

The Disruptive Implications of Fintech- Policy Themes 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 seems to be ushering in an order for upheaval, and 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 framework,⁶ 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 is a history of many culminating moments of disruption. The current wave of ‘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 contextualising ‘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

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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 ‘Blockchain could be totally transformative for financial services industry’ Financial Times (22 May 2016).

³ Price Waterhouse Coopers, *Blurred Lines: How Fintech is Shaping the Financial Services Industry* (March 2016).

⁴ where short-term financial institution borrowing is backed by collateral. See for eg Zoltan Pozsar, Tobias Adrian, Adam Ashcraft and Hayley Boesky, ‘Shadow Banking’ (Federal Reserve Bank of New York Staff Report 2010); Stijn Claessens and Let Ratnovski, ‘What is Shadow Banking?’ (IMF Working Paper 2014) at <http://ssrn.com/abstract=2559504>.

⁵ Douglas Arner, János Barberi and Ross P Buckley, ‘The Evolution of Fintech: A New Post-Crisis Paradigm?’ (2015) at <http://ssrn.com/abstract=2676553>.

⁶ Joseph Bower and Clayton Christensen, ‘Disruptive Technologies: Catching the Wave’ (1995) Harvard Business Review 43-53; Clayton Christensen and M Raynor, *The Innovator’s Solution* (Harvard Business School Press, 2003).

⁷ A survey of fintech can be found in Oscar Flynt, *Fintech: Understanding Financial Technology and its Radical Disruption of Modern Finance* (Amazon Media 2016).

innovation in a widely understood sense,⁸ the article focuses on potential revolutions⁹ of products, intermediaries or markets and the regulatory implications of such. The article will not examine in detail particular areas of fintech, but will draw from a range of examples and their key features. The disruptive potential of fintech will be discussed to highlight market themes, 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 analysing 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 A 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 B, C and D then discuss these aspects as applied to selected fintech innovations in financial products, services and markets. Part E concludes.

A. 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 conjuration 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 securitisation 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 environment factors, as well as by individual incentives and entrepreneurial moments. Many financial innovations can also be thought of as 'disruptive' as they

⁸ Christensen et al'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 and Paul Nunes, 'Big Bang Disruption' (March 2013) *Harvard Business Law Review* 45.

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

¹⁰ Charles S Tapiero, 'The Future of Financial Engineering' (2013) at <http://ssrn.com/abstract=2259232>.

¹¹ Emiliios Avgouleas, 'Regulating Financial Innovation: A Multifaceted Challenge to Financial Stability, Consumer Protection, and Growth' in Moloney, Ferran and Payne (eds), *Oxford Handbook of Financial Regulation* (Oxford University Press, 2015).

usher in new products, new ways of effecting transactions and intermediation, new institutions and organisational forms and may permanently change the landscape of finance.

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 globalisation and capital liberalisation,¹³ and the knowledge revolutions in economic, legal, communications and digital technologies.¹⁴ In particular, regulatory environments can promote financial innovation by either being facilitative¹⁵ or indeed restrictive, and therefore incentivising 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 kickstart 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

¹² Ian M Ramsay, 'Financial Innovation and Regulation: The Case of Securitisation' (1993) 4 *Journal of Banking and Finance Law and Practice* 169.

¹³ Emiliós Avgouleas, 'Regulating Financial Innovation: A Multifaceted Challenge to Financial Stability, Consumer Protection, and Growth' in Moloney, Ferran and Payne (eds), *Oxford Handbook of Financial Regulation* (Oxford University Press, 2015); Prasanna Gai, Sujit Kapadia, Stephen Millard and Ander Perez, 'Financial Innovation, Macroeconomic Stability and Systemic Crises' (Bank of England Working Paper 2008) who describe these as benign economic conditions that are favourable to experimentation.

¹⁴ Above, W Scott Frame and Lawrence J White, 'Technological Change, Financial Innovation, and Diffusion in Banking' in Allen N. Berger, Philip Molyneux, and John O.S. Wilson (eds), *The Oxford Handbook of Banking* (2nd ed OUP 2015).

¹⁵ Such as the US JOBS Act which is dismantling the regulatory barriers to financial promotion, as discussed in Chris Brummer, 'Disruptive Technology and Securities Regulation' (2015) 84 *Fordham Law Review* 977. 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 D. Assadi (ed), *Strategic Approaches to Successful Crowdfunding* (IGI Global 2015).

¹⁶ Michael S Knoll, 'The Ancient Roots of Modern Financial Innovation: The Early History of Regulatory Arbitrage' (2008) 87 *Oregon Law Review* 93.

¹⁷ Yanto Chandra and Shu-Jung Sunny Yang, 'Managing Disruptive Innovation: Entrepreneurial Strategies and Tournaments for Corporate Longevity' (2011) 37 *Journal of General Management* 23.

¹⁸ Nicola Gennaioli, Andrei Schleifer and Robert Vishny, 'Financial Innovation and Financial Fragility' (2010) at <http://ssrn.com/abstract=1688940> indeed warns of the demand-led syndrome in financial innovation which can lead to mis-selling.

¹⁹ Shelagh Heffernan, Xiaoqing (Maggie) Fu, Xiaolan Fu, 'Financial Innovation in the UK' (2008) at <http://ssrn.com/abstract=1266125>.

²⁰ Ronald J Gilson, 'Locating Innovation: The Endogeneity of Technology, Organizational Structure and Financial Contracting' (2009) at <http://ssrn.com/abstract=1492762>.

²¹ Dan Awrey, 'Towards a Supply-Side Theory of Financial Innovation' (2013) 41 *Journal of Comparative Economics* 401; Dan Awrey, 'Complexity, Innovation, and the Regulation of Modern Financial Markets' (2012) 2 *Harvard Business Law Review* 235.

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 behaviour 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 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 liquefy long-term relationship-based assets such as mortgage loans into liquid, standardised 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 towards facilitating illegal behaviour,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

²² Emiliós Avgouleas, 'Regulating Financial Innovation: A Multifaceted Challenge to Financial Stability, Consumer Protection, and Growth' in Moloney, Ferran and Payne (eds), *Oxford Handbook of Financial Regulation* (Oxford University Press, 2015); Lars Norden, Consuelo Silva Buston and Wolf Wagner, 'Financial Innovation and Bank Behavior: Evidence from Credit Markets' (2011) at <http://ssrn.com/abstract=1800162>.

²³ Brian J Henderson and Neil D Pearson, 'The Dark Side of Financial Innovation' (2009) at <http://ssrn.com/abstract=1342654>.

²⁴ Nicola Gennaioli, Andrei Schleifer and Robert Vishny, 'Financial Innovation and Financial Fragility' (2010) at <http://ssrn.com/abstract=1688940>.

²⁵ Margaret M Blair, 'Financial Innovation and the Distribution of Wealth and Income' (2010) at <http://ssrn.com/abstract=1656451>; Wenxi Jiang and Hongjun Yan, 'Financial Innovation, Investor Behavior, and Arbitrage: Evidence from the ETF Market' (2016) at <http://ssrn.com/abstract=2023142>.

²⁶ See a historical perspective in Michael S Knoll, 'The Ancient Roots of Modern Financial Innovation: The Early History of Regulatory Arbitrage' (2008) 87 *Oregon Law Review* 93. However see FCA, 'Market-Based Finance: Its Contributions and Emerging Issues' (Occasional Paper 2016) which disagrees that regulatory arbitrage plays a significant part in driving financial innovation especially in market-based finance

²⁷ Ian M Ramsay, 'Financial Innovation and Regulation: The Case of Securitisation' (1993) 4 *Journal of Banking and Finance Law and Practice* 169.

²⁸ P. K. Mishra and B. B. Pradhan, 'Financial Innovation and Effectiveness of Monetary Policy' (2008) at <http://ssrn.com/abstract=1262657>.

²⁹ Tom CW Lin, 'Financial Weapons of War' (2016) 100 *Minnesota Law Review* 1377.

consumers.³⁰ For example, Kling points out that cost-effective fixed rate mortgages for consumers would not be possible without the 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 marketisation of financial assets. Although such marketisation promotes access and improves the liquidity characteristics of assets, the apparent benefits of marketisation are often oversold. A balanced view is not taken with regard to the changed nature or increased risks of the assets, such as in securitised products. Some perverse consequences of securitisation 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 innovation such as high frequency trading are a double-edged sword, as on the one hand it can facilitate lightning fast and efficient trading, and hence improves market

³⁰ Chris Brummer, 'Disruptive Technology and Securities Regulation' (2015) 84 Fordham Law Review 977.

³¹ Andrew Kling, 'Not What They Had In Mind: A History of Policies that Produced the Financial Crisis of 2008' (2009) at <http://ssrn.com/abstract=1474430>.

³² Lars Norden, Consuelo Silva Buston and Wolf Wagner, 'Financial Innovation and Bank Behavior: Evidence from Credit Markets' (2011) at <http://ssrn.com/abstract=1800162>.

³³ FCA, 'Market-Based Finance: Its Contributions and Emerging Issues' (Occasional Paper 2016).

³⁴ Wenxi Jiang and Hongjun Yan, 'Financial Innovation, Investor Behavior, and Arbitrage: Evidence from the ETF Market' (2016) at <http://ssrn.com/abstract=2023142>.

³⁵ Thorsten Beck, Tao Chen, Chen Lin and Frank M. Song, 'Financial Innovation: The Bright and the Dark Sides' (2014) at <http://ssrn.com/abstract=1991216>. However there is also contrary research that shows such benefits to be limited for countries that already have stringent and developed bank regulations in place such as capital adequacy, see Thorsten Beck, Tao Chen, Chen Lin and Frank M. Song, 'Financial Innovation: The Bright and the Dark Sides' (2014) at <http://ssrn.com/abstract=1991216>.

³⁶ Saumitra Jha, 'Sharing the Future: Financial Innovation and Innovators in Solving the Political Economy Challenges of Development' (2012) at <http://ssrn.com/abstract=2001039> on how financial innovation penetrates the political economy and brings about stability for economic development.

³⁷ Nigel Jenkinson, Adrian Penalver and Nicholas Vause, 'Financial Innovation: What Have We Learnt?' (Bank of England Quarterly Bulletin 2008, Q3) at <http://ssrn.com/abstract=1275792>.

³⁸ The mis-selling of unsuitable structured products by Coutts Private Bank in the UK for example, see FCA, *Final Notice to Coutts & Co* (2012) at <http://www.fca.org.uk/static/pubs/final/coutts-mar12.pdf>; Nicola Gennaioli, Andrei Schleifer and Robert Vishny, 'Financial Innovation and Financial Fragility' (2010) at <http://ssrn.com/abstract=1688940>.

quality,³⁹ it could also be abused by ‘pingers’ and ‘spoofers’ who test the market but have no genuine desire to transact,⁴⁰ not to mention making markets more susceptible to vulnerabilities that could culminate in unexplained ‘flash crashes’.⁴¹

Finally, a number of 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 marketisation aspect so prevalent in much of financial innovation causes assets to be subject to market risk and to behavioural reactions that exacerbate market risk. Such marketisation, 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 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

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 and Gbenga Ibikunle, ‘A Taxonomy of the ‘Dark Side’ of Financial Innovation: The Cases of High Frequency Trading and Exchange Traded Funds’ (2011) at <http://ssrn.com/abstract=1974914>.

⁴¹ Eg see ‘What Caused the Flash Crash [of 2010]: One Big Bad Trade’, *The Economist* (October 2010).

⁴² Tim Adam and Andre Guettler, ‘Pitfalls and Perils of Financial Innovation: The Use of CDS by Corporate Bond Funds’ (2015) 55 *Journal of Banking and Finance* 204; Margaret M Blair, ‘Financial Innovation and the Distribution of Wealth and Income’ (2010) at <http://ssrn.com/abstract=1656451>; Tanju Yorulmazer, ‘Has Financial Innovation Made the World Riskier? CDS, Regulatory Arbitrage and Systemic Risk’ (Federal Reserve Bank of NY Paper, 2013) at <http://ssrn.com/abstract=2176493>.

⁴³ Nigel Jenkinson, Adrian Penalver and Nicholas Vause, ‘Financial Innovation: What Have We Learnt?’ (Bank of England Quarterly Bulletin 2008, Q3) at <http://ssrn.com/abstract=1275792>; Kathryn Judge, ‘Fragmentation Nodes: A Study in Financial Innovation, Complexity and Systemic Risk’ (2012) *Stanford Law Review* 102; Dan Awrey, ‘Complexity, Innovation, and the Regulation of Modern Financial Markets’ (2012) 2 *Harvard Business Law Review* 235.

⁴⁴ Kathryn Judge, ‘Fragmentation Nodes: A Study in Financial Innovation, Complexity and Systemic Risk’ (2012) *Stanford Law Review* 102 refers to 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.

⁴⁵ Margaret M Blair, ‘Financial Innovation and the Distribution of Wealth and Income’ (2010) at <http://ssrn.com/abstract=1656451>.

⁴⁶ Dan Awrey, ‘Complexity, Innovation, and the Regulation of Modern Financial Markets’ (2012) 2 *Harvard Business Law Review* 235.

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 2007-9, global regulators now disfavour 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 for investor protection. Product intervention powers have been used by the UK 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

⁴⁷ Douglas Arner, János Barberi and Ross P Buckley, ‘The Evolution of Fintech: A New Post-Crisis Paradigm?’ (2015) at <http://ssrn.com/abstract=2676553>;

⁴⁸ David KC Lee and Ernest GS Teo, ‘Emergence of Fintech and the LASIC Principles’ (2015) at <http://ssrn.com/abstract=2668049>; Lesley H. Curtis and Kevin A. Schulman, ‘Overregulation of Health Care: Musings on Disruptive Innovation Theory’ (2006) 69 *Law and Contemporary Problems* 195 on highly regulated sectors such as healthcare being forbidding to the development of innovative and low-cost solutions.

⁴⁹ Nathan Cortez, ‘Regulating Disruptive Innovation’ (2014) 29 *Berkeley Technology Law Journal* 175.

⁵⁰ Such as the UK Financial Services Authority’s (pre-2013) approaches to private equity and hedge funds. The FSA subjected private equity and hedge funds to monitoring, and also encouraged their compliance with voluntary industry standard codes such as the Hedge Funds’ Standard Board’s voluntary code developed in the wake of the Large Report (Andrew Large and Hedge Funds Working Group, *Hedge Fund Standards: Final Report* (2008) at http://www.hfsb.org/sites/10377/files/final_report.pdf); and the Private Equity Monitoring Group’s Guidelines, evolved from the Walker Report (David Walker, *Guidelines for Disclosure and Transparency in Private Equity* (Nov 2007) at http://privateequityreportinggroup.co.uk/wp-content/uploads/2015/11/wwg_report_final.pdf).

⁵¹ Nathan Cortez, ‘Regulating Disruptive Innovation’ (2014) 29 *Berkeley Technology Law Journal* 175.

⁵² FSA, *The Turner Review: A Regulatory Response to the Global Banking Crisis* (March 2009) at http://www.fsa.gov.uk/pubs/other/turner_review.pdf; Markus Brunnermeier, Andrew Crockett, Charles Goodhart, Avinash D. Persaud and Hyun Shin, *The Fundamental Principles of Financial Regulation* (International Center for Monetary and Banking Studies: Geneva Reports, 2009) at <http://www.princeton.edu/~hsshin/www/Geneva.pdf>.

⁵³ S137D, Financial Services Act 2012 amending the Financial Services and Markets Act 2000; FCA, *Making Temporary Product Intervention Rules* (March 2013) at <http://www.fca.org.uk/your-fca/documents/policy-statements/fsa-ps133>; Articles 40-42 Regulation (EU) No 600/2014 of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Regulation (EU) No 648/2012 providing for product intervention powers on the part of the EBA and ESMA, as well as national regulators.

⁵⁴ FCA, *Restrictions on the Retail Distribution of Regulatory Capital Instruments* (June 2015) at <https://www.fca.org.uk/news/ps15-14-restrictions-retail-distribution-regulatory-capital-instruments>.

⁵⁵ ESMA, *Guidelines on ETFs and other UCITs Issues* (August 2014) at https://www.esma.europa.eu/sites/default/files/library/2015/11/esma-2014-0011-01-00_en_0.pdf.

⁵⁶ FCA, *Regulatory Sandbox* (Nov 2015) at <https://www.fca.org.uk/your-fca/documents/regulatory-sandbox>.

previous regulatory gaps,⁵⁷ regulators seem willing to take more formal steps in regulatory governance over shadow banking developments⁵⁸ 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 efficiency⁶⁰ 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 a vis financial 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.

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

⁵⁷ See generally Mads Andenas and Iris H-Y Chiu, *The Foundations and Future of Financial Regulation* (Oxford: Routledge 2014) on how financial stability concerns have driven regulatory reforms in an extensive manner, also Emiliós Avgouleas, ‘Regulating Financial Innovation: A Multifaceted Challenge to Financial Stability, Consumer Protection, and Growth’ in Moloney, Ferran and Payne (eds), *Oxford Handbook of Financial Regulation* (Oxford University Press, 2015).

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 FCA, *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* (March 2014) at <http://www.fca.org.uk/your-fca/documents/policy-statements/ps14-04>.

⁶⁰ See Chapter 2 on the discussion of 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 2007-9, in Mads Andenas and Iris H-Y Chiu, *The Foundations and Future of Financial Regulation* (Oxford: Routledge 2014) and cites within.

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

⁶² Joseph Bower and Clayton Christensen, ‘Disruptive Technologies: Catching the Wave’ (1995) *Harvard Business Review* 43-53; Clayton Christensen and M Raynor, *The Innovator’s Solution* (Harvard Business School Press, 2003).

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.

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 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 institutionalisation 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.

⁶⁴ Larry Downes and Paul Nunes, 'Big Bang Disruption' (March 2013) Harvard Business Law Review 45; David Ahlstrom, 'Innovation and Growth: How Business Contributes to Society' (2010) 24 Academy of Management Perspectives 11.

⁶⁵ RW Veryzer Jnr, 'Discontinuous Innovation and the Product Development Process' (1998) 15 Journal of Product Innovation Management 304.

⁶⁶ Jay Paap and Ralph Katz, 'Anticipating Disruptive Innovation' (2004) Research Technology Management 13.

⁶⁷ Suggested in Felix von Pechmann, Christophe Midler, Re'mi Maniak and Florence Charue-Duboc, 'Managing Systemic and Disruptive Innovation: Lessons from the Renault Zero Emission Initiative' (2015) 24 Industrial and Corporate Change 677.

⁶⁸ Larry Downes and Paul Nunes, 'Big Bang Disruption' (March 2013) Harvard Business Law Review 45.

⁶⁹ Finn Orstavik, 'Innovation as Re-Institutionalization: A Case Study of Technological Change in Housebuilding in Norway' (2014) 32 Construction Management and Economics 857.

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 and Gregory M. Rose, 'The Disruptive Nature of Information Technology Innovations: The Case of Internet Computing in Systems Development Organizations' (2003) 27 MIS Quarterly 557.

⁷¹ Bank of England, *The Prudential Regulation Authority's Approach to Banking Supervision* (April 2013) at <http://www.bankofengland.co.uk/publications/Documents/prapproach/bankingappr1304.pdf>. This is also

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 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, enforcement rights, in order 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 2007-9 was the development of securitisation as a means to manage long-term illiquid assets. Securitisation 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 marketisation and dispersion of risk. This substitutive effect became widespread, enduring 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 of the sector,⁷⁴ in terms of the characteristics of firms, established institutions and practices in the sector and the key features of marketplaces.

internationally endorsed in the Basel Committee, *Core Principles for Effective Banking Supervision* (September 2012) at <http://www.bis.org/publ/bcbs230.htm>, Principle 8.

⁷² To be discussed shortly in Part B.

⁷³ £378m in the UK as of 2013, see Ulrich Atz and David Bholat, ‘Peer-to-peer Lending and Financial Innovation in the United Kingdom’ (Bank of England Staff Working Paper, April 2016).

⁷⁴ This explains why for example the single regulator structure arose to meet the needs of an increasingly integrated financial product sector, see Jeremy W. Markham, “ Super-Regulator: A Comparative Analysis of Securities and Derivatives Regulation in the US, UK and Japan” (2003) 28 *Brooklyn Journal of International Law* 319; Eilis Ferran, “Examining the UK’s Experience in Adopting a Single Financial Regulator Model” (2003) 28 *Brooklyn J of Int Law* 257 in discussing the adoption of a single regulator in the UK in the early 2000s.

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/organisations, 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 socio-economic legitimacy and utility of financial institutions and marketplaces,⁷⁹ the ethics of financial intermediation,⁸⁰ and the distributive consequences of financialisation.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

⁷⁵ In particular, Mads Andenas and Iris H-Y Chiu, *The Foundations and Future of Financial Regulation* (Oxford: Routledge 2014) argue that financial stability has become clearly a priority and underlies many reforms in the UK and European Union. This is now expressly adopted as the UK Prudential Regulation Authority (Bank of England)'s regulatory objective.

⁷⁶ FSA, *The Turner Review* (2009) at http://www.fsa.gov.uk/pubs/other/turner_review.pdf.

⁷⁷ Eg the counter-cyclical buffer introduced in Basel Committee on Banking Supervision, *Basel III: A Global Regulatory Framework for More Resilient Banks and Banking Systems* (rev June 2011, Basel: BIS 2010) <<http://www.bis.org/publ/bcbs189.pdf>.

⁷⁸ Such as crisis management and resolution frameworks, see Financial Stability Board (FSB), *Key Attributes of Effective Resolution Regimes for Financial Institutions* (2014) at http://www.fsb.org/2014/10/r_141015/ and the UK's 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' (2013) 13 *Journal of Corporate Law Studies* 401; Tamara Lothian, 'Beyond Macroprudential Regulation: Three Ways of Thinking about Financial Crisis, Regulation and Reform' (2012) 3 *Global Policy* 410.

⁸⁰ Dan Awrey, William Blair and David Kershaw, 'Between Law and Markets: Is there a Role for Culture and Ethics in Financial Regulation?' (2013) 38 *Delaware Journal of Corporate Law* 191; Richard Lambert, *Promoting High Standards of Competence and Ethics: Banking Standards Review* (May 2014) and the setting up of the Banking Standards Council, 2014.

⁸¹ Eg see discussions in Greta Krippner, 'Accumulation and the Profits of Finance' in Ismail Erturk, Julie Froud, Sukhdev Johal, Adam Leaver and Karel Williams (eds), *Financialization At Work: Key Tests and Commentary* (Oxford: Routledge, 2008); Basak Kus, 'Financialisation and Income Inequality in OECD Nations: 1995-2007' (2012) 43 *The Economic and Social Review* 477; Gerald Epstein and Arjun Jayadev, 'The Rise of Rentier Incomes in OECD Countries: Financialization, Central Bank Policy and Labor Solidarity' in Gerald A Epstein ed, *Financialization and the World Economy* (Cheltenham: Edward Elgar, 2005) at 46; Ken-Hou Lin and Donald Tomaskovic-Devey, 'Financialization and U.S. Income Inequality, 1970–2008' (2013) 118 *American Journal of Sociology* 1284; Gerard Dumenil and Dominique Levy, 'Financialization, Neo-liberalism and Income Inequality in the USA' in Ismail Erturk, Julie Froud, Sukhdev Johal, Adam Leaver and Karel Williams (eds), *Financialization At Work: Key Tests and Commentary* (Oxford: Routledge, 2008).

⁸² Houman B Shadab, 'The Law and Economics of Hedge Funds: Financial Innovation and Investor Protection' (2009) 6 *Berkeley Business Law Journal* 240.

gaps.⁸³ Regulators also act in a governance landscape that is multi-faceted and de-centred⁸⁴ 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 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 contextualised approach.

B. Financial Product Innovation

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. Eg see James Peck, Riz Mokal and Ted Janger, 'Financial Engineering Meets Chapter 11 – Safe Harbors and the Bankruptcy Code' (2011) at <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?' (2011) 5 Brooklyn Journal of Corporate, Financial and Commercial Law 273 at <http://ssrn.com/abstract=1702457>; Julia Black, 'Mapping the Contours of Contemporary Financial Services Regulation' (2002) 2 Journal of Corporate Law Studies 253; 'Enrolling Actors in Regulatory Systems: Examples from UK Financial Services Regulation' [2003] Public Law 63.

⁸⁵ Price Waterhouse Coopers, *Blurred Lines: How Fintech is Shaping the Financial Services Industry* (March 2016).

⁸⁶ Such as hybrid forms of innovation that ultimately achieve 'regime change' as suggested in Marc Dijk, Renato J. Orsato and René Kemp, 'Towards a Regime-Based Typology of Market Evolution' (2015) 92 Technological Forecasting and Social Change 276 where 'regime change' is understood as changes in the existing market regime whether through evolutionary or disruptive (narrowly-defined) forms of innovation.

Financial product innovation is driven by financialisation- the increasing reliance upon finance to meet economic needs.⁸⁷ In a political scientist's view, 'financialisation 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 Financialisation 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 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 financialisation, 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 al⁹³ describe financialisation 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.

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 collectivisation 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.

Collectivisation of Investment Management

In order to meet the needs of cost-effective access to professional investment management, savings are organised 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 standardisation in the relational dimension between investment intermediaries and savers, and therefore (ironically) less prospect for tailor-made financial solutions to specific needs. Erturk et

⁸⁷ Gerald A Epstein, 'Introduction: Financialization and the World Economy' in Gerald A Epstein ed, *Financialization and the World Economy* (Cheltenham: Edward Elgar, 2005) at 3.

⁸⁸ Gautam Mukunda, 'The Price of Wall Street's Power' (2014) *Harvard Business Review* 70, on the effects of financialisation 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' (1966) 33 *Social Research* 160; 'Life Cycle, Individual Thrift, and the Wealth Of Nations' (1988) 76 *The American Economic Review* 297 on deferred consumption for the purposes of retirement saving. The 'life cycle hypothesis of consumption' is widely discussed in economic literature, examples of some citations are A Deaton, 'Franco Modigliani and the Life Cycle Theory of Consumption' (2005) at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=686475; Martin Browning and Thomas F Crossley, 'The Life Cycle Model of Consumption and Saving' (2000) at <http://socserv.mcmaster.ca/sedap/p/sedap28.PDF>.

⁹¹ <http://www.kelsoinstitute.org/pdf/nc3.pdf>.

⁹² Gerald F Davis, *Managed by the Markets: How Finance Re-shaped America* (New York: OUP, 2009) at p.18.

⁹³ Ismail Erturk, Julie Froud, Sukhdev Johal, Adam Leaver and Karel Williams, 'The Democratization of Finance? Promises, Outcomes and Conditions' (2007) 14 *Review of International Political Economy* 553.

al⁹⁴ critically describes the rise in collective investment management as a form of ‘coupon pool’ capitalism where the masses become feedstock for finance. The collectivisation of savers’ capital into pools intermediated by financial intermediaries results in certain ramifications for the characterisation of the investment paradigm- investment is channelled into a collective product branded by the intermediary’s management competence and expertise. 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 transactionalisation of investment relationships and the de-socialisation 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, Bogle⁹⁶ 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. 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-personalised, transactional and myopic/short termist is not something that regulators grasped immediately. Much of investment regulation in the UK 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 standardised regulatory duties for investment intermediaries introduced in the EU, such as a duty of suitability⁹⁸ for investment advice,⁹⁹ is based on a relational paradigm. In the US, investment advisers regulated under the Investment Advisers Act 1940 owe a fiduciary duty to their clients which encompass aspects of loyalty and care, again emphasising the relationship basis of the intermediary-client paradigm. Are these relational duties limited and anachronistic in the transactionalised and de-personalised investment environment?¹⁰⁰ Both the UK and EU 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 UK is carrying out a study into asset management practices and considering if further regulation may be necessary for directly governing

⁹⁴ Ismail Erturk, Julie Froud, Sukhdev Johal, Adam Leaver and Karel Williams, ‘Financialisation, Coupon Pool and Conjuncture’ in Ismail Erturk, Julie Froud, Sukhdev Johal, Adam Leaver and Karel Williams (eds), *Financialization At Work: Key Tests and Commentary* (Oxford: Routledge, 2008).

⁹⁵ Paul H Dembinski, *Finance: Servant or Deceiver* (transl by Kevin Cook, Basingstoke: Palgrave Macmillan 2009).

⁹⁶ John C Bogle, *Common Sense on Mutual Funds* (Chicester: John Wiley & Sons, 2011) at p.425ff.

⁹⁷ See generally, Timothy Spangler, *The Law of Private Investment Funds* (Oxford: Oxford University Press 2012). The scope of fiduciary duty is however rather limited, as it is limited to a proscriptive duty and can be contractually modified, see See Law Commission, *Fiduciary Duties and Regulatory Rules* (Law Com CP No 124, 1995), *Seymour v Ockwell & Co* and *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” (2008) *Legal Studies* 254.

¹⁰⁰ See for example, Kathryn Judge, ‘Intermediary Influence’ (2015) 82 *University of Chicago Law Review* 573.

investment management practices.¹⁰¹ The EU 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 financialisation, which includes the growth of the industry of investment management and collectively managed products. The private organisation 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.

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 commoditised¹⁰³ on a large scale while at the same time creating cost-effective opportunities for access.¹⁰⁴ However, marketization also results in certain perverse incentives towards mis-selling to financial consumers products they may not need.¹⁰⁵ In this way, the financial intermediation 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 UK, and it has taken many years for the mis-selling of payment protection insurance and card identity

¹⁰¹ FCA, *Asset Management Market Study* (Nov 2015) at <https://www.fca.org.uk/news/asset-management-market-study>.

¹⁰² UCITS Commission Directive 2010, Art 24 on the duty to consider the use of voting rights for UCITs funds; and Arts 3f-3h of the proposed EU Shareholders' Rights Directive 2014; see Iris H-Y Chiu, 'European Shareholder Rights Directive Proposals: A Critical Analysis in Mapping with the UK Stewardship Code?' (2016) ERA Forum 1.

¹⁰³ Karen Ho, 'Situating Global Capitalisms: A View from Wall Street Investment Banks' (2005) 20 *Cultural Anthropology* 68; Jonathan Nitzan and Shimshon Bichler, *Capital as Power: A Study of Order and Creorder* (Oxford: Routledge, 2009).

¹⁰⁴ Ismail Erturk, Julie Froud, Sukhdev Johal, Adam Leaver and Karel Williams, 'The Democratization of Finance? Promises, Outcomes and Conditions' (2007) 14 *Review of International Political Economy* 553.

¹⁰⁵ The 'feedstock syndrome' referred to earlier, see Ismail Erturk, Julie Froud, Sukhdev Johal, Adam Leaver and Karel Williams, 'Financialisation, Coupon Pool and Conjuncture' in Ismail Erturk, Julie Froud, Sukhdev Johal, Adam Leaver and Karel Williams (eds), *Financialization At Work: Key Tests and Commentary* (Oxford: Routledge, 2008).

¹⁰⁶ Paul H Dembinski, *Finance: Servant or Deceiver* (transl by Kevin Cook, Basingstoke: Palgrave Macmillan 2009).

¹⁰⁷ Alessio M Paces, "Financial Intermediation in the Securities Markets Law and Economics of the Conduct of Business Regulation" (2000) 20 *International Review of Law and Econs* 479.

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 financialisation and consumer responsabilisation, as increasing commoditisation of financial products and consumers have brought about a structurally predatory sales culture¹¹² in the financial sector.

The two trends discussed above have been made possible in a regulatory context where regulators tend not to regulate financial 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 behaviour and culture, (c) observed

¹⁰⁸ Gfk NOP (for the FSA), 'The Sale of Payment Protection Insurance – Mystery Shopping Results' (November 2005) CR45 <http://www.fsa.gov.uk/pubs/consumer-research/crpr45.pdf>; FSA, 'The Sale of Payment Protection Insurance: Thematic update' (September 2007) http://www.fsa.gov.uk/pubs/other/ppi_thematic_update.pdf.

¹⁰⁹ For example, in payment protection insurance, see FSA, 'The Assessment and Redress of Payment Protection Insurance Complaints: Feedback on the further consultation in CP10/6 and final Handbook text' (August 2010) PS10/12 http://www.fsa.gov.uk/pubs/policy/ps10_12.pdf. For example, the UK 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 <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' (March 2015) at <http://www.fca.org.uk/news/compensation-for-card-and-identity-protection-policyholders>.

¹¹⁰ Discussed in Ellis Ferran, 'Regulatory Lessons from the Payment Protection Insurance Mis-Selling Scandal in the UK' (2012) *European Business Organisation Law Review* 248.

¹¹¹ See for eg 'Lloyd's Group Hit by Record £117m Fine over PPI Handling', *BBCNews* (5 June 2015). CPP mis-selling firms have been fined about £10.5 m in total, see FCA, 'CPP Card and Identity Protection Compensation Scheme Closure' (March 2015) at <http://www.fca.org.uk/news/compensation-for-card-and-identity-protection-policyholders>.

¹¹² Jerome Want, *Corporate Cultures* (NY: St Martin's Press, 2006); House of Lords and House of Commons, *Changing Banking for Good* (2013), Vol II.

¹¹³ Also discussed in Mads Andenas and Iris H-Y Chiu, *The Foundations and Future of Financial Regulation* (Oxford: Routledge 2014) at chapter 8.

¹¹⁴ There are limited regulatory interventions into product quality such as the EU's prescription of portfolio diversification for UCITs, the largest mutual funds industry in the European Union. European Parliament and Council Directive 2009/65/EC 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 UK FCA Handbook COLL 5.2.

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 collectivisation and mass-selling. These indicia could have provided possibilities to reflect upon public interest needs and the role of regulation and governance. The commoditisation of savers and borrowers and the de-personalisation of the investment paradigm have caused lasting structural impact on the investment management industry, now characterised as short-termist¹¹⁵ and riddled with principal-agent problems,¹¹⁶ affecting the ultimate performance and utility of products sold.

Regulators in the UK and EU have begun to take steps to address the structural problem of ‘tainted intermediation’ by regulating conduct of business more stringently. The EU 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 UK 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 minimise 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.

Fintech and Financial Product Innovation

¹¹⁵ Caitlin Helms, Mark Fox and Robert Kenagy, ‘Corporate Short-Termism: Causes and Remedies’ (2012) 23 *International and Comparative Company Law Review* 45; Marc T Moore and Edward Walker-Arnott, ‘A Fresh Look at Stock Market Short Termism’ (2014) 41 *Journal of Law and Society* 416.

¹¹⁶ Particular areas of mention are complex fee structures that often over-charge savers, see findings in FCA, *Clarity of Fund Charges: Thematic Review* (May 2014) at <https://www.fca.org.uk/static/documents/thematic-reviews/tr1407.pdf>; and 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’. See for example, ‘European markets watchdog examines closet trackers’, *Financial Times* (23 Nov 2014).

¹¹⁷ The EU 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 UK’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 The Retail Distribution Review, FSA, ‘Distribution of Retail Investments: Delivering the RDR – feedback to CP09/18 and final rules’ (March 2010) PS10/6 http://www.fsa.gov.uk/pubs/policy/ps10_06.pdf; FSA, ‘Distribution of Retail Investments: Delivering the RDR – Professionalism’ (January 2011) PS11/01 http://www.fsa.gov.uk/pubs/policy/ps11_01.pdf and FCA Handbook COBS 6.1A.

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 2007-9. They are also marketed as being able to provide alternative returns opportunities in a relatively low interest rate environment.¹²⁰ Two key innovations, online crowdfunding and peer-to-peer financial services have arisen to be popular retail investment options of late, and 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 collectivisation and mass-selling culture discussed above. 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 responsabilisation and diligence is required. Moreover, these products do not yet benefit from the standardised 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 increasingly popularity of such products could also lead to more standardisation 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 dimensions such as being family or friends of the finance-

¹²⁰ These are identified to be the key drivers of growth in the fintech areas of online crowdfunding and peer-to-peer (or P2P) financial services, see Ulrich Atz and David Bholat, 'Peer-to-peer Lending and Financial Innovation in the United Kingdom' (Bank of England Staff Working Paper, April 2016), Eugenia Macchiavello, 'Peer-to-Peer Lending and the 'Democratization' of Credit Markets: Another Financial Innovation Puzzling Regulators' (2015) at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2668131.

¹²¹ See Matthew Hollow, 'Crowdfunding and Civic Society in Europe: A Profitable Partnership?' (2013) 4 Open Citizenship 68 at <http://ssrn.com/abstract=2333635>; Karina Sigar, 'Fret No More: Inapplicability of Crowdfunding Concerns in the Internet Age and the Jobs Act's Safeguards' (2012) 64 Administrative Law Review 473.

¹²² Lars Hornuf and Armin Schwienbacher, 'Should Securities Regulation Promote CrowdInvesting?' (2015) at <http://ssrn.com/abstract=2412124>.

¹²³ Matthew Hollow, 'Crowdfunding and Civic Society in Europe: A Profitable Partnership?' (2013) 4 Open Citizenship 68 at <http://ssrn.com/abstract=2333635>.

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 finalise a price for the loan ie 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 US 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 US, 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 UK, 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 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 UK FCA's reliance on capital adequacy requirements to govern P2P lenders, mimicking banking regulation, and the reliance placed by both the US SEC and UK FCA

¹²⁴ De Liu, Daniel J Brass, Yong Lu and Dongyu Chen, 'Friendships in Online Peer-to-Peer Lending: Pipes, Prisms, and Relational Herding' (2015) at <http://ssrn.com/abstract=2251155>.

¹²⁵ May explain the home bias found in Mingfeng Lin and Siva Viswanathan, 'Home Bias in Online Investments: An Empirical Study of an Online Crowdfunding Market' (2016) 62 *Management Science* 1393.

¹²⁶ De Liu, Daniel J Brass, Yong Lu and Dongyu Chen, 'Friendships in Online Peer-to-Peer Lending: Pipes, Prisms, and Relational Herding' (2015) at <http://ssrn.com/abstract=2251155>.

¹²⁷ Sebastian C. Moeninghoff and Axel Wieandt, 'The Future of Peer to Peer Finance' (2013) *Zeitschrift für Betriebswirtschaftliche Forschung* 466.

¹²⁸ Zaiyan Wei and Mingfeng Lin, 'Market Mechanisms in Online Peer-to-Peer Lending' (2016) *Management Science* forthcoming, at <http://ssrn.com/abstract=2328468>.

¹²⁹ See Karina Sigar, 'Fret No More: Inapplicability of Crowdfunding Concerns in the Internet Age and the Jobs Act's Safeguards' (2012) 64 *Administrative Law Review* 473. In particular, the SEC requirements have been criticised in Andrew Verstein, 'The Misregulation of Person-to-Person Lending' (2011) 45 *University of California at Davis Law Review* 445.

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 £50million lent by investors, thereafter 0.2% of the next £450m followed by 0.1% of £500m 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 FCA, *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* (March 2014).

¹³¹ Above.

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 finalised and the 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.

A ‘Disruptive Innovation’ Model in Understanding the Implications of Fintech Product Innovation

As discussed above, ‘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. Besides such disintermediation seems available at a cost that is affordable,¹³⁴ through platform-based technologies that are able to match the supply and demand sides of capital, and even offer comparative information, choice and access.¹³⁵ Does such ‘disintermediation’ offer a powerful alternative to the existing structures of intermediation?

We are sceptical 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 online crowdfunding and P2P portals, investors vet their investees/borrowers directly using information posted and 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 consider whether investors’ expectations are commensurate with the risk levels they are assuming. Further, does private law address investors’ needs if they should wish

¹³² The UK FCA allows equity crowdfunding to be open to sophisticated investors only, or retail investors capped at 10% of their investible assets. See FCA, ‘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’ (March 2014) at <http://www.fca.org.uk/static/documents/policy-statements/ps14-04.pdf>.

¹³³ Paul Jeffrey and David Arnold, ‘Disrupting Banking’ (2014) Business Strategy Review 11.

¹³⁴ Jon M. Garon, ‘Mortgaging the Meme: Financing and Managing Disruptive Innovation’ (2012) 10 Nw. J. Tech. & Intell. Prop. 441.

¹³⁵ See for example, discussions in Brett King, *Breaking Banks: The Innovators, Rogues, and Strategists Rebooting Banking* (Chicester: John Wiley & Sons 2014); Geoffrey G. Parker, Marshall W. Van Alstyne and Sangeet Paul Choudary, *Platform Revolution: How Networked Markets are Transforming the Economy--and How to Make Them Work for You* (WW Norton & Co 2016).

¹³⁶ Also see Part C.

¹³⁷ Such as the European UCITs, see generally, Niamh Moloney, *EU Securities and Financial Markets Regulation* (Oxford: OUP 2015) at chapter III.1-3.

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 paper 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. Further 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 towards 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 lending platforms are changing the way a lending or investment decision is made. Empirical 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-standardisation and subjectivisation 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-standardised 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

¹³⁸ Rajkamal Iyer Asim Ijaz Khwaja Erzo F. P. Luttmer Kelly Shue, 'Screening in New Credit Markets: Can Individual Lenders Infer Borrower Creditworthiness in Peer-to-Peer Lending?' (2009) at <http://ssrn.com/abstract=1570115>.

¹³⁹ Jefferson Duarte, Stephan Siegel and Lance Young, 'Trust and Credit: The Role of Appearance in Peer-to-peer Lending' (2012) 25 *Review of Financial Studies* 2455.

¹⁴⁰ Ulrich Atz and David Bholat, 'Peer-to-peer Lending and Financial Innovation in the United Kingdom' (Bank of England Staff Working Paper, April 2016).

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 standardised 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 'levelling' of information asymmetry made possible by such data 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 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 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 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 present presumptively a blueprint for how online crowdfunding or P2P lending *ought* to be governed, 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 symptomatic or is derivative in nature.

C. 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 liquidity transformations, and new interfaces of engagement with investors

¹⁴¹ Rajkamal Iyer Asim Ijaz Khwaja Erzo F. P. Luttmer Kelly Shue, 'Screening in New Credit Markets: Can Individual Lenders Infer Borrower Creditworthiness in Peer-to-Peer Lending?' (2009) at <http://ssrn.com/abstract=1570115>.

¹⁴² Eg Auswide Bank in Australia taking a 20% stake in Moneyplace, a P2P lender.

characterise 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, 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 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.

Disintermediation?

Disintermediation often refers to innovations that allow the by-passing 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 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 securitisation, which is the transformation of illiquid and relationship-based assets like mortgage loans into more standardised and marketable securities that can be sold more widely to investors. Collective investment is also a Type 2 intermediation.

¹⁴³ Such as in *Woods v Martins Bank Ltd* [1959] 1 QB 55.

¹⁴⁴ Morning Star ratings for investment funds, for example.

¹⁴⁵ Rehypothecation markets, discussed in Gary Gorton, Andrew Metrick, Andrei Shleifer and Daniel K. Tarullo, 'Regulating the Shadow Banking System' (Brookings Papers on Economic Activity 2010).

¹⁴⁶ Shaun French and Andrew Leyschon, 'The New, New Financial System? Towards a Conceptualization of Financial Reintermediation' (2004) 11 *Review of International Political Economy* 263; also interpreted in Mark Nissen, 'Agent-Based Supply Chain Disintermediation versus Re-intermediation: Economic and Technological Perspectives' (2000) 9 *International Journal of Intelligent Systems in Accounting, Finance & Management* 237.

¹⁴⁷ Shaun French and Andrew Leyschon, 'The New, New Financial System? Towards a Conceptualization of Financial Reintermediation' (2004) 11 *Review of International Political Economy* 263.

¹⁴⁸ *Foley v Hill* (1848) 2 HLC 28, 9 ER 1002.

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 arbitrage,¹⁵⁰ 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 if sectoral forms of regulation that focus excessively on banks need to be recalibrated in scope and application.¹⁵³

¹⁴⁹ Steven L Schwarcz, 'Framing Address: A Framework for Analyzing Financial Market Transformation' (2013) 36 Seattle University Law Review 299; Claudia M Buch, 'Are Banks Different? Evidence from International Data' (2002) 5 International Finance 97.

¹⁵⁰ Steven L Schwarcz, 'Framing Address: A Framework for Analyzing Financial Market Transformation' (2013) 36 Seattle University Law Review 299.

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 This area has been heavily boosted in the EU and UK. 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 UK which is more balanced in terms of bank and capital-markets financing for its corporate economy. Eg see the Financial Services: Implementing the Framework for Financial Markets- Action Plan (1998) COM (1999)232, The Markets in Financial Instruments Directive 2004 that introduces harmonised standards of investment firm conduct is seen as a major step towards liberalising capital markets yet maintaining standards that would inspire market confidence, Directive 2004/39/EC of the European Parliament and of the Council of 21 April 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 EU seen as necessary to support its capital markets growth, although critical discussions of the scope and design of investor protection can be found generally in Guido Ferranini and Eddy Wymeersch, *Investor Protection in Europe: Corporate Law Making, The MiFID and Beyond* (Oxford: OUP 2006) and Niamh Moloney, *How to Protect Investors: Lessons from the EC and UK* (Cambridge: Cambridge University Press 2010).

¹⁵³ There is a lot of debate on how financial regulation architecture can best meet the changing needs of regulating finance. A sample of discussions can be found in E Wymeersch, "The Structure of Financial Supervision in Europe: About Single, Twin Peaks and Multiple Financial Supervisors" (2006) at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=946695; Joseph J Norton, "Global Financial Sector Reform: The Single Financial Regulator Model Based on the United Kingdom FSA Experience--A Critical Reevaluation" (2005) 39 International Lawyer 15; Howell E Jackson, "Regulation in a Multi-sectored Financial Services Industry" (1999) 77 Washington University Law Quarterly 319 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 UK 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" (2011) Oxford Journal of Legal Studies 455.

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 revolutionised 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 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 centralised 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 are 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 endeavour 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 sceptical 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-

¹⁵⁴ Shaun French and Andrew Leyschon, 'The New, New Financial System? Towards a Conceptualization of Financial Reintermediation' (2004) 11 *Review of International Political Economy* 263.

¹⁵⁵ The leading site in the UK is moneysupermarket.com.

¹⁵⁶ See Campbell R Harvey, 'Cryptofinance' (2014) at <http://ssrn.com/abstract=2438299>; Trent J. MacDonald, Darcy Allen, and Jason Potts, 'Blockchains and the Boundaries of Self-Organized Economies: Predictions for the Future of Banking' in Paulo Tasca, Tomaso Aste, Liorana Pelizzon, & Nicolas Perony (eds), *Banking Beyond Banks and Money* (2016) at <http://ssrn.com/abstract=2749514>.

¹⁵⁷ ESMA, *The Distributed Ledger Technology Applied to Securities Markets* (Discussion Paper, June 2016); Andrea Pinna and Wiebe Ruttenberg, 'Distributed Ledger Technologies in Securities Post-Trading' (ECB Working Paper 2016).

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 re-intermediation. The recognition of the reality of disintermediation as being a largely transitional process to re-intermediation would help regulators in conceptualising the scope of regulatory regimes and to consider conduct risks in new re-intermediary relationships. For example, the UK FCA is monitoring how new information intermediaries like price comparison websites influence consumer behaviour and are looking into ensuring that their conduct is fair and aboveboard.¹⁶¹ Price comparison websites can be incentivised to influence consumer behaviour 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 already arising. Credit scoring intermediaries and other

¹⁵⁸ Zachary J Gubler, ‘The Financial Innovation Process: Theory and Application’ (2011) 36 Delaware Journal of Corporate Law 56; Shaun French and Andrew Leyschon, ‘The New, New Financial System? Towards a Conceptualization of Financial Reintermediation’ (2004) 11 Review of International Political Economy 263.

¹⁵⁹ Tom CW Lin, ‘Infinite Financial Intermediation’ (2015) 50 Wake Forest Law Review 843.

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

¹⁶¹ FCA, *Thematic Review: Price Comparison Websites in the General Insurance Sector* (July 2014) at <https://www.fca.org.uk/news/tr14-11-price-comparison-websites-in-the-general-insurance-sector>.

¹⁶² for arranging regulated financial transactions such as contracts of insurance. Financial Services Authority, *Guidance on The Selling of General Insurance Policies through Price Comparison Websites* (Oct 2011) at <https://www.fca.org.uk/your-fca/documents/finalised-guidance/fsa-fg1117>.

¹⁶³ FCA, *Thematic Review: Price Comparison Websites in the General Insurance Sector* (July 2014) at <https://www.fca.org.uk/news/tr14-11-price-comparison-websites-in-the-general-insurance-sector>.

¹⁶⁴ Tom CW Lin, ‘Infinite Financial Intermediation’ (2015) 50 Wake Forest Law Review 843.

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 FCA, *Asset Management Market Study* (Nov 2015) which is looking into whether asset management fees are appropriate, delivering value for money. On hedge fund fees, see ‘Hedge Funds and Private Equity Funds Pressured to Cut Fees’, *Financial Times* (21 Feb 2016); ‘Down to 1.4 and 17?’, *The Economist* (8 Feb 2014) 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’ (2015) at <http://ssrn.com/abstract=2551272>.

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.

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 organisation, such as organising 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 judgement. 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 information about them has been comprehensively collected, and consistently organised 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 and will return to algorithmic trading to be discussed 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 categorise investor information well and make the right interpretations out of them.

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

¹⁶⁷ Gary Bergman, ‘Using Automation to Improve the Credit Review Function’ (1998-1999) 14 *Com. Lending Rev.* 60.

¹⁶⁸ Lisa Valentine, ‘4 Tech Trends to Watch’ (1999) *ABA Banking Journal* 46.

¹⁶⁹ Andrew Hargadon, *How Breakthroughs Happen: The Surprising Truth About How Companies Innovate* (Mass: Harvard Business School Press, 2003).

¹⁷⁰ Yongjae Lee and Jangho Kim, ‘On the Viability of Robo-Advising for Individual Investors’ (2015) at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2679303; Darren Tedesco, ‘I, Robo-Adviser? Creating the Blended Adviser Experience’ (2015) *Journal of Financial Planning* 17.

principle be promoted even if the robo-advising capabilities need to be refined. Further, the robo-adviser is seen to be more capable of consistent interpretation and application of information.¹⁷¹

However, Fein voices scepticism of robo-advisers as they are seen to be unable to substitute for 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 US 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 standardise the information they have been provided and are not able to detect nuances in investors' communications and sentiment. These limitations make robo-advisers unable to fully comprehend an investors' appetite and needs. She 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 labour, 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 UK FCA envisions that automated advice can be provided without the need for human intervention in the regime of '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 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

A 'Disruptive Innovation' Model in Understanding the Implications of Fintech in Intermediation Processes and Interfaces

Fintech is 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

¹⁷¹ Darren Tedesco, 'I, Robo-Adviser? Creating the Blended Adviser Experience' (2015) *Journal of Financial Planning* 17.

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

¹⁷³ Melanie Fein, 'Robo-advisers; A Closer Look' (2015) at <http://ssrn.com/abstract=2658701>.

¹⁷⁴ Rodrigo Zepeda, 'The Industrialization Blueprint: Re-engineering the Future of Banking and Financial Services' (2015) *The Capco Institute Journal of Financial Transformation* 9.

¹⁷⁵ FCA, *Finalised Guidance: Simplified Advice* (March 2012) at <http://fca.org.uk/static/pubs/guidance/fg12-10.pdf>.

¹⁷⁶ See for example Scopino's argument that firms that develop and use automated trading agents that are programmed by algorithms should be registered and regulated by the US Commodities and Futures Trading Commission, Gregory Scopino, 'Preparing Financial Regulation for the Second Machine Age: The Need for Oversight Of Digital Intermediaries in the Futures Markets' (2015) *Columbia Business Law Review* 439.

¹⁷⁷ Price Waterhouse Coopers, *Blurred Lines: How Fintech is Shaping the Financial Services Industry* (March 2016).

‘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 setting out clearly 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 UK and EU legislation¹⁷⁸ may be over and under-inclusive at the same time.

New intermediaries such as information intermediaries for online P2P and crowdfunding portals should be monitored, as well as new payment intermediaries such as Apply 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, rivalling banks in the

¹⁷⁸ Duties imposed on financial intermediaries via the EU Markets in Financial Instruments Directive 2014 and the UK 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 discussions in chapter 6, Iain MacNeil, *An Introduction to the Law on Financial Investment* (Oxford: Hart 2012, 2nd ed); Niamh Moloney, *EU Securities and Financial Markets Regulation* (Oxford; OUP 2015) at Part IV generally.

¹⁷⁹ Not to be as far-reaching as the EU Regulation of Credit Rating Agencies 2009 (amd 2011, 2013) but certainly worth considering the rationale for regulation of information intermediaries and what aspects of market failures and public interest there are, see Iris H-Y Chiu, ‘Regulatory Governance of Credit Rating Agencies in the EU: The Perils of Pursuing the Holy Grail of Rating Accuracy’ (2013) *European Journal of Risk and Regulation* 199 and cites within.

¹⁸⁰ Governed by the Payment Services Directive 2007 (Directive 2007/64/EC of the European Parliament and of the Council of 13 November 2007 on payment services in the internal market amending Directives 97/7/EC, 2002/65/EC, 2005/60/EC and 2006/48/EC and repealing Directive 97/5/EC); UK Payment Services Regulations 2009.

importance of these functions, 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 problems in the client-intermediary relationship.

Further, it may be important to qualify the use of automation in risk management and the making of prudential judgments, as bank internal models for capital adequacy have been shown to be inadequate before the global financial crisis 2007-9, 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 also 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 EU and UK in relation to market manipulation,¹⁸³ or whether states of mind and standards of care are relevant and to what extent.

Finally in terms of 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 in terms of globalisation 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

¹⁸¹ Financial Stability Board, *Next Steps on the NBNI G-SIFI Assessment Methodologies* (30 July 2015) at <http://www.fsb.org/2015/07/next-steps-on-the-nbni-g-sifi-assessment-methodologies/>.

¹⁸² Eg see Jukka Vauhkonen, 'Bank Safety under Basel II Capital Requirements' (November 2009) Bank of Finland Research Paper No 29-2009 http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1513239.

¹⁸³ Eg see *Winterflood Securities Ltd (Winterflood) and two others v Financial Services Authority* (FSA) [2010] EWCA Civ 423 which affirmed 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 EU 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. For eg see the Financial Stability Board's *Global Shadow Banking Monitoring Report* issued since 2013 as a consolidation of 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. See for eg *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 2015); *Information Sharing for Resolution Purposes* (Oct 2013).

necessity for extra-territorial legislation.¹⁸⁵ It is important for regulators to work with technology experts and a network of surveillance and enforcement agencies in addressing how cyber-risks may affect traditional conceptions of investor protection and intermediary responsibility.¹⁸⁶ Finally, regulators must also be aware that fintech developments that may appear ‘alternative’ today could rapidly become widely adopted and regulators should not be taken by surprise. The judgment-based approach¹⁸⁷ championed internationally and in the UK 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’ in considering regulatory implications.

We also think 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 not consumer disputes be capable of resolution within similar principles, frameworks and interfaces? In the UK, there is scope to consider developing the Financial Ombudsman service¹⁸⁸ in this way.¹⁸⁹

D. Market-places in Finance

¹⁸⁵ such as under the European Union Market Abuse Directive that potentially targets any market abuse activity in relation to financial instruments that are traded on European financial markets which can be concurrently traded elsewhere, Article 2(4) of the Market Abuse Regulation 2014 states 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 For eg see Morgan Stanley, *Beyond Firewalls: A New World of Cyber Security* (Nov 2015). It is to be noted that the US 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, Regulation S-P at <https://www.sec.gov/spotlight/cybersecurity.shtml>. This area is still generally submerged in ‘organisational arrangements’ in the EU, with no specific flagging up of cyber risks see for eg Art 16, Markets in Financial Instruments Directive that deals 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 Bank of England, *The Prudential Regulation Authority’s Approach to Banking Supervision* (April 2013) at <http://www.bankofengland.co.uk/publications/Documents/prapproach/bankingappr1304.pdf>. This is also internationally endorsed in the Basel Committee, *Core Principles for Effective Banking Supervision* (September 2012) at <http://www.bis.org/publ/bcbs230.htm>, Principle 8.

¹⁸⁸ See sections 225 to 232, UK Financial Services and Markets Act 2000. 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 for eg *R. (on the application of IFG Financial Services Ltd) v Financial Ombudsman Service 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 Management & Tax Solutions Ltd* [2012] EWHC 3669 QB and [2014] EWCA Civ 118.

¹⁸⁹

Finally we 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.

Market-places in financial instruments used to tend towards centralisation. This is because the network effects of users favour 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.¹⁹⁰ However, the rise of market monopolies or oligopolies has produced uncompetitive effects,¹⁹¹ and this has led to a deliberate policy movement in the US, UK and EU to foster market competition, ie to stimulate a market for markets.¹⁹² The development of market competition in the UK was led by harmonised EU 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).

The Fragmented Markets Phenomenon

In the US, UK and EU 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; internalisation being frequently practiced in the EU. Into the picture

¹⁹⁰ Peter Gomber, Satchit Sagade, Erik Theissen, Moritz Christian Weber and Christian Westheide, 'Competition Between Equity Markets: Evidence from the Consolidation Versus Fragmentation Debate' (2013) at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2362216.

¹⁹¹ John C Coffee, "Competition Versus Consolidation: The Significance Of Organizational Structure In Financial And Securities Regulation" (1995) 50 *Business Lawyer* 447; Jason Fink, Kristin E. Fink, James P. Weston, 'Competition on the Nasdaq and the Growth of Electronic Communication Networks' (2006) 30 *Journal of Banking and Finance* 2537 found collusive behaviour 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.

¹⁹² The US 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 discussion in Stephen Diamond and Jennifer Kuan, 'The Importance of Institutional Design: Evidence from the New York Stock Exchange IPO and Reg. NMS' (2012) at <http://ssrn.com/abstract=1987275>. Where the EU 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 Quotation system, see Jean-Pierre Casey and Karel Lannoo, "The MIFID Implementing Measures: Excessive Detail or Level Playing Field?" CEPS Working Paper No.1, May 2006, at www.ceps.be; Lena Körber, Oliver Linton and Michael Vogt, 'The Effect of Fragmentation in Trading on Market Quality in the UK Equity Market' (2013) at <http://ssrn.com/abstract=2315414> and generally, John Board, Charles Sutcliffe, and Stephen Wells, *Transparency and Fragmentation* (London: Palgrave Macmillan 2002). However see Peter Hoffmann, 'Adverse Selection, Market Access, and Inter-Market Competition' (2016) 65 *Journal of Banking and Finance* 108 who thinks that the EU's price transparency rules do not go far enough to promote effective market competition and more adverse effects of market fragmentation are observed.

we should add newer developments such as 'dark pools'¹⁹³ 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-ask spreads on markets have reduced¹⁹⁴ and transaction fees have been reduced.¹⁹⁵ Further, market fragmentation caters to the needs of different traders,¹⁹⁶ and the rise of dark pools is a case in point. Dark pools have arisen 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.¹⁹⁷ However, they are controversial as they do not practice price transparency¹⁹⁸ 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.¹⁹⁹ 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.²⁰⁰ It is inconclusive if liquidity across fragmented markets, including secretive dark pools, is reduced overall.²⁰¹

¹⁹³ See for example discussion in James Brugler, 'Into the Light: Dark Pool Trading and Intraday Market Quality on the Primary Exchange' (Bank of England Staff Working Paper 2015); Sabrina Buti, Barbara Rindi and Ingrid Werner, 'Diving into Dark Pools' (2011) at <http://www.ssrn.com/abstract=1630499>.

¹⁹⁴ Jason Fink, Kristin E. Fink, James P. Weston, 'Competition on the Nasdaq and the Growth of Electronic Communication Networks' (2006) 30 *Journal of Banking and Finance* 2537; ESMA, 'Order Duplication And Liquidity Measurement In EU Equity Markets' (ESMA Economic Report 2016). Even dark pools have not damaged but have instead contributed to better price efficiency according to some empirical research eg see Haoxiang Zhu, 'Do Dark Pools Harm Price Discovery?' (2013) *Review of Financial Studies*, at <http://ssrn.com/abstract=1712173>; James Brugler, 'Into the Light: Dark Pool Trading and Intraday Market Quality on the Primary Exchange' (Bank of England Staff Working Paper 2015); Patricia Kefilwe Madigele, 'Financial Markets Analysis: A Critical Analysis of Dark Pools' (2014) at <http://ssrn.com/abstract=2437314>; Sabrina Buti, Barbara Rindi and Ingrid Werner, 'Diving into Dark Pools' (2011) at <http://www.ssrn.com/abstract=1630499> but only limited to highly liquid and large cap stocks; William Peng He and Andrew Lepone, 'Determinants of Liquidity and Execution Probability in Exchange Operated Dark Pool: Evidence from the Australian Securities Exchange' (2006) at <http://ssrn.com/abstract=1969190> on empirical findings from the Australian markets that support positive findings on market quality.

¹⁹⁵ Markus Baldauf and Joshua Mollner, 'Trading in Fragmented Markets' (2016) at <http://ssrn.com/abstract=2782692>.

¹⁹⁶ James Angel, Lawrence Harris and Chester S Spatt, 'Equity Trading in the 21st Century' (2010) at <http://ssrn.com/abstract=1584026>.

¹⁹⁷ Pierre Paulden, 'Daggers, Dark Pools & Disintermediation' (2007) 41 *Institutional Investor* 60.

¹⁹⁸ Andreas M Fleckner, 'Regulating Trading Practices' in E Ferran et al (eds), *Oxford Handbook of Financial Regulation* (Oxford: OUP 2015).

¹⁹⁹ Causing transaction cost on open markets to rise, see Krishnamurthy Iyer, Ramesh Johari and Ciamac C Moallemi, 'Welfare Analysis of Dark Pools' (2016) at <http://ssrn.com/abstract=2040959>.

²⁰⁰ Acknowledged in Sabrina Buti, Barbara Rindi and Ingrid Werner, 'Diving into Dark Pools' (2011) at <http://www.ssrn.com/abstract=1630499>.

²⁰¹ Lena Körber, Oliver Linton and Michael Vogt, 'The Effect of Fragmentation in Trading on Market Quality in the UK Equity Market' (2013) at <http://ssrn.com/abstract=2315414> do not think liquidity across markets is affected, but see contrary findings in Markus Baldauf and Joshua Mollner, 'Trading in Fragmented Markets' (2016) at <http://ssrn.com/abstract=2782692>; Paul Bennett and Li Wei, 'Market Structure, Fragmentation, and Market Quality' (2006) 9 *Journal of Financial Markets* 49.

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.²⁰² It could be argued that fragmented markets only *work* and demonstrate beneficial effects as a result of regulatory intervention in the US, UK and EU that foster a level playing field.²⁰³ 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 commoditised and are less incentivised to take on broader governance roles in the interests of maintaining market order and stability. Macey and O'Hara²⁰⁴ 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, Yadav²⁰⁵ also doubts that marketplaces are sufficiently incentivised 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 UK FCA continues to gently nudge dark pools towards optimal self-governing behaviour and prefers a non-intrusive approach.²⁰⁶ It is questioned whether this is consistent with the forward-looking regulatory approach the UK 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 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 downward spiral of price in a rapid trading environment.²⁰⁷ It is only after the

²⁰² Markus Baldauf and Joshua Mollner, 'Trading in Fragmented Markets' (2016) at

<http://ssrn.com/abstract=2782692>; Vanthuan Nguyen, Bonnie F Van Ness and Robert A Van Ness, 'Short- and Long-Term Effects of Multimarket Trading' (2007) 42 *The Financial Review* 349.

²⁰³ Vanthuan Nguyen, Bonnie F Van Ness and Robert A Van Ness, 'Short- and Long-Term Effects of Multimarket Trading' (2007) 42 *The Financial Review* 349. Certain large orders are however exempted from price transparency under the EU Markets in Financial Instruments Regulation 2014, which continues to support their routing to dark pools. Andreas Storckenmaier and Martin Wagener, 'Do we need a European "National Market System"? Competition, Arbitrage, and Suboptimal Executions' (2011) at <http://ssrn.com/abstract=1760778> on how price transparency regulation in the EU causes markets to behave as if consolidated for the benefit of investors.

²⁰⁴ Jonathan Macey and Maureen O'Hara, 'From Markets to Venues: Securities Regulation in an Evolving World' (2005) 58 *Stanford Law Review* 563.

²⁰⁵ Yesha Yadav, 'The Governance Gap in Fragmented Markets' (2016) at <http://ssrn.com/abstract=2754786>.

²⁰⁶ FCA, *Thematic Review: UK Equity Market Dark Pools – Role, Promotion and Oversight in Wholesale Markets* (July 2016) at <http://fca.org.uk/news/tr16-05-uk-equity-market-dark-pools> is of 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.

²⁰⁷ Andrei A Kirilenko, Albert S Kyle, Mehrdad Samadi and Tugkan Tuzun, 'The Flash Crash: High Frequency Trading in an Electronic Market' (2011) at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1686004;

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.²⁰⁸ 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 UK and EU has to an extent attempted to address the governance deficit. The EU Markets in Financial Instruments Directive 2014 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.²⁰⁹ This regime has been transposed in UK 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.²¹⁰ The support for market competition and the maintenance of short term price efficiency encourages myopic trading and short-termism.²¹¹ The adverse long-term effects and welfare-destruction effects of short termism have been highlighted²¹² 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 longer term goals. This inherent bias is something that regulators need to address in considering any regulatory implications for fintech innovation in marketplaces.

The backdrop of regulatory favour 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.

Trading Innovations

Profits in finance are increasingly being made in trading as intermediaries act as traders exploiting opportunities for value arbitrage.²¹³ As mentioned above, short-termist trading is now the norm on

Albert J. Menkveld and Bart Zhou Yueshen, 'The Flash Crash: A Cautionary Tale about Highly Fragmented Markets' (2016) at <http://ssrn.com/abstract=2243520>.

²⁰⁸ https://www.nyse.com/markets/nyse/trading-info#Circuit_Breakers.

²⁰⁹ See Articles 17(5), 33, 48 and 54, Markets in Financial Instruments Directive 2014.

²¹⁰ The rise of the trading culture is discussed in Dalia Tsuk Mitchell, 'Institutional shareholders as Proxies: The Contours of Shareholder Democracy' (2006) 65 Washington and Lee Law Rev 4.

²¹¹ Paul Frentrop, 'Short Termism of Institutional Investors and the Double Agency Problem' (2012) at <http://ssrn.com/abstract=2249872>; David Marginson and Laurie McAulay, 'Exploring the Debate on Short-Termism: A Theoretical and Empirical Analysis' (2008) 29 Strategic Management 273; James Juniper, 'A Genealogy of Short-Termism in Capital Markets' (1998) at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=219990; Marc T Moore and Edward Walker-Arnott, 'A Fresh Look at Stock Market Short Termism' (2014) 41 Journal of Law and Society 416.

²¹² Eg Department of Business, Skills and Innovation, *The Kay Review of UK Equity Markets and Long-Term Decision Making* (Final Report, 23 July 2012).

²¹³ The rise of a trading culture is discussed in Dalia Tsuk Mitchell, 'Institutional shareholders as Proxies: The Contours of Shareholder Democracy' (2006) 65 Washington and Lee Law Rev 4

financial markets. It could be argued that such short-termist pursuit of price efficiency aligns with long-term allocative welfare.²¹⁴ However, if short term prices are not nearly as efficient as one hopes,²¹⁵ then short term value arbitrage results in zero sum games that are carried out with complete obliviousness to the impact on the long term.²¹⁶ 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 programmes embedding certain risk management practices defined by traders. In a simplistic way, this is another technological development that replaces human labour 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, and is able to take place in milliseconds, approaching the speed of light.²¹⁷

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.²¹⁸ 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 after that so that gains are made without any risky exposure.²¹⁹ 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.²²⁰ 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

²¹⁴ 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" (1970) 25 *Journal of Finance* 383; Art Durnev, Merritt Fox, Randall Morck, and Bernard Yeung, "Law, Share Price Accuracy, and Economic Performance: The New Evidence" (2003) 102 *Michigan Law Review* 331-386.

²¹⁵ note critique against the Efficient Markets theorists, see D Langevoort, "Taming the Animal Spirits of the Stock Markets: A Behavioral Approach to Securities Regulation" (2002) 97 *Northwestern University Law Rev* 135 and much of the behavioural literature in most notably, Robert Shiller, *Irrational Exuberance* (Princeton University Press 2006, 2nd ed).

²¹⁶ Eg see Emeka Duruigbo, 'Tackling Shareholder Short-Termism and Managerial Myopia' (2011-12) 100 *Kentucky Law Journal* 531; Maria Maher and Thomas Andersson, 'Corporate Governance: Effects on Firm Performance and Economic Growth' (OECD Working Paper 1999).

²¹⁷ James Angel, 'When Finance Meets Physics: The Impact of the Speed of Light on Financial Markets and their Regulation' (2014) 49 *The Financial Review* at <http://ssrn.com/abstract=2378352>.

²¹⁸ Frank Pasquale, 'Law's Acceleration of Finance: Redefining the Problem of High-Frequency Trading' (2015) 36 *Cardozo Law Review* 2085.

²¹⁹ Mi Hyun Yoon, 'Trading in a Flash: Implication of High Frequency Trading for Securities Regulators' (2010) 24 *Emory International Law Review* 913.

²²⁰ Discussed in Steven McNamara, 'The Law and Ethics of High-Frequency Trading' (2016) 17 *Minnesota Journal of Law, Science & Technology* 71.

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.²²¹

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.²²² Capital markets are at best semi-strong efficient, so traders have always sought to exploit inefficiencies to make private gains.²²³ Such behaviour is not new to human nature. Empirical researchers on HFT also find that markets with HFT participation enjoy beneficial effects, in terms of price discovery²²⁴ and liquidity,²²⁵ though more arguably, lower price volatility.²²⁶ 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.²²⁷ HFTs that appear to supply constant liquidity are also themselves liquidity takers.²²⁸ HFT has the potential of

²²¹ Discussed in Charles R Korsmo, 'High Frequency Trading- A Regulatory Strategy' (2013) 48 University of Richmond Law Review 523.

²²² Holly A Bell, 'High Frequency Trading: Do Regulators Need to Control this Tool of Informationally Efficient Markets?' (2013) Cato Institute Policy Analysis 731.

²²³ Robert Jarrow and Philip Protter, 'A Dysfunctional Role of High Frequency Trading in Electronic Markets' (2011) at <http://ssrn.com/abstract=1781124>.

²²⁴ Jonathan Brogaard, Terence Hendershott and Ryan Riordan, 'High Frequency Trading and Price Discovery' (ECB Working Paper 2013) at <http://ssrn.com/abstract=2341037>; Gbenka Ibikunle, 'Competition for Order flow and Price Discovery: The Curious case of High-tech Entrants' (2015) at <http://ssrn.com/abstract=2440691>; Jeffrey G MacIntosh, 'High Frequency Traders: Angels or Devils?' (2013) at <http://ssrn.com/abstract=2340673>; Ekkehart Boehmer, Kingsley Fong and Julie Wu, 'International Evidence on Algorithmic Trading' (2015) at <http://ssrn.com/abstract=2022034>. In particular, price discovery across fragmented markets are improved by HFT, see Martin Haferkorn, 'High Frequency Trading and its Role in Fragmented Markets' (2015) at <http://ssrn.com/abstract=2600240>.

²²⁵ 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 Jonathan Brogaard, Terence Hendershott and Ryan Riordan, 'High Frequency Trading and Price Discovery' (ECB Working Paper 2013) at <http://ssrn.com/abstract=2341037>; Jeffrey G MacIntosh, 'High Frequency Traders: Angels or Devils?' (2013) at <http://ssrn.com/abstract=2340673>. 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 Kirilenko and Andrew Lo, 'Moore's Law vs. Murphy's Law: Algorithmic Trading and Its Discontents' (2013) at <http://ssrn.com/abstract=2235963>. Further Ekkehart Boehmer, Kingsley Fong and Julie Wu, 'International Evidence on Algorithmic Trading' (2015) at <http://ssrn.com/abstract=2022034> are of the view that HFT firms are not committed market-makers and hence their provision of liquidity may be very transient and unreliable.

²²⁶ Some commentators opine that HFT causes more price volatility due to the rapid firing of orders, eg see Ekkehart Boehmer, Kingsley Fong and Julie Wu, 'International Evidence on Algorithmic Trading' (2015) at <http://ssrn.com/abstract=2022034>; Andreas M Fleckner, 'Regulating Trading Practices' in E Ferran et al (eds), Oxford Handbook of Financial Regulation (Oxford: OUP 2015); but others have found no or beneficial impact instead, see Andrei Kirilenko and Andrew Lo, 'Moore's Law vs. Murphy's Law: Algorithmic Trading and Its Discontents' (2013) at <http://ssrn.com/abstract=2235963> and Martin Haferkorn, 'High Frequency Trading and its Role in Fragmented Markets' (2015) at <http://ssrn.com/abstract=2600240>.

²²⁷ Merritt Fox, Lawrence Glosten and Gabriel Rauterberg, 'The New Stock Market: Sense and Nonsense' (2015) 65 Duke Law Journal 191; Robert Jarrow and Philip Protter, 'A Dysfunctional Role of High Frequency Trading in Electronic Markets' (2011) at <http://ssrn.com/abstract=1781124>; Steven McNamara, 'The Law and Ethics of High-Frequency Trading' (2016) 17 Minnesota Journal of Law, Science & Technology 71.

²²⁸ David Easley, Marcos M. López de Prado and Maureen O'Hara, 'Flow Toxicity and Liquidity in a High-frequency World' (2012) 25 The Review of Financial Studies 1457; D. Sornette and S. von der Becke, 'Crashes and High Frequency Trading' (2011) at <http://ssrn.com/abstract=1976249>.

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.²²⁹

Although some HFT practices are arguably competitive innovations not involving market abuse, commentators raise questions over (a) the fairness or otherwise 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 needs to be addressed.²³⁰ The arguments in favour of market efficiency should not totally drown the concerns regarding the ethics of individual 'harms' that are caused.²³¹ Further, a market that favours the competitive advantage enjoyed by HFT firms would only provoke a socially useless arms race in trading innovation.²³² Commentators urge that certain market practices exacerbate the already unfair advantage HFT firms have and would need to be scrutinised. For example, co-location gives HFT firms an advantage in information although this advantage is open to any who can rent such space.²³³ Further, HFTs that subscribe to preferential data feeds that are sent a fraction of a second before such feeds are made for public release also have an arguably unfair information advantage.²³⁴ Exchanges also practice flash orders, ie 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.²³⁵ The SEC's recent fines imposed on Barclays and Credit Suisse could be key to nailing down the undesirable practice of flash orders.²³⁶ The SEC enforcement action was based on the banks' misrepresentation to their investors that their dark pools are fair when they in fact practise 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.

²²⁹ Merritt Fox, Lawrence Glosten and Gabriel Rauterberg, 'The New Stock Market: Sense and Nonsense' (2015) 65 *Duke Law Journal* 191.

²³⁰ Michael J Aitken, Angelo Aspris, Sean Foley and Frederic H de B Harris, 'Market Fairness: The Poor Country Cousin of Market Efficiency' (2014) at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2440671.

²³¹ Michael Davis, Andrew Kumiega and Ben van Vliet, 'Ethics, Finance, and Automation: A Preliminary Survey of Problems in High Frequency Trading' (2013) 19 *Science Engineering and Ethics* 851.

²³² Camillo von Muller, 'Regulating High Frequency Trading: A Micro-Level Analysis of Spatial Behavior, Optimal Choices, and Pareto-Efficiency in High Speed Markets' (2012) at <http://ssrn.com/abstract=2000119>.

²³³ Charles R Korsmo, 'High Frequency Trading- A Regulatory Strategy' (2013) 48 *University of Richmond Law Review* 523; Steven McNamara, 'The Law and Ethics of High-Frequency Trading' (2016) 17 *Minnesota Journal of Law, Science & Technology* 71. But the practice of co-location is arguably legitimised in the EU 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'.

²³⁴ Steven McNamara, 'The Law and Ethics of High-Frequency Trading' (2016) 17 *Minnesota Journal of Law, Science & Technology* 71.

²³⁵ Steven McNamara, 'The Law and Ethics of High-Frequency Trading' (2016) 17 *Minnesota Journal of Law, Science & Technology* 71.

²³⁶ Both banks have been fined, see 'Barclays and Credit Suisse are fined over US 'dark pools'', *BBCNews* (1 Feb 2016).

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 behaviour or pin it down as being abusive. It may be argued that the current regulatory framework should be able to capture HFTs demonstrating anti-social behaviour and market abuse. In this way, HFT is not itself a problem.²³⁷ However, certain HFT practices push the boundaries of current regulatory definitions, such as layering. One could argue that layering is a form of 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.²³⁸ 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 objective²³⁹ in the wake of the global financial crisis 2008-9. 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.²⁴⁰ Micro-efficient behaviour could indeed result in pro-cyclical and herding behaviour that is damaging to overall market and financial stability.²⁴¹ It is arguable that HFT, which augments micro-efficient behaviour 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.²⁴² 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.²⁴³ 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 exacerbate them and very rapidly too, making it difficult for interventions to take place for the stabilisation of markets. Thus, the systemic risk impact of HFT trading has been flagged up for scrutiny,²⁴⁴ and the HFT firms that benefit from exploiting such technology should arguably be called upon to ensure

²³⁷ James Angel, Lawrence Harris and Chester S Spatt, 'Equity Trading in the 21st Century' (2010) at <http://ssrn.com/abstract=1584026>; Holly A Bell, 'High Frequency Trading: Do Regulators Need to Control this Tool of Informationally Efficient Markets?' (2013) Cato Institute Policy Analysis 731.

²³⁸ Tara E Levens, 'Too Fast, Too Frequent? High-Frequency Trading and Securities Class Actions' (2015) 82 The University of Chicago Law Review 1511 argues 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.

²³⁹ Mads Andenas and Iris H-Y Chiu, *The Foundations and Future of Financial Regulation* (Oxford: Routledge 2014) especially at chapters 1 and 2.

²⁴⁰ Eg see FSA, *The Turner Review* (2009) at http://www.fsa.gov.uk/pubs/other/turner_review.pdf; Viral Acharya and Matthew Richardson (eds), *Restoring Financial Stability: How to Repair a Failed System* (NY and Chichester: John Wiley & Sons 2009).

²⁴¹ Emiliios Avgouleas, 'The Global Financial Crisis, Behavioural Finance and Financial Regulation: In Search of a New Orthodoxy' (2009) 9 Journal of Corporate Law Studies 23.

²⁴² Albert J. Menkveld and Bart Zhou Yueshen, 'The Flash Crash: A Cautionary Tale about Highly Fragmented Markets' (2016) at <http://ssrn.com/abstract=2243520>.

²⁴³ Andrei Kirilenko and Andrew Lo, 'Moore's Law vs. Murphy's Law: Algorithmic Trading and Its Discontents' (2013) at <http://ssrn.com/abstract=2235963>; D. Sornette and S. von der Becke, 'Crashes and High Frequency Trading' (2011) at <http://ssrn.com/abstract=1976249>.

²⁴⁴ Charles R Korsmo, 'High Frequency Trading- A Regulatory Strategy' (2013) 48 University of Richmond Law Review 523.

that the technology is used, governed and controlled in a manner responsible for the maintenance of market and financial stability.

We are also 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.²⁴⁵ Otherwise the era of trading innovations would take us into an insular world of micro-efficiency and speed without reference to wider and long-term impact. Trading innovations such as HFT have not gained a salutary social reputation,²⁴⁶ and are contributing towards a wider perception that financial elites dominate the financial markets, disempowering and disenfranchising less sophisticated users.²⁴⁷

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. The next Section turns to a very different market development- private markets denominated in alternative currencies such as bitcoin which is supported by blockchain technology.

Private Alternative Markets- Bitcoin and Blockchain

One of fintech's poster-children would be new digital currencies such as bitcoin supported by the blockchain technology. In essence bitcoin is non-government backed private 'money', which is not regarded as legal tender in most jurisdictions, but is increasingly accepted on a private basis as a means of exchange.²⁴⁸ 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.²⁴⁹ 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, but 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 closed networks.²⁵⁰ For example, digital currencies exclusive to online games, such as 'gold' in the popular World of Warcraft. Bitcoin is another digital currency, but it is potentially capable of breaking boundaries largely

²⁴⁵ Frank Pasquale, 'Law's Acceleration of Finance: Redefining the Problem of High-Frequency Trading' (2015) 36 *Cardozo Law Review* 2085.

²⁴⁶ Michael Lewis, *Flash Boys* (London: Penguin 2015).

²⁴⁷ Which is already a trend in the deregulatory and liberal era of financialisation, see generally chapter 3 in Mads Andenas and Iris H-Y Chiu, *The Foundations and Future of Financial Regulation* (Oxford: Routledge 2014) and cites within depicting a highly decentred governance landscape but highly captured by the financial elite.

²⁴⁸ Andres Guadamuz and Chris Marsden, 'Blockchains and Bitcoin: Regulatory Responses to Cryptocurrencies' (2015) at <http://ssrn.com/abstract=2704852>.

²⁴⁹ Lawrence J. Trautman and Alvin C. Harrell, 'Bitcoin Versus Regulated Payment Systems: What Gives?' (2016) at <http://ssrn.com/abstract=2730983> Charles Proctor, *Mann on The Legal Aspect of Money* (Oxford: OUP 2012) at chapter 1.

²⁵⁰ Andres Guadamuz and Chris Marsden, 'Blockchains and Bitcoin: Regulatory Responses to Cryptocurrencies' (2015) at <http://ssrn.com/abstract=2704852>.

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.²⁵¹ 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 and authorised, and then 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, ie fraud and double-spending,²⁵² is minimised. Supported by blockchain technology, private 'bitcoin-based' economies could arise across borders on the worldwide web, and constitute alternative commercial and financial markets to conventional ones.²⁵³

The development of such alternative markets has attracted some regulatory support²⁵⁴ as being *prima facie* not inconsistent with policy-makers' bias towards 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.²⁵⁵ Some commentators see the creation of such a decentralised and private economic phenomenon as truly liberating, as existing political or systemic shackles to economic development could be overcome by the creation of new institutions. It is suggested that the blockchain technology enables new institutional structures such as decentralised autonomous institutions to arise, to replace centrally governed institutions. These decentralised institutions have the potential to be more sophisticated than conventional ones and are automatically coordinating in ways that are efficient.²⁵⁶ 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.²⁵⁷ The private money economy of crypto-currencies and blockchain could truly support development and the unbanked in the developing world.²⁵⁸ It is also suggested that private money economies such as denominated in bitcoin would develop economies of scale in due course and a *lex cryptographia* will arise to establish standards of use and behaviour, and dispute resolution, much

²⁵¹ See for example Aaron Wright & Primavera De Filippi, 'Decentralized Blockchain Technology and the Rise of Lex Cryptographia' (2015) at <http://ssrn.com/abstract=2580664>; Campbell R Harvey, 'Cryptofinance' (2014) at <http://ssrn.com/abstract=2438299>.

²⁵² Misha Tsukerman, 'The Block Is Hot: A Survey of the State of Bitcoin Regulation and Suggestions for the Future' (2015) 30 Berkeley Technology Law Journal 385.

²⁵³ Eg see Wilko Bolt and Maarten RC van Oort, 'On the Value of Virtual Currencies' (2016) at <http://ssrn.com/abstract=2767609>.

²⁵⁴ 'Barclays, UK Regulator Endorses Bitcoin with Start-up', *Bloomberg* (6 April 2016).

²⁵⁵ For example, 'Bitcoin Users would Face Jail under Russian Cryptocurrencies Law', *Bloomberg* (28 April 2016). See map of bitcoin status as put together by CNN at <http://money.cnn.com/interactive/technology/where-is-bitcoin-legal/>.

²⁵⁶ Trent J. MacDonald, Darcy Allen, and Jason Potts, 'Blockchains and the Boundaries of Self-Organized Economies: Predictions for the Future of Banking' in Paulo Tasca, Tomaso Aste, Lorian Pelizzon, & Nicolas Perony (eds), *Banking Beyond Banks and Money* (2016) at <http://ssrn.com/abstract=2749514>.

²⁵⁷ Larissa Lee, 'New Kids on the Blockchain: How Bitcoin's Technology Could Reinvent the Stock Market' (2016) 12 Hastings Business Law Journal 81.

²⁵⁸ Paul Vigna and Michael J Cassey, *Cryptocurrency: How Bitcoin and Digital Money are Challenging the Global Economic Order* (London: Vintage 2016).

like the development of the 'law merchant' for international trade from days of old.²⁵⁹ Private 'bitcoin-based' markets and economies embody for some the utopian ideals of new democracy and not just new commercial opportunities.²⁶⁰

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,²⁶¹ exploitation by fraudsters and criminals²⁶² and the inherent vulnerabilities of code.²⁶³ Further, participants in such alternative markets and economies must fully bear the market risks of bitcoin. Bitcoin can be subject to hyper-inflation or deflation as its value,²⁶⁴ 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,²⁶⁵ while leaving performance and behaviour issues

²⁵⁹ Aaron Wright & Primavera De Filippi, 'Decentralized Blockchain Technology and the Rise of Lex Cryptographia' (2015) at <http://ssrn.com/abstract=2580664>.

²⁶⁰ Paolo Tasca, 'Digital Currencies: Principal Trends, Opportunities and Risks' (2015) at <http://ssrn.com/abstract=2657598>.

²⁶¹ 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 regard bitcoins as valuable for 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' (2014) at <http://ssrn.com/abstract=2424516>; Angela Walch, 'The Bitcoin Blockchain as Financial Market Infrastructure: A Consideration of Operational Risk' (2015) 18 *Legislation and Public Policy* 837. Marcella Atzuri, 'Blockchain Technology and Decentralized Governance: Is the State Still Necessary?' (2015) at <http://ssrn.com/abstract=2731132> warn against raising an unaccountable and powerful class of technology elites maintaining the blockchain who would become new institutions of power.

²⁶² 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 discussion in Misha Tsukerman, 'The Block Is Hot: A Survey of the State of Bitcoin Regulation and Suggestions for the Future' (2015) 30 *Berkeley Technology Law Journal* 385.

²⁶³ Although blockchain cryptography has been touted to be difficult to hack and safe, a bitcoin exchange Mt Gox has suffered hacking and lost 85 million bitcoins. Hence, the technology is not completely hack-proof and as Walch argues, suffers from the operational risk of maintenance failures. See discussion in Angela Walch, 'The Bitcoin Blockchain as Financial Market Infrastructure: A Consideration of Operational Risk' (2015) 18 *Legislation and Public Policy* 837; Misha Tsukerman, 'The Block Is Hot: A Survey of the State of Bitcoin Regulation and Suggestions for the Future' (2015) 30 *Berkeley Technology Law Journal* 385; Larissa Lee, 'New Kids on the Blockchain: How Bitcoin's Technology Could Reinvent the Stock Market' (2016) 12 *Hastings Business Law Journal* 81.

²⁶⁴ See Larissa Lee, 'New Kids on the Blockchain: How Bitcoin's Technology Could Reinvent the Stock Market' (2016) 12 *Hastings Business Law Journal* 81, but see Wilko Bolt and Maarten RC van Oort, 'On the Value of Virtual Currencies' (2016) at <http://ssrn.com/abstract=2767609> for a more optimistic account which thinks the value of bitcoin can be stabilised through increased use and exchange with state-backed conventional currency.

²⁶⁵ 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 on a Risk-based Approach to Virtual Currencies* (2015) at <http://www.fatf-gafi.org/media/fatf/documents/reports/Guidance-RBA-Virtual-Currencies.pdf>. The UK government 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

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, governments²⁶⁶ and established institutions²⁶⁷ 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 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,²⁶⁸ and make blockchain technology both mainstream and proprietised, deviating from its open source roots. Volunteer miners could now become professionally employed to work on and develop proprietary systems. The impact of proprietary commercialisation of the blockchain technology sector could significantly and adversely affect the development of an open source blockchain 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 the article is sceptical of the enduring quality of this phenomenon. Bitcoin deviations have already developed, such as Litecoin and Dogecoin, and the competitive forces supporting such decentralisation are only likely to foster more fragmentation and less potency against the organised endeavours of incumbent institutions to harvest the potential of blockchain technology. Regulatory interventions such as the New York bitlicence²⁶⁹ may indeed be needed to bolster the competitive future of bitcoin!

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imposed on existing financial sector firms. See HM Treasury, *Digital Currencies: Response to the Call for Information* (March 2015) at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/414040/digital_currencies_response_to_call_for_information_final_changes.pdf; Bank of England's position in <http://www.bankofengland.co.uk/banknotes/Pages/digitalcurrencies/default.aspx>.

²⁶⁶ Eg the Financial Accelerator created by the Bank of England to harness fintech for its own use, see 'Bank of England launches Fintech Accelerator' (17 June 2016) at <http://www.bankofengland.co.uk/publications/Pages/speeches/2016/914.aspx>; study by the European Securities and Markets Authority to consider the use of distributed ledger technologies in the securities markets, see ESMA, *The Distributed Ledger Technology Applied to Securities Markets* (Discussion Paper, June 2016).

²⁶⁷ Eg 'Santander says first UK bank to use blockchain for overseas payments' *Reuters* (26 May 2016) at <http://uk.reuters.com/article/us-santander-blockchain-idUKKCN0YH1UJ>.

²⁶⁸ Andrea Pinna and Wiebe Ruttenberg, 'Distributed Ledger Technologies in Securities Post-Trading' (ECB Working Paper 2016) point out the transaction costs needed in reconciling and overhauling existing systems.

²⁶⁹ Department of Financial Services, *Virtual Currencies* at <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 discussion in Misha Tsukerman, 'The Block Is Hot: A Survey of the State of Bitcoin Regulation and Suggestions for the Future' (2015) 30 *Berkeley Technology Law Journal* 385.

In financial market-places, the key change that took place was led by policy-makers promoting market competition. Although policy-makers 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,²⁷⁰ rigorous internal control and governance for markets,²⁷¹ obligations imposed on markets to monitor and report abuse swiftly²⁷² and the trade-through rule in the US highlighted earlier. Many of the positive findings on market quality in the US, UK and EU 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 misbehaviour in dark pools. In the UK and EU, rules on best execution, fair and clear investor communication and market abuse are able to address principal-agent abuses, fraudulent and market abuse behaviour. The UK and EU protect retail investors by a best execution rule premised on best consideration,²⁷³ and institutional investors by a best execution rule defined by a range of factors that matter to such investors.²⁷⁴ The UK has in particular imposed a general principle of fair, clear and not misleading investor communications,²⁷⁵ and so would be able to reach the same decision as the SEC in enforcing against dark pools that were misrepresented to investors. The UK and EU's market abuse regime is premised on strict liability for having caused distortive effects on the market,²⁷⁶ and hence the use of HFT that results in those effects can be subject to market abuse enforcement. It however remains to be seen if practices such as layering would be indicted. The EU 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 EU legislation and is obliged to provide liquidity on a predictable basis.²⁷⁷ 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.²⁷⁸

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 policy presumption of favour 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

²⁷⁰ Regulation NMS in the US and the pre-trade and post-trade obligations operative in UK and EU markets by virtue of the Markets in Financial Instruments Directive 2004, which was recast and adopted again in 2014.

²⁷¹ Markets in Financial Instruments Directive 2004, which was recast and adopted again in 2014.

²⁷² Above.

²⁷³ See FCA Handbook COBS 11.2.7.

²⁷⁴ FCA Handbook, COBS 11.2, 11.2.6.

²⁷⁵ Principle 7, FCA Handbook, PRIN module.

²⁷⁶ The outcomes based approach is stated in the Market Abuse Regulation 2014, Art 12, and UK cases such as *Winterflood Securities v FSA* [2010] EWCA Civ 423.

²⁷⁷ Markets in Financial Instruments Directive 2014, Art 17.

²⁷⁸ Markets in Financial Instruments Regulation, Art 26(3).

by a number of commentators above are unlikely to be addressed.²⁷⁹ 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 UK as being contributory to an unhealthy short-termist culture in the corporate sector,²⁸⁰ increasingly disengaged from investing in the real economy for the long term.²⁸¹ Although the UK exhorts institutional investors to behave in a long-termist manner by soft law,²⁸² and the EU²⁸³ 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 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.²⁸⁴ 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 proprietisation 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 threat²⁸⁵ but could be allowed to exist

²⁷⁹ In fact, as co-location is one of the criteria for defining high frequency trading under the EU Markets in Financial Instruments Directive 2014, it is unlikely that policy-makers would turn around to enforce against this practice as such.

²⁸⁰ See for eg Aspen Institute, 'Overcoming Short-termism: A Call for a More Responsible Approach to Investment and Business Management' (2009) at <https://www.aspeninstitute.org/publications/overcoming-short-termism-call-more-responsible-approach-investment-business-management/>.

²⁸¹ Department of Business, Skills and Innovation, *The Kay Review of UK Equity Markets and Long-Term Decision Making* (Final Report, 23 July 2012); John Kay, *Other People's Money* (London: Profile Books 2015); Colin Mayer, *Firm Commitment* (Oxford: Oxford University Press 2013).

²⁸² UK Stewardship Code and see discussions in Iris H-Y Chiu, 'Institutional shareholders as Stewards: Towards a New Conception of Corporate Governance?' (2012) 6 Brooklyn Journal of Financial, Corporate and Commercial Law 387; 'Turning Institutional Investors into "Stewards"- Exploring the Meaning and Objectives in "Stewardship"' (2013) Current Legal Problems 1; Konstantinos Sergakis, 'The UK Stewardship Code: Bridging the Gap Between Companies and Institutional Investors' (2013) 47 RJTUM 109.

²⁸³ Proposed Shareholder Rights Directive 2014, see Proposal for a Directive of the European Parliament and of the Council amending Directive 2007/36/EC as regards 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 9 April 2014; Parliament amended version of 8 July 2015 at <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+TA+P8-TA-2015-0257+0+DOC+XML+V0//EN>.

²⁸⁴ Financial Action Task Force, *Guidance on a Risk-based Approach to Virtual Currencies* (2015) at <http://www.fatf-gafi.org/media/fatf/documents/reports/Guidance-RBA-Virtual-Currencies.pdf>.

²⁸⁵ Sentiments also shared in David S Evans, 'Economic Aspects of Bitcoin and Other Decentralized Public-Ledger Currency Platforms' (2014) at <http://ssrn.com/abstract=2424516>.

as parallel systems with conventional markets and economies as long as no systemic risk issues or financial crime are implicated.

E. 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 such as investor protection and financial stability, and whether regulatory rules and prescription need updating and adaptation to new practices and methodologies. 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.²⁸⁶ Further, this framework is also useful for regulators to consider whether they should introduce certain policy frameworks to initiate structural changes,²⁸⁷ 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 ‘blue print’ for appraising financial innovation. Over the longer term, such a blue print 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 position and leave financial innovations to be evaluated only by financial elites. Regulators should also not adopt knee jerk reactions to new developments and

²⁸⁶ 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 Approach to Understanding Shadow Banking’, *Journal of Corporation Law*, 2016, forthcoming; and Iris H-Y Chiu and Iain MacNeil (eds), *Research Handbook on Shadow Banking* (Cheltenham: Edward Elgar 2017), forthcoming, featuring a comprehensive treatment of shadow banking activities whether led by fintech or otherwise.

²⁸⁷ Such as the UK regulator’s initiative to introduce competition in the financial benchmarks market. This will not be belaboured here, see critically discussion in Iris H-Y Chiu, ‘Regulating Financial Benchmarks by ‘Proprietisation’: A Critical Discussion’ (2016) 11 *Capital Markets Law Journal* 191. On the financial benchmarks regulatory regime, see FCA Handbook MAR 8, and FCA, ‘Bringing Additional Benchmarks into the Regulatory and Supervisory Regime’ (March 2015). The EU 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 Regulation (EU) No 596/2014, 3 May 2016 at <http://data.consilium.europa.eu/doc/document/PE-72-2015-INIT/en/pdf>.

extend unsuitable regulatory frameworks over them.²⁸⁸ Finally, regulators should try to avoid being caught entirely 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.²⁸⁹ 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.

²⁸⁸ See critique in Andrew Verstein, 'The Misregulation of Person-to-Person Lending' (2011) 45 University of California at Davis Law Review 445.

²⁸⁹ Bank of England, *The Prudential Regulation Authority's Approach to Banking Supervision* (April 2013) at <http://www.bankofengland.co.uk/publications/Documents/prapproach/bankingappr1304.pdf>. This is also internationally endorsed in the Basel Committee, *Core Principles for Effective Banking Supervision* (September 2012) at <http://www.bis.org/publ/bcbs230.htm>, Principle 8.