. Servs.*, 112th Cong. (2011) (statement of Rep. Jeb Hensarling, Vice Chairman, H. Comm. on Fin. Servs.).

113. *See generally*, FIN. INDUS. REGULATORY AUTH., NOTICE TO MEMBERS 05-49 SAFEGUARDING CONFIDENTIAL CUSTOMER INFORMATION (July 2005), http://www.finra.org/industry/notices/05-49.

114. Bloomberg, for example, recently invoked the Act to obtain and publish information about government loans obtained by private banks through the various lending facilities created during the financial crises. Bloomberg L.P. v. Bd. of Governors of the Fed. Reserve Sys., 601 F.3d 143, 145–146 (2d Cir. 2010). And, of course, Congress may always subpoena information known to exist within the Office. Nazareth & Tahyar, *supra* note 20, at 180–81.

115. *See* Nazareth & Tahyar, *supra* note 20, at 161.

information. The more granularity that regulators require firms to maintain, report, or disclose, the greater the risk that such information may be "de-anonymized" by those with access to such information to reveal the identity of customers and their financial status. FINRA's CARDS proposal, for example, was criticized for the significant volume of customer-level account information FINRA required firms to store and its implications for customer privacy.[116] Similarly, the SEC's revisions to the Asset-Backed Securities Regulation (Regulation AB) faced significant headwinds from privacy advocates who objected to the public disclosure and availability (in XBRL format) of borrower loan-level or asset-level data in connection with the offer of securitized products.[117]

E. COMPLIANCE CULTURE

Automated surveillance will also have significant consequences for how rank-and-file employees—including both front-office and back-office personnel—perceive the role of law and regulation in firm culture. Commentators have long argued that effective compliance systems require the development of an overriding normative compliance framework. While a firm "tone at the top" is essential, an effective compliance system must generate a spirit of compliance throughout the organization by reinforcing "principles of the trade" or the "integrity" of advisory and brokerage functions. [118] This is especially important in light of the fact that sales representatives are subject to significant financial pressure to sell securities

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116. See CARDS RULE PROPOSAL, *supra* note 24, at 5–6 (discussing concerns about the collection of "personally identifying information"); Sandra Fulton, *Government Agency Proposes Datamining Individuals' Financial Transactions*, AM. CIV. LIBERTIES UNION (Mar. 24, 2014, 4:13 PM), https://www.aclu.org/blog/government-agency-proposes-datamining-individuals-financial-transactions.

117. Re-opening of Comment Period for Asset-Backed Securities Release, Securities Act Release No. 9552, 79 Fed. Reg. 11,361, 11,361 (Feb. 28, 2014) (to be codified at 17 C.F.R. pts. 200, 229, 230, 232, 239, 240, 243, 249) (soliciting comment as to whether to scale back the granularity of asset-level data published on EDGAR or to permit issuers to control access as necessary to address privacy concerns).

118. Barbara Black, *Curbing Broker-Dealers' Abusive Sales Practices: Does Professor Jensen's Integrity Framework Offer a Better Approach?*, 48 WAKE FOREST L. REV. 771, 789 (2013) (contrasting the views of James Fanto and Michael Jensen). For example, FINRA has undertaken to assess the frameworks that firms use "to develop, communicate and assess conformance with their culture" based on the following:

> five indicators of a firm's culture: (i) whether control functions are valued within the organization; (ii) whether policy or control breaches are tolerated; (iii) whether the organization seeks to proactively identify risk and compliance events; (iv) whether supervisors are effective role models of firm culture; and (iv) whether firms identify and address sub-cultures—such as the culture at a branch office, a trading desk or an investment banking department—that may not conform to the overall corporate culture.

Establishing, Communicating and Implementing Cultural Values, FIN. INDUSTRY REG. AUTHORITY (Feb. 2016), http://www.finra.org/industry/establishing-communicating-and-implementing-cultural-values#sthash.zV9DMaYV.dpuf [hereinafter *Establishing Cultural Values*].

products, which may often muddle the message compliance personnel are charged to convey.[119]

Automation can both help and hurt in this regard. Certainly, automated systems can incorporate legal or regulatory principles into algorithmic decision-making models, whether through hardwiring or machine learning.[120] Computer-guided decision-making may also reinforce mindful adherence to suitability or other ethical obligations by associated persons.[121] At the same time, automated systems may alienate rank-and-file personnel beset by prompts and nudges that create "ambiguity and confusion" about their employers' expectations.[122] In the worst case, sales and trading personnel may game automated compliance systems—for example, by entering false or misleading information—for the purpose of generating desired outcomes.[123] This might be a particularly advantageous strategy when they believe such systems are maintained by off-site or third-party compliance personnel.[124]

Automation may also affect the incentives of supervisory and compliance personnel. In particular, the circumstances justifying personal liability for supervisory and compliance failures have significant implications for efforts by firms to build effective compliance systems.[125] On the one hand,

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119. *See* Arthur B. Laby, *Regulatory Convergence and Organizational Culture*, 90 TUL. L. REV. 1181, 1190–92 (2016); Emily Glazer, *How Wells Fargo's High-Pressure Sales Culture Spiraled Out of Control*, WALL ST. J. (Sept. 16, 2016, 3:10 PM), http://www.wsj.com/articles/how-wells-fargos-high-pressure-sales-culture-spiraled-out-of-control-1474053044 (describing how "hourly targets, fear of being fired and bonuses" drove Wells Fargo employees to continue to open bank accounts for customers without authorization on a firm-wide scale despite compliance training and internal investigations).

120. *See, e.g.*, Joshua A. Kroll et al., *Accountable Algorithms*, 165 U. PA. L. REV. (forthcoming 2017) (discussing the availability of tools in automated decision-making systems "to assure that substantive policy choices are effectively implemented in automated decisions beyond the simple determination that rules are consistently applied"); *see also* Gregory Scopino, *Preparing Financial Regulation for the Second Machine Age: The Need for Oversight of Digital Intermediaries in the Futures Markets*, 2015 COLUM. BUS. L. REV. 439, 509 (discussing strategies for how moral and ethical knowledge could be implanted into derivatives intermediaries).

121. *See, e.g.*, Scott Killingsworth, *Modeling the Message: Communicating Compliance through Organizational Values and Culture*, 25 GEO. J. LEGAL ETHICS 961, 966–68 (2012) (discussing the positive and negative effects of "command and control" compliance systems).

122. *Cf.* Alex Rosen Blat & Luke Stark, *Uber Drivers: Information Asymmetries and Control in Dynamic Work* 14 (Ctr. of European Policy Studies Workshop Paper Oct. 15, 2015), http://ssrn.com/abstract=2686227 (concluding that "[n]ew forms of labor communications are needed to address the inconsistencies of work that is characterized by algorithmic dynamism and ambiguous information flows to improve labor-platform relations").

123. Kenneth A. Bamberger, *Technologies of Compliance: Risk and Regulation in a Digital Age*, 88 TEX. L. REV. 669, 714 (2010) (observing that "[t]he predictability of rule-bound code and the often static nature of technological implementations can permit individual actors motivated by organizational incentives and individual greed to manipulate their behavior in ways that mask its riskiness from technological sensitivity").

124. *Id.* (adding that "[l]ayers of technological opacity . . . can shield such behavior from both internal and external oversight until negative outcomes manifest themselves").

125. Stephen Joyce, *Scrutiny of Compliance Personnel May Backfire, SIFMA Exec Says*, BLOOMBERG BNA (Apr. 6, 2016), http://www.bna.com/scrutiny-compliance-personnel-n579820

enforcement personnel recognize that investigation of the conduct of compliance personnel—such as for "failure to monitor" rank-and-file employees—may discourage them from actively engaging with the business sides of firms.[126] On the other hand, regulators continue to bring enforcement actions against individuals who, in their judgment, fail "vigorously" to prevent misconduct within a firm.[127]

The availability of automated compliance may therefore provide a further excuse for compliance personnel to avoid active engagement in the supervision of associated persons. Some commentators already fear that compliance departments may not properly train supervisory personnel in the use of their systems, or integrate their systems with those of supervisors, to avoid such liability.[128] In larger firms, legal, compliance, and supervisory personnel may further silo themselves within the firm's governance structure to avoid supervisory liability. In former SEC Commissioner Daniel Gallagher's words, penalizing "robust engagement on the part of legal and compliance personnel" creates a "dangerous dilemma" for firms in defining the limitations of the liability of compliance personnel within a firm.[129]

IV. ENHANCING HUMAN AGENCY IN COMPLIANCE

To address these foreseeable complications, enhancing human agency in compliance may thus be a necessary counterweight to the rapid automation of securities trading and securities regulation. By reinforcing existing relationships between compliance personnel, managers, and regulators, as well as across compliance personnel at peer firms, the financial services industry can collaboratively detect and address incipient threats to market

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69526/ (arguing that fear of personal liability may dissuade qualified individuals from assuming high-risk compliance assignments, such as responsibility for anti-money laundering rules).

126. For example, senior SEC and FINRA enforcement officials have publicly suggested that enforcement action against compliance personnel should be taken only when they are "affirmatively involved in the misconduct, helped mislead regulators or had a clear responsibility to implement programs and policies and wholly failed to carry out their responsibilities." *Id.* (quoting Stephanie Avakian, Deputy Director of the SEC Enforcement Division, and paraphrasing comments of Bradley Bennett, Executive Vice President of Enforcement at FINRA).

127. *In re* Urban, Exchange Act Release No. 66,259, Investment Advisers Act Release No. 3366, 99 SEC Docket 994, 2010 WL 3500928, at *39 (Sept. 8, 2010) (noting the Division of Enforcement's position "that once Urban became involved in addressing the red flags, he was obligated to respond vigorously and that he failed to do so"). Although the administrative law judge in *Urban* ultimately found that Urban had acted reasonably and that no remedial action was appropriate, it nevertheless held that "the case law dictates that Urban be found to be Glantz's supervisor," notwithstanding the fact that "Urban did not have any of the traditional powers associated with a person supervising brokers." *Id.* at *44.

128. *See* Tilkin, *supra* note 79, at 68–69 (observing that compliance software must be "fully distribut[ed] up and down the chain of command" in order to fulfill its purpose).

129. Daniel M. Gallagher, Comm'r, U.S. Sec. & Exch. Comm'n, Remarks at The SEC Speaks in 2012, Washington, D.C. (Feb. 24, 2012), https://www.sec.gov/News/Speech/Detail/Speech/1365171489872; *see also* Martin, *supra* note 63, at 175 (stating that "[t]o do the job well, a CCO has to be able to influence workers and managers, but to avoid liability, the CCO cannot operate as their supervisor").

integrity and business conduct. Branding the value added by compliance—both internally and externally—may also counteract the complacency and alienation that automation may breed. At the same time, firms and regulators should not be reluctant to eliminate human agency where it adds little value, and more generally to rationalize the cost of compliance, so as to maximize the autonomy and efficiency of human personnel.

A. INTEGRATING COMPLIANCE PERSONNEL IN STANDARD-SETTING

Because the institutional competence and institutional incentives of regulatory and compliance personnel are often in tension, standard-setting must remain a collaborative project among federal regulators and industry representatives. The rise of automated surveillance requires—for the convenience of both compliance personnel and regulators—standards of conduct that can be manageably upheld through a combination of human and automated surveillance. The authority of compliance personnel in firms is enhanced to the extent that they have multiple and effective opportunities to influence the development of regulatory mandates.

1. Maintaining Relationships with Regulators

The more opportunities that regulators can provide compliance and operations personnel to participate in standard-setting, the more effective automated surveillance and compliance systems will be. Regulators have traditionally relied on SROs to take the lead with respect to standard-setting—particularly in circumstances where the industry collectively benefits from coordinated activity, but no one firm captures a sufficient share of the benefit to justify the cost of maintaining, complying with, or enforcing the standard.[130] When regulators take standard-setting in house, however, firms must contribute through more stylized channels, such as individual or industry comments. As a result, regulators may develop standards that are difficult to interpret and enforce.[131]

The recent debate over whether the SEC should adopt a fiduciary standard for retail investment advice illustrates how difficult it is to implement qualitative standards into an effective compliance program. The steps required under traditional know-your-customer and suitability

130. For example, SROs provide much of the infrastructure for the collection and dissemination of real-time information and trading activity in equity securities, financial derivatives, and benchmarks. DOMBALAGIAN, *supra* note 11, at 156–58. Their control of the mechanisms of collection and distribution of such information effectively sets most of the technical standards for those information products. *Id.*

131. *See, e.g.*, Louis Kaplow, *Rules Versus Standards: An Economic Analysis*, 42 DUKE L.J. 557, 621–23 (1992) (contrasting the ex-ante costs of developing rules with the ex-post costs of applying and enforcing standards); Cass R. Sunstein, *Problems with Rules*, 83 CALIF. L. REV. 953, 961–68 (1995) (contrasting, *inter alia*, the strengths and weaknesses of rules, standards, and principles as sources of law).

obligations may well be sufficiently objective to be subject to automated information gathering, analysis, and surveillance, with compliance officers following up on exception reports and other red flags as appropriate.[132] Implementing a higher standard of loyalty—such as the fiduciary or "best interests" standard applicable to investment advisers—could require significantly more complex procedures for broker-dealers that participate in securities distributions, engage in principal trading, or sell proprietary products.[133]

While some of these procedures may be readily susceptible to automation, others would need to be developed over time through the iterative experience of compliance officers. For example, regulators and compliance personnel could use various performance benchmarks and testing procedures to analyze whether a firm's financial products or transactions are suitable for customers.[134] Compliance personnel will play a key role in identifying practices at the sales level that implicate fiduciary concerns, developing supervisory procedures and surveillance mechanisms that flag violative transactions or omissions, and defending their interpretation of the fiduciary mandate in enforcement and arbitration proceedings.

2. Maintaining Relationships Across Firms

The active involvement of competent compliance personnel must also play a role in developing new industry sales and trading platforms and associated surveillance mechanisms. While no one firm always benefits from an investment in developing new standards, the long-term benefits of limiting suboptimal standard-setting at the regulatory level is often worth the effort. As a result, compliance personnel may play an important role in developing industry trading and surveillance practices, which may then be incorporated into federal and SRO surveillance mechanisms.

Delegation to private standard-setting associations has often been an effective strategy for implementing certain technical or business standards.

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132. For example, FINRA's suitability rule comprises three components: "reasonable-basis suitability, customer-specific suitability, and quantitative suitability." FINRA MANUAL R. 2111(a), supp. material .05. A CARDS-style compliance program could monitor the suitability of recommended products based on each customer's investment profile, including their "age, other investments, financial situation and needs, tax status, investment objectives, investment experience, investment time horizon, liquidity needs, risk tolerance, and any other information the customer may disclose." *Id.* at 2111(a). A CARDS-style compliance program could also perform a quantitative assessment that "a series of recommended transactions, even if suitable when viewed in isolation, are not excessive and unsuitable for the customer when taken together in light of the customer's investment profile." *Id.* at 2111(a), supp. material .05(c).

133. *See, e.g.*, Arthur B. Laby, *Selling Advice and Creating Expectations: Why Brokers Should Be Fiduciaries*, 87 WASH. L. REV. 707, 743 (2012) (discussing the differences between the standards applicable to broker-dealers and investment advisers).

134. *See, e.g.*, Lauren E. Willis, *Performance-Based Consumer Law*, 82 U. CHI. L. REV. 1309, 1360–68 (2015) (outlining how benchmarks and testing could be developed for consumer products, including consumer financial products).

For example, generally accepted accounting principles or internal controls for disclosure and financial reporting were historically the product of the accounting and auditing professions in the United States.[135] As a more recent example, the recent crisis has rekindled interest in automating fixed-income trading through trading systems that aggregate inventory across firms.[136] Developing rules for best execution or permissible markups in such systems, however, will require particularized knowledge, especially given the inventory risk associated with fixed-income trading practices.[137]

Because standards necessarily impact different firms in different ways, legal and compliance officers are uniquely situated to uphold governance structures that provide firms with a meaningful opportunity to participate in the standard-setting process. While deference to compliance professionals may sometimes achieve a better result than formal rulemaking, regulators are keenly observant of the accessibility, funding, governance, and standard-setting processes of private standard setters.[138] In particular, both SROs and trade associations have sought to maintain diversity in representation of firms of different sizes and with different business models, to allay fears that larger firms employ their weight in such bodies to promote standards that are too costly or burdensome for smaller firms.[139]

B. ENHANCING THE INTERNAL PERCEPTION OF COMPLIANCE

Clarifying and highlighting the role of compliance personnel may also enhance the internal perception of compliance and how compliance adds value to the firm. The relationship between a firm's compliance and

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135. *See, e.g.*, TIM BÜTHE & WALTER MATTLI, THE NEW GLOBAL RULES: THE PRIVATIZATION OF REGULATION IN THE WORLD ECONOMY 60–98 (Princeton U. Press 2011) (observing the institutional history of the Financial Accounting Standards Board in the United States and how the standard-setting hierarchy it oversees gives it a "strong position to speak with a single voice on behalf of U.S. interests" in the efforts to harmonize international accounting standards).

136. *See, e.g.*, Katie Linsell, John Glover & Nabila Ahmed, *Banks Unite in Project Neptune to Boost Bond Trading*, BLOOMBERG BUS. (Oct. 6, 2014, 7:44 AM), http://www.bloomberg.com/news/articles/2014-10-06/banks-said-to-unite-in-project-neptune-to-increase-bond-trading.

137. *See, e.g.*, FIN. INDUS. REGULATORY AUTH., REGULATORY NOTICE 14-52 PRICING DISCLOSURE IN THE FIXED INCOME MARKETS 9 (Nov. 2014) [hereinafter PRICING DISCLOSURE] (distinguishing markups in "trades in the same security where the firm and the customer trades occur on the same trading day, most of [which] occur in close time proximity to each other," from markups on securities held overnight, where "concerns that intervening news or market movement that occur between the component trades would create a corresponding change in the price differential between the components").

138. *See* DOMBALAGIAN, *supra* note 11, at 126–30.

139. Of course, SROs are membership organizations with a statutory obligation to ensure nondiscriminatory access to membership and to guarantee fair representation in governance. *See* 15 U.S.C. §§ 78f(b)(3), 78o-3(b)(4) (2012). As entities with quasi-public obligations, moreover, their rules, policies, and procedures are subject to regulatory review and public notice and comment for compliance with "core principles" or other statutory obligations. To the extent that SROs establish standards through formal rules, the Exchange Act ensures an opportunity for public notice and comment in the standard-setting process. *Id.* § 78s. For a description of the "mini-APA" provisions of Exchange Act §19, see LOUIS LOSS ET AL., SECURITIES REGULATION 6:53–139 (4th ed. 2011).

supervisory hierarchies is not always clear. For smaller firms, compliance and supervisory responsibilities may well be carried out by the same individuals within the firm. In larger firms, compliance personnel are often viewed as individuals with legal or regulatory backgrounds, who have little exposure to the business side of the firms by which they are employed, apart from their compliance role.[140]

Courts and regulators, moreover, have done little to dispel perception of compliance personnel as a cost center.[141] For example, even as FINRA has renewed its interest in the efforts of its member firms to promote a culture of compliance,[142] it is difficult to transmute the quality of a firm's compliance culture into a compelling business advantage, apart from the mitigation of sanctions in the occasional disciplinary action.[143] Highlighting tangible reputational benefits of compliance would create greater incentive for both compliance personnel and business managers to collaborate on the design of more effective compliance controls.[144]

1. Regulatory Performance Standards

In recent years, regulators have explored the broader use of performance disclosures or performance standards as a means to improve the public accountability of regulated entities. Performance disclosures, for example, are aimed at informing prospective customers of the integrity and efficiency of various securities intermediaries.[145] Mutual fund performance disclosures have long been a staple of retail investment decisionmaking, though not

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140. Fanto, *supra* note 9, at 123–24. Supervisory responsibilities, by contrast, tend to fall on business managers, who rise from the ranks based on exceptional performance as front-line employees, who are compensated based on the performance of their underlings and therefore face many of the same conflicts of interest. *Id.* at 144–48. In such circumstances, supervisory responsibility for their noncompliance may be easier to justify. *Id.* at 147–49.

141. *See, e.g.*, David M. Driesen, *Legal Theory Lessons from the Financial Crisis*, 40 J. CORP. L. 55, 72 (2014) (discussing the place of profit and cost centers in the hierarchy of financial firms).

142. *Establishing Cultural Values*, *supra* note 118 (notice of FINRA's plan to "meet with executive business, compliance, legal and risk management staff [of member firms] to discuss cultural values [and how each firm] communicates and reinforces those values directly, implicitly and through its reward system").

143. Within the context of enforcement actions, they often recognize the existence and efficacy of adequate compliance controls as a mitigating factor when the firm faces liability for the actions of its employees. For example, the SEC and FINRA each factor the effectiveness of a firm's compliance regime into the determination of sanctions for violative conduct. *In re* Millenium Grp. of N.Y., Exchange Act Release No. 44,969, 76 SEC Docket 3 (Oct. 23, 2001) (setting forth "some of the criteria [the SEC] will consider in determining whether, and how much, to credit self-policing, self-reporting, remediation and cooperation"); SANCTIONS GUIDELINES, *supra* note 109, at 6 (instructing adjudicators to consider "[w]hether, at the time of the violation, the respondent member firm had developed reasonable supervisory, operational and/or technical procedures or controls that were properly implemented").

144. Stephen P. Wink, *The Bankruptcy of the Securities Market Paradigm*, 9 VA. BUS. L. REV. 369, 387 (2015) (highlighting the benefits of an incentive based regulatory approach).

145. Willis, *supra* note 134, at 1335–40.

without controversy.[146] Credit rating agencies in the wake of Dodd-Frank have become subject to more onerous performance reporting to help investors assess their credit ratings.[147] The SEC requires trading venues and brokerage firms to publish statistics designed to help investors assess the quality of a trading venue's price discovery process or a broker's execution services.[148]

Performance standards, meanwhile, allow regulators to monitor activity at individual firms and to take appropriate remedial action where appropriate. Exchanges may employ statistical measures to assess the quality of execution provided by their designated market makers.[149] The Volcker Rule assesses the bona fide market making related activities of bank-affiliated dealers based on performance metrics relating to sources of revenue, risk, and variance.[150] Recently, for example, FINRA began to grade firms based on the extent to which they permit spoofing—i.e., the placement of fake orders to manipulate other traders into revealing trading interest or trading against their interest—through their order books.[151]

More generally, as regulators standardize quantifiable metrics for best execution and suitability through their automated surveillance tools, it will become increasingly possible to provide similar "report cards" for best execution and suitability not only at the firm level,[152] but with respect to individual trades. For example, regulators might eventually be able to bypass firms and provide investors with information about the quality of individual executions, or the performance of a portfolio against the aggregate returns to comparably situated investors.[153] In such a world, compliance personnel may

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146. *See, e.g.*, Black, *supra* note 17, at 325–26 (discussing the importance retail investors place on past performance of mutual funds even as they do a "poor job of providing investors with the necessary information to evaluate the overall costs of their investments").

147. Nationally Recognized Statistical Rating Organizations, Exchange Act Release No. 72,936, 79 Fed. Reg. 55,078, 55,262–67 (Sept. 15, 2014) (amending 17 C.F.R. §§ 240.17g-1, 240.17g-2, 240.17g-7).

148. *See* Regulation NMS, 17 C.F.R. §§ 243.605, 243.606 (2016).

149. *See, e.g.*, *Rule 8.60: Evaluation of Trading Crowd Performance*, CHI. BD. OPTIONS EXCH. (June 18, 2010), http://wallstreet.cch.com/cboe/rules/cboe-rules/chp_1_1/chp_1_1_8/chp_1_1_8_2/default.asp; *Rule 104: Dealings and Responsibilities of DMMs*, N.Y. STOCK EXCH. (Feb. 7, 2013), http://nyserules.nyse.com/nyse/rules/nyse-rules/chp_1_3/chp_1_3_7/chp_1_3_7_8/default.asp; *see also* Stanislav Dolgopolov, *Providing Liquidity in a High-Frequency World: Trading Obligations and Privileges of Market Makers and a Private Right of Action*, 7 BROOK. J. CORP. FIN. & COM. L. 303, 356–57 (2013).

150. 12 C.F.R. pt. 248, app. A (2016).

151. Letter from Rick Ketchum, Chairman & Chief Exec. Officer, Fin. Indus. Regulatory Auth., 2016 Regulatory and Examination Priorities Letter (Jan. 5, 2016), http://www.finra.org/industry/2016-regulatory-and-examination-priorities-letter.

152. *Equity Report Cards*, FIN. INDUS. REGULATORY AUTH., http://www.finra.org/industry/report-center/equity-report-cards (last visited Nov. 3, 2016) (providing firm report cards, *inter alia*, for best execution, market order timeliness, and trade-throughs, among other metrics).

153. *See, e.g.*, PRICING DISCLOSURE, *supra* note 137 (proposed rule requiring firms to disclose on the customer confirmation the contemporaneous purchase price of securities in fixed-income transactions). *See also* MUN. SEC. RULEMAKING BD., REGULATORY NOTICE 2015-16 6–7 (Sept. 24, 2015), http://www.msrb.org/~/media/files/regulatory-notices/rfcs/2015-16.ashx (requiring the same for municipal securities transactions).

be invited to play a more proactive role in "tutoring" supervisors and representatives on how to meet performance targets, or justifying and documenting deviations from regulatory standards when necessary to meet specific customer needs.

It is nevertheless difficult to design outcome measures that signal a robust compliance culture, let alone measures that are sufficiently objective to provide more than reputational rewards. Disclosure-based regulation often "presupposes investors who are capable of understanding the information" and that dedicated investor-education efforts are necessary to make disclosure-based regulation meaningful.[154] As suggested above, efforts to grade compliance through quantitative metrics may of course backfire, if firms or their employees merely adapt sales techniques to game surveillance mechanisms.[155] The SEC's response to unrealistic statistical reporting on its enforcement results, as Velikonja's study demonstrates, provides a cautionary example of how performance standards may distort incentives.[156]

2. The Revolving Door

Improving the image of compliance personnel within firms may also require commentators to reconsider longstanding prejudices against encouraging employees—in particular, junior compliance personnel—to cycle through business, compliance, and regulatory careers. Commentators are rightfully wary of the perverse incentives created by a "revolving door" between private industry and the public sector: senior regulatory personnel with policy-making authority at administrative agencies are often lawyers or economists who are recruited from, and later return to, industry or private practice after public service.[157] As a result, they may have an incentive to act in a manner that maintains and augments the authority of the agency during their tenure to ensure well-compensated employment in the regulated industry when they retire.[158]

By the same token, however, mid-and junior-level compliance personnel can benefit significantly in understanding how regulation works through a combination of regulatory and business experience. Rather than viewing business and compliance as separate silos, for example, there may be a long-term advantage in improving the quality of regulation and compliance if firms cultivated the careers of compliance personnel in a manner that promotes broader exposure to business and regulatory concerns. This may include time at a regulatory agency or SRO, or rotation through standing

154. Black, *supra* note 17, at 334–36.

155. *See* sources cited *supra* notes 123–124.

156. Velikonja, *supra* note 53, at 933–40.

157. For a discussion of the literature, see David Zaring, *Against Being Against the Revolving Door*, 2013 U. ILL. L. REV. 507, 512–14 (2013).

158. *Id.* at 520 (noting an agent's self-interest in diligently furthering agency objectives).

committees of regulatory advisory committees or industry trade associations.[159]

C. RATIONALIZING THE ROLE OF COMPLIANCE PERSONNEL

Finally, to the extent automation is inevitable, it should be leveraged to maximum efficiency so that compliance personnel are free to devote their time and energy to activities where human agency demonstrably adds value. As clearing services consolidate in a handful of carrying brokers, much of the back-office compliance responsibility of smaller firms may be alleviated.[160] There are nevertheless several aspects of compliance that could be automated at the federal or SRO level to alleviate firms of the burden to establish duplicative systems or to dedicate personnel to routine activities. As a simple example, regulators could contract with other federal agencies and with public records firms to maintain and verify financial disclosures by associated persons or to monitor continuing education requirements on an automated basis.

The rollout of new compliance mandates, moreover, could be streamlined across federal regulators and self-regulatory bodies. Industry naturally resists the incremental burdens of new regulation, since firms bear all of the cost of new mandates while regulators and the investing public share most of their positive externalities. Those burdens could be made less onerous by timing federal and SRO mandates around a development schedule that allows compliance personnel to plan the rollout of new recordkeeping or reporting software in conjunction with systems modifications to other aspects of the firm's internal controls. Such a schedule would not only allow compliance personnel to make intelligent choices about how to implement new mandates, but would facilitate more effective training of compliance and supervisory personnel in the use of new data and surveillance tools.

Better data standards may also eliminate the need for in-house forensic analysis of data without necessarily requiring firms to cede control over their proprietary and customer information. Compliance officers routinely complain of the "unnecessary and burdensome duplication of effort" to fit the different formats and informational needs of different regulators.[161] In some respects, the consolidation of federal and SRO authority over data may achieve this goal. For example, FINRA's consolidation of self-regulatory authority in the securities industry may help over time to eliminate

159. *See* Katz, *supra* note 37, at 512 (observing that a "regular stream of knowledgeable people from the industry" would address the need to build a staff "possessing the broader mix of the skills that are needed to be a modern regulator" as well as the problem of "staff isolation from the industry it regulates").

160. *See, e.g.*, CARDS RULE PROPOSAL, *supra* note 24, at 4, 9–10 (discussing the decision to impose recordkeeping obligations primarily on carrying or clearing firms "[t]o minimize the impact on small and mid-size firms").

161. SIA 2006 STUDY, *supra* note 5, at 17.

redundancies in regulatory standards, while the OFR may eventually develop recordkeeping standards that apply across all firms and harmonize with those required by foreign regulators.

To this end, policy makers may consider whether redundancies may be further reduced through the streamlining of information-gathering exercises. For example, in the Gramm-Leach-Bliley Act,[162] Congress sought to balance the need for multiple regulators to obtain information through reporting and examination requirements against the often duplicative and inconsistent nature of such requests.[163] To achieve this goal, Congress established a hierarchy of public and private information sources for financial regulators to consult before compelling the production of new information or conducting an independent examination.[164] A similar policy for federal and state securities regulators would help promote investment in new information gathering systems.

CONCLUSION

Information technology and automation may ultimately not supplant human autonomy as much as "move and reorient human presence and action."[165] Just like robots patrolling the skies, exploring the ocean floors, and circling the globe, automated surveillance and compliance systems can see what we cannot see and do what we cannot do, but do not necessarily know what to look for, where to look for it, what it means, and how best to respond to it. As human beings, that is our job. The task we must set for ourselves is to figure out how best to use the tools at our disposal to enhance the human experience, and in the case of financial services, to advance the goals of market efficiency, integrity, and investor protection.

In part, this means taking compliance out of the metaphorical "back office" and placing it on the "front line." For compliance personnel to build and manage the surveillance systems of the future, they must be experts in financial services and maintain relationships with peers, regulators, and related industries to be better able to anticipate and prevent internal and

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162. 12 U.S.C. § 1844 (2012).

163. *See* S. REP. NO. 105-336, at 46 (1998) (noting that Gramm-Leach-Bliley's reporting framework "streamlines the regulatory process by requiring coordination and information-sharing between the various Federal and State regulators").

164. 12 U.S.C. §§ 1844(c)(1)(B), 1844(2)(B) (requiring the Federal Reserve Board, "to the fullest extent possible," to use "(i) reports and other supervisory information that the [supervised entity] has been required to provide to other Federal or State regulatory agencies; (ii) externally audited financial statements . . . ; (iii) information otherwise available from Federal or State regulatory agencies; and (iv) information that is otherwise required to be reported publicly," as well as "examination reports made by other Federal or State regulatory agencies relating to a bank holding company and any subsidiary of a bank holding company" in its supervisory activities); *id.* § 1844(c)(2)(C) (similarly requiring the Board to "avoid duplication of examination activities, reporting requirements, and requests for information" through prior consultation with other federal and state regulators).

165. MINDELL, *supra* note 2, at 15.

external risks. Firms that fail to make these investments in human autonomy—the cultivation of informed, credible, and empowered compliance personnel—may well succumb to the weaknesses and limitations of the automated systems they create. Those who rise to the challenge, however, will harness the power of financial technology for the betterment of the investing public.