

**FINTECH AND DISRUPTIVE BUSINESS MODELS IN
FINANCIAL PRODUCTS, INTERMEDIATION AND
MARKETS- POLICY IMPLICATIONS FOR
FINANCIAL REGULATORS**

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INTRODUCTION AND ABSTRACT

A recent Financial Times survey indicates that the financial services sector (in mainstream terms) is concerned about the disruptive¹ potential of several digital-based technologies as applied to financial services, such as blockchain, big data and robo-advisers.² Not to mention that we have already of late witnessed the emergence of high frequency algorithmic trading, novel consumer payment devices, online crowdfunding and peer-to-peer lending. Financial technology, which seems to be ushering in an order for upheaval, is defined by Price Waterhouse Coopers as “a dynamic segment at the intersection of the financial services and technology sectors where technology-focused start-ups and new market entrants innovate the products and services currently provided by the traditional financial services industry.”³ Nevertheless, financial technology is not a new concept and should be understood in broader terms. From the development of stock exchanges that facilitate corporate fund-raising to the development of wholesale money markets,⁴ financial technology is financial innovation intertwined with legal technology to change the way finance is conducted,⁵ oftentimes as a form of disruptive innovation. “Disruptive innovation” in Bower and Christensen’s framework⁶ refers to the creation of new markets and value networks that eventually disrupt existing markets and value networks, displacing established market leaders and alliances. Financial technology has a history of many culminating moments of disruption. The current wave of

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1. “Disruptive” in business or commercial terms refers to a process of challenge and gradual capture of market share, dislodging incumbents in an industry, as will be explained below.

2. Attracta Mooney, *Blockchain Could be Totally Transformative for Financial Services Industry*, FIN. TIMES (May 22, 2016), <https://www.ft.com/content/bca31b78-1d02-11e6-b286-cddde55ca122>.

3. PRICE WATERHOUSE COOPERS, *BLURRED LINES: HOW FINTECH IS SHAPING THE FINANCIAL SERVICES INDUSTRY* (2016), <http://www.pwc.com/gx/en/advisory-services/FinTech/PwC%20FinTech%20Global%20Report.pdf> [hereinafter *BLURRED LINES*].

4. Where short-term financial institution borrowing is backed by collateral. *See, e.g.*, Zoltan Pozsar et al., *Shadow Banking* (Fed. Reserve Bank of N.Y. Staff Report No. 458, 2010), https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr458.pdf; Stijn Claessens & Let Ratnovski, *What is Shadow Banking?*, (Int’l Monetary Fund, Working Paper No. 14/25, 2014), <http://ssrn.com/abstract=2559504>.

5. Douglas Arner et al., *The Evolution of Fintech: A New Post-Crisis Paradigm?* (U. N.S. Wales L. Res. Paper No. 2016-62, 2016), <http://ssrn.com/abstract=2676553>.

6. Joseph Bower & Clayton Christensen, *Disruptive Technologies: Catching the Wave*, HARV. BUS. REV. MAG. 43-53 (1995); CLAYTON M. CHRISTENSEN & MICHAEL E. RAYNOR, *THE INNOVATOR’S SOLUTION* (2003) [hereinafter *CHRISTENSEN & RAYNOR, THE INNOVATOR’S SOLUTION*].

“fintech” specifically focuses on the embedment of digital technology into financial technology, different aspects of which have, to larger or smaller extents, also required innovation in legal technology.⁷

By contextualizing “fintech” against the broader historical backdrop in financial technology, this Article intends to offer high-level perspectives in order to frame the understanding of the disruptive potential of fintech and the implications for financial regulation. Using the framework of disruptive innovation in a widely understood sense,⁸ the Article focuses on potential revolutions⁹ of products, intermediaries or markets and the regulatory implications of such. This Article will not examine particular areas of fintech in detail, but will instead draw from a range of examples and their key features. The disruptive potential of fintech will be discussed to highlight market themes and changes in legal technology and regulatory implications, in respect of (a) financial product development, (b) financial intermediation interfaces, and/or (c) financial markets and value networks. In this way, we can critically appreciate to what extent and in what respects fintech is disruptive, and whether its disruption is relevant to financial regulatory objectives.

This overview Article, which provides a framework for analyzing the disruptive potential of fintech and regulatory implications, is envisaged to be an anchor for more specific pieces that examine particular areas of fintech in more detail. We believe that such a high-level perspective is necessary so as to introduce a more coherent blueprint for regulatory thinking and design, avoiding silo-based and narrowly reactive approaches to increasingly complex financial innovation.

Part I of the Article sketches the nature and development of financial innovation—outlining the drivers, achievements and dark sides of financial innovation. It critically suggests a framework of “disruptive innovation” for understanding the regulatory implications of financial innovation. Financial innovation could be a flash in the pan or introduce enduring change, so the first indicia for regulatory implications could be the “disruptive” nature of the financial innovation concerned. We introduce a framework for regulatory thinking and evaluation of “disruptive finance”—in terms of the nature of the “change” observed, its “substitutive potential” and its “structural impact.” Parts II, III, and IV

7. A survey of fintech can be found in OSCAR FLYNT, *FINTECH: UNDERSTANDING FINANCIAL TECHNOLOGY AND ITS RADICAL DISRUPTION OF MODERN FINANCE* (2016) (ebook).

8. Christensen & Raynor’s original framework deals with low-end innovations in a small segment of the market gradually capturing the market as a form of emerging disruption. However, this is only one form of disruption and commentators have developed other forms such as surprise disruptions emanating from outside the sector entirely. See Larry Downes & Paul Nunes, *Big Bang Disruption*, HARV. BUS. REV. (Mar. 2013), <https://hbr.org/2013/03/big-bang-disruption>.

9. Again understood widely in terms of substantive products that will become enduring, or in terms of organization forms, medium of business conduct.

then discuss these aspects as applied to selected fintech innovations in financial products, services and markets. Part V concludes.

I. A FRAMEWORK FOR DISRUPTIVE FINANCIAL INNOVATION

Finance can be thought of as “a derivative of social and political needs, engineered by economic theories, computational and data driven technologies.”¹⁰ It is a conjunction of economic, legal and increasingly information-based technologies, but put simply, a means to meet certain ends. Hence, finance continually evolves through financial innovation, and the topical development of “fintech” should be understood in that context. As Avgouleas points out, from fractional reserve banking to the rise of securities exchanges, from securitization of assets to high frequency trading, financial innovation is an ongoing and unceasing phenomenon.¹¹ Financial innovation is driven by a mixture of firm-based characteristics and wider environmental factors, as well as by individual incentives and entrepreneurial moments. Many financial innovations can also be thought of as “disruptive” as they usher in new products, new ways of effecting transactions and intermediation, new institutions and organizational forms, that may permanently change the landscape of finance.

A. A Brief History of Financial Innovation

A survey of the literature on what drives financial innovation shows the culmination of a mixture of factors. Contextual factors are important such as the regulatory and tax environments,¹² the economic policies of globalization and capital liberalization,¹³ and the knowledge revolutions in economic, legal, communications and digital technologies.¹⁴ In particular, regulatory environments can promote financial innovation, by either being facilitative,¹⁵ or indeed restrictive, and therefore,

10. Charles S. Tapiero, *The Future of Financial Engineering*, (N.Y.U. Poly Res. Paper Series, May 1, 2013), <http://ssrn.com/abstract=2259232>.

11. Emilios Avgouleas, *Regulating Financial Innovation: A Multifaceted Challenge to Financial Stability, Consumer Protection, and Growth*, in OXFORD HANDBOOK OF FINANCIAL REGULATION (Niamh Moloney et al. eds., 2015).

12. Ian M. Ramsay, *Financial Innovation and Regulation: The Case of Securitisation*, 4 J. BANKING & FIN. L. & PRAC. 169 (1993).

13. Avgouleas, *supra* note 11; PRASANNA GAI ET AL., FINANCIAL INNOVATION, MACROECONOMIC STABILITY AND SYSTEMIC CRISES (2006) (describing these as benign economic conditions that are favorable to experimentation).

14. W. Scott Frame & Lawrence J. White, *Technological Change, Financial Innovation, and Diffusion in Banking*, in THE OXFORD HANDBOOK OF BANKING (Allen N. Berger et al. eds., 2d ed. 2015).

15. Such as the U.S. JOBS Act which is dismantling the regulatory barriers to financial

incentivizing regulatory arbitrage.¹⁶ We will return shortly to discussing regulatory arbitrage as an incentive for financial innovation. Knowledge revolutions are especially relevant to the development of financial innovation by non-incumbents who may pioneer or kick start new products, processes, interfaces and markets altogether.¹⁷ Further, the patterns of market demand also drive financial innovation, as it is suggested that investors' demands for safe, highly liquid yet high return investment products are what drive much of financial innovation.¹⁸

Financial innovation, as entrepreneurial moments, are also driven by firm-based factors¹⁹ that interact with the wider context, usually seeking to improve efficiencies such as the reduction of agency and transaction costs²⁰ or to improve the competitive advantage of the firm. In particular, Awrey²¹ proposes a supply-side theory of financial innovation that posits that financial innovation is driven by intermediaries' need to create monopolies over their products in order to extract maximum rents in an extremely competitive environment.

Perverse incentives are nevertheless crucial to driving the design and purpose of financial innovation. The profit incentive drives a significant amount of financial innovation that entails gambling behavior for short-term gains. Speculation with 'other people's money' that may produce profits in the short term has changed the nature of derivatives from being hedging instruments to being gambling instruments.²² Much of financial innovation is poised to exploit investors' value misperceptions in order

promotion. See Chris Brummer, *Disruptive Technology and Securities Regulation*, 84 *FORDHAM L. REV.* 977 (2015). Further, regulators supporting competition may also use law as a means to fashioning competitive advantage. See Jack Wroldsen, *Proactive Law as Competitive Advantage in Crowdfunding*, in *STRATEGIC APPROACHES TO SUCCESSFUL CROWDFUNDING* (D. Assadi ed., 2015).

16. Michael S. Knoll, *The Ancient Roots of Modern Financial Innovation: The Early History of Regulatory Arbitrage*, 87 *OR. L. REV.* 93 (2008).

17. Yanto Chandra & Shu-Jung Sunny Yang, *Managing Disruptive Innovation: Entrepreneurial Strategies and Tournaments for Corporate Longevity*, 37 *J. GEN. MGMT.* 23. (2011).

18. Nicola Gennaioli et al., *Financial Innovation and Financial Fragility* (Fondazione Eni Enrico Mattei, Working Paper No. 114.2010, 2010), <http://ssrn.com/abstract=1688940> (warning of the demand-led syndrome in financial innovation which can lead to mis-selling).

19. Shelagh Heffernan et al., *Financial Innovation in the UK* (Faculty of Finance, Working Paper No. 4, 2008), <http://ssrn.com/abstract=1266125>.

20. Ronald J. Gilson, *Locating Innovation: The Endogeneity of Technology, Organizational Structure and Financial Contracting* (Stan. L. & Econ. Olin, Working Paper No. 377, 2009), <http://ssrn.com/abstract=1492762>.

21. Dan Awrey, *Towards a Supply-Side Theory of Financial Innovation*, 41 *J. COMP. ECON.* 401 (2013); Dan Awrey, *Complexity, Innovation, and the Regulation of Modern Financial Markets*, 2 *HARV. BUS. L. REV.* 235 (2012) [hereinafter Awrey, *Complexity*].

22. Avgouleas, *supra* note 11; LARS NORDEN ET AL. *FINANCIAL INNOVATION AND BANK BEHAVIOR: EVIDENCE FROM CREDIT MARKETS* (2011), <http://ssrn.com/abstract=1800162>.

to make short-term gains for financial intermediaries.²³ Further, financial innovations resulting in complex investment products are motivated largely by profit incentives with little regard for the consequences for mis-selling.²⁴ A number of empirical researchers have also found that the development of highly leveraged products, such as synthetic exchange-traded funds serve primarily speculative purposes instead of genuinely beneficial economic purposes.²⁵

Regulatory arbitrage is a major driver of financial innovation.²⁶ For example, the development of processes to liquify long-term relationship-based assets such as mortgage loans into liquid, standardized marketable securities has been motivated by the desire to evade stringent capital adequacy rules imposed on banks.²⁷ Nevertheless, financial innovation that seeks to moderate the effects of regulation could also be seen as a way to manage the risk of policy or regulatory uncertainty.²⁸ There are two faces with regulatory arbitrage, one relating to evasion of laws and rules, in the worst case, with intentions toward facilitating illegal behavior,²⁹ and the other a genuine effort at moderating cost, maintaining efficiency or competitive advantages in the face of laws and rules that create impeding effects for business. More often than not regulatory arbitrage is a phenomenon that should be understood along a spectrum of the two opposite aspects.

Against the backdrop of the mixture of factors that drive financial innovation, it is no surprise that financial innovation has yielded mixed results in terms of social benefit and harm. Many commentators agree that much of financial innovation produces efficiency and widening access to consumers.³⁰ For example, Kling points out that cost-effective fixed rate mortgages for consumers would not be possible without the

23. Brian J. Henderson & Neil D. Pearson, *The Dark Side of Financial Innovation*, EFA 2009 BERGEN MEETINGS PAPER (Feb. 13, 2009), <http://ssrn.com/abstract=1342654>.

24. Gennaioli et al., *supra* note 18.

25. Margaret M. Blair, *Financial Innovation and the Distribution of Wealth and Income* (Vand. L. & Econ. Res. Paper No. 10-22, 2010), <http://ssrn.com/abstract=1656451>; WENXI JIANG & HONGJUN YAN, FINANCIAL INNOVATION, INVESTOR BEHAVIOR, AND ARBITRAGE: EVIDENCE FROM THE ETF MARKET (Mar. 31, 2016), <http://ssrn.com/abstract=2023142>.

26. See Knoll, *supra* note 16, at 93. *But see* FINANCIAL CONDUCT AUTHORITY, MARKET-BASED FINANCE: ITS CONTRIBUTIONS AND EMERGING ISSUES (2016) (disagreeing with the proposition that regulatory arbitrage plays a significant part in driving financial innovation especially in market-based finance).

27. Ramsay, *supra* note 12, at 173.

28. P.K. MISHRA & B.B. PRADHAN, FINANCIAL INNOVATION AND EFFECTIVENESS OF MONETARY POLICY (Sept. 3, 2008), <http://ssrn.com/abstract=1262657>.

29. Tom C.W. Lin, *Financial Weapons of War*, 100 MINN. L. REV. 1377, 1394-97 (2016) (documenting instances of illegal behavior).

30. Brummer, *supra* note 15, at 1031-35 (documenting financial innovations that produced efficiency and increased access).

financial innovation of interest rate hedging derivative products.³¹ Empirical research has found that cost-savings for financial institutions derived from financial innovation are often passed onto investors and borrowers.³² Financial innovation that transforms asset characteristics such as in terms of liquidity and marketability also help in broadening financing opportunities for borrowers whether households or corporations.³³ For example, the development of exchange-traded funds has improved liquidity and investor access to otherwise less liquid products.³⁴ At a more macro level, Beck et al. show that financial innovation correlates with increases in a country's growth opportunities and GDP per capita,³⁵ and is important for emerging economies in their development.³⁶

On the other hand, the catalogue of potential social harms from financial innovation range from the micro-level to the systemic level. One of the key trends in financial innovation, more to be discussed shortly, is the increasing marketization of financial assets. Although such marketization promotes access and improves the liquidity characteristics of assets, the apparent benefits of marketization are often oversold. A balanced view is not taken with regard to the changed nature or increased risks of the assets, such as in securitized products. Some perverse consequences of securitization are a decline in lending standards, information asymmetry between investors and originators, and a failure to monitor the performance of underlying assets.³⁷ Often financial innovation is supported or permitted without due consideration for such unintended consequences.

Further, financial innovation could be used in predatory schemes or could be misused to further self-interested and anti-social motivations. Financial innovation can be used to repackage riskier or less liquid assets into apparently risk-managed, liquid and highly desirable assets in order to exploit investors. Over-selling of such marginally suitable products could ultimately result in mis-selling scandals.³⁸ Further, financial

31. ARNOLD KLING, NOT WHAT THEY HAD IN MIND: A HISTORY OF POLICIES THAT PRODUCED THE FINANCIAL CRISIS OF 2008 (Sept. 15, 2009), <http://ssrn.com/abstract=1474430>.

32. NORDEN ET AL., *supra* note 22.

33. FINANCIAL CONDUCT AUTHORITY, *supra* note 26.

34. JIANG & YAN, *supra* note 25.

35. THORSTEN BECK ET AL., FINANCIAL INNOVATION: THE BRIGHT AND THE DARK SIDES (Jan. 2014), <http://ssrn.com/abstract=1991216>.

36. SAUMITRA JHA, SHARING THE FUTURE: FINANCIAL INNOVATION AND INNOVATORS IN SOLVING THE POLITICAL ECONOMY CHALLENGES OF DEVELOPMENT 18-19 (Stan. Graduate Sch. of Bus., Working Paper No. 2093, 2011), <http://ssrn.com/abstract=2001039>.

37. Nigel Jenkinson et al., *Financial Innovation: What Have We Learnt*, BANK ENGLAND Q. BULL., 330, 334-35 (2008).

38. See Financial Services Authority, Final Notice To: Coutts & Company (2012), <http://www.fca.org.uk/static/pubs/final/coutts-mar12.pdf>; Gennaioli et al., *supra* note 18.

innovation such as high frequency trading are a double-edged sword. On the one hand, it can facilitate lightning fast and efficient trading, thus improving market quality.³⁹ Alternatively, it could also be abused by “pingers” and “spoofers” who test the market but have no genuine desire to transact,⁴⁰ making markets more susceptible to vulnerabilities that could culminate in unexplained “flash crashes.”⁴¹

Finally, a few commentators are of the view that financial innovation correlates with increased systemic risk for the financial and economic systems. Financial innovation often involves more credit creation. Such increases in leverage as a systemic phenomenon often creates greater risk for all participants in the financial and real economies, and could raise systemic fragility in the face of shocks or crises.⁴² Further, financial innovation also produces more complexity, which makes systems and markets more susceptible to systemic effects. As identified by commentators,⁴³ complexity often exacerbates information asymmetry resulting in mispriced allocations in the market, asset bubbles, and painful corrections and market instability. Further, the marketization aspect so prevalent in much of financial innovation causes assets to be subject to market risk and to behavioral reactions that exacerbate market risk. Such marketization, which transforms assets from relationship-based ones to marketable ones, inevitably foregoes the erstwhile flexibility underlying relationship-based assets that can be beneficial for managing defaults and crises.⁴⁴ In sum, increases in financial fragility and systemic risk seem to be the trade-off for supporting financial innovation. Further, Blair also

39. In terms of price discovery and liquidity in generally well-traded stocks and in normal times, see more discussion in Part D.

40. Ivan Diaz-Rainey & Gbenga Ibikunle, *A Taxonomy of the “Dark Side” of Financial Innovation: The Cases of High Frequency Trading and Exchange Traded Funds*, 20 INT’L J. ENTREPRENEURSHIP & INNOVATION MGMT. 9, 14 (forthcoming 2016), <http://ssrn.com/abstract=1974914>.

41. *What Caused the Flash Crash? One Big, Bad Trade*, ECONOMIST ONLINE (Oct. 1, 2010, 6:42 PM), http://www.economist.com/node/21011433/print?_ga=1.209039698.1910423928.1475623269.

42. See Tim Adam & Andre Guettler, *Pitfalls and Perils of Financial Innovation: The Use of CDS by Corporate Bond Funds*, 55 J. BANKING & FIN. 204, 204-05 (2015); Blair, *supra* note 25, at 1-4; TANJU YORULMAZER, HAS FINANCIAL INNOVATION MADE THE WORLD RISKIER? CDS, REGULATORY ARBITRAGE AND SYSTEMIC RISK 2-4 (Apr. 23, 2013), <http://ssrn.com/abstract=2176493>.

43. See Jenkinson, *supra* note 37, at 331; Kathryn Judge, *Fragmentation Nodes: A Study in Financial Innovation, Complexity, and Systemic Risk*, 64 STAN. L. REV. 657, 660-61 (2012) (discussing the consequences of complexity); Awrey, *Complexity*, *supra* note 21, at 235, 267, 275-76 (outlining some negative implications of increased complexity).

44. Judge, *supra* note 43, at 709-10 (discussing this as “stickiness” of contractual terms such as mortgage foreclosures if the underlying mortgages default, leaving little work-out room that could mitigate the risks with respect to the underlying assets, thus exacerbating adverse market pricing and reactions to such assets).

points out that financial innovation has created patterns of wealth distribution that are concentrated upon the financial elite while risks have correspondingly increased for ordinary investors.⁴⁵

As financial innovation seems to be a double-edged sword, and in Awrey's words, "welfare-indeterminate,"⁴⁶ the regulatory engagement with financial innovation has always been one of relative passivity and catch-up. Regulators, cautious of not impeding the development of competitive innovation and choice for consumers, often dismantle regulatory barriers to support competition or refrain from adding such barriers.⁴⁷ This is because much of financial innovation depends on low cost and flexible models, which would be stifled by the high cost of regulation.⁴⁸ Thus, regulators often take a "wait and see" approach, preferring to monitor developments regulating financial innovation. Regulators may also adopt informal approaches⁴⁹ or soft law, in order to be flexible in governing financial innovation.⁵⁰ However, such an approach risks prolonged regulatory inertia,⁵¹ and would also mean that regulatory developments are reactive, with the possibility of swinging extremely to risk aversion if failures or scandals arise.

After the global financial crisis of 2007-2009, global regulators now disfavor an excessively laissez-faire or reactive approach in financial regulation.⁵² They have developed more forward-looking regulatory frameworks to monitor and sometimes pre-empt certain developments. In this respect, regulators now have forward-looking product intervention powers⁵³ to intervene in product distribution where this may be warranted

45. Blair, *supra* note 25, at 4-5.

46. Awrey, *Complexity*, *supra* note 21, at 276-77.

47. Arner et al., *supra* note 5, at 33.

48. See DAVID K.C. LEE & ERNIE G.S. TEO, EMERGENCE OF FINTECH AND THE LASIC PRINCIPLES 14 (2015), <http://ssrn.com/abstract=2668049>; Lesley H. Curtis & Kevin A. Schulman, *Overregulation of Health Care: Musings on Disruptive Innovation Theory*, 69 LAW & CONTEMP. PROBS. 195, 196, 200 (2006) (describing how highly regulating sectors such as healthcare can stifle the development of innovative and low-cost solutions).

49. Nathan Cortez, *Regulating Disruptive Innovation*, 29 BERKELEY TECH. L.J. 175, 187-90 (2014) (explaining the concept of "soft laws").

50. See HEDGE FUND WORKING GROUP, HEDGE FUND STANDARDS: FINAL REPORT 119 (2008); DAVID WALKER, PRIVATE EQUITY MONITORING GRP., GUIDELINES FOR DISCLOSURE AND TRANSPERANCE IN PRIVATE EQUITY 12-13 (2007).

51. Cortez, *supra* note 49, at 175, 202.

52. See FINANCIAL SERVICES AUTHORITY, THE TURNER REVIEW: A REGULATORY RESPONSE TO THE GLOBAL BANKING CRISIS (Mar. 2009), http://www.fsa.gov.uk/pubs/other/turner_review.pdf [hereinafter THE TURNER REVIEW]; MARKUS BRUNNERMEIER ET AL., THE FUNDAMENTAL PRINCIPLES OF FINANCIAL REGULATION 25-27 (2009), <http://www.princeton.edu/~hsshin/www/Geneva.pdf>.

53. See Financial Services Act, 2012, c. 21, § 137D (U.K.); FINANCIAL CONDUCT AUTHORITY, POLICY STATEMENT PS13/3, THE FCA'S USE OF TEMPORARY PRODUCT INTERVENTION RULES, <http://www.fca.org.uk/your-fca/documents/policy-statements/fsa-ps133>; 2014 O.J. (L 600) 173 (providing for product intervention powers on the part of the EBA and

for investor protection. Product intervention powers have been used by the U.K. Financial Conduct Authority (FCA) to prevent sales of banks' contingent convertible bonds to retail investors,⁵⁴ and in Europe, the European Securities and Markets Authority has exercised similar powers by requiring more stringent investor disclosures for the sales of indexed and exchange-traded funds.⁵⁵ However, regulators are also equipped with more benign, softer powers such as the FCA's "regulatory sandbox"⁵⁶ which allow financial innovation to be carried out in experimental ways within the parameters of regulatory approval and monitoring. Further, besides correcting for previous regulatory gaps,⁵⁷ regulators seem willing to take more formal steps in regulatory governance over shadow banking developments,⁵⁸ or limiting certain transactions to the wholesale sector,⁵⁹ so as to introduce forms of proportionate governance without excessive regulation. The evolution of financial regulation has come a long way from merely being facilitative of market efficiency,⁶⁰ to a point where other public interest objectives pervade, such as financial and market stability. The regulatory regime has become a bedrock of the financial sector architecture itself. Hence financial innovation is necessarily studied within the paradigm of regulatory implications.

In this new phase of regulatory dynamics *vis-à-vis* financial

ESMA, as well as national regulators).

54. FINANCIAL CONDUCT AUTHORITY, PS15/14: RESTRICTIONS ON THE RETAIL DISTRIBUTION OF REGULATORY CAPITAL INSTRUMENTS (Dec. 6, 2015), <https://www.fca.org.uk/news/ps15-14-restrictions-retail-distribution-regulatory-capital-instruments>.

55. EUROPEAN SECURITIES AND MARKETS AUTHORITY, GUIDELINES FOR COMPETENT AUTHORITIES AND UCITS MANAGEMENT COMPANIES: GUIDELINES ON ETFs AND OTHER UCITS 6-7 (2014), https://www.esma.europa.eu/sites/default/files/library/2015/11/esma-2014-0011-01-00_en_0.pdf.

56. FINANCIAL CONDUCT AUTHORITY, REGULATORY SANDBOX 5-11 (2015), <https://www.fca.org.uk/your-fca/documents/regulatory-sandbox>.

57. See generally MADS ANDENAS & IRIS H-Y CHIU, THE FOUNDATIONS AND FUTURE OF FINANCIAL REGULATION (2014) (discussing how financial stability concerns have driven regulatory reforms in an extensive manner); see also Avgouleas, *supra* note 11.

58. Such as the Securities Financing Transactions Regulation 2015, Regulation (EU) 2015/2365 of the European Parliament and of the Council of 25 November 2015 on transparency of securities financing transactions and of reuse and amending Regulation (EU) No 648/2012.

59. For example, the FCA restricts the marketing of investment based crowdfunding products to only sophisticated investors or to retail investors for investment below 10% of their investible assets, see FINANCIAL CONDUCT AUTHORITY, POLICY STATEMENT PS 14/4: THE FCA'S REGULATORY APPROACH TO CROWDFUNDING OVER THE INTERNET, AND THE PROMOTION OF NON-READILY REALISABLE SECURITIES BY OTHER MEDIA—FEEDBACK TO CP13/13 AND FINAL RULES (Mar. 2014), <http://www.fca.org.uk/your-fca/documents/policy-statements/ps14-04> [hereinafter POLICY STATEMENT PS 14/4].

60. See ANDENAS & CHIU, *supra* note 57, ch.2 & cites within (discussing transactional efficiencies forming the basis of much of financial regulation and the evolution away from the purely rational micro-economic view particularly in light of the global financial crisis of 2007-2009).

innovation, this Article proposes that “disruptive innovation” could provide a framework for considering the regulatory implications of fintech.⁶¹ We argue that it is helpful to develop a high-level framework that provides some indicia for considering whether and to what extent regulatory intervention in financial innovation should take place. We draw from general business innovation literature to derive such insights that can be of enduring value.

B. *Disruptive Innovation as a Framework for Studying the Governance Implications for Financial Innovation*

“Disruptive innovation”⁶² refers to the creation of new markets and value networks that eventually disrupt existing markets and value networks, displacing established market leaders and alliances. This framework may be more specifically understood as the development of innovation that first takes place at the low end of the market, which does not immediately threaten incumbents as it is a weak substitute. The innovation however distinguishes itself by new performance criteria to the market, such as convenience and portability, lower price, or ease of use. The gradual uptake by the market and development of economies of scale stealthily allow the innovation to become dominant in due course, disrupting and replacing incumbents. In later literature, commentators have sought to broaden the concept of “disruptive innovation.”⁶³ This is because some innovations produce disruptive effects of introducing novelty and displacing incumbents in different ways but reach the same result.⁶⁴

Focusing on the outcome characteristics of disruptive innovation, it may be understood as involving “significant new technologies, requir[ing] considerable change in consumption patterns and are perceived as offering substantially enhanced benefits.”⁶⁵ In this manner, the key characteristics of “disruption” connote of genuine “*change*” with *substitutive potential* that ultimately produces *structural impact*.

“Change” is defined as achieving a difference in performance and value (especially to customers) whether it is achieved by a product, process, functional service, or utility change.⁶⁶ Sometimes change is

61. As will be discussed in relation to the examples raised in Parts B, C and D.

62. Bower & Christensen, *supra* note 6, at 43-53; CHRISTENSEN & RAYNOR, *THE INNOVATOR’S SOLUTION*, *supra* note 6.

63. By not confining to developments in the same sector, or necessarily starting at the low end of the market, or adopting a gradual trajectory of displacement.

64. Downes & Nunes, *supra* note 8, at 45; David Ahlstrom, *Innovation and Growth: How Business Contributes to Society*, 24 *ACAD. MGMT. PERSP.* 11 (2010).

65. R.W. Veryzer, Jr., *Discontinuous Innovation and the Product Development Process*, 15 *J. PRODUCT INNOVATION MGMT.* 304 (1998).

66. Jay Paap & Ralph Katz, *Anticipating Disruptive Innovation*, *RES. TECH. MGMT.* 13

symptomatic (*i.e.*, in methodologies and processes). Other changes may be more substantive, such as customer preferences or shifting the bases of competition. A genuinely disruptive change would be one, whether symptomatic or substantive, which would result in significant market or structural impact upon the industry.⁶⁷

Substitutive potential can arise whether or not the disruption comes from the same sector, or outside of the given sector, as long as the function of substitution may be achieved.⁶⁸ Such substitution could be in relation to financial products, intermediation processes or interfaces, or financial markets.

“Structural impact” refers to how the change and substituting innovation eventually creates significant repercussions at industry level and causes structural change to the industry itself.⁶⁹ Such impact should be pervasive⁷⁰ in order to be significant and not merely a flash in the pan. Studying impact can however take time as “change” and “substitution” can undergo a process of institutionalization which may not be easily foreseen.

We argue that the “disruptive innovation” framework gives rise to these three elements “change,” “substitutive potential,” and “structural impact” that can inform regulatory thinking. A framework for regulatory thinking is useful to prevent forward-looking or ‘judgment-based’ regulation⁷¹ from being either too passive or precautionary.

First, regulators should discern what “change” in performance or value the financial innovation has brought about. For example, in relation to substantive change, regulators should be interested if new channels for meeting financial needs are being created, and where new, unlicensed intermediaries are introduced in the landscape. Regulators should also take heed if new financial needs are being defined and framed, and the extent of market uptake. In terms of symptomatic change, regulators

(2004).

67. Suggested in Felix von Pechmann et al., *Managing Systemic and Disruptive Innovation: Lessons from the Renault Zero Emission Initiative*, 24 *INDUS. & CORP. CHANGE* 677 (2015).

68. Downes & Nunes, *supra* note 8, at 45.

69. Finn Orstavik, *Innovation as Re-Institutionalization: A Case Study of Technological Change in Housebuilding in Norway*, 32 *CONSTRUCTION MGMT. & ECON.* 857 (2014).

70. In the sense of becoming widely adopted as well as enduring, see for example discussion on the nature of IT innovation, which is capable of being merely symptomatic, in Kalle Lyytinen & Gregory M. Rose, *The Disruptive Nature of Information Technology Innovations: The Case of Internet Computing in Systems Development Organizations*, 27 *MIS Q.* 557 (2003).

71. BANK OF ENGLAND, THE PRUDENTIAL REGULATION AUTHORITY’S APPROACH TO BANKING SUPERVISION (Apr. 2013), <http://www.bankofengland.co.uk/publications/Documents/praapproach/bankingappr1304.pdf>. This is also internationally endorsed in the Basel Committee. Bank for International Settlements, *Core Principles for Effective Banking Supervision*, BIS.COM (Sept. 2012) princ. 8, <http://www.bis.org/publ/bcbst230.htm>.

should take note if existing channels for meeting financial needs are being changed in forms or interfaces, and whether such forms or interfaces are captured within existing regulation. Regulators should also discern if there are changes in legal technology, such as in defining legal relationships, property rights, and enforcement rights, in order to ascertain if any substantive change has indeed come about in banking or investment paradigms.

Next, the “substitutive potential” of “change” can be highly indicative to regulators as to whether the change is significant enough to be monitored and considered for regulatory initiatives. The “disruptive innovation” model anticipates a form of stealthy but dominant substitution. However, even if a change does become fully substitutive, we are of the view that significant migration effects on the part of financial end-users should warrant regulators’ attention. Substitutive effects may have implications in terms of regulatory arbitrage. For example, an area that regulators ought to have paid great attention to prior to the global financial crisis of 2007-2009 was the development of securitization as a means to manage long-term illiquid assets. Securitization caused change in the way banks managed such long-term credit risk, as it substituted long-term monitoring as the traditional form of risk management with marketization and dispersion of risk. This substitutive effect became widespread, endured and should have alerted regulators to monitor such change. This substitutive effect in bank prudential risk management can undermine existing regulatory frameworks in prudential regulation that focuses on assets on the books. Regulators would have needed a more robust regulatory framework that integrates on and off-balance sheet assets, as well as credit and market risk.

Finally, regulators need to consider the structural impact of potentially substitutive forms of change. This is not easy to foresee especially if the change is only emerging. For example, will peer-to-peer lending⁷² become substitutive for traditional bank credit channels? The market is small⁷³ compared to traditional bank credit at the moment, and the structural impact of such an industry is hard to foretell. However, the information analytics techniques and the investment model underlying the peer-to-peer lending products can become substitutive forms of change for how credit is created in the future. Even if the structural impact of a financial innovation is uncertain, regulators could create a dynamic impact map for a form of continuous monitoring to inform regulatory thinking. Much of financial regulation is inevitably tied to the structure

72. To be discussed shortly in Part B.

73. £378m in the United Kingdom as of 2013. See Ulrich Atz & David Bholat, *Peer-to-Peer Lending and Financial Innovation in the United Kingdom* (Bank of England Staff Working Paper, Apr. 2016).

of the sector,⁷⁴ in terms of the characteristics of firms, established institutions and practices in the sector and the key features of marketplaces. Substitutive changes that have a structural impact will inevitably undermine regulatory assumptions underlying these frameworks. Regulators need to be able to adapt to new structures in firms/organizations, marketplaces and intermediation practices and methodologies in order to review constantly if public interest objectives such as investor protection, financial stability and market confidence are being achieved.

The post-crisis financial regulatory environment has become an expanded universe in terms of regulatory objectives.⁷⁵ This is in response to the recognition that severe governance gaps have arisen in an era of deregulation and minimalist regulation focused on narrowly defined market-based goals such as market efficiency.⁷⁶ Blind spots have been created in relation to questions such as long-term financial stability, which has now formed the basis of regulatory reforms such as counter-cyclical prudential regulation⁷⁷ and regulatory reforms designed to mitigate the adverse consequences of too-big-to-fail financial institutions.⁷⁸ Continuing questions however evolve around the socioeconomic legitimacy and utility of financial institutions and marketplaces,⁷⁹ the ethics of financial intermediation,⁸⁰ and the

74. See Jeremy W. Markham, *Super-Regulator: A Comparative Analysis of Securities and Derivatives Regulation in the US, UK and Japan*, 28 BROOK. J. INT'L L. 319 (2003) (explaining why for example the single regulator structure arose to meet the needs of an increasingly integrated financial product sector); Elis Ferran, *Examining the UK's Experience in Adopting a Single Financial Regulator Model*, 28 BROOK. J. INT'L L. 257 (2003) (discussing the adoption of a single regulator in the United Kingdom in the early 2000s).

75. ANDENAS & CHIU, *supra* note 57 (arguing that financial stability has become clearly a priority and underlies many reforms in the United Kingdom and European Union). This is now expressly adopted as the U.K. Prudential Regulation Authority (Bank of England)'s regulatory objective.

76. THE TURNER REVIEW, *supra* note 52.

77. See, e.g., BASEL COMMITTEE ON BANKING SUPERVISION, *BASEL III: A GLOBAL REGULATORY FRAMEWORK FOR MORE RESILIENT BANKS AND BANKING SYSTEMS* (rev. June 2011, 2010), <http://www.bis.org/publ/bcbs189.pdf> (introducing the counter-cyclical buffer).

78. Such as crisis management and resolution frameworks, see Financial Stability Board (FSB), *Key Attributes of Effective Resolution Regimes for Financial Institutions* (2014), http://www.fsb.org/2014/10/r_141015/ and the U.K. ring-fencing reforms of retail banks from their investment counterparts in the banking group, see Financial Services (Banking Reform) Act 2013.

79. Julia Black, *Reconceiving Financial Markets—from the Economic to the Social*, 13 J. CORP. L. STUD. 401 (2013); Tamara Lothian, *Beyond Macroprudential Regulation: Three Ways of Thinking about Financial Crisis, Regulation and Reform*, 3 GLOBAL POL'Y 410 (2012).

80. Dan Awrey et al., *Between Law and Markets: Is There a Role for Culture and Ethics in Financial Regulation?*, 38 DELAWARE J. CORP. L. 191 (2013); RICHARD LAMBERT, *PROMOTING HIGH STANDARDS OF COMPETENCE AND ETHICS: BANKING STANDARDS REVIEW* (May 2014) and the setting up of the Banking Standards Council, 2014.

distributive consequences of financialization.⁸¹ The regulatory monitoring of the “change,” “substitutive potential” and “structural impact” of financial innovation needs to be mapped against this dynamic landscape of the rejuvenation of financial regulation. Regulators should however also take into account the role of private law and informal forms of governance. Private law such as the law of contracts or property may protect investors⁸² or indeed achieve opposite effects, and can be used as forms of legal technology in creating governance gaps.⁸³ Regulators also act in a governance landscape that is multifaceted and decentered,⁸⁴ and informal governance mechanisms such as industry bodies’ guidance, shareholder activism and other mechanisms also need to be considered in the governance matrix.

“Disruptive innovation” is an appropriate framework for this article as the focus is on fintech, which is currently driven by fringe movements in the financial sector or outside of the sector altogether,⁸⁵ less so by incumbent companies’ incremental innovation, in keeping with the character of Bower’s and Christensen’s original thesis. Further, we are also of the view that given the rapidly developing nature of financial innovation observed over the past decades, “disruptive” forms of financial innovation are but the norm. Hence, we are of the view that the “disruptive innovation” framework is arguably the only appropriate high-level framework that captures the nature and character of financial innovation in order to flesh out its key aspects.

It may be argued that the “disruptive innovation” framework is too

81. E.g., see discussions in Greta Krippner, *Accumulation and the Profits of Finance*, in FINANCIALIZATION AT WORK: KEY TESTS AND COMMENTARY (Ismail Erturk et al. eds., 2008) [hereinafter FINANCIALIZATION AT WORK]; Basak Kus, *Financialisation and Income Inequality in OECD Nations: 1995-2007*, 43 ECON. & SOC. REV. 477 (2012); Gerald Epstein & Arjun Jayadev, *The Rise of Rentier Incomes in OECD Countries: Financialization, Central Bank Policy and Labor Solidarity*, in FINANCIALIZATION AND THE WORLD ECONOMY 46 (Gerald A. Epstein ed., 2005); Ken-Hou Lin & Donald Tomaskovic-Devey, *Financialization and U.S. Income Inequality, 1970-2008*, 118 AM. J. SOC. 1284 (2013); Gerard Dumenil & Dominique Levy, *Financialization, Neo-liberalism and Income Inequality in the USA*, in FINANCIALIZATION AT WORK, *supra*.

82. Houman B Shadab, *The Law and Economics of Hedge Funds: Financial Innovation and Investor Protection*, 6 BERKELEY BUS. L.J. 240 (2009).

83. For example, the repo market as a form of shadow banking grew largely on the basis of private property rights underlying the structure of collateral transactions. *See, e.g.*, JAMES PECK ET AL., FINANCIAL ENGINEERING MEETS CHAPTER 11 – SAFE HARBORS AND THE BANKRUPTCY CODE: “THE LONG AND THE SHORT OF IT” (2011), <http://discovery.ucl.ac.uk/1402065/1/Peck,%20Mokal%20and%20Janger%20on%20Safe%20Harbors%20and%20the%20Bankruptcy%20Code.pdf>.

84. Dan Awrey, *Regulating Financial Innovation; A More Principles-based Alternative?*, 5 BROOK. J. CORP., FIN. & COMM. L. 273 (2011), <http://ssrn.com/abstract=1702457>; Julia Black, *Mapping the Contours of Contemporary Financial Services Regulation*, 2 J. CORP. L. STUD. 253 (2002); *Enrolling Actors in Regulatory Systems: Examples from UK Financial Services Regulation*, PUB. L. 63 (2003).

85. BLURRED LINES, *supra* note 3.

narrow as it does not encompass incremental forms of innovation that could achieve the same effects in terms of change, substitution and impact. We do not think that the use of the “disruptive innovation” framework is inappropriate as it is used in a broader sense focused on the outcome effects of “change,” “substitution” and “structural impact,” and thus encompasses innovation trajectories that are more evolutionary in nature.⁸⁶ This Article does not foreclose the possibility that “disruptive innovation” may arise from within an industry incumbent that changes and substitutes its existing products or services in such a way that structural impact is achieved.

This Article will proceed to discuss fintech innovation in financial products, services and markets by applying the “disruptive innovation” framework to discuss the aspects of “change,” “substitutive potential” and “structural impact.” The nature of the “change,” “substitutive potential” and “structural impact” of selected fintech developments is necessarily appraised against the fabric of existing developments and our application of the disruptive innovation framework is a highly contextualized approach.

II. FINANCIAL PRODUCT INNOVATION

Financial product innovation is driven by financialization—increasing the reliance upon finance to meet economic needs.⁸⁷ In a political scientist’s view, “financialization is the increase in the influence of financial markets, institutions and elites over both the economy and other institutions of society, including the government.”⁸⁸ Financialization corresponds with the retreat of the state in welfarism, leaving savers to manage their myriad savings needs including long-term retirement needs via investment.⁸⁹

Saving is defined as deferred consumption,⁹⁰ expected to be deployed

86. Such as hybrid forms of innovation that ultimately achieve “regime change” as suggested in Marc Dijk et al., *Towards a Regime-Based Typology of Market Evolution*, 92 *TECHNOLOGICAL FORECASTING & SOC. CHANGE* 276 (2015) where “regime change” is understood as changes in the existing market regime whether through evolutionary or disruptive (narrowly-defined) forms of innovation.

87. Gerald A Epstein, *Introduction: Financialization and the World Economy*, in *FINANCIALIZATION AND THE WORLD ECONOMY*, *supra* note 81, at 3.

88. Gautam Mukunda, *The Price of Wall Street’s Power*, *HARV. BUS. REV.* 70 (2014) (discussing the effects of financialization upon the American economy).

89. Saving through occupational and personal pensions.

90. Originally Franco Modigliani, *The Life Cycle Hypothesis of Saving, the Demand for Wealth and the Supply of Capital*, 33 *SOC. RES.* 160 (1966); *Life Cycle, Individual Thrift, and the Wealth Of Nations*, 76 *AM. ECON. REV.* 297 (1988) (discussing deferred consumption for the purposes of retirement saving). The “life cycle hypothesis of consumption” is widely discussed in economic literature. *See, e.g.*, Angus Deaton, *Franco Modigliani and the Life Cycle Theory of*

for use after accumulation, such as for a deposit payment for a house purchase; or for the purposes of capital formation for new productive activity (*i.e.*, investment).⁹¹ In an era of financialization, the function of saving is increasingly mediated by investment,⁹² such that investment has become the key generator of income for deferred consumption. In other words, saving is almost exclusively carried out through investment. Erturk et al. describe financialization as championing a form of democratic participation for households in the investment market, giving opportunities to and empowering households to be engaged in wealth generation through saving in investment.⁹³

A key trend in financial product innovation is the broadening of investment choice. Encouraging savers to access financial markets is a confluence of public policy as well as the private interests of the financial sector. The financial sector has grown in importance, scale and profit levels with savers being channelled into its conduits to meet various economic needs. Two key trends in financial innovation which respond to such demand-led forces are the collectivization of savings for investment, with phenomenal implications for financial product innovation, and the mass-selling of risk management products such as insurance packaged with credit or banking products.

A. *Collectivization of Investment Management*

In order to meet the needs of cost-effective access to professional investment management, savings are organized into collective investment vehicles. Collective pooling of savings into investment funds ensures sufficiently affordable access to investment due to economies of scale. However, this gives rise to standardization in the relational dimension between investment intermediaries and savers, and therefore (ironically) less prospect for tailor-made financial solutions to specific needs. Erturk et al. critically describe the rise in collective investment management as a form of “coupon pool” capitalism where the masses become feedstock for finance.⁹⁴ The collectivization of savers’ capital

Consumption, NAT’L BUREAU OF ECON. RES. (Mar. 2005), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=686475; Martin Browning & Thomas F Crossley, *The Life Cycle Model of Consumption and Saving* (SEDAP Res. Paper No. 28, 2000), <http://socserv.mcmaster.ca/sedap/p/sedap28.PDF>.

91. Function of Savings in the Financing of Capital Formation, KelsoInstitute.org, <http://www.kelsoinstitute.org/pdf/nc3.pdf>.

92. GERALD F DAVIS, *MANAGED BY THE MARKETS: HOW FINANCE RE-SHAPED AMERICA* 18 (2009).

93. Ismail Erturk et al., *The Democratization of Finance? Promises, Outcomes and Conditions*, 14 REV. INT’L POL. ECON. 553 (2007) [hereinafter Erturk et al., *The Democratization of Finance?*].

94. Ismail Erturk et al., *Financialisation, Coupon Pool and Conjuncture* [hereinafter

into pools intermediated by financial intermediaries results in certain ramifications for the characterization of the investment paradigm. Investors' capital are channeled into "funds" created and branded by intermediaries and this process creates disengagement between investors and the ultimate recipients of such investment. Savers thus invest in abstract "products" and not identified "borrowers." Savers seek accountability for their trust by looking at narrowly defined but comparable performance metrics applied to investment funds, and manage their risks by looking to the right to exit either in a secondary market or through redemption rights. Hence, the financial innovation of collective investment has steadily resulted in the transactionalization of investment relationships and the de-socialization of the investment products market in general.⁹⁵

Investment intermediaries compete for market share and engage in marketing and branding to attract financial flows to themselves. Bogle observes that investment intermediaries have become focused upon capturing as much as possible of the supply of capital instead of managing such capital as stewards for the beneficiaries who have entrusted them.⁹⁶ Increasingly, investment intermediaries and savers are focused on myopic perspectives in short-termist investment performance.

The changing character of the investment market to be de-personalized, transactional and myopic/short termist is not something that regulators grasped immediately. Much of investment regulation in the United Kingdom continued to assume a relational paradigm in investment intermediation, relying on common law rules of duties of care and fiduciary duties to meet investors' needs.⁹⁷ Even standardized regulatory duties for investment intermediaries introduced in the European Union, such as a duty of suitability⁹⁸ for investment advice,⁹⁹ is based on a relational paradigm. In the United States, investment advisers regulated under the Investment Advisers Act 1940 owe a fiduciary duty to their clients which encompasses aspects of loyalty and care, again emphasizing the relationship basis of the intermediary-client paradigm.

Are these relational duties limited and anachronistic in the

Erturk et al., *Financialisation*], in FINANCIALIZATION AT WORK, *supra* note 81.

95. PAUL H. DEMBINSKI, FINANCE: SERVANT OR DECEIVER (Kevin Cook trans., 2009).

96. JOHN C. BOGLE, COMMON SENSE ON MUTUAL FUNDS 425ff (2011).

97. *See generally* TIMOTHY SPANGLER, THE LAW OF PRIVATE INVESTMENT FUNDS (2012). The scope of fiduciary duty is however rather limited, as it is limited to a proscriptive duty and can be contractually modified. *See* Law Commission, *Fiduciary Duties and Regulatory Rules* (Law Com. CP No. 124, 1995), *Seymour v Ockwell & Co & Zurich IFA, Ltd.* [2005] EWHC 1137 (QB), [2005] PNLR 798.

98. Via the Markets in Financial Instruments Directive 2014, now recast in the Markets in Financial Instruments Directive 2014, art. 25.

99. Iris H-Y Chiu, *The Nature of a Financial Investment Intermediary's Duty to his Client*, LEGAL STUD. 254 (2008).

transactionalized and de-personalized investment environment?¹⁰⁰ Both the United Kingdom and European Union have now identified deficits in the relational paradigm of client accountability and we see that civil enforcement is relatively impotent in terms of governing investment management practices. The United Kingdom is carrying out a study into asset management practices and considering if further regulation may be necessary for directly governing investment management practices.¹⁰¹ The European Union has already tabled a proposal to govern one aspect of investment funds' practices—the exercise of funds' corporate governance rights in investee companies.¹⁰²

The substitution of private investment management for state welfarism has resulted in irreversible structural impact in the age of financialization, which includes the growth of the industry of investment management and collectively managed products. The private organization of collective investment is the prevailing paradigm for savers to meet their long-term investment needs. Law and regulation have been slow to catch onto the nature of the seismic change.

B. Mass-Selling of Consumer-Based Risk Management in Packaged Products

Another development in financial product innovation is that of bundled elements in financial products, such as credit, insurance and deposit all in one. Such products appeal to consumers as they seem to be a holistic means of meeting financial needs while balanced by appropriate risk management.

The market for bundled products allows financial innovation to be commoditized¹⁰³ on a large scale while at the same time creating cost-effective opportunities for access.¹⁰⁴ However, marketization also results in certain perverse incentives toward mis-selling to financial consumer products they may not need.¹⁰⁵ In this way, the financial intermediation

100. See, e.g., Kathryn Judge, *Intermediary Influence*, 82 UNIV. CHIC. L. REV. 573 (2015).

101. See FINANCIAL CONDUCT AUTHORITY, ASSET MANAGEMENT MARKET STUDY TERMS OF REFERENCE (Market Study No. MS15/2.1, Nov. 2015), <https://www.fca.org.uk/publication/market-studies/ms15-02-1.pdf>

102. UCITS Commission Directive 2010, art. 24 (discussing the duty to consider the use of voting rights for UCITs funds); *id.* arts. 3f-3h (discussing the proposed E.U. Shareholders' Rights Directive 2014); see Iris H-Y Chiu, *European Shareholder Rights Directive Proposals: A Critical Analysis in Mapping with the UK Stewardship Code?*, ERA FORUM 1 (2016).

103. Karen Ho, *Situating Global Capitalisms: A View from Wall Street Investment Banks*, 20 CULTURAL ANTHROPOLOGY 68 (2005); JONATHAN NITZAN & SHIMSHON BICHLER, CAPITAL AS POWER: A STUDY OF ORDER AND CREORDER (2009).

104. Erturk et al., *The Democratization of Finance?*, *supra* note 93, at 553.

105. The "feedstock syndrome" referred to earlier. See Erturk et al., *Financialisation*, *supra* note 94, in FINANCIALIZATION AT WORK, *supra* note 81.

relationships have been distorted by perverse incentives to become predatory and transient relationships, increasingly alienated from a sense of professional service.¹⁰⁶ As many financial goods are credence goods (*i.e.*, their performance or utility takes time to become apparent), it is not difficult for financial intermediaries to abuse the agency problem¹⁰⁷ by making immediate sales of products for immediate gain, leaving the end-user to reckon with the utility of the product (or lack thereof) in the longer term.

Bundled products are mass-sold (and mis-sold) to consumers on a phenomenal scale in the United Kingdom, and it has taken many years for the mis-selling of payment protection insurance and card identity protection insurance products to unravel. Although they can serve genuinely useful purposes,¹⁰⁸ such products have been sold in an indiscriminating manner for the purposes of profit-making.¹⁰⁹ It has taken years for the regulator to introduce redress mechanisms¹¹⁰ and to take enforcement actions against such mis-selling.¹¹¹ The slowness and reactive nature of regulatory response is again an under-appreciation of the seismic change in financialization and consumer responsabilization, as increasing commoditization of financial products and consumers have brought about a structurally predatory sales culture in the financial sector.¹¹²

The two trends discussed above have been made possible in a regulatory context where regulators tend not to regulate financial

106. DEMBINSKI, *supra* note 95.

107. Alessio M. Paces, *Financial Intermediation in the Securities Markets Law and Economics of the Conduct of Business Regulation*, 20 INT'L REV. L. & ECON. 479 (2000).

108. GfK NOP (for the FSA), *The Sale of Payment Protection Insurance – Mystery Shopping Results* (Nov. 2005) CR45, <http://www.fsa.gov.uk/pubs/consumer-research/crpr45.pdf>; FINANCIAL SERVICES AUTHORITY, *THE SALE OF PAYMENT PROTECTION INSURANCE: THEMATIC UPDATE* (Sept. 2007), http://www.fsa.gov.uk/pubs/other/ppi_thematic_update.pdf.

109. *See, e.g.*, FSA, *The Assessment and Redress of Payment Protection Insurance Complaints: Feedback on the Further Consultation in CP10/6 and Final Handbook Text* (Aug. 2010) PS10/12, http://www.fsa.gov.uk/pubs/policy/ps10_12.pdf (discussing payment protection insurance). For example, the U.K. FCA set up a statutory redress scheme (under s414A, Financial Services and Markets Act 2000) in 2013 for compelling certain identified financial institutions to compensate their mis-sold clients. *See* *Welcome to the CPP Redress Scheme*, CPP, <http://www.cppredressscheme.co.uk/>. The Scheme has successfully resulted in £451 million of compensation, *see* FCA, *CPP Card and Identity Protection Compensation Scheme Closure* (Mar. 2015), <http://www.fca.org.uk/news/compensation-for-card-and-identity-protection-policyholders> [hereinafter FCA, CPP Card].

110. Eilis Ferran, *Regulatory Lessons from the Payment Protection Insurance Mis-Selling Scandal in the UK*, EUR. BUS. ORG. L. REV. 248 (2012).

111. *See, e.g.*, *Lloyd's Group Hit by Record £117m Fine over PPI Handling*, BBC NEWS (June 5, 2015). CPP mis-selling firms have been fined about £10.5 m in total. *See* FCA, CPP Card, *supra* note 109.

112. JEROME WANT, *CORPORATE CULTURES* (2006); 2 HOUSE OF LORDS AND HOUSE OF COMMONS, *CHANGING BANKING FOR GOOD* (2013).

products directly.¹¹³ This means that financial regulation has seldom prescribed the features of investment products, leaving the design of such products to market forces and leaving it to the market to judge their quality. The entrenched reticence with respect to product quality is understandable, as distortions of perception, which can be introduced by “regulatory endorsement,” should be prevented in relation to credence goods.¹¹⁴ However, such reticence means that financial intermediaries have a substantial amount of freedom to structure their products in accordance with their incentives and efficiency structures. The true social utility of products is likely affected by the principal-agent problem, but the extent of this cannot be determined on an *ex ante* basis. Mis-selling is not easy to prevent in such a context. In other words, ‘tainted intermediation’ is a structural problem for investors navigating the choice of financial products.

We are of the view that the structural problem of “tainted intermediation” is in part due to the lack of regulatory engagement in the pre-crisis era with developments in product innovation. Applying the “disruptive innovation” framework, regulators should have observed that there are (a) changes in financial consumption trends, (b) changes in intermediary behavior and culture, (c) observed patterns of “substitution” (*i.e.*, from relationship-based to market-based financial intermediation) and (d) the emergence of “structural impact” upon the industry in terms of investment collectivization and mass-selling. These indicia could have provided possibilities to reflect upon public interest needs and the role of regulation and governance. The commoditization of savers and borrowers and the de-personalization of the investment paradigm have caused lasting structural impact on the investment management industry, now characterized as short-termist¹¹⁵ and riddled with principal-agent problems,¹¹⁶ affecting the ultimate performance and utility of products

113. See also ANDENAS & CHIU, *supra* note 57, at 237-74.

114. Council Directive 2009/65/EC, of the European Parliament and of the Council of 13 July 2009 on the Coordination of Laws, Regulations and Administrative Provisions Relating to Undertakings for Collective Investment in Transferable Securities [2009] OJ L302/32 (UCITS recast Directive), arts. 50-53, transposed in the U.K. FCA Handbook COLL 5.2 (There are limited regulatory interventions into product quality such as the E.U. prescription of portfolio diversification for UCITs, the largest mutual funds industry in the European Union).

115. Caitlin Helms et al., *Corporate Short-Termism: Causes and Remedies*, 23 INT’L & COMP. CO. L. REV. 45 (2012); Marc T. Moore & Edward Walker-Arnott, *A Fresh Look at Stock Market Short Termism*, 41 J.L. & SOC’Y 416, 420 (2014).

116. Particular areas of mention are complex fee structures that often over-charge savers. See Financial Conduct Authority, *Clarity of Fund Charges*, THEMATIC REV. (May 2014), <https://www.fca.org.uk/static/documents/thematic-reviews/tr1407.pdf>. See, e.g., *European Markets Watchdog Examines Closet Trackers*, FIN. TIMES (Nov. 23, 2014) (discussing charging saver-beneficiaries for active fund management when little of such is actually done and the fund secretly tracks an index, a practice known as “closet-indexing”).

sold.

Regulators in the United Kingdom and European Union have begun to take steps to address the structural problem of “tainted intermediation” by regulating conduct of business more stringently. The European Union for example has introduced more prescriptive rules of investment management in its largest mutual fund industry, the UCITs,¹¹⁷ and in conduct of business in advice and distribution generally.¹¹⁸ The United Kingdom has, in addition to adopting those rules, also imposed its own regime of retail distribution,¹¹⁹ banning product commissions and forcing investment advisers to be directly remunerated by their clients so as to minimize conflicts of interest at the advisory stage. However, there is still relatively little regulatory thinking on the nature and purposes of the financial products themselves, although “product intervention” powers, as mentioned earlier, have been introduced to prevent potential mis-selling.

Against this context, fintech is leading a new wave of financial product innovation towards reconstructing the relational basis in the investment paradigm, re-connecting savers and borrowers directly. Will this provide a much-needed balance to the deficiencies of the current landscape for retail financial products? We sketch the major key features of these new products and highlight issues for consideration in terms of the regulation and governance.

C. Fintech and Financial Product Innovation

New financial products that cater to investors fashion themselves as unconnected to the conventional banking industry that has fallen into disrepute since the global financial crisis of 2007-2009. They are also marketed as being able to provide alternative returns opportunities in a

117. The E.U. UCITs Directive 2009 (recast) and its subsequent amendments, especially in the Commission Directive of 2010, have increasingly prescribed conduct of business rules that ensure that such collective investments are managed in beneficiaries’ interests as a whole. Regulatory terms and supervision take the place of individual monitoring and calling to account which consumers are increasingly unable to do, being “submerged” entities in a collective investment pool. Further, the Markets in Financial Instruments Directive 2014 prescribes more conduct of business rules in conflict of interest management, portfolio management and investment advice, and the U.K.’s Retail Distribution Review 2013, resulting in the enactment of FCA Handbook COBS 6.1A, has banned advisor commissions in order to protect consumers seeking advice at the distribution stage.

118. Markets in Financial Instruments Directive 2014.

119. FSA, Distribution of Retail Investments: Delivering the RDR—Feedback to CP09/18 and Final Rules (Mar. 2010) PS10/6, http://www.fsa.gov.uk/pubs/policy/ps10_06.pdf; FSA, Distribution of Retail Investments: Delivering the RDR—Professionalism, Feedback to CP10/14 and CP10/22 and Final Rules (Jan. 2011) PS11/01, http://www.fsa.gov.uk/pubs/policy/ps11_01.pdf; FCA Handbook COBS 6.1A.

relatively low interest rate environment.¹²⁰ Two recently popular key innovations in retail investment options, online crowdfunding and peer-to-peer financial services, create appeal by distinguishing themselves as being exclusively online interfaces, using digital information technology to change how financial products are offered. These new products also seem to differentiate themselves from the collectivization and mass-selling culture. These products encourage direct consumer interfaces and evaluation, and seem to tease the consumer into a sense of empowerment and engaged selection. However, we suggest that these products are in early days of development. The sense of refreshing “alternativeness” offered by these products inherently contains a trade-off for the consumer—a higher degree of responsibility and diligence is required. Moreover, these products do not yet benefit from the standardized regulatory protections attached to established products in advice and distribution. Further, the “alternativeness” of these products may be over-sold. These products are often structured as collective products in which consumers participate, and so the submergence of individual consumers into a “pool” is the same investment structure as that which persists in the mainstream. The increasing popularity of such products could also lead to more standardization and “mass-selling.”

Online crowdfunding allows individuals to participate in funding a project, by pooling small contributions together. The project could be a civic movement, a cultural project, a community development or a small business. Crowdfunders do not share ownership of the project but instead enjoy gifts or tokens of appreciation from the project owners and managers.¹²¹ This means of fund-raising has become popular with small businesses and with investors—small businesses are able to raise important though small sums for starting up and developing, while not being subject to expensive compliance requirements under securities regulation,¹²² and investors enjoy the appeal of selecting the recipient of their funding as a matter of personal choice. In fact, commentators point out that such investment choices are socially embedded, involving elements of consideration for social or public worthiness,¹²³ relational

120. See Atz & Bholat, *supra* note 73 (identifying key drivers of growth in the fintech areas of online crowdfunding and peer-to-peer (or P2P) financial services); Eugenia Macchiavello, *Peer-to-Peer Lending and the “Democratization” of Credit Markets: Another Financial Innovation Puzzling Regulators*, 21 COLUM. J. EUR. L. 521 (2015), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2668131.

121. See Matthew Hollow, *Crowdfunding and Civic Society in Europe: A Profitable Partnership?*, 4 OPEN CITIZENSHIP 68, 71 (2013), <http://ssrn.com/abstract=2333635>; Karina Sigar, *Fret No More: Inapplicability of Crowdfunding Concerns in the Internet Age and the Jobs Act’s Safeguards*, 64 ADMIN. L. REV. 473, 475 (2012).

122. Lars Hornuf & Armin Schwenbacher, *Should Securities Regulation Promote Crowd Investing?* (Aug. 15, 2015), <http://ssrn.com/abstract=2412124>.

123. Hollow, *supra* note 121, at 68.

dimensions such as being family or friends of the finance-seeker,¹²⁴ and other factors that are not economically rational, such as being supportive of the local community¹²⁵ or heeding an online herding trend.¹²⁶

Online peer-to-peer (P2P) financial services, of which the most significant is P2P lending in consumer credit,¹²⁷ allows individuals to post information on an online platform in order to attract lenders. Typically lenders may finalize a price for the loan (*i.e.*, interest rate and duration), through an open auction process or through posting,¹²⁸ and would only take fractions of the total amount sought. Hence, the online platform brokers a syndicated loan for the loan-seeker, charging a fee for such brokering service, as well as servicing of the payments made. The loans may range from 12-60 months in duration, and the lenders bear the risk of default.

Online crowdfunding and P2P financial services are a growing sector, and major players such as the Lending Club Corporation and On Deck Capital in the United States have already listed on the New York Stock Exchange. Regulators, anxious that financial innovation should not be unduly stifled, have been tentative on governing these areas. In the United States, the JOBS Act creates exemptions for online crowdfunding if certain investor protection thresholds are met, and eases some requirements for P2P platforms imposed by the Securities Exchange Commission in terms of filing prospectuses.¹²⁹ In the United Kingdom, P2P lenders are subject to a modified version of capital adequacy and disclosure requirements that are proportionate for their business,¹³⁰ while online crowdfunding platforms need to ensure that certain investor protections are achieved, such as marketing largely to sophisticated investors and limiting the exposure of retail investors' net assets to such

124. De Liu et al., *Friendships in Online Peer-to-Peer Lending: Pipes, Prisms, and Relational Herding*, 39 MIS Q. 729-42 (2015), <http://ssrn.com/abstract=2251155>.

125. Mingfeng Lin & Siva Viswanathan, *Home Bias in Online Investments: An Empirical Study of an Online Crowdfunding Market*, 62 MGMT. SCI. 1393, 1398 (2016) (which may explain the home bias).

126. Liu et al., *supra* note 124.

127. Sebastian C. Moenninghoff & Axel Wieandt, *The Future of Peer to Peer Finance*, ZEITSCHRIFT FÜR BETRIEBSWIRTSCHAFTLICHE FORSCHUNG 466, 474 (Aug/Sept. 2013).

128. Zaiyan Wei & Mingfeng Lin, *Market Mechanisms in Online Peer-to-Peer Lending*, MGMT. SCI. (forthcoming 2016), <http://ssrn.com/abstract=2328468>.

129. See Sigar, *supra* note 121, at 476; Andrew Verstein, *The Misregulation of Person-to-Person Lending*, 45 U.C. DAVIS L. REV. 445, 503 (2011) (criticizing the SEC requirements).

130. For example, many P2P lenders are asked to set aside £20,000 a minimum capital supported by variable capital based on total lending, such as 0.3% of the first £50 million lent by investors, thereafter 0.2% of the next £450 million followed by 0.1% of £500 million and above of investors' lending (until March 2017, after which the adequacy requirements are revised to be £50,000 minimum plus a variable capital in the formulation above). See POLICY STATEMENT PS 14/4, *supra* note 59.

opportunities.¹³¹

Regulators are taking restrained approaches to govern the new fintech products in a highly derivative manner from existing regulatory regimes. This approach may be based on a presumption that the issues that may arise from such financial innovation are the same, or that the regulatory objectives are equivalent. Hence, the U.K. FCA's reliance on capital adequacy requirements to govern P2P lenders, mimicking banking regulation, and the reliance placed by both the U.S. SEC and U.K. FCA on disclosure and exempt offerings under securities regulation to deal with online crowdfunding.¹³² The broad critique against such approaches is that they are derivative in nature and such an approach is questionable in terms of its wisdom to deal with new issues. That said, such regulatory regimes are by no means finalized and this Article does not engage in a protracted critique of regulatory regimes that are only emerging. Instead, we propose using the "disruptive innovation" framework above to flesh out the key "changes," "substitutive potential," and "structural impact" that are relevant for regulatory monitoring.

D. A "Disruptive Innovation" Model in Understanding the Implications of Fintech Product Innovation

"Tainted intermediation" is a structural problem for investors navigating the choice of financial products. Financial products based on fintech innovation may offer a refreshing option. Using a disruptive innovation framework, we discuss below how online crowdfunding and P2P lending introduces "change," "substitutive potential," and "structural impact" for regulatory consideration.

In terms of "change," online crowdfunding and P2P lending models offer direct access to retail investors for many small amounts of contribution, hence commentators describe this feature as a form of "disintermediation."¹³³ The benefit of disintermediation is the reconstruction of the relationship between borrower and saver directly. Affordable disintermediation seems available,¹³⁴ through platform-based technologies that can match the supply and demand sides of capital and offer comparative information, choice, and access.¹³⁵ Does such

131. *Id.*

132. *See id.* (explaining how the U.K. FCA allows equity crowdfunding to be open to sophisticated investors only, or retail investors capped at 10% of their investible assets).

133. Paul Jeffrey & David Arnold, *Disrupting Banking*, 25 BUS. STRATEGY REV. 11 (2014).

134. Jon M. Garon, *Mortgaging the Meme: Financing and Managing Disruptive Innovation*, 10 NW. J. TECH. & INTELL. PROP. 441, 443 (2012).

135. *See, e.g.*, BRETT KING, *BREAKING BANKS: THE INNOVATORS, ROGUES, AND STRATEGISTS REBOOTING BANKING* (2014); GEOFFREY G. PARKER ET AL., *PLATFORM REVOLUTION: HOW NETWORKED MARKETS ARE TRANSFORMING THE ECONOMY—AND HOW TO MAKE THEM WORK FOR YOU* (2016).

“disintermediation” offer a powerful alternative to the existing structures of intermediation?

We are skeptical of the empowering claims of disintermediation for ultimate borrowers and savers/lenders.¹³⁶ This is because these products significantly change the patterns in risk allocation. Using information posted on online crowdfunding and P2P portals, investors vet their investees/borrowers directly in order to determine whether or not to extend their contribution, hence bearing in full the credit, as well as market risks associated with their investment. This is a change from the full intermediation model offered by depositary banks and partial intermediation models offered by investment firms which are subject to a range of disclosure, conduct of business rules and portfolio composition rules.¹³⁷ Regulators need to be mindful of the public interest implications from such a change in risk allocation, and regulators must consider whether investors’ expectations are commensurate with the risk levels they are assuming.

Further, does private law address investors’ needs if they should wish to take enforcement action against their borrowers or lending platforms? Regulators should be mindful that these products are ultimately collective investment products where individual investments are aggregated and investors may not have an individual “claim” against the borrower. Without going into length in this Article and notwithstanding this to be an important question, private law actions are highly arguable as the collective nature of the investment and the lack of a form of securities regulation makes any individual claim more difficult to sustain against the borrower. Moreover, the limited nature of the platform’s intermediation role also makes it difficult to sustain conduct of business claims against them. At a basic level, investors must appreciate that there is a concomitant shift in risk allocation toward them with potentially lower levels of investor protection.

Nevertheless, the social embedment of online crowdfunding and P2P lending may infuse investment decisions with considerations beyond efficiency and economic viability. These factors may make such financial markets more diverse and less prone to systemic herding forces that pervade many conventional financial markets. However, how the social underpinnings of such investments would work out in balancing the financial eco-system is uncertain, and what other unintended consequences may entail need to be studied.

Moreover, online crowdfunding and P2P pending platforms are changing the way a lending or investment decision is made. Empirical

136. *See also* Part C.

137. *See generally* NIAMH MOLONEY, EU SECURITIES AND FINANCIAL MARKETS REGULATION (2015) ch. III.1-3.

research has produced mixed results as to how robustly lenders and investors accurately process information posted about the borrower/investee prospects. Research has indicated that information technology breakthroughs have allowed lenders/investors to better assess the credit risk of borrowers/investees.¹³⁸ But at the same time, research has also found that lenders/investors rely on impressionistic short-hand information such as prospects' appearance to make decisions.¹³⁹ Such de-standardization and subjectivization is not based on robust assumptions of retail lenders' and investors' assessment of information and decision-making. There are potential investor protection and market stability issues that may require regulatory monitoring in such a de-standardized and subjective market interface.

In terms of “substitutive potential,” it may be argued that online crowdfunding and P2P lending are unlikely to be able to coordinate very large amounts. Hence traditional banks and investment banks continue to play an important part in large scale finance such as in corporate and project finance. The substitutive potential is greatest for smaller amounts (*i.e.*, small business and individual consumer credit).¹⁴⁰ However, regulators need to monitor these areas even if the amounts involved are not phenomenal. This is because areas of consumer credit and small business finance command social attention and public interest concern—scandals that arise in these quarters often trigger significant social response.

Finally, in terms of structural impact, we see the online crowdfunding and P2P lending models as ushering in two key structural trends. One is the use of information analytics to automate much of financial communications and intermediation, and the other is the consolidation of innovative and conventional forms of financial intermediation in bringing about new transformations.

Online crowdfunding and P2P lending platforms provide a significant amount of information to lenders/investors, whether posted by the prospects themselves or linked to social networking sites, where the prospects may be vetted as individuals, and not just according to standardized financial information.¹⁴¹ Information technology breakthroughs may be able to achieve efficiency in data analytics, the use of big data, and transform how investment market interfaces work. The “leveling” of information asymmetry made possible by such data

138. Rajkamal Iyer et al., *Screening in New Credit Markets: Can Individual Lenders Infer Borrower Creditworthiness in Peer-to-Peer Lending?* (AFA Denver Meetings Paper, 2011), <http://ssrn.com/abstract=1570115> [hereinafter Iyer et al., *Screening in New Credit Markets*].

139. Jefferson Duarte et al., *Trust and Credit: The Role of Appearance in Peer-to-Peer Lending*, 25 REV. FIN. STUD. 2455, 2470 (2012).

140. Atz & Bholat, *supra* note 73.

141. Iyer et al., *Screening in New Credit Markets*, *supra* note 138.

analytics revolutions could go towards mitigating one of the entrenched features of the principal-agent problem in ‘tainted intermediation.’ Investors could be given more and relevant information, and investors could be in a position to demand more transparency too.

Conventional banking and investment firms are starting to adopt such new interfaces and methodology used by online crowdfunding and P2P lending platforms, having a transformative effect upon financial sector intermediation more widely. Further, the consolidation of fringe or alternative fintech businesses into mainstream financial groups could also result in structural transformation in the industry. We already see Lending Club tying up with Union Bank in order to achieve a public flotation, and we see banks taking stakes in P2P lenders in order to use the P2P front to grow their market shares.¹⁴²

We are of the view that fintech products have the potential to countervail some aspects of sub-optimal principal-agent problems in conventional financial intermediation. However, their novelty and disintermediated interfaces bring investor protection issues more sharply into focus, making regulators more anxious about their governance implications. Regulators need to study the key change in risk allocation and compare it with the relative merits and deficiencies of mainstream intermediation where structural principal-agent problems are rife. Regulators should also monitor the footprint of the new fintech-based products to determine in what areas of credit they have a substitutive effect and whether such substitutive potential could become structurally significant. In that light, regulators can then determine the scope of the necessary regulatory perimeter for these new fintech-based products and the design of regulatory governance in order to achieve an appropriate degree of investor protection and financial stability.

We do not presumptively present a blueprint for how online crowdfunding or P2P lending *ought* to be governed; instead, we are only fleshing out relevant issues using the “disruptive innovation” framework to develop regulatory thinking. We believe that this approach is better able to inform reasoned policy-making that does not merely address the symptoms of novelty in nature.

III. FINANCIAL INTERMEDIATION INTERFACES AND PROCESSES

Financial intermediation processes are subject to constant evolution and innovation, in response to market and regulatory changes. New intermediary entities, new processes and methodologies in asset, risk and

142. Sofia, *Auswide Bank Takes 20% Equity in P2P Lender MoneyPlace for \$60 Million*, LETSTALKPAYMENTS.COM (Dec. 18, 2015), <https://letsstalkpayments.com/auswide-bank-takes-20-equity-in-p2p-lender-moneyplace-for-60-million/>.

liquidity transformations, and new interfaces of engagement with investors characterize the nature of innovation in financial intermediation. These changes have been driven by the needs of operational cost-effectiveness and efficiency; consumer demand for certain attributes of their experience, such as speed, simplicity and easy access; and the forces of competition and breakthroughs in financial, legal and digital technology. Investors have moved from relying on a bank branch manager's investment advice¹⁴³ to using external systems of rating such as credit ratings for corporate debt and securities.¹⁴⁴ Short-term borrowing by banks has moved from inter-bank lending arrangements to highly developed wholesale money markets where short-term borrowing is financed by collateral and can be obtained from money market funds, asset managers and other wholesale sector institutions.¹⁴⁵ Financial innovation has also developed many changes to user interfaces, from the bank teller to the automated teller machine and internet banking. Investors are shifting from face-to-face investment advice sessions to automated advice portals or robo-advisers and online execution-only products.

The new wave of financial innovation led by fintech continues along some common themes that have persisted through the years of financial intermediation evolution. Two key themes are disintermediation (and re-intermediation) and automation.

A. Disintermediation?

Disintermediation often refers to innovations that allow the bypassing of existing middlemen so that the entities at the end of the supply and demand chain (*i.e.*, savers/investors and borrowers/fund raisers) could meet directly.¹⁴⁶ In finance, "middlemen" or intermediaries may perform a variety of roles. French and Leyschon describe these as "Type 1," "Type 2," and "Type 3" roles.¹⁴⁷ Type 1 roles refer largely to intermediation in terms of information and transaction costs. For example, the use of a broker to execute purchases and sales of securities is a Type 1 intermediation. The broker engages in information intermediation for the investor, informing the investor of buy and sell

143. See *Woods v. Martins Bank*, 1 Q.B. 55, 71 (1959).

144. Morning Star ratings for investment funds, for example.

145. Gary Gorton & Andrew Metrick, *Regulating the Shadow Banking System* 261 (Brookings Papers on Economic Activity, 2010) (discussing rehypothecation markets).

146. See Shaun French & Andrew Leyschon, *The New, New Financial System? Towards a Conceptualization of Financial Reintermediation*, 11 REV. INT'L POL. ECON. 263 (2004); see, e.g., Mark Nissen, *Agent-Based Supply Chain Disintermediation Versus Re-Intermediation: Economic and Technological Perspectives*, 9 INT'L J. INTELLIGENT SYSTEMS ACCT., FIN. & MGMT. 237 (2009).

147. French & Leyschon, *supra* note 146, at 278.

research, and carries out the execution of the investor's trade. Type 1 intermediation is essentially of a brokerage nature.

Type 2 intermediation involves a form of asset transformation, usually in respect of liquidity. For example, the full intermediation performed by banks that take customer deposits on an on-demand basis¹⁴⁸ in order to transform deposits into long-term loans. More recent types of transformations include securitization, which is the transformation of illiquid and relationship-based assets like mortgage loans into more standardized and marketable securities that can be sold more widely to investors. Collective investment is also a Type 2 intermediation.

Type 3 intermediation involves efficiency transformation. For example, banks have been challenged by credit card companies in respect of payments and consumer credit since the 1980s, and these incumbents are now being challenged by digital payment systems developed by fintech companies such as Amazon, Google and Alipay.

Disintermediation has been understood by different commentators in different ways. One line of literature views disintermediation as primarily a move away from using bank-based intermediation towards other intermediaries that are capital markets-based.¹⁴⁹ The implications from such a move are significant for regulatory regimes that have primarily focused on bank regulation. These include considerations of regulatory arbitrage¹⁵⁰ (*i.e.*, whether such intermediaries are managing similar risks like banks and ought to be regulated in a similar manner), via the extension of prudential regulation;¹⁵¹ whether the risk allocation between such intermediaries and investors has changed and hence give rise to a need to look into gaps in investor protection;¹⁵² and generally reviewing

148. See *Foley v. Hill*, 9 E.R. 1002, 1007 (1848).

149. Steven L Schwarcz, *Framing Address: A Framework for Analyzing Financial Market Transformation*, 36 SEATTLE UNIV. L. REV. 299, 303 (2013); see, e.g., Claudia M Buch, *Are Banks Different? Evidence from International Data*, 5 INT'L FIN. 97, 110 (2002).

150. Schwarcz, *supra* note 149, at 304.

151. This has been adopted by the European Union, which extended an adapted form of the international Basel II Accord for bank prudential regulation to investment firms as well, Directive 2006/49/EC of the European Parliament and of the Council of 14 June 2006 on the capital adequacy of investment firms and credit institutions (recast).

152. See, e.g., Financial Services: Implementing the Framework for Financial Markets-Action Plan 3 (COM 1998) (1999) (explaining this area has been heavily boosted in the European Union and United Kingdom. As much of Continental Europe is heavily bank-financed in terms of its corporate economy, the European Union has always been keen to develop its capital markets and learn from the United Kingdom which is more balanced in terms of bank and capital-markets financing for its corporate economy.); see GUIDO FERRANINI & EDDY WYMEERSCH, INVESTOR PROTECTION IN EUROPE: CORPORATE LAW MAKING, THE MiFID AND BEYOND (2006); see, e.g., NIAMH MOLONEY, HOW TO PROTECT INVESTORS: LESSONS FROM THE EC AND UK (2010) (explaining that the Markets in Financial Instruments Directive 2004 that introduces harmonised standards of investment firm conduct is seen as a major step toward liberalizing capital markets yet maintaining standards that would inspire market confidence, Directive 2004/39/EC of the

if sectoral forms of regulation that focus excessively on banks need to be recalibrated in scope and application.¹⁵³

Another line of literature is more business-oriented and looks into whether the supply and demand sides for investment capital are actually able to transact directly without the assistance of Types 1, 2 or 3 intermediaries.¹⁵⁴ For example, one could argue that the development of online platforms allows insurance purchasers to buy directly from insurance companies and hence the role of the insurance broker is subject to disintermediation. This is a form of Type 1 disintermediation, where the internet revolution facilitates more effective access to information, thus giving insurance purchasers the tools to bypass the insurance broker. Nevertheless, we observe that new providers arise to offer services to compare features and premiums for insurance products, hence consumers may prefer to use an online comparison site¹⁵⁵ in order to decide which insurance products to buy. In this sense, the apparent disintermediation we observed is only temporary, giving rise to new re-intermediation by new or existing providers. Even if the internet has revolutionized information access, information gathering and analysis is still a time-consuming exercise, and the room for re-intermediation has quickly been filled up by fintech innovation in the form of comparison and rating sites.

One may also see the advent of the blockchain technology as being able to introduce real disintermediation in financial investment transactions. This is because blockchain, which is a distributed ledger technology, allows the supply and demand sides of capital to meet online and to execute transactions as a private arrangement verified and sealed by secure cryptographic technology maintained by volunteer software

European Parliament and of the Council of April 21, 2004 on markets in financial instruments amending Council Directives 85/611/EEC and 93/6/EEC and Directive 2000/12/EC of the European Parliament and of the Council and repealing Council Directive 93/22/EEC. Commentators generally agree that this has opened up an era of investor protection regulation in the European Union seen as necessary to support its capital markets growth.).

153. See Eddy Wymeersch, *The Structure of Financial Supervision in Europe: About Single, Twin Peaks and Multiple Financial Supervisors* (2006), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=946695; see Joseph J Norton, *Global Financial Sector Reform: The Single Financial Regulator Model Based on the United Kingdom FSA Experience--A Critical Reevaluation*, 39 INT'L LAW. 15 (2005) (explaining there is a lot of debate on how financial regulation architecture can best meet the changing needs of regulating finance); see Howell E Jackson, *Regulation in a Multi-Sectoral Financial Services Industry*, 77 WASH. U. L.Q. 319 (1999) (offering different arguments for sustaining different regulatory structures. Sectoral systems may foster regulatory competition, while twin peaks systems may foster dedication to certain objectives and focus in regulatory implementation. The single regulator has been hailed to match industry structure but the U.K. experience may tell of confusion in regulatory objectives, overload and unfitness for purpose.); see also Eilis Ferran, *The Break-up of the Financial Services Authority*, OXFORD J. LEGAL STUD. 455 (2011).

154. French & Leyschon, *supra* note 146, at 276.

155. The leading site in the United Kingdom is moneysupermarket.com.

engineers.¹⁵⁶ The use of blockchain technology to execute and confirm transactions ensures that the veracity of such transactions are not dependent on the settlement, clearing and centralized custodial systems underlying securities markets, hence we can bypass the existing financial intermediation infrastructure.¹⁵⁷ Although the distributed ledger technology has genuine disintermediating effects, it does not offer information intermediation or asset, maturity and liquidity transformation. Hence, an investor that seeks those services is unlikely to be able to avoid using financial intermediaries altogether. Disintermediation is not only about the technological capabilities offered for the purpose, it correspondingly requires increased due diligence, oversight and increased endeavor and responsibility on the part of investors. These trade-offs do not make it certain that investors would opt for disintermediating options and relegate financial intermediaries to obsolescence.

Where Types 1 and 3 disintermediation are concerned, commentators are skeptical that there has been *real* disintermediation of a lasting impact. Even if certain intermediation processes and interfaces can be disrupted by cheaper and more accessible alternatives, the cost of information mediation and transaction formation are not eliminated. Disintermediation only gives rise to re-intermediation,¹⁵⁸ and as Lin observes, finance is a persistent state of “infinite intermediation.”¹⁵⁹ Gialdini and Lenglet describe the persistence of financial intermediation as being due to the need for translators of processes to bring together the supply and demand sides for investment capital, and this hermeneutic function is a form of sense-making in order to help each side achieve their ends.¹⁶⁰ For example, payment users who switch from credit cards to Google Pay are not supporting disintermediation as such, but rather re-intermediation. The recognition of the reality of disintermediation as

156. See Campbell R. Harvey, *Cryptofinance* (Jan. 14, 2016), <http://ssrn.com/abstract=2438299>; Trent J. MacDonald et al., *Blockchains and the Boundaries of Self-Organized Economies: Predictions for the Future of Banking*, in *BANKING BEYOND BANKS AND MONEY* ch. X (Paulo Tasca et al. eds., 2016), <http://ssrn.com/abstract=2749514>.

157. European Securities and Markets Authority, *The Distributed Ledger Technology Applied to Securities Markets* (Discussion Paper No. ESMA/2016/773, 2016) [hereinafter ESMA, *The Distributed Ledger Technology*]; see Andrea Pinna & Wiebe Ruttenberg, *Distributed Ledger Technologies in Securities Post-Trading: Revolution or Evolution?* (Eur. Cent. Bank, Working Paper No. 172, 2016).

158. See Zachary J Gubler, *The Financial Innovation Process: Theory and Application*, 36 *DEL. J. CORP. L.* 56, 71 (2011); see French & Leyschon, *supra* note 146, at 268-70.

159. Tom C.W. Lin, *Infinite Financial Intermediation*, 50 *WAKE FOREST L. REV.* 643, 658 (2015) [hereinafter Lin, *Infinite Financial Intermediation*].

160. Laurence Gialdini & Marc Lenglet, *Financial Intermediaries in an Era of Disintermediation: European Brokerage Firms in a MiFID Context* (Apr. 4, 2010), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1616022.

being a largely transitional process to re-intermediation would help regulators in conceptualizing the scope of regulatory regimes and to consider conduct risks in new re-intermediary relationships. For example, the U.K. FCA is monitoring how new information intermediaries like price comparison websites influence consumer behavior and are looking into ensuring that their conduct is fair and aboveboard.¹⁶¹ Price comparison websites can be incentivized to influence consumer behavior under conflicts of interest, for example, by placing certain search results high in the list where these are from providers that pay them commissions. The FCA has brought price comparison websites within its regulatory perimeter.¹⁶² It has further conducted a thematic review in 2014 revealing failings in price comparison websites' conduct, such as making recommendations about best products to buy without explaining clearly the basis for doing so.¹⁶³

In terms of Type 2 disintermediation, Lin is of the view that asset transformation functions are highly sophisticated and difficult to disintermediate fully.¹⁶⁴ This is because the benefits of such disintermediation are less clear cut. Although investors may pay less fees for relatively disintermediated investment options such as P2P lending, investors do not enjoy the risk management and asset transformation offered by Type 2 intermediaries such as mutual and hedge funds.¹⁶⁵ The lower cost of access to more highly disintermediated opportunities such as P2P lending has to be juxtaposed against the greater information diligence that has to be undertaken by the investor in light of the investor's full assumption of credit risk. Indeed, commentators¹⁶⁶ see that re-intermediation trends in this industry are on the rise. Credit scoring

161. See generally Financial Conduct Authority, TR14/11: Price Comparison Websites in the General Insurance Sector (July 16, 2014), <https://www.fca.org.uk/news/tr14-11-price-comparison-websites-in-the-general-insurance-sector> [hereinafter FCA, TRA14/11].

162. Financial Services Authority, Guidance on The: Selling of General Insurance Policies Through Price Comparison Websites (Oct. 2011), <https://www.fca.org.uk/your-fca/documents/finalised-guidance/fsa-fg1117>.

163. FCA, TR14/11, *supra* note 161.

164. Lin, *Infinite Financial Intermediation*, *supra* note 159, at 655.

165. Although fees for such services would be relatively higher. That said, these intermediaries are also under scrutiny and pressured by market forces to moderate their fees. See FINANCIAL CONDUCT AUTHORITY, ASSET MANAGEMENT MARKET STUDY TERMS OF REFERENCE, *supra* note 101 (looking into whether asset management fees are appropriate, delivering value for money). See Madison Marriage & Attracta Mooney, *Hedge Funds and Private Equity Funds Pressured to Cut Fees*, FIN. TIMES (Feb. 21 2016), <https://www.ft.com/content/07867a66-d737-11e5-8887-98e7feb46f27> (discussing hedge fund fees); *Down to 1.4 and 1.7?*, ECONOMIST (Feb. 8 2014), <http://www.economist.com/news/finance-and-economics/21595942-cost-investing-alternative-assets-fallingslowly-down-14-and-17> (discussing how fee reduction is a response to market forces and affects fund strategies).

166. ADAIR MORSE, PEER-TO-PEER CROWDFUNDING: INFORMATION AND THE POTENTIAL FOR DISRUPTION IN CONSUMER LENDING (Jan. 17, 2015), <http://ssrn.com/abstract=2551272>.

intermediaries and other information mediation agents have arisen to bridge the information and diligence gaps for investors. Investors in this industry would still incur a set of new transaction costs.

B. Automation

A persistent trend that shapes financial intermediation methodologies and interfaces is the use of automation to improve efficiencies for both savers/investors and borrowers/fund-raisers. Earlier uses of automation have been focused on information and data organization, such as organizing borrower information to help the exercise of human judgment in making underwriting decisions.¹⁶⁷ Such automation is able to take the “manual chores” out of the financial intermediation processes and achieve operational efficiency, complementing the exercise of human judgment. The efficiency savings would likely also be experienced by borrowers as there is less delay in waiting for approvals for mortgages or other credit,¹⁶⁸ and borrowers would be assured a process where personal information has been comprehensively collected, and consistently organized and used.

However automation innovation is also driven by human curiosity that wishes to see how far artificial intelligence can be developed.¹⁶⁹ Increasingly, artificial intelligence is used to substitute for the judgment functions that humans carry out in the financial intermediation processes. Two key trends are robo-advice and algorithmic trading. We turn to robo-advice first and will return to algorithmic trading in the next Part.

Robo-advisors have arisen in the financial services marketplace as a cost-effective means for small investors to obtain investment advice that is tailor-made. They are essentially automated interfaces that offer investment advice and discretionary investment management services without the intervention of a human adviser, using algorithms and asset allocation models that are advertised as being tailored to each individual’s investment needs.

Robo-advisers take the information automation developments in the industry to a new level. They could be fed with significant amounts of information on investment products, risk classifications and forward-looking information, and they could be made to perform the mapping task between such information and investor information that is provided to them. The robustness of the mapping exercise would largely depend on whether the robo-adviser is programmed in such a way as to be able to

167. Gary Bergman, *Using Automation to Improve the Credit Review Function*, COM. LENDING REV., June 1999, at 60.

168. *4 Tech Trends to Watch*, ABA BANKING J., Mar. 1999, at 46.

169. ANDREW HARGADON, *HOW BREAKTHROUGHS HAPPEN: THE SURPRISING TRUTH ABOUT HOW COMPANIES INNOVATE* (2003).

categorize investor information well and interpret them correctly.

Commentators have mixed views on whether robo-advisers can robustly map and interpret investor information accurately and then “recommend” a range of suitable products to investors. Supporting commentators are of the view that the robo-adviser is a genuine low-cost investment adviser for small investors, and serves the purpose of financial inclusion and access.¹⁷⁰ Robo-advice can, in principle, be promoted even if the robo-advising capabilities need to be refined. Further, the robo-adviser is thought to be more capable of consistent interpretation and application of information.¹⁷¹

However, Fein voices skepticism of robo-advisers as they are viewed to be unable to substitute certain capabilities of human judgment, and hence cannot discharge the fiduciary standard of care or the suitability standard for investment advice that are currently imposed under legislation for the U.S. investment advisers and broker-dealers.¹⁷² In particular, she voices doubts as to robo-advisers’ capability to have a holistic view of investors’ portfolio needs. Such holistic or “peripheral vision” in exercising judgment about an investor’s portfolio is a human capability that artificial intelligence is likely unable to replicate. Further, robo-advisers tend to standardize the information they have been provided and cannot detect nuances in investors’ communications and sentiment. These limitations prevent robo-advisers from fully comprehending an investors’ appetite and needs. Fein also thinks that robo-advisers suffer from the same agency problems as human advisers, in terms of conflicts of interest management, and may in fact be less effective in drawing investors’ attention to such matters.¹⁷³

We are unlikely to see a rollback on the innovative developments in automation and artificial intelligence.¹⁷⁴ The profound implications of such change lie primarily in the substitution of human labor, and increasingly human judgment, and regulators need to consider if such a development is adequately captured within existing conduct of business rules and whether private law bargaining and remedies can address investor protection needs. The U.K. FCA envisions that automated advice can be provided without the need for human intervention in the regime of

170. Yongjae Lee et al., *On the Viability of Robo-Advising for Individual Investors* (Oct. 2015), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2679303; Darren Tedesco, *I, Robo-Adviser? Creating the Blended Adviser Experience*, J. FIN. PLAN, Jan. 2015, at 17.

171. Tedesco, *supra* note 170, at 17.

172. Melanie Fein, FINRA’s Report on Robo-Advisors: Fiduciary Implications (Apr. 1, 2016), <http://ssrn.com/abstract=2768295>.

173. Melanie Fein, *Robo-Advisers; A Closer Look* (June 30, 2015), <http://ssrn.com/abstract=2658701>.

174. Rodrigo Zepeda, *The Industrialization Blueprint: Re-Engineering the Future of Banking and Financial Services*, 42 CAPCO INST. J. FIN. TRANSFORMATION 9 (2015).

“simplified advice,”¹⁷⁵ for the benefit of retail customers. Nevertheless it is for the providers of such automated portals to demonstrate that they meet the same standards of suitability as those imposed on investment advisers generally. Regulators should consider how evolutions in automation affect the scope of regulated entities, the setting of regulatory standards, and the attachment of responsibilities and liability.¹⁷⁶

C. A “Disruptive Innovation” Model in Understanding the Implications of Fintech in Intermediation Processes and Interfaces

Fintech will constantly push the boundaries in disintermediation, re-intermediation and automation, likely focusing on customer user interfaces and the consumer experience.¹⁷⁷ Applying the “disruptive innovation” framework to such developments, we highlight the “changes” with “substitutive potential” that are likely to have “structural impact” in order to frame the relevant perspectives for regulatory thinking.

Regulators need to pay attention to the changes in terms of new intermediaries that arise as a result of new technologies in intermediation processes and interfaces, and consider if those new industries give rise to gaps in investor and consumer protection as well as regulatory arbitrage. It need not be assumed that the wholesale extension of regulatory perimeter is always warranted, and indeed the adaptation of regulatory design is almost always warranted.

For example, we are of the view that the FCA’s approach to price comparison websites should be refined in light of their comparative properties. Such websites are useful to consumers for comparative purposes, and so perhaps conduct of business standards should focus on this particular aspect, ensuring that the “comparative expectations” are met. We would like to see specific conduct of business rules, for example, dealing with website capabilities in surveying the whole of the market, and explicitly revealing any limitations, and clearly setting out the parameters of comparison and how the results should be used. These are different standards from those generally applicable to individual advice and, thus, conventional conduct of business rules under the U.K. and E.U. legislation¹⁷⁸ may be over- and under-inclusive at the same time.

175. FCA, FINALISED GUIDANCE: SIMPLIFIED ADVICE (Mar. 2012), <https://www.fca.org.uk/publication/finalised-guidance/fg12-10.pdf>.

176. See, e.g., 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 (2015) (arguing that firms that develop and use automated trading agents that are programmed by algorithms should be registered and regulated by the U.S. Commodities and Futures Trading Commission).

177. BLURRED LINES, *supra* note 3.

178. IAIN MACNEIL, AN INTRODUCTION TO THE LAW ON FINANCIAL INVESTMENT (2d. ed.

New intermediaries such as information intermediaries for online P2P and crowdfunding portals should be monitored, as well as new payment intermediaries such as Apple iPay, Google Pay, and Amazon Payments, in order to discern changes in performance and conduct of business aspects that affect regulatory objectives. In terms of credit information intermediaries, regulators need to consider the market and systemic importance of the accuracy of their representations. It may be considered as to whether regulatory principles should be introduced for intermediaries' internal quality systems for the formation of opinions as well as their communication formats.¹⁷⁹ In terms of payment intermediaries, the regulatory objectives of payment integrity, settlement certainty and systemic orderliness should guide regulators in considering how such new payment intermediaries should be governed as compared to existing bank-based payment systems and credit card providers.¹⁸⁰ Further, existing intermediaries who foray into new areas should also be monitored in terms of the implications for the existing regulatory parameters. For example, asset managers are increasingly becoming important in asset and liquidity transformation, rivaling banks, and it is important to monitor their prudential conduct in such transformations and impact on systemic risk.¹⁸¹

In terms of substitutive potential, it is important for regulators to pay special attention to how far functions of human judgment may be substituted by fintech innovations that continue to accelerate automation in financial services. There may be scope for considering whether some functions should not be fully or partly substituted by human judgment and how complementarity with human judgment should be preserved. On the other hand, it is also pertinent to consider to what extent the substitution for human discretion may indeed improve the principal-agent

2012) (discussing duties imposed on financial intermediaries via the E.U. Markets in Financial Instruments Directive 2014 and the U.K. FCA Handbook Conduct of Business Sourcebook include the duty to provide suitable or appropriate advice, the duty of best execution, the duty to make fair, clear and not misleading communications, the duty to protect client money and assets, to manage conflicts of interest and avoid inducements that are not permitted); *see, e.g.*, MOLONEY, *supra* note 137.

179. *See* Iris H-Y Chiu, *Regulatory Governance of Credit Rating Agencies in the EU: The Perils of Pursuing the Holy Grail of Rating Accuracy*, 4 EUR. J. RISK & REG. 199 (2013) (Not to be as far-reaching as the E.U. Regulation of Credit Rating Agencies 2009 (and 2011, 2013), but certainly worth considering the rationale for regulation of information intermediaries and what aspects of market failures and public interest there are).

180. Governed by the Payment Services Directive 2007. Directive 2007/64/EC of the European Parliament and of the Council of 13 Nov. 2007 on Payment Services in the Internal Market Amending Directives 97/7/EC, 2002/65/EC, 2005/60/EC & 2006/48/EC and repealing Directive 97/5/EC; U.K. Payment Services Regulations 2009.

181. Press Release, Financial Stability Board, Next Steps on the Nib-Bank Non-Insurer Global Systemically Important Financial Institutions (NBNI G-SIFIs) (July 30, 2015), <http://www.fsb.org/2015/07/next-steps-on-the-nbni-g-sifi-assessment-methodologies/>.

problems in the client-intermediary relationship.

Further, the use of automation in risk management and the making of prudential judgments must be qualified, as bank internal models for capital adequacy have been shown to be inadequate before the global financial crisis of 2007-2009, grossly under-estimating risk. Models can be manipulated to be overly optimistic in order to avoid regulatory obligations,¹⁸² and it is important to discern what perverse incentives there are in using automation. Scopino points out that one of the implications of the substitution of human judgment is the reframing of responsibility and liability for financial services providers. Robots cannot be directly impugned for the outputs they deliver, hence liability and responsibility need to be framed appropriately for the designers and users of such interfaces and processes. This is an area fraught with debate as we need to consider whether the effects upon the market are important enough for us to define liabilities into strict forms, such as adopted in the European Union and the United Kingdom in relation to market manipulation,¹⁸³ or the extent to which states of mind and standards of care are relevant.

In regards to structural impact, the automation and online provision of many financial intermediation processes and interfaces will continue to bring major changes in the financial sector. The relocation of financial intermediation processes into the virtual sphere raises implications regarding globalization and the reach of territorial regulation, cyber risks, confidentiality, and shifts in the relational dimensions of the intermediary-client relationship. There is a need for regulators to coordinate with each other at the international level in terms of standard-setting as well as global surveillance, information sharing and enforcement assistance.¹⁸⁴ There is scope to consider the necessity for

182. See, e.g., Jukka Vauhkonen, *Bank Safety Under Basel II Capital Requirements* (Bank of Finland Res. Discussion Paper No. 29-2009, 2009), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1513239.

183. See, e.g., *Winterflood Secs., Ltd. v. Fin. Servs. Auth.* [2010] EWCA Civ. 423 (affirming that market manipulation liability is premised on effects of distortion in the market and not on the state of mind relating to the trading behaviour that gave rise to those effects, subject to rather narrowly defined defences in the E.U. Market Abuse Regulation 2014).

184. Such international coordination has been greatly accelerated since the Financial Stability Board and Basel Committee undertook substantial efforts to coordinate international standard setting and international coordination. See, e.g., FINANCIAL STABILITY BOARD, *GLOBAL SHADOW BANKING MONITORING REPORT* (2013); FINANCIAL STABILITY BOARD, *GLOBAL SHADOW BANKING MONITORING REPORT* (2014); FINANCIAL STABILITY BOARD, *GLOBAL SHADOW BANKING MONITORING REPORT* (2015) (consolidating global coordinated surveillance findings; and the Board also coordinates international guidelines and best practices for information sharing in relation to systemically important financial institutions, Basel Capital Accord compliance and resolution arrangements); GUIDANCE ON COOPERATION AND INFORMATION SHARING WITH HOST AUTHORITIES OF JURISDICTIONS WHERE A G-SIFI HAS A SYSTEMIC PRESENCE THAT ARE NOT REPRESENTED ON ITS CMG (Nov. 3, 2015), <http://www.fsb.org/wp-content/uploads/Guidance-on->

extra-territorial legislation.¹⁸⁵ It is important for regulators to work with technology experts, networks of surveillance, and enforcement agencies in addressing how cyber-risks may affect traditional conceptions of investor protection and intermediary responsibility.¹⁸⁶ Regulators must also be aware that fintech developments that may appear “alternative” today could rapidly become widely adopted. The judgment-based approach¹⁸⁷ championed internationally and in the United Kingdom can form the basis for a regulatory approach that adopts early monitoring and reflective consideration of the key aspects of fintech innovation in terms of “change,” “substitutive potential,” and “structural impact.”

Finally, we believe that fintech in intermediary interfaces and processes provides inspiration for possible regulatory innovation that will bring about significant structural impact. For example, fintech advancement could be applied to financial consumer dispute resolution. This is an important complement to the structural changes in financial intermediation processes and interfaces. As consumers are increasingly promised cost-effective, quick, immediate access to financial intermediation services that could be partly or fully automated, why should consumer disputes not be capable of resolution within similar principles, frameworks and interfaces? In the United Kingdom, there is

cooperation-with-non-CMG-hosts.pdf; FINANCIAL STABILITY BOARD, INFORMATION SHARING FOR RESOLUTION PURPOSES: CONSULTATIVE DOCUMENT (Aug. 12, 2013).

185. For instance, under the E.U. Market Abuse Regulation, any market abuse activity in relation to financial instruments that are traded on European financial markets which can be concurrently traded elsewhere are potentially targeted. *See* Council Reg. No. 596/2014/EC On Market Abuse, 2014 O.J. L173/1, art. 2(4) [hereinafter Market Abuse Regulation] (stating that the prohibition of market abuse behaviour and hence the enforcement against such behaviour is in relation to financial instruments traded on regulated and authorised trading exchanges or platforms, so trading conduct that occurs in a third country affecting such instruments would be caught within the scope of the Regulation).

186. *See Beyond Firewalls: A New World of Cyber Security*, MORGAN STANLEY.COM (Nov. 20, 2015), <http://www.Morganstanley.com/ideas/Cyber-security-risks-and-opportunities>. It is to be noted that the U.S. SEC has started to adopt Regulations that deal with cyber risks, in particular to ensure that regulated institutions and markets have control structures in place to address information security and deal with cyber risks, such as Regulation SCI and Regulation S-P, which may be found at <https://www.sec.gov/spotlight/cybersecurity.shtml>. This area is still generally submerged in “organisational arrangements” in the European Union, with no specific flagging up of cyber risks. *See, e.g.*, Council Directive 93/22/EEC On Markets in Financial Instruments, 2004 O.J. L145, art. 16 [hereinafter Markets in Financial Instruments Directive] (dealing generally with the continuity and efficiency of operations, sound governance structures, general internal control and safeguard of information). In sum there are regulatory duties imposed on firms to ensure adequate infrastructure, systems and safeguards but the extent of firms legal liabilities are yet untested.

187. *See generally* BANK OF ENGLAND, THE PRUDENTIAL REGULATION AUTHORITY’S APPROACH TO BANKING SUPERVISION, *supra* note 71 (describing the judgment-based approach); *see generally* Bank for International Settlements, *supra* note 71 (showing international endorsement by the Basel Committee).

scope to consider developing the Financial Ombudsman service in this way.¹⁸⁸

IV. MARKETPLACES IN FINANCE

We now turn to how market-places in finance have been constituted and are evolving in order to discern the aspects of “change,” “substitution,” and “structural impact” that may inform regulatory considerations.

Marketplaces in financial instruments used to tend towards centralization. This is because the network effects of users favor consolidating transactions in a dominant marketplace where transactions can be more efficiently executed. The rise of national stock exchanges for corporate securities reflected this particular tendency.¹⁸⁹ However, the rise of market monopolies or oligopolies has produced uncompetitive effects,¹⁹⁰ and this has led to a deliberate policy movement in the United States, the United Kingdom, and the European Union to foster market competition (*i.e.*, to stimulate a market for markets).¹⁹¹ The development

188. See Financial Services and Markets Act, 2000, c. 8, §§ 225-32, (U.K.). The Ombudsman has compulsory jurisdiction over regulated financial entities and consumers can make complaints against financial services providers. Consumers experience an informal and cost-effective dispute resolution process based on principles of fairness and justice. See, e.g., R. (on the Application of IFG Fin. Serv., Ltd. v. Fin. Ombudsman Serv., Ltd., [2005] EWHC 1153. The Ombudsman has the power to award up to £150,000 in compensation to aggrieved consumers whose complaints are upheld but the award is subject to *res judicata*, which means that claimants are not allowed to claim for further damages through court litigation. Clark v. In Focus Asset Mgmt. & Tax Sols., Ltd. [2012] EWHC 3669 QB and [2014] EWCA Civ. 118.

189. Peter Gomber et al., *Competition Between Equity Markets: A Review of the Consolidation Versus Fragmentation Debate* (House of Fin. Sustainable Architecture for Fin. in Eur. Working Paper No. 35, 2016), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2362216.

190. John C. Coffee, *Competition Versus Consolidation: The Significance of Organizational Structure in Financial and Securities Regulation*, 50 BUS. LAW. 447 (1995); Jason Fink et al., *Competition on the Nasdaq and the Growth of Electronic Communication Networks*, 30 J. BANKING & FIN. 2537 (2006) (finding collusive behavior on established exchanges such as Nasdaq that extracted excessive rents from trading participants, and hence support the beneficial effects of competition to reduce such market failures).

191. The United States encouraged market competition by placing markets on a level playing field under Regulation NMS which required all bid and offer prices to be posted on a Consolidated Quotation system, and by requiring that trade-through be achieved (*i.e.*, the routing of orders to the execution venue with the best price). See, e.g., Stephen Diamond & Jennifer Kuan, *The Importance of Institutional Design: Evidence from the New York Stock Exchange IPO and Reg. NMS*, AM. L. & ECON. ASS'N (forthcoming Jan. 2012), <http://ssrn.com/abstract=1987275>. Where the European Union is concerned, the Markets in Financial Instruments Directive 2004 encouraged the flourishing of alternative trading venues such as electronic trading networks away from main exchanges, subjecting all to the same pre and post-trade price transparency obligations, therefore fostering a form of level playing field without a trade-through rule or Consolidated

of market competition in the United Kingdom was led by harmonized E.U. legislation. Policy intervention in this area may be regarded as addressing a market failure, but may also be regarded as distorting. Nevertheless, such policy intervention has produced a largely fragmented state of financial market structures. Inter-market competition and fragmentation has become a structural reality in financial marketplaces. Against this context, we will discuss recent developments such as dark pools, trading innovations and even alternative “utopian” marketplaces denominated in unconventional value carriers, such as private currencies like bitcoin.

A. *The Fragmented Markets Phenomenon*

In the United States, the United Kingdom, and the European Union, an array of marketplaces cater for broker-dealers’ trading activities, from national exchanges in New York, London and Frankfurt to electronic networks set up by brokerages and investment banks such as BATS, which consolidated with Chi-X, Instinet (bought by Nomura), and Archipelago, which was consolidated with the NYSE. We could also consider investment banks’ order books as internal marketplaces; internalization being frequently practiced in the European Union. Into the picture we should add newer developments such as ‘dark pools’¹⁹² which are closed networks that do not display price transparency and are intended for the execution of usually large orders where traders prefer anonymity.

Market fragmentation is the result of policy support for market competition. Such policy support is arguably not unwarranted as commentators have found that indicators of market quality have improved with competition between fragmented markets. A survey of literature indicates broadly that price discovery has improved (*i.e.*, bid-

Quotation system. See Jean-Pierre Casey & Karel Lannoo, *The MIFID Implementing Measures: Excessive Detail or Level Playing Field?* (CEPS Working Paper No.1, May 2006), <https://www.ceps.eu/publications/mifid-implementing-measures-excessive-detail-or-level-playing-field>; see also Lena Körber et al., *The Effect of Fragmentation in Trading on Market Quality in the UK Equity Market*, 34 J. TIME SERIES ANALYSIS 552-61 (2013), <http://ssrn.com/abstract=2315414>. See generally JOHN BOARD ET AL., *TRANSPARENCY AND FRAGMENTATION: FINANCIAL MARKET REGULATION IN A DYNAMIC ENVIRONMENT* (2002). But see Peter Hoffmann, *Adverse Selection, Market Access, and Inter-Market Competition*, 65 J. BANKING & FIN. 108 (2015) (stating that the E.U. price transparency rules do not go far enough to promote effective market competition and more adverse effects of market fragmentation are observed).

192. See generally James Brugler, *Into the Light: Dark Pool Trading and Intraday Market Quality on the Primary Exchange*, (Bank of England, Staff Working Paper No. 545, 2015) (discussing dark pool trading); see generally Sabrina Buti et al., *Diving into Dark Pools* (Fisher College of Business, Working Paper No. 2010-03-010, 2011), <http://www.ssrn.com/abstract=1630499> (discussing dark pool trading).

ask spreads on markets have reduced¹⁹³ and transaction fees have been reduced¹⁹⁴). Further, market fragmentation caters to the needs of different traders,¹⁹⁵ and the rise of dark pools is a case in point. Dark pools have grown primarily as venues where institutional investors could anonymously trade large orders of securities without unduly exposing themselves or affecting price movements in the open market.¹⁹⁶ However, they are controversial as they do not practice price transparency¹⁹⁷ and therefore cause adverse selection. They can be seen to be a place that steals the liquidity that institutional orders would have offered to open marketplaces.¹⁹⁸ In such dark pools, the less transparent environment may also be used by brokers towards abusive ends, such as the carrying out of proprietary trading that is detrimental to the interests of their clients.¹⁹⁹ It is inconclusive if liquidity across fragmented markets, including secretive dark pools, is reduced overall.²⁰⁰

In critically evaluating the pros and cons of market fragmentation, one needs to bear in mind the effects of regulatory intervention. Where markets are in competition *as such* (without any regulatory policy that addresses the adverse effects of such competition), the increase in information cost for brokers and investors and the reduced pools of liquidity in each fragmented venue could result in adverse selection cost, worse price efficiency, liquidity, and transaction outcomes for individual trades.²⁰¹ It could be argued that fragmented markets only *work* and

193. Fink et al., *supra* note 190, at 2537; Carlos Aparcio Roqueiro, *Order Duplication and Liquidity Measurement in EU Equity Markets*, ESMA ECON. REP. No. 1 (2016). Even dark pools have not damaged but have instead contributed to better price efficiency according to some empirical research. *See, e.g.*, Haoxiang Zhu, *Do Dark Pools Harm Price Discovery?*, REV. FIN. STUD. (forthcoming 2013), <http://ssrn.com/abstract=1712173>; Brugler, *supra* note 192; Patricia Kefilwe Madigele, *Financial Markets Analysis: A Critical Analysis of Dark Pools*, (May 15, 2014), <http://ssrn.com/abstract=2437314>; Buti et al., *supra* note 192; William Peng He & Andrew Lepone, *Determinants of Liquidity and Execution Probability in Exchange Operated Dark Pool: Evidence from the Australian Securities Exchange* (Dec. 6, 2011), <http://ssrn.com/abstract=1969190> (writing on empirical findings from the Australian markets that support positive findings on market quality).

194. Markus Baldauf & Joshua Mollner, *Trading in Fragmented Markets* (July 22, 2016), <http://ssrn.com/abstract=2782692>.

195. James Angel et al., *Equity Trading in the 21st Century* (Marshall Res. Paper Series Working Paper FBE 09-10, 2010), <http://ssrn.com/abstract=1584026>.

196. Pierre Paulden, *Daggers, Dark Pools & Disintermediation*, 41 INST. INVESTOR 60 (2007).

197. Andreas M. Fleckner, *Regulating Trading Practices*, in OXFORD HANDBOOK OF FINANCIAL REGULATION, *supra* note 11.

198. Thereby causing transaction cost on open markets to rise. *See* Krishnamurthy Iyer et al., *Welfare Analysis of Dark Pools* (Dec. 1, 2016), <http://ssrn.com/abstract=2040959>.

199. Buti et al., *supra* note 192.

200. Körber et al., *supra* note 191. *But see* Baldauf & Mollner, *supra* note 194; Paul Bennett & Li Wei, *Market Structure, Fragmentation, and Market Quality*, 9 J. FIN. MKTS. 49 (2006).

201. Baldauf & Mollner, *supra* note 194; Vanthuan Nguyen et al., *Short- and Long-Term*

demonstrate beneficial effects as a result of regulatory intervention in the United States, the United Kingdom, and the European Union that foster a level playing field.²⁰² In other words, policy-makers' fostering of market competition results in a form of 'controlled competition,' as regulation promotes efficient capital markets effects but also sets out to prevent certain market failures.

We argue that the focus on market competition and the fostering of fragmented markets has produced two pronounced effects. One is that marketplaces have become commoditized and are less incentivized to take on broader governance roles in the interests of maintaining market order and stability. Macey and O'Hara²⁰³ argue that market competition has made it too costly for markets to introduce governance structures for vetting issuers and traders, as capturing their fees and rents have become a predominant concern. Further, Yadav²⁰⁴ doubts that marketplaces are sufficiently incentivized to invest enough to maintain market order and stability. Under-investment in governance by markets has resulted in a governance gap for overall market order and stability. However, the U.K. FCA continues to gently nudge dark pools towards optimal self-governing behavior and prefers a non-intrusive approach.²⁰⁵ It is questioned whether this is consistent with the forward-looking regulatory approach the U.K. regulator has adopted. One of the most-cited recent episodes of market instability was the Flash Crash of May 2010 on the New York Stock Exchange (NYSE) where for 30 minutes, a range of securities lost significant market value in a rapid selling episode that depressed their prices. The Flash Crash was attributed to the temporary lack of liquidity in the market for the affected stocks after a large sell order of index futures failed to be executed immediately, forcing a

Effects of Multimarket Trading, 42 FIN. REV. 349 (2007).

202. Nguyen et al., *supra* note 201, at 349. Certain large orders are, however, exempted from price transparency under the E.U. Markets in Financial Instruments Regulation 2014, which continues to support their routing to dark pools. Andreas Storkenmaier & Martin Wagener, Do We Need a European 'National Market System'? Competition, Arbitrage, and Suboptimal Executions (May 3, 2011), <http://ssrn.com/abstract=1760778> (writing on how price transparency regulation in the European Union causes markets to behave as if consolidated for the benefit of investors).

203. Jonathan Macey & Maureen O'Hara, *From Markets to Venues: Securities Regulation in an Evolving World*, 58 STAN. L. REV. 563 (2005).

204. Yesha Yadav, *Fixing Private Regulation in Public Markets* (Vanderbilt L. & Econ. Res. Paper No. 16-5, 2016), <http://ssrn.com/abstract=2754786>.

205. FINANCIAL CONDUCT AUTHORITY, TR16/5: UK EQUITY MARKET DARK POOLS—ROLE, PROMOTION AND OVERSIGHT IN WHOLESALE MARKETS 22 (2016), <http://fca.org.uk/news/tr16-05-uk-equity-market-dark-pools> (discussing the view that dark pools benefit their users but the conduct of the pools could be more optimal). The FCA wishes to continue adopting a relatively non-intrusive approach, asking dark pools to clarify user expectations, and to ensure that governance, control and monitoring of dark pools are adequate. Users are also exhorted to understand the purposes served by such venues.

downward spiral of price in a rapid trading environment.²⁰⁶ It is only after the Flash Crash that the NYSE updated their circuit breakers for the new trading environment, so that trading suspensions can be introduced beyond a certain threshold of abnormal price slide.²⁰⁷ The belated response in considering the market risks of such trading practices and to put in place appropriate governance and control shows the reluctance of marketplaces to invest in costly governance and control.

Much greater regulatory control over marketplaces in the United Kingdom and European Union has to an extent attempted to address the governance deficit. The E.U. Markets in Financial Instruments Directive 2014 (MiFID) imposes on all markets the obligation to monitor and detect market abuse, report abnormalities, and put in place controls and governance for resilience purposes, such as circuit breakers.²⁰⁸ This regime has been transposed in U.K. legislation. The MiFID's regime seems to show that persistent regulatory oversight and intervention is a necessary condition for the healthier aspects of market competition to be reaped while controlling for its externalities.

Second, market competition has induced a cultural shift towards emphasis on trading and market arbitrage, disengaging the role of markets from being long-term allocators of investment for the real economy.²⁰⁹ The support for market competition and the maintenance of short-term price efficiency encourages myopic trading and short-termism.²¹⁰ The adverse long-term effects and welfare-destruction effects of short-termism have been highlighted²¹¹ but continue to be given inadequate consideration in policy development. Regulators, in their overwhelming support for the immediate benefits of market competition, have persisted with a quiet trade-off of long-term goals. This inherent

206. Andrei A. Kirilenko et al., *The Flash Crash: High Frequency Trading in an Electronic Market*, J. FIN. (forthcoming 2016), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1686004; Albert J. Menkveld & Bart Zhou Yueshen, *The Flash Crash: A Cautionary Tale about Highly Fragmented Markets* (Apr. 2, 2016), <http://ssrn.com/abstract=2243520>.

207. NYSE Trading Information, Circuit Breakers, https://www.nyse.com/markets/nyse/trading-info#Circuit_Breakers.

208. See Markets in Financial Instruments Directive 2014, arts. 17(5), 33, 48 & 54.

209. Dalia Tsuk Mitchell, *Institutional Shareholders as Proxies: The Contours of Shareholder Democracy*, 65 WASH. & LEE L. REV. 1503 (2006) (discussing the rise of the trading culture).

210. PAUL FRENTROP, INAUGURAL LECTURE: SHORT TERMISM OF INSTITUTIONAL INVESTORS AND THE DOUBLE AGENCY PROBLEM (June 25, 2012), <http://ssrn.com/abstract=2249872>; David Marginson & Laurie McAulay, *Exploring the Debate on Short-Termism: A Theoretical and Empirical Analysis*, 29 STRATEGIC MGMT. 273 (2008); James Juniper, *A Genealogy of Short-Termism in Capital Markets* (Centre of Business, Analysis & Res. Working Paper No. 2000-03, 2000), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=219990; Moore & Walker-Arnott, *supra* note 115, at 416.

211. E.g., DEPARTMENT OF BUSINESS, SKILLS & INNOVATION, THE KAY REVIEW OF UK EQUITY MARKETS AND LONG-TERM DECISION MAKING 39 (Final Report, July 23, 2012).

bias is something that regulators need to address in considering any regulatory implications for fintech innovation in marketplaces.

The backdrop of regulatory favor for market competition explains to an extent the development of financial innovation in marketplaces focused on achieving more profitable and less risky trading, in the form of algorithmic and high-frequency trading.

B. Trading Innovations

Profits in finance are increasingly being made in trading as intermediaries act as traders exploiting opportunities for value arbitrage.²¹² As mentioned above, short-termist trading is now the norm in financial markets. It could be argued that such short-termist pursuit of price efficiency aligns with long-term allocative welfare.²¹³ However, if short-term prices are not nearly as efficient as one hopes,²¹⁴ then short-term value arbitraging results in zero sum games that are carried out with complete obliviousness to the impact on the long-term.²¹⁵ Cautionary voices are however in a minority as policy-makers subject to short-termist democratic politics themselves, are not keen to take stronger stands against the rise of the trading culture. In such a context, trading innovations have flourished, in particular algorithmic and high frequency trading.

Algorithmic trading involves the use of computer programmed algorithms to execute trades automatically, such programs embedding certain risk management practices defined by traders. In a simplistic way, this is another technological development that replaces human labor by machines whose programmed executions would be quicker and much more consistent than human judgments. Moreover, with the use of increasingly sophisticated computers, more comprehensive data analytics can inform algorithmic trading. Today's high frequency trading is based on an information processing capacity far exceeding the human capacity,

212. Mitchell, *supra* note 209, at 1525.

213. The logic of accepting the efficient capital markets hypothesis in its strong form, although supporting commentators have conceded that most markets only at best exhibit a semi-strong form. See Eugene Fama, *Efficient Capital Markets: A Review of Theory and Empirical Work*, 25 J. FIN. 383 (1970); Art Durnev et al., *Law, Share Price Accuracy, and Economic Performance: The New Evidence*, 102 MICH. L. REV. 331, 386 (2003).

214. See D. Langevoort, *Taming the Animal Spirits of the Stock Markets: A Behavioral Approach to Securities Regulation*, 97 NW. UNIV. L. REV. 135 (2002); ROBERT SHILLER, *IRRATIONAL EXUBERANCE* (2d ed. 2006).

215. See, e.g., Emeka Duruigbo, *Tackling Shareholder Short-Termism and Managerial Myopia* (2011-12) 100 KY. L.J. 531; Maria Maher & Thomas Andersson, *Corporate Governance: Effects on Firm Performance and Economic Growth*, in *CORPORATE GOVERNANCE REGIMES: CONVERGENCE AND DIVERSITY* (Joseph A. McCahery et al., 2002).

and is able to take place in milliseconds, approaching the speed of light.²¹⁶

It may be argued that the rise of high frequency trading (HFT) has greatly exacerbated the focus on the trading culture, as traders try to profit from slivers of value arbitrage, driving short-termism to an extreme.²¹⁷ Commentators document that high frequency traders embark on a high volume and low margin strategy, which, aided by the speed and the relatively short span of exposure, creates very little risk for traders. For example, traders may enter many passive orders into a market to capture liquidity rebates offered by markets and cancel them very quickly soon after so that gains are made without any risky exposure.²¹⁸ Another tactic is layering, where many orders at marginally increasing prices are entered and cancelled, resulting in slower traders responding to the increasing bids. The high frequency traders then capture trades at the much higher bids that has been induced by the layering.²¹⁹ HFT also involves capturing small advantages in the speed of obtaining market information. For example, many HFT firms rent space very close to exchange servers so that they may obtain a millisecond advantage in public information releases before information arrives at slower markets. This practice is known as co-location. Such information advantage allows HFT firms to gain a trading advantage over the rest of the market.²²⁰

It may be argued that such new forms of competitive innovation should not raise alarm as value arbitrage has been sought by traders long before the advent of such technology.²²¹ Capital markets are, at best, semi-strong efficient so traders have always sought to exploit inefficiencies for private gains.²²² Such behavior is not new to human nature. Empirical researchers on HFT also find that markets with HFT participation enjoy beneficial effects, in terms of price discovery²²³ and

216. James Angel, *When Finance Meets Physics: The Impact of the Speed of Light on Financial Markets and Their Regulation*, 49 FIN. REV. (2014), <http://ssrn.com/abstract=2378352>.

217. Frank Pasquale, *Law's Acceleration of Finance: Redefining the Problem of High-Frequency Trading*, 36 CARDOZO L. REV. 2085 (2015).

218. Mi Hyun Yoon, *Trading in a Flash: Implication of High Frequency Trading for Securities Regulators*, 24 EMORY INT'L L. REV. 913 (2010).

219. Steven McNamara, *The Law and Ethics of High-Frequency Trading*, 17 MINN. J.L. SCI. & TECH. 71 (2016).

220. Charles R Korsmo, *High Frequency Trading- A Regulatory Strategy*, 48 U. RICH. L. REV. 523 (2013).

221. Holly A. Bell, *High Frequency Trading: Do Regulators Need to Control this Tool of Informationally Efficient Markets?* (Cato Inst. Pol. Analysis No. 731, 2013).

222. Robert Jarrow & Philip Protter, *A Dysfunctional Role of High Frequency Trading in Electronic Markets* (Johnson Sch. Res. Paper Series No. 08-2011, 2011), <http://ssrn.com/abstract=1781124>.

223. Jonathan Brogaard et al., *High Frequency Trading and Price Discovery* (Eur. Cent. Bank, Working Paper No. 1602, 2013), <http://ssrn.com/abstract=2341037>; Gbenka Ibikunle, *Competition for Order flow and Price Discovery: The Curious Case of High-tech Entrants* (Aug. 14, 2015), <http://ssrn.com/abstract=2440691>; Jeffrey G. MacIntosh, *High Frequency Traders:*

liquidity,²²⁴ though more arguably, lower price volatility.²²⁵ Of course, one could argue that the overall market effects, even if beneficial, are at a broad level only. At the micro level, those that have traded with HFTs have been subject to exploitation and worse, predatory trading. The slower trader who transacted with the HFT in a layered market has incurred an adverse selection cost.²²⁶ HFTs that appear to supply constant liquidity are also themselves liquidity takers.²²⁷ HFT has the potential of splitting up large institutional orders to obtain best prices across different markets, but also has the potential of sniffing out large institutional orders in dark pools and executing against them at less than sub-optimal prices for the institutional investor.²²⁸

Although some HFT practices are arguably competitive innovations not involving market abuse, commentators raise questions over (a) the fairness of engaging in such innovative advantage; (b) the potential for HFT to sponsor market abuse and (c) how HFT may undermine regulatory objectives, such as financial and market stability.

Regulators seem hesitant on making a judgment on (a). As mentioned earlier, HFT has consistently shown to produce beneficial short-term effects in market quality, making prices more efficient and generally providing more and constant liquidity. However, the process of making prices more efficient generally involve exploiting a less-quickly informed or less rapid trader, and the “unfairness” at the micro transactional level

Angels or Devils? (C.D. Howe Inst. Comment. No. 391, 2013), <http://ssrn.com/abstract=2340673>; Ekkehart Boehmer et al., *International Evidence on Algorithmic Trading* (AFA 2013 San Diego Meetings Paper, 2015), <http://ssrn.com/abstract=2022034>. See also Martin Haferkorn, *High Frequency Trading and its Role in Fragmented Markets*, 23 PROCS. OF THE EUR. CONF. ON INFO. SYS. (2015), <http://ssrn.com/abstract=2600240>.

224. This is because HFT firms may enter continuous passive orders into the system, providing constant liquidity, or be engaged in market making as such market making is aligned with their high volume, low margin strategy. See Brogaard et al., *supra* note 223, at 28; MacIntosh, *supra* note 223, at 11. However, HFT firms are not committed liquidity providers and market makers and could vanish if the market conditions are unfavourable, exacerbating into flash crashes like in May 2010, see Andrei A. Kirilenko & Andrew W. Lo, *Moore's Law vs. Murphy's Law: Algorithmic Trading and Its Discontents*, 27 J. ECON. PERSP. 51, 63 (2013). See also Boehmer et al., *supra* note 223, at 26 (discussing the view that HFT firms are not committed market-makers and hence their provision of liquidity may be very transient and unreliable).

225. Some commentators opine that HFT causes more price volatility due to the rapid firing of orders, see, e.g., Boehmer et al., *supra* note 223, at 6; Fleckner, *supra* note 197, in OXFORD HANDBOOK OF FINANCIAL REGULATION, *supra* note 11, at 668; but others have found no beneficial impact, see Kirilenko & Lo, *supra* note 224, at 68; Haferkorn, *supra* note 223, at 13.

226. Merritt B. Fox et al., *The New Stock Market: Sense and Nonsense*, 65 DUKE L.J. 191, 217-18 (2015); Jarrow & Protter, *supra* note 222; McNamara, *supra* note 219, at 132.

227. David Easley et al., *Flow Toxicity and Liquidity in a High-Frequency World*, 25 REV. OF FIN. STUD. 1457, 1482 (2012); Didier Sornette & Susanne von der Becke, *Crashes and High Frequency Trading* 5 (Swiss Fin. Sci. Res. Paper No. 11-63, 2011), <http://ssrn.com/abstract=1976249>.

228. Fox et al., *supra* note 226, at 194.

needs to be addressed.²²⁹ The arguments in favor of market efficiency should not totally drown the concerns regarding the ethics of individual “harms” that are caused.²³⁰ Further, a market that favors the competitive advantage enjoyed by HFT firms would only provoke a socially useless arms race in trading innovation.²³¹ Commentators urge that certain market practices exacerbate the already unfair advantage HFT firms have and would need to be scrutinized. For example, co-location gives HFT firms an advantage in information although this advantage is open to any who can rent such space.²³² Further, HFT that subscribes to preferential data feeds that are sent a fraction of a second before such feeds are made for public release also has an arguably unfair information advantage.²³³ Exchanges also practice flash orders (*i.e.*, to allow HFT firms to briefly see an order before it appears on the open market) if it is not immediately executable. This again undermines the level playing field in the markets.²³⁴ The SEC’s recent fines imposed on Barclays and Credit Suisse could be key to nailing down the undesirable practice of flash orders.²³⁵ The SEC enforcement action was based on the banks’ misrepresentation to their investors that their dark pools are fair when they in fact practice flash orders to HFT firms. Although the flash orders were not themselves the subject of enforcement, such enforcement could go some way in articulating a firmer regulatory position about them.

On (b), although the majority of HFT practices are to capture slivers of value arbitrage, the superior technology of HFT can be used towards market abuse and it may be rather difficult to detect such behavior or pin it down as being abusive. It may be argued that the current regulatory framework should be able to capture HFT demonstrating anti-social behavior and market abuse. In this way, HFT is not itself a problem.²³⁶ However, certain HFT practices push the boundaries of current regulatory definitions, such as layering. One could argue that layering is a form of

229. Michael J. Aitken et al., *Market Fairness: The Poor Country Cousin of Market Efficiency* 4 (Nov. 12, 2014), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2440671.

230. Michael Davis et al., *Ethics, Finance, and Automation: A Preliminary Survey of Problems in High Frequency Trading*, 19 *SCI. ENG’G & ETHICS* 851 (2013).

231. Camillo Von Muller, *Regulating High Frequency Trading: A Micro-Level Analysis of Spatial Behavior, Optimal Choices, and Pareto-Efficiency in High Speed Markets* (Univ. St. Gallen Law & Econ. Res. Paper No. 04, 2012), <http://ssrn.com/abstract=2000119>.

232. Korsmo, *supra* note 220, at 564; McNamara, *supra* note 219, at 74. But the practice of co-location is arguably legitimised in the European Union as the Markets in Financial Instruments Directive 2014 adopts the practice of co-location as part of the definition of HFT. There is thus no policy move towards regarding this practice as “unfair.”

233. McNamara, *supra* note 219, at 108.

234. *Id.* at 71.

235. *Barclays and Credit Suisse are Fined Over US ‘Dark Pools,’* BBCNews (Feb. 1, 2016), <http://www.bbc.com/news/business-35456219>.

236. Angel et al., *supra* note 195; Bell, *supra* note 221.

market abuse as it is a rapid version of pump and dump, causing market prices to rise by the layered orders and then seeking to execute at a much higher price at the expense of the counterparty.²³⁷ On the other hand, layering involves rapid cancellation, unlike pump and dump, and so market information is technically not distorted, except that slower traders have not had a chance to process them in such rapid fire. The governance gaps raised by the capabilities of HFT need to be looked into.

Finally, market practices do not merely have transactional and efficiency impact and could, at a broader level, affect market and financial stability. Financial stability in particular has been overtly embraced as a key public good and regulatory objective in the wake of the global financial crisis of 2008 and 2009.²³⁸ Commentators exhort that it is not sufficient to assume that marketplaces will work optimally, and that the micro-efficiencies in marketplaces will align with wider phenomena such as financial stability.²³⁹ Micro-efficient behavior could indeed result in pro-cyclical and herding behavior that is damaging to overall market and financial stability.²⁴⁰ It is arguable that HFT, which augments micro-efficient behavior to the hilt, could have a particularly adverse impact on financial stability. HFT is largely automated and may not be able to nimbly respond to abnormal market conditions or significant changes.²⁴¹ In such a situation, the rapid trading automation of HFT would exacerbate pro-cyclical actions that could cause already difficult market conditions to more rapidly slide into crisis.²⁴² In other words, HFT may not be responsible for bringing about difficult market conditions such as a decline in liquidity or falling asset prices. But it could be used to quickly exacerbate them, making it difficult for interventions to take place for the stabilization of markets. Thus, the systemic risk impact of HFT trading has been flagged up for scrutiny,²⁴³ and the HFT firms that benefit from exploiting such technology should arguably be called upon to ensure that the technology is used, governed, and controlled in a manner responsible for the maintenance of market and financial stability.

237. Tara E. Levens, *Too Fast, Too Frequent? High Frequency Trading and Securities Class Actions*, 82 U. CHI. L. REV. 1511 (2015) (arguing that it is difficult to fit HFT borderline practices into existing interpretations of insider dealing or market manipulation due to the specific rules that have evolved to address those methodologies).

238. See generally ANDENAS & CHIU, *supra* note 57.

239. See THE TURNER REVIEW, *supra* note 52; see generally VIRAL V. ACHARYA & MATTHEW RICHARDSON, *RESTORING FINANCIAL STABILITY: HOW TO REPAIR A FAILED SYSTEM* (Acharya & Richardson eds., 2009).

240. Emiliios Avgouleas, *The Global Financial Crisis, Behavioural Finance and Financial Regulation: In Search of a New Orthodoxy*, 9 J. CORP. L. STUD. 23 (2009).

241. Menkveld & Yueshen, *supra* note 206.

242. Kirilenko & Lo, *supra* note 224; Sornette, & Von der Becke, *supra* note 227.

243. Korsmo, *supra* note 220, at 523.

We are of the view that the relationship between trading innovations and longer term consequences such as long-term allocative efficiency in the real economy and wealth distribution of financial gains must be considered.²⁴⁴ Otherwise, the era of trading innovations would take us into an insular world of micro-efficiency and speed without reference to wide, long-term impact. Trading innovations such as HFT have not gained a salutary social reputation,²⁴⁵ and are contributing toward a wide perception that financial elites dominate the financial markets, disempowering and disenfranchising less sophisticated users.²⁴⁶

Although dynamic innovations in trading technology are being introduced by financial-cum-technology elites, an increasingly small and alienating group of experts, other fintech innovations arise to challenge such market developments. Alternative markets, which are supported to a certain extent by anti-establishment ideologies, are arising. Next, we turn to a very different market development—private markets denominated in alternative currencies, such as bitcoin, which is supported by blockchain technology.

C. Private Alternative Markets—Bitcoin and Blockchain

One of fintech's poster-children would be new digital currencies like bitcoin, which are supported by the blockchain technology. In essence bitcoin is non-government backed private "money" that is not regarded as legal tender in most jurisdictions but is increasingly accepted on a private basis as a means of exchange.²⁴⁷ The concept of money developed from ancient times as a means of exchange with intrinsic value (such as gold and silver coins) to predominantly a means of exchange backed by sovereigns and law.²⁴⁸ However, the concept of intrinsic value has not become totally irrelevant as money is used as a means to store value, meaning that its commodity value is still important. Such value has become, for most currencies, reflected in the price that the markets are willing to pay for the currency.

Private money is not a new phenomenon and has largely flourished in

244. Pasquale, *supra* note 217, at 2085.

245. MICHAEL LEWIS, FLASH BOYS (2015).

246. Which is already a trend in the deregulatory and liberal era of financialization, see generally chapter 3 in ANDENAS & CHIU, *supra* note 57 and cites within depicting a highly decentred governance landscape but highly captured by the financial elite.

247. Andrés Guadamuz & Chris Marsden, *Blockchains and Bitcoin: Regulatory Responses to Cryptocurrencies*, 20 FIRST MONDAY (2015), <http://firstmonday.org/ojs/index.php/fm/article/view/6198/5163>.

248. See Lawrence J. Trautman & Alvin C. Harrell, *Bitcoin Versus Regulated Payment Systems: What Gives?*, 37 CARDOZO L. REV. 1, 3 (forthcoming 2016), <https://ssrn.com/abstract=2730983>; *The Concept of Money*, in MANN ON THE LEGAL ASPECT OF MONEY (Charles Proctor ed., 7th ed. 2012).

closed networks.²⁴⁹ For example, digital currencies exclusive to online games, like ‘gold’ in the popular *World of Warcraft*. Bitcoin is another digital currency, but it is potentially capable of breaking boundaries largely because it is supported by blockchain technology that aims to create the institution and infrastructure for exchange in the real economy.

The technical working of blockchain technology has been extensively documented elsewhere.²⁵⁰ In brief, it is a distributed ledger technology that maintains a single record of all transactions. Every record of transaction is created by market participants using secure cryptography to ensure that every transaction is initiated, authorized, verified, and sealed by volunteer software experts (called miners). The record created is then indelible and irreversible. This technology has the potential of bolstering confidence in the ordinary commercial use of bitcoin, as the main risk with the use of such private money, mainly fraud and double-spending,²⁵¹ is minimized. Supported by blockchain technology, private “bitcoin-based” economies could arise across borders on the Internet, and form alternative commercial and financial markets.²⁵²

The development of such alternative markets has attracted some regulatory support²⁵³ as being *prima facie* not inconsistent with policy-makers’ bias toward market competition. However, regulatory response is mixed at the international level, as the “alternative” nature of such economies necessarily poses some threat to states and regulators.²⁵⁴ Some commentators see the creation of such a decentralized and private economic phenomenon as truly liberating, as existing political or systemic shackles to economic development could be overcome by the

249. Guadamuz & Marsden, *supra* note 247.

250. See, e.g., Aaron Wright & Primavera De Filippi, *Decentralized Blockchain Technology and the Rise of Lex Cryptographia* (Mar. 10, 2015), <http://ssrn.com/abstract=2580664>; Harvey, *supra* note 156.

251. Misha Tsukerman, *The Block is Hot: A Survey of the State of Bitcoin Regulation and Suggestions for the Future*, 30 BERKELEY TECH. L.J., 1127, 1133 (2015).

252. See, e.g., Wilko Bolt & Maarten R.C. van Oordt, *On the Value of Virtual Currencies* 25-29 (Bank of Canada, Staff Working Paper No. 2016-42, 2016), <http://www.bankofcanada.ca/wp-content/uploads/2016/08/swp2016-42.pdf> (suggesting that as more consumers and merchants participate in using Bitcoin, volatility will decrease and the currency will function productively).

253. The Financial Conduct Authority recently granted an e-money license to a British startup that exchanges dollars and pounds with Bitcoin and facilitates Bitcoin transfers. Edward Robinson, Barclays, *UK Regulators Endorse Bitcoin with Startup*, BLOOMBERG (Apr. 6, 2016), <http://www.bloomberg.com/news/articles/2016-04-06/barclays-u-k-regulators-embrace-bitcoin-in-deal-with-startup>.

254. The Russian Finance Ministry recently proposed legislation that would fine users of virtual currencies and imprison them for up to seven years. Anna Andrianova, *Bitcoin Users would Face Jail under Russian Cryptocurrencies Law*, BLOOMBERG (Apr. 27, 2016), <https://www.bloomberg.com/news/articles/2016-04-28/russian-law-would-send-bitcoin-users-to-jail-as-cyber-criminals>. See *Where is Bitcoin Legal?*, CNN MONEY, <http://money.cnn.com/interactive/technology/where-is-bitcoin-legal/> (last visited Oct. 14, 2016).

creation of new institutions. It is suggested that the blockchain technology enables new institutional structures, such as decentralized autonomous institutions, to replace centrally governed institutions. These decentralized institutions have the potential to be more sophisticated than conventional ones and are automatically coordinating in ways that are efficient.²⁵⁵ For example, investors in a private “bitcoin-based” financial investment economy could be freed of the shackles of existing intermediary structures in the financial sector and invest without being subject to extensive principal-agent problems.²⁵⁶ The private money economy of crypto-currencies and blockchain could truly support the unbanked in the developing world.²⁵⁷ It is also suggested that private money economies would develop economies of scale in due course and a *lex cryptographia* will arise to establish standards of use and behavior, and dispute resolution, much like the development of the “law merchant” for international trade from long ago.²⁵⁸ Private “bitcoin-based” markets and economies may represent a utopia for some, as such economies are disentangled from conventional economies seen to be under political control.²⁵⁹

However, the rise of such alternative private money-based economies faces great challenges. Such alternative economies are fraught with risks relating to the lack of governance,²⁶⁰ exploitation by fraudsters and

255. MacDonald et al., *supra* note 156, § 2.2 Blockchains as a Technology of Decentralization, Like Markets, at 5.

256. Larissa Lee, *New Kids on the Blockchain: How Bitcoin’s Technology Could Reinvent the Stock Market*, 12 HASTINGS BUS. L.J. 81 n.2, 82 (2016).

257. Paul Vigna & Michael J. Casey, *THE AGE OF CRYPTOCURRENCY: HOW BITCOIN AND DIGITAL MONEY ARE CHALLENGING THE GLOBAL ECONOMIC ORDER* (2016).

258. Wright & Filippi, *supra* note 250, at 44-49.

259. PAOLO TASCA, *DIGITAL CURRENCIES: PRINCIPAL TRENDS, OPPORTUNITIES AND RISKS* (2015), <https://www.ecurex.com/report-download/1b7d41a0-9288-11e6-94b0-3d4cfe118176>.

260. The governance of blockchain-supported bitcoin markets is the strength of the cryptographic technology itself and the incentives of volunteer software programmers who verify and seal transactions for bitcoins in return. Evans questions to what extent the incentive system underlying the maintenance of blockchain by miners would sustain. What if miners no longer reap value from their efforts? Why would decentralised miners be able to coordinate and agree on code, and are miners plagued with conflicts of interest? What would prevent miners from becoming rogues? See David S. Evans, *Economic Aspects of Bitcoin and Other Decentralized Public-Ledger Currency Platforms* (Coase-Sandor Inst., Working Paper No. 685, 2014), <http://ssrn.com/abstract=2424516>; Angela Walch, *The Bitcoin Blockchain as Financial Market Infrastructure: A Consideration of Operational Risk*, 18 NYU J. LEGIS. PUB. POL’Y 837, 870-74 (2015) (arguing that Bitcoin’s decentralization presents potential problems with maintaining the currency system, especially as no one has authority to intervene); Marcella Atzuri, *Blockchain Technology and Decentralized Governance: Is the State Still Necessary?* (Dec. 1, 2015), <http://ssrn.com/abstract=2731132> (warning against raising an unaccountable and powerful class of technology elites to maintain the blockchain as they will become new institutions of power).

criminals,²⁶¹ and the inherent vulnerabilities of code.²⁶² Further, participants in such alternative markets and economies must fully bear the market risks of bitcoin. Bitcoin can be subject to hyperinflation or deflation as its value,²⁶³ not backed by sovereigns and determined in relatively small user markets, can be highly unstable. This could be the Achilles heel of bitcoin-backed alternative markets, making them relatively unscalable. Where such alternative markets remain relatively small and closed, regulatory intervention may be limited and proportionate, targeting fraud, money laundering and terrorist financing,²⁶⁴ while leaving performance and behavior issues to resolution by private redress and/or law. Where such alternative markets attain any scale that warrants regulatory attention, then intervention levels could be higher and erode the very private nature of such markets.

Further, governments²⁶⁵ and established institutions²⁶⁶ are interested in developing the blockchain technology to enhance existing infrastructure. Hence, the biggest uses of blockchain could be deployed in securities clearing, settlement and custodial functions, or in

261. This has not only been raised as a risk, but has materialised in the dark online market of the Silk Road where bitcoins have been used to sponsor trade in illegal substances including drugs and weapons. See Tsukerman, *supra* note 251, at 1148-49.

262. Although blockchain cryptography has been touted as safe, Mt Gox, a bitcoin exchange, lost roughly 850 thousand bitcoins through hacking. Hence, the technology is not completely hack-proof and, as Walch argues, it suffers from the operational risk of maintenance failures. See Walch, *supra* note 260, at 859-61; Tsukerman, *supra* note 251, at 1150; Lee, *supra* note 256, at 104-07.

263. See Lee, *supra* note 256, at 89-90. But see BOLT & VAN OORDT, *supra* note 252 (arguing for a more optimistic outlook which theorizes that the value of bitcoin can be stabilised through increased use and exchange with state-backed conventional currency).

264. This is the essence of the Financial Action Task Force's recommendation for a risk-based approach, that countries assess the extent of risks posed by the digital currencies economies and take proportionate steps to address any money laundering or terrorist financing risks. See FINANCIAL ACTION TASK FORCE, GUIDANCE FOR A RISK-BASED APPROACH: VIRTUAL CURRENCIES (2015), <http://www.fatf-gafi.org/media/fatf/documents/reports/Guidance-RBA-Virtual-Currencies.pdf> [hereinafter GUIDANCE FOR A RISK-BASED APPROACH]. The United Kingdom proposes to apply the existing framework of anti-money laundering and terrorist financing proportionately to digital currencies but will not require all digital wallet providers to be subject wholesale to the compliance obligations imposed on existing financial sector firms. See HM TREASURY, DIGITAL CURRENCIES: RESPONSE TO THE CALL FOR INFORMATION (Mar. 2015), https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/414040/digital_currencies_response_to_call_for_information_final_changes.pdf.

265. An example is the Financial Accelerator created by the Bank of England to harness fintech for its own use. See Oscar Williams-Grut, *Bank of England Launches Fintech Accelerator*, BUS. INSIDER (June 17, 2016), <http://www.businessinsider.com/the-bank-of-england-launches-fintech-accelerator-2016-6>; see ESMA, *The Distributed Ledger Technology*, *supra* note 157 (considering the use of distributed ledger technologies in the securities markets).

266. E.g., Andrew MacAskill & Huw Jones, *Santander says First UK Bank to use Blockchain for Overseas Payments*, REUTERS (May 26, 2016), <http://uk.reuters.com/article/us-santander-blockchain-idUKKCN0YH1UZ>.

international payments and transfers made by established financial institutions. Incumbents' adoption of the blockchain technology could overshadow its functions in the private currency-backed markets and create incentives to impede blockchain innovation for such markets. Incumbents could carry out significant investment and coordination among different systems used in different parts of the financial sector,²⁶⁷ and make blockchain technology both mainstream and proprietary, deviating from its open source roots. Volunteer miners could now become professionally employed to work on, and develop, proprietary systems. The impact of proprietary commercialization of the blockchain technology sector could significantly and adversely affect the development of an open source block-chain supporting the private money markets/economies.

Although the rise of private "bitcoin-based" markets and economies seem to pose a much-touted disruptive challenge to existing markets, we are at a highly dynamic point in witnessing such development, and we are skeptical of the enduring quality of this phenomenon. Bitcoin deviations have already developed, such as Litecoin and Dogecoin, and the competitive forces supporting such decentralization are only likely to foster more fragmentation and less potency against the organized endeavors of incumbent institutions to harvest the potential of blockchain technology. Regulatory interventions such as the New York bitlicense may indeed be needed to bolster the competitive future of bitcoin.²⁶⁸

D. A "Disruptive Innovation" Model in Understanding the Implications of Fintech in Financial Marketplaces

In financial marketplaces, the key change that took place was led by policymakers promoting/market competition. Although policymakers could not foresee the "disruptive" changes that would be brought about by a proliferation of electronic trading venues, this "managed disruption" took place under a rubric of overarching regulatory principles that supported immediate and salient price transparency,²⁶⁹ rigorous internal control and governance for markets,²⁷⁰ obligations imposed on markets

267. See Pinna & Ruttenberg, *supra* note 157 (pointing out that the transaction costs needed in reconciling and overhauling existing systems).

268. N.Y. State, Dep't of Fin. Servs., Part 200. Virtual Currencies, <http://www.dfs.ny.gov/legal/regulations/adoptions/dfsp200t.pdf> (allowing a licence to be granted to financial services operators using virtual currencies subject to regulatory governance for the robustness in maintaining cybersecurity and in preventing money laundering); see Tsukerman, *supra* note 251.

269. Regulation NMS in the United States and the pre-trade and post-trade obligations operative in the U.K. and E.U. markets by virtue of the Markets in Financial Instruments Directive 2004, which was recast and adopted again in 2014.

270. Directive 2004/39/EC of the European Parliament and of the Council on markets in financial instruments amending Council Directives 85/611/EEC and 93/6/EEC and Directive

to monitor and report abuse swiftly,²⁷¹ and the trade-through rule in the United States highlighted earlier. Many of the positive findings on market quality in the United States, the United Kingdom, and the European Union could be due to such a “managed disruption” process.

In this light, the rise of dark pools would not be unforeseen, and neither should innovative practices in trading. Current regulatory principles are able to capture within its scope misbehavior in dark pools. In the United Kingdom and the European Union, rules on best execution, fair and clear investor communication, and market abuse are able to address principal-agent abuses, fraudulent, and market abuse behavior. The United Kingdom and the European Union protect retail investors by a best execution rule premised on best consideration,²⁷² and institutional investors by a best execution rule defined by a range of factors that matter to such investors.²⁷³ The United Kingdom has, in particular, imposed a general principle of fair, clear, and nondeceptive investor communications,²⁷⁴ and so would be able to reach the same decision as the SEC in enforcing against dark pools that were misrepresented to investors. The U.K. and E.U. market abuse regime is premised on strict liability for having caused distortive effects on the market,²⁷⁵ and hence the use of HFT that results in those effects can be subject to market abuse enforcement. It remains to be seen, however, if practices such as layering would be indicted. The European Union has introduced *ex ante* governance of HFT systems by requiring firms to ensure that robust risk controls, business continuity plans and internal governance are in place. Further, an HFT that engages in trading patterns such as making two-way markets in simultaneous orders would be regarded as a market-maker under E.U. legislation and is obliged to provide liquidity on a predictable basis.²⁷⁶ Trades that are carried out via algorithmic trading are also required to be reported with that identification, allowing regulatory monitoring of the impact of such trading on markets.²⁷⁷

Financial markets innovation are consistent with the “managed disruption” sanctioned by policy-makers who have introduced market competition policies. Regulators are generally benign towards such innovation while proportionately protecting stability in markets. The danger however of such a “managed disruption” process is that there is a

2000/12/EC of the European Parliament and of the Council and repealing Council Directive 93/22/EEC.

271. *Id.*

272. *See* FCA Handbook COBS 11.2.7.

273. FCA Handbook COBS 11.2, 11.2.6.

274. FCA Handbook, PRIN module, princ. 7.

275. The outcomes based approach is stated in the Market Abuse Regulation 2014, art. 12, and U.K. cases such as *Winterflood Secs., Ltd. & Ors. v. Fin. Servs. Auth.* [2010] EWCA Civ 423.

276. Markets in Financial Instruments Directive 2014, art. 17.

277. Markets in Financial Instruments Regulation, art. 26(3).

policy presumption of favor of competitive market innovations and it could become difficult to persuade policy-makers to deal adequately with sub-optimal aspects. The “unfairness” aspect of co-location or preferential data feeds for HFT firms raised by a number of commentators above are unlikely to be addressed.²⁷⁸ The adverse selection cost for investors trading on the opposite side of an HFT firm remains a private cost that regulators are unlikely to intervene to address.

The entrenched policy preference for short-term market efficiency as a healthy manifestation of market competition would obscure questions addressed at long-term welfare consequences. Fragmented, competitive markets and a pro-innovation culture in trading cement structural changes in financial marketplaces, making them places for ruthless competition, zero sum games, and short-termist gains. This short-termist trading culture has been lamented in the United Kingdom as being contributory to an unhealthy short-termist culture in the corporate sector,²⁷⁹ increasingly disengaged from investing in the real economy for the long term.²⁸⁰ Although the United Kingdom exhorts institutional investors to behave in a long-termist manner by soft law,²⁸¹ and the European Union²⁸² is concerned that institutional investors should account for how they manage their portfolios for the long-term interests of beneficiaries, these concerns seem only tepidly addressed compared to the overwhelming policy support for short-term efficient markets and the trading culture in these markets.

On the “change” ushered in by private markets or economies

278. In fact, as co-location is one of the criteria for defining high frequency trading under the E.U. Markets in Financial Instruments Directive 2014, it is unlikely that policy-makers would turn around to enforce against this practice as such.

279. See, e.g., ASPEN INST., OVERCOMING SHORT-TERMISM: A CALL FOR A MORE RESPONSIBLE APPROACH TO INVESTMENT AND BUSINESS MANAGEMENT (Sept. 9, 2009), <https://www.aspeninstitute.org/publications/overcoming-short-termism-call-more-responsible-approach-investment-business-management/>.

280. JOHN KAY, THE KAY REVIEW OF UK EQUITY MARKETS AND LONG-TERM DECISION MAKING: FINAL REPORT (July 23, 2012), https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/253454/bis-12-917-kay-review-of-equity-markets-final-report.pdf; JOHN KAY, OTHER PEOPLE’S MONEY (2015); COLIN MAYER, FIRM COMMITMENT (2013).

281. See Iris H-Y Chiu, *Institutional Shareholders as Stewards: Towards a New Conception of Corporate Governance?*, 6 BROOK. J. CORP. FIN. & COM. L. 387 (2012); Iris H-Y-Chiu, *Turning Institutional Investors into “Stewards”: Exploring the Meaning and Objectives of “Stewardship,”* 66 CURRENT LEGAL PROBS. 1 (2013); Konstantinos Sergakis, *The UK Stewardship Code: Bridging the Gap Between Companies and Institutional Investors*, 47 REVUE JURIDIQUE THÉMIS DE L’UNIVERSITÉ DE MONTREAL 109 (2013).

282. Proposed Shareholder Rights Directive 2014, see Proposal for a Directive of the European Parliament and of the Council amending Directive 2007/36/EC as regard the encouragement of long long-term shareholder engagement and Directive 2013/34/EU as regards certain elements of the corporate governance statement (SWD (2014) 126, 127, 128 final) published Apr. 9, 2014; Parliament amended version of July 8, 2015, <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+TA+P8-TA-2015-0257+0+DOC+XML+V0//EN>.

denominated in bitcoin, we think such “change” is slightly less certain in its substitutive potential. Although some regulators are generally supportive in the same pro-competition spirit, they are also ready to intervene if material risks such as money laundering, terrorist financing, fraud, and consumer protection become significant issues of concern.²⁸³ The compliance cost for developing such alternative markets at a larger scale could become forbidding. Further, as the blockchain technology can be harnessed by incumbent financial institutions, the increasing proprietization and forked developments of such technology could create a negative impact for alternative markets denominated in bitcoin. We doubt that such alternative markets or economies are likely to pose a serious substitutive threat²⁸⁴ but could be allowed to exist as parallel systems with conventional markets and economies as long as no systemic risk issues or financial crime are implicated.

CONCLUSION

This Article suggests a high-level framework in which to study the nature, risks and regulatory implications of fintech innovation today. The “disruptive innovation” framework proposed by business school academics is able to help regulators identify *changes* in entities, practices, methodologies, and even ideologies and culture in the financial sector, and to consider the *substitutive potential* of such changes. Significant substitutive potential can give rise to *structural impact* in the financial sector, replacing incumbent entities, practices, methodologies, and markets or creating significant alternative institutions alongside incumbent ones. This framework of studying *change*, *substitutive potential*, and *structural impact* can inform regulators of the need to evaluate if regulatory scope is adequate, whether regulatory principles will continue to meet regulatory objectives like investor protection and financial stability, and whether regulatory rules and prescription need to update and adapt to new practices and methodologies. Here, we applied this framework to study key trends in fintech innovations in financial products, intermediation and markets.

The “disruptive innovation” framework applies not only to a study of fintech for the purposes of regulatory considerations, but also to financial innovation that does not have a fintech element, such as certain aspects of shadow banking.²⁸⁵ Further, this framework is also useful for

283. GUIDANCE ON A RISK-BASED APPROACH, *supra* note 264.

284. *See also* Evans, *supra* note 260.

285. For an overview of how the regulatory perimeter should be informed by shadow banking, see Iris H-Y Chiu, *Transcending Regulatory Fragmentation and the Construction of an Economy-Society Discourse: Implications for Regulatory Policy Derived from a Functional*

regulators to consider whether they should introduce certain policy frameworks to initiate structural changes,²⁸⁶ such as in supporting financial market competition.

The introduction of a high-level framework, consistent with understandings in business innovation, is important so that regulators may have a useful ‘blueprint’ for appraising financial innovation. Over the longer term, such a blueprint contributes towards the development of a more effective regulatory culture that can anticipate developments and carry out consistent policy approaches. Regulators should not take a hands-off approach and leave financial innovations to be evaluated only by financial elites. Regulators should also not adopt knee-jerk reactions to new developments and extend unsuitable regulatory frameworks over them.²⁸⁷ Finally, regulators should try to avoid being caught by surprise if a fallout results from certain financial innovation, as much more is now expected of the new forward-looking approach to financial regulation.²⁸⁸ We cannot expect zero failure but regulators need to equip themselves with suitable frameworks for high-level perspectives and policy design in order to exercise powers appropriately in supplying the public goods of financial stability and investor protection.

Approach to Understanding Shadow Banking, J. CORP. L. (forthcoming 2016); RESEARCH HANDBOOK ON SHADOW BANKING: LEGAL AND REGULATORY ASPECTS (Iris H. Chiu & Iain MacNeil, eds., forthcoming 2017) (featuring a comprehensive treatment of shadow banking activities whether led by Fintech or otherwise).

286. Such as the U.K. regulator’s initiative to introduce competition in the financial benchmarks market. This will not be belaboured here. See Iris H-Y Chiu, *Regulating Financial Benchmarks by ‘Proprietisation’: A Critical Discussion*, 11 CAP. MKTS. L. J. 191 (2016). On the financial benchmarks regulatory regime, see Financial Conduct Authority, PS15/6: Bringing Additional Benchmarks into the Regulatory and Supervisory Regime (Mar. 23, 2015). The European Union is also bringing in a comprehensive regulatory regime for financial benchmarks, see Regulation of the European Parliament and of the Council on indices used as benchmarks in financial instruments and financial contracts or to measure the performance of investment funds and amending Directives 2008/48/EC and 2014/17/EU and (EU) No. 596/2014, May 3 2016, <http://data.consilium.europa.eu/doc/document/PE-72-2015-INIT/en/pdf>.

287. See Verstein, *supra* note 129, at 445.

288. BANK OF ENGLAND, THE PRUDENTIAL REGULATION AUTHORITY’S APPROACH TO BANKING SUPERVISION, *supra* note 71. This is also internationally endorsed in the Basel Committee. See Bank for International Settlements, *supra* note 71, princ. 8.