

REGULATING THE FINTECH REVOLUTION: HOW REGULATORS CAN ADAPT TO TWENTY-FIRST CENTURY FINANCIAL TECHNOLOGY

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INTRODUCTION

The FinTech Revolution, which describes the rapid adoption of financial technology (“FinTech”) by non-traditional financial services firms, presents numerous challenges to regulators trying to ef-

fectively manage and preserve stability in the marketplace. This Note will attempt to answer the important open question of how these innovations fit into the overall regulatory structure. Part I provides an overview of the historical development of FinTech from the Industrial Revolution to the present, examining the characteristics of the FinTech Revolution and the factors which contributed to its rise. Part II provides a survey of the current FinTech market and regulatory structure and analyzes the need for changing the current approach to regulation. Building off of this analysis, Part III provides a proposal for how regulators should adapt to the FinTech Revolution by developing what this Note refers to as “smart regulation.” While the overall focus is on the U.S. regulatory system, this Note draws from foreign regulatory experiences, principally those from Europe and Asia, to inform its analysis.

I.

A HISTORY OF FINTECH: FROM EVOLUTION TO REVOLUTION

The development of FinTech has transformed the market for financial services and the global economy. Although interest from academics and policymakers is relatively recent, FinTech has always been a key element of the post-Industrial Revolution economy. This Part discusses the development of financial technology and the macroeconomic factors that catalyzed the “FinTech Revolution,” providing historical context for the analysis that follows.

A. *What is FinTech?*

FinTech has become a popular term to describe “an economic industry composed of companies that use technology to make financial systems more efficient.”¹ The origin of the term itself is popularly attributed to Citigroup during the 1990s as part of the Financial Services Technology Consortium, a project aimed toward facilitating technological collaboration.² However, FinTech’s ety-

1. Brendan McManus, *What is Fintech?*, WHARTON FINTECH BLOG (Feb. 2, 2018), <https://www.whartonfintech.org/blog-archive/2016/2/16/what-is-fintech> [<https://perma.cc/A5J4-QFLS>]; Cf. Patrick Schueffel, *Taming the Beast: A Scientific Definition of Fintech*, 4 J. INNOVATION MGMT. 32, 45 (2016) (suggesting a narrower definition limited to a “new financial industry that applies technology to improve financial activities”) (emphasis added).

2. See, e.g., John L. Douglas and Reuben Grinberg, *Old Wine in New Bottles: Bank Investments in Fintech Companies*, 36 REV. BANKING & FIN. L. 667, 669 (2017); Marc Hochstein, *Fintech (the Word, That Is) Evolves*, AM. BANKER (Oct. 5, 2015, 7:12 PM), <https://www.americanbanker.com/opinion/fintech-the-word-that-is-evolves>

mology might be more appropriately attributed to Manufacturers Hanover Trust Company, a predecessor to JPMorgan Chase, one of Citigroup's "Big Four" rivals.³ As early as 1972, the term "FINTECH" appeared in a scholarly article by the bank's vice president detailing models used to solve the bank's daily problems.⁴ Whatever its origin, by 2015 the word had grown beyond industry circles and into colloquial language.⁵

B. *The Rise of FinTech*

Although the term itself may be attributed to the latter part of the twentieth century, the history of financial technology far predates it. From the appearance of the abacus in Babylonia⁶ to the debut of securities in fourteenth-century Italian city-states,⁷ the history of finance is a history of innovation. However, what distinguishes the history of FinTech from its superset history of finance is the speed of innovation that occurred after the Industrial Revolution. Technological advancements such as the invention of the telegraph in 1838 and the laying of the first successful transatlantic cable in 1866 provided the infrastructure needed for the global fi-

[<https://perma.cc/BB86-9V82>]; Atul Monga, *Fintechification: The Evolution of Financial Services*, GRANT THORNTON: INSIGHTS (July 21, 2016), <https://www.grantthornton.co.uk/insights/fintechification-the-evolution-of-financial-services/> [<https://perma.cc/D7Y2-CQ8G>].

3. Manufacturers Hanover Trust Company was acquired in 1992 by Chemical Bank, which later acquired Chase Manhattan Bank in 1996. Chase became the nominal surviving corporation and later merged with J.P. Morgan & Co. to form JPMorgan Chase & Co. See Michael Quint, *Manufacturers Hanover Fades Out*, N.Y. TIMES (June 22, 1992), <https://www.nytimes.com/1992/06/22/business/manufacturers-hanover-fades-out.html> [<https://perma.cc/2MY5-SDU8>]; *Our History*, JPMORGAN CHASE & CO., <https://www.jpmorganchase.com/corporate/About-JPMC/our-history.htm> [<https://perma.cc/MH9E-PBS5>] (last visited Oct. 21, 2019).

4. Schueffel, *supra* note 1, at 36.

5. See, e.g., *Fintech*, GOOGLE TRENDS, <https://trends.google.com/trends/explore?date=all&q=fintech> [<https://perma.cc/ZBA4-LP8Z>] (last visited Feb. 3, 2018); Bob Bryan, *The 10 Hot New Financial Buzzwords You Need to Know*, BUS. INSIDER (Dec. 4, 2015), <http://www.businessinsider.com/the-10-hot-new-financial-buzzwords-you-need-to-know-2015-12> [<https://perma.cc/2LX6-89RB>].

6. See *Abacus*, ENCYCLOPEDIA BRITANNICA, <https://www.britannica.com/technology/abacus-calculating-device> [<https://perma.cc/4E26-99KR>] (last visited Feb. 18, 2018).

7. See B. MARK SMITH, *A HISTORY OF THE GLOBAL STOCK MARKET: FROM ANCIENT ROME TO SILICON VALLEY* 12 (2003).

financial system we see today.⁸ The ability to transmit information quickly across the globe facilitated rapid financial market integration. As John Maynard Keynes wrote in *The Economic Consequences of the Peace*:

The inhabitant of London could order by telephone, sipping his morning tea in bed, the various products of the whole earth, in such quantity as he might see fit, and reasonably expect their early delivery upon his doorstep; he could at the same moment and by the same means adventure his wealth in the natural resources and new enterprises of any quarter of the world, and share, without exertion or even trouble, in their prospective fruits and advantages.⁹

These innovations during the nineteenth century established the first era in FinTech's history. This period, which continued into the twentieth century, was largely characterized by incumbent financial institutions utilizing technology to support their operations—often in proximity to regulators.¹⁰

The 2008 Global Financial Crisis (GFC) marked a notable shift in FinTech's history and the commencement of a new era—the FinTech Revolution. This new stage has been characterized by an increase in the use of financial technology by non-licensed and non-traditional financial companies to compete directly with incumbent licensed financial institutions.¹¹ Now, a decade into this new era, academics and policymakers alike are questioning how today's FinTech fits in with the current financial regulatory structure. With this overview in mind, FinTech's bifurcated history is examined in more depth below, with Subpart 1 exploring its early historical developments and Subpart 2 analyzing the post-GFC factors that brought about the FinTech Revolution.

1. The Emergence of FinTech: From Industrial Revolution to the GFC

The Industrial Revolution led to a leap in globalization that gave rise to the first stage of FinTech. While the nineteenth century

8. Eilene Zimmerman, *The Evolution of Fintech*, N.Y. TIMES (Apr. 6, 2016), <https://www.nytimes.com/2016/04/07/business/dealbook/the-evolution-of-fintech.html> [<https://perma.cc/NW3K-BGPK>].

9. JOHN MAYNARD KEYNES, *THE ECONOMIC CONSEQUENCES OF THE PEACE* 6 (1920).

10. See Dirk A. Zetzsche et al., *From FinTech to TechFin: The Regulatory Challenges of Data-Driven Finance* (Eur. Banking Inst., Working Paper No. 6, 2017) [hereinafter *From FinTech to TechFin*].

11. See *id.* at 7; see also Douglas W. Arner et al., *The Evolution of FinTech: A New Post-Crisis Paradigm*, 47 GEO. J. INT'L L. 1271, 1286 (2016) (discussing FinTech 3.0).

was marked by the emergence of FinTech's foundational technology, such as the telegraph and transatlantic cable discussed above, the twentieth century saw FinTech's rapid market expansion. During the post-war era, the financial markets were introduced to a number of communication innovations, including real-time electronic stock delivery¹² and the telex network, a precursor to the fax machine, which set the next stage of financial technology development.¹³ Digitalization continued: Texas Instruments launched the first handheld electronic calculator in 1967¹⁴ and NASDAQ was established in 1971, marking the transition from physical to electronic trading in the United States.¹⁵ Meanwhile, consumer financial services were revolutionized with the appearance of the first modern credit cards from Diners Club in 1950¹⁶ and the first automated teller machine (ATM) from Barclays in 1967.¹⁷ In 1983, online banking was established in the United Kingdom¹⁸ and by the end of the century more than 90% of U.S. banking transactions were conducted over the internet.¹⁹

The financial market's increasing integration during this period led to the establishment of a number of collaborative efforts amongst and between financial institutions and governments. In 1918, the Federal Reserve (the "Fed") established Fedwire, which connected the Fed's regional banks by telegraph and allowed for a centralized funds transfer system between financial institutions.²⁰ In 1970, the Clearing House Interbank Payments System (CHIPS) was

12. See, e.g., Zimmerman, *supra* note 8 (noting the introduction of the Quotron by Quotron Systems in 1960); *Instinet*, INVESTOPEDIA (Aug. 15, 2018), <https://www.investopedia.com/terms/i/instinet.asp> [<https://perma.cc/E4CX-QP2Q>] (describing Instinet as "Wall Street's oldest electronic communications network").

13. Zimmerman, *supra* note 8 (discussing the global telex network in 1966).

14. *Electronic Calculator Invented 40 Years Ago*, NAT'L PUB. RADIO (Sept. 30, 2007), <https://www.npr.org/templates/story/story.php?storyId=14845433> [<https://perma.cc/E4CX-QP2Q>].

15. Thomas Puschmann, *Fintech*, 59 BUS. & INFO. SYS. ENGINEERING 69, 70 (2017).

16. Jay MacDonald & Taylor Tompkins, *The History of Credit Cards*, CREDITCARDS.COM (July 11, 2017), <https://www.creditcards.com/credit-card-news/history-of-credit-cards.php> [<https://perma.cc/MU8Y-TMZJ>].

17. Linda Rodriguez McRobbie, *The ATM is Dead. Long Live the ATM!*, SMITHSONIAN MAG. (Jan. 8, 2015), <https://www.smithsonianmag.com/history/atm-dead-long-live-atm-180953838/> [<https://perma.cc/4QF4-DX6C>].

18. SANDY CHORON & HARRY CHORON, MONEY: EVERYTHING YOU NEVER KNEW ABOUT YOUR FAVORITE THING TO FIND, SAVE, SPEND, & COVET 22 (2011).

19. *Id.* at 23.

20. *Fedwire and National Settlement Services*, FED. RES. BANK OF N.Y. (Mar. 2015), <https://www.newyorkfed.org/aboutthefed/fedpoint/fed43.html> [<https://perma.cc/8HA7-Q5Qc>].

established in the United States,²¹ followed by the Society for Worldwide Interbank Financial Telecommunications (SWIFT) three years later, which was established to facilitate cross-border financial communications.²² The twentieth century also saw the first major international collaborative effort among banking regulators in response to the rise of FinTech. After a series of financial disturbances, including the collapse of Herstatt Bank in 1974, the central bank governors of the Group of Ten countries²³ established the Basel Committee on Banking Supervision to enhance financial stability in the increasingly integrated global banking system.²⁴

While this period included a rapid expansion of financial technology in the global economy, as mentioned before, this technology was largely developed or used by incumbent financial institutions that operated within a series of governmental and self-regulatory frameworks.²⁵ While FinTech startups such as Bloomberg Terminals²⁶ and PayPal existed at the time,²⁷ these firms represented the exception rather than the norm. However, after the economy emerged from the GFC, such characterization no longer remained true.

2. The FinTech Revolution

The 2008 GFC had a large, transformational impact on the FinTech market that set the stage for the FinTech Revolution. During this period, new actors rapidly emerged as a wave of new investments, talent, and opportunities entered the market. Three factors heavily influenced this shift: (1) changes in public perception of the financial industry, (2) new labor market shifts to technology firms, and (3) reduced barriers of entry into the FinTech market.

21. *CHIPS*, FED. RES. BANK OF N.Y. (Apr. 2002), <https://www.newyorkfed.org/aboutthefed/fedpoint/fed36.html> [<https://perma.cc/EH6E-R2YW>].

22. Susan V. Scott & Markos Zachariadis, *Origins and Development of SWIFT, 1973–2009*, 54 *BUS. HIST.* 462, 466 (2012).

23. Belgium, Canada, France, Germany, Italy, Japan, Sweden, Switzerland, the Netherlands, the United Kingdom, and the United States. *G10*, BANK FOR INT'L SETTLEMENTS, <https://www.bis.org/list/g10publications/index.htm> [<https://perma.cc/KT9T-QFPH>] (last visited Oct. 21, 2019).

24. *History of the Basel Committee*, BANK FOR INT'L SETTLEMENTS (Dec. 30, 2016), <https://www.bis.org/bcbs/history.htm> [<https://perma.cc/S84H-NLTH>].

25. Zetsche, *supra* note 10, at 6–7.

26. *See, e.g.*, Harry McCracken, *How the Bloomberg Terminal Made History—And Stays Ever Relevant*, *FAST COMPANY* (Oct. 6, 2015), <https://www.fastcompany.com/3051883/the-bloomberg-terminal> [<https://perma.cc/6GCQ-S88J>].

27. *See, e.g.*, Mark Odell, *Timeline: The Rise of PayPal*, *FIN. TIMES* (Sept. 30, 2014), <https://www.ft.com/content/86432398-4897-11e4-9d04-00144feab7de> [<https://perma.cc/VB38-6PUW>].

Together, these converging forces brought about the next era of FinTech's history.

The dramatic breakdown of public confidence in traditional financial institutions, brought on by the GFC, was instrumental in the FinTech Revolution. The collapse of Lehman Brothers—then the fourth-largest investment bank experiencing the largest bankruptcy in U.S. history²⁸—shattered public perception of the financial industry. No longer were banks and incumbent financial institutions associated with stability and trust. In 2009, less than a quarter (22%) of Americans expressed confidence in banks—down from 53% just five years prior.²⁹ On the other hand, technology firms such as PayPal, Google, Amazon, and Apple benefited from public confidence levels above 50%.³⁰ This shift in public perception opened the door for startups and technology firms to offer financial services to segments of the population who previously viewed incumbent financial institutions as the only ones with the experience and legitimacy to handle their money.³¹

The effects of the GFC on the labor market also contributed to broader structural shifts in the FinTech market. Many of those who worked on Wall Street before the GFC changed careers to join technology firms, including Ruth Porat, former CFO at Morgan Stanley, who left for the same position at Google's parent company, Alphabet;³² Michael Evans, former vice chairman and head of Asia at Goldman Sachs, who left to become president of Alibaba;³³ and Anthony Noto, former head of Goldman Sachs' technology, media

28. ROSALIND Z. WIGGINS ET AL., YALE PROGRAM ON FIN. STABILITY, *The Lehman Brothers Bankruptcy A: Overview 1* (2014).

29. Andrew Dugan, *Confidence in U.S. Banks Low but Rising*, GALLUP (June 22, 2015), http://news.gallup.com/poll/183749/confidence-banks-low-rising.aspx?utm_source=Economy&utm_medium=newsfeed&utm_campaign=tiles&_ga=2.140366643.1054986099.1517777649-569239598.1517777649 [https://perma.cc/R8QB-2GSF].

30. *Survey Shows Americans Trust Technology Firms More Than Banks and Retailers*, MEDICI (June 25, 2015), <https://gomedici.com/survey-shows-americans-trust-technology-firms-more-than-banks-and-retailers/> [https://perma.cc/A2DE-4LGA].

31. Arner et al., *supra* note 11, at 1286.

32. *Three Goldman Bankers Leave for Uber as Tech World Raids Wall Street Talent*, CNBC (Nov. 25, 2015, 7:07 AM), <https://www.cnbc.com/2015/11/25/three-goldman-bankers-leave-for-uber-as-tech-world-raids-wall-street-talent.html> [https://perma.cc/9EV3-X6W8].

33. *Id.*

and telecom group, who left to become CFO of Twitter³⁴ and later CEO of SoFi.³⁵

These departures in the post-GFC market were not abnormal. Since the GFC, the relative prestige of working on Wall Street has fallen,³⁶ with Wall Street salaries falling behind those at Silicon Valley tech firms.³⁷ Furthermore, tech firms often provide for larger revenue sharing among employees through stock-based compensation plans,³⁸ which have the potential to be very lucrative in an industry notable for its rapid growth. These market shifts have also impacted the amount of new talent entering the labor market. For example, after the GFC, the number of Harvard Business School graduates entering technology firms increased nearly threefold in just five years.³⁹ These labor market conditions have provided rising startups and technology firms the talent and human capital necessary to enter the financial services industry and compete directly against traditional financial institutions.

The proliferation of open information and lower technology costs have catalyzed this new era of FinTech's history by lowering barriers to entry. Information is more prevalent today than ever before, owing to the emergence of the World Wide Web nearly three decades ago.⁴⁰ Open-access research and education, coupled with open-source and open-access software, has removed barriers to human capital and to platforms necessary to develop apps and new technologies.⁴¹ Demographic shifts toward younger generations that embrace technology and the growing use of smartphones for

34. Trusha Chokshi, *Why Silicon Valley Wants Wall Street's Best*, CNBC (July 30, 2014, 12:08 PM), <https://www.cnbc.com/2014/07/30/careers-bankers-leave-wall-street-for-technology-industry.html> [https://perma.cc/ZKV6-KNEA].

35. Press Release, Social Finance Inc., SoFi Names Anthony Noto Chief Executive Officer (Sept. 27, 2018), <https://www.sofi.com/press/sofi-names-anthony-noto-chief-executive-officer/> [https://perma.cc/H39U-MVAL].

36. Jonnelle Marte, *More Leaving Wall Street for Tech*, MARKETWATCH (Oct. 9, 2013), <https://www.marketwatch.com/story/support-group-for-frustrated-bankers-2013-10-08> [https://perma.cc/S8L2-7E47].

37. See *Tech Firms Shell Out to Hire and Hoard Talent*, ECONOMIST (Nov. 5, 2016), <https://www.economist.com/news/business/21709574-tech-firms-battle-hire-and-hoard-talented-employees-huge-pay-packages-silicon-valley> [https://perma.cc/UEY5-82N8].

38. *Id.*

39. Chokshi, *supra* note 34.

40. *The Birth of the Web*, CERN, <https://home.cern/topics/birth-web> [https://perma.cc/8676-U4AQ].

41. *E.g.*, massive open online courses (MOOCs), which provide open access education across the web; GitHub, which provides a repository of software version control; and freeware development tools such as Android Studio and Xcode, which allow individuals to develop apps for Android software and iOS, respectively.

financial services now allow FinTech firms to reach a market of millions of consumers instantly.⁴²

Additionally, the digitalization that began during the latter part of the twentieth century has also reduced barriers to entry by reducing the need for costly physical infrastructure. For example, cloud computing, in which one firm sells their excess computing capacity to another firm over the internet, now allows startups and other FinTech firms to minimize their upfront information technology (IT) infrastructure costs.⁴³ All three factors discussed above have facilitated the rapid rise of new entrants into today's FinTech market.

II. THE CURRENT FINTECH MARKET AND REGULATORY FRAMEWORK

Because the FinTech Revolution has been a highly transformative and disruptive force on the financial services market, the question of how FinTech innovation fits into the parameters of the current regulatory framework has become salient. This Part analyzes the current economic environment for the FinTech industry, starting with a review of the FinTech market's products and services, firms, business models, and size. Next, this Part surveys the federal and state regulatory systems faced by FinTech firms operating in the U.S. economy. Finally, this Part examines the current state of regulators' wait-and-see approach to the FinTech Revolution. From this examination, this Part concludes that policymakers must adapt their regulatory models to preserve stability in the financial markets.

A. *The Current FinTech Market*

Today's FinTech market has grown to be an incredibly diverse economic ecosystem. In addition to infrastructure technologies, including cryptocurrencies and blockchain, FinTech encompasses such products and services as payment and money transfers, peer-to-peer lending, equity crowdfunding, money management, insur-

42. See Bd. of Governors of the Fed. Reserve Sys., *Consumers and Mobile Financial Services 2016* (Mar. 2016), <https://www.federalreserve.gov/econresdata/consumers-and-mobile-financial-services-report-201603.pdf> [https://perma.cc/2N4H-CAMT].

43. *What is Cloud Computing?*, MICROSOFT AZURE, <https://azure.microsoft.com/en-us/overview/what-is-cloud-computing/> [https://perma.cc/U6A4-7NWZ] (last visited Oct. 21, 2019).

ance, and much more.⁴⁴ In 2017, an Ernst & Young (EY) study found that one in three digitally active consumers used FinTech products and services, with payment services accounting for the largest share, followed by insurance, and then savings and investments.⁴⁵

As mentioned before, it is not the use of new technology as applied to these financial services that makes the FinTech Revolution distinct, but *who* is providing these financial services. PricewaterhouseCoopers divides FinTech market participants into four distinct categories: the As, Bs, Cs, and Ds:

[The] As are large, well-established financial institutions such as Bank of America, Chase, Wells Fargo, and Allstate. . . . Bs are big tech companies that are active in the financial services space but not exclusively so, such as Apple, Google, Facebook, and Twitter. . . . Cs are companies that provide infrastructure or technology that facilitates financial services transactions. . . . Ds are disruptors: fast-moving companies, often startups, focused on a particular innovative technology or process.⁴⁶

All of these actors make up the larger FinTech ecosystem, but it is the rapid emergence of the Bs and Ds into financial services that distinguishes the FinTech Revolution. Today there are thousands of FinTech startups (a.k.a. Ds),⁴⁷ including dozens of so-called “unicorns” (private companies valued at over \$1 billion),⁴⁸

44. See Ryan Browne, *Everything You've Always Wanted to Know About Fintech*, CNBC: THE FINTECH EFFECT (Oct. 2, 2017, 3:11 PM), <https://www.cnbc.com/2017/10/02/fintech-everything-youve-always-wanted-to-know-about-financial-technology.html> [<https://perma.cc/D4T3-TQUG>]; DELOITTE, FINTECH BY THE NUMBERS: INCUMBENTS, STARTUPS, INVESTORS ADAPT TO MATURING ECOSYSTEM (2017), <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/financial-services/us-dcfs-fintech-by-the-numbers-web.pdf> [<https://perma.cc/Q99Z-ELP2>]; *An Introduction to Fintech: Key Sectors and Trends*, S&P GLOBAL MARKET INTELLIGENCE (2016), <https://www.spglobal.com/marketintelligence/en/documents/an-introduction-to-fintech-key-sectors-and-trends.pdf> [<https://perma.cc/4PMC-EDZE>].

45. EY, EY FINTECH ADOPTION INDEX 2017: THE RAPID EMERGENCE OF FINTECH 3 (2017), [http://www.ey.com/Publication/vwLUAssets/ey-fintech-adoption-index-2017/\\$FILE/ey-fintech-adoption-index-2017.pdf](http://www.ey.com/Publication/vwLUAssets/ey-fintech-adoption-index-2017/$FILE/ey-fintech-adoption-index-2017.pdf) [<https://perma.cc/H87M-BPCZ>] [hereinafter EY FINTECH ADOPTION].

46. *Q&A: What is FinTech?*, PwC (Apr. 2016), <https://www.pwc.com/us/en/financial-services/publications/viewpoints/assets/pwc-fsi-what-is-fintech.pdf> [<https://perma.cc/8B4L-YLC2>].

47. See *Innovations in Payments: The Future of FinTech*, BNY MELLON (2015), <https://www.bnymellon.com/us/en/our-thinking/innovation-in-payments-the-future-is-fintech.jsp> [<https://perma.cc/9HSD-BHD4>].

48. See Oscar Williams-Grut, *The 27 Fintech Unicorns From Around the World, Ranked by Value*, BUS. INSIDER (Aug. 1, 2016, 2:00 AM), <http://www.businessinsider.com/fintech-unicorns-ranked-by-value-2016-7> [<https://perma.cc/HG42-CNLF>].

which are capable of competing directly with incumbent financial institutions. In addition to startups, tech firms that have leveraged their technology and data to add financial services to their value chain (a.k.a. Bs) have also begun to transform the market for financial services.⁴⁹ Today these actors operate largely through three business models, which both compete and partner with one another:

The first model involves technology firms that provide financial services directly to customers through the use of mobile platforms and other innovations. . . . These FinTech firms do not rely on banks to deliver their products and services, and often compete directly with banks and other traditional financial institutions. . . . The second model covers banks and other traditional financial services providers which have adapted and developed FinTech solutions to improve the delivery of their financial services. . . . The third model involves partnerships and similar relationships between nonbank FinTech firms and traditional banks to deliver financial services. This model often combines the innovation and user experience focus of FinTech firms with the risk management skills, deep customer relationships and other strengths of traditional banks.⁵⁰

Given the breadth of FinTech market participants and their products and services, perhaps it is unsurprising that there is not yet consensus as to the exact size of the FinTech market. *Forbes* reported a market valuation of \$870 billion across more than 1,000 FinTech firms.⁵¹ Meanwhile, FinTech's transactional value has been estimated at over \$1.2 trillion.⁵² Despite any disagreement over its size, it is agreed that the FinTech market has grown at an excep-

49. See Zetzsche, *supra* note 10, at 3 (citing Ryan Shea, *Fintech Versus Techfin: Does Technology Offer Real Innovation or Simply Improve What is Out There?*, THOMSON REUTERS (July 26, 2016), <https://www.refinitiv.com/perspectives/ai-digitalization/fintech-versus-techfin-technology-offer-real-innovation-simply-improve/> [https://perma.cc/TWR9-UK45]).

50. Gerald Tsai, Dir., Fintech and Applications, Fin. Inst. Supervision and Credit, Fed. Reserve Bank of S.F., Remarks at the 4th Bund Summit on Fintech (July 9, 2017), <https://www.frbsf.org/our-district/press/leadership-speeches/2017/july/fintech-us-regulatory-response/> [https://perma.cc/8544-KVLU].

51. Jeb Su, *The Global Fintech Landscape Reaches Over 1000 Companies, \$105B in Funding, \$867B in Value: Report*, FORBES (Sept. 28, 2016, 4:13 PM), <https://www.forbes.com/sites/jeanbaptiste/2016/09/28/the-global-fintech-landscape-reaches-over-1000-companies-105b-in-funding-867b-in-value-report/#3e66835126f3> [https://perma.cc/JCW3-HXH6].

52. See *FinTech: Highlights*, STATISTA, <https://www.statista.com/outlook/295/109/fintech/united-states#> [https://perma.cc/Z7AR-N2VC] (last visited Feb. 9, 2018) [hereinafter STATISTA].

tionally fast rate. Since 2013, over \$40 billion has been invested in startups alone.⁵³ Between 2014 and 2015, the larger FinTech economy saw investments more than double from \$17.8 billion to more than \$38 billion.⁵⁴ FinTech market penetration is also expected to gain momentum, with more than half of global consumers adopting FinTech services in the coming years.⁵⁵ It is the rapid growth and massive size of the FinTech market that warrants the attention of regulators and prompts the question of how FinTech fits into the overall regulatory framework.

B. *The Current U.S. Regulatory Framework*

The U.S. financial regulatory system is an incredibly complex structure characterized by its overlapping dual federal-state framework, which includes ten federal regulatory bodies and fifty state jurisdictions, each with its own rules and regulatory agencies.⁵⁶ As then-Comptroller of the Currency John D. Hawke, Jr. noted in 2003: “[T]he current bank regulatory structure offends all of our aesthetic and logical instincts. It’s complicated; it’s irrational; it probably has inefficiencies; and it takes a great deal of explaining. It’s the product of historical accident, improvisation, and expediency, rather than a methodically crafted plan.”⁵⁷

Fifteen years later, the patchwork of U.S. financial regulations has only grown more complicated. Most notably, in response to the GFC, Congress passed the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 (Dodd-Frank).⁵⁸ At over 2,300 pages covering sixteen separate titles, Dodd-Frank substantially reformed the U.S. financial system, including adding thirteen new federal offices to the regulatory framework.⁵⁹

53. See PwC, GLOBAL FINTECH REPORT 2017 3 (2017), <https://www.pwc.com/gx/en/industries/financial-services/assets/pwc-global-fintech-report-2017.pdf> [<https://perma.cc/V2CY-EZFY>].

54. Su, *supra* note 51.

55. EY FINTECH ADOPTION, *supra* note 45, at 7.

56. See Falguni Desai, *The Fintech Boom And Bank Innovation*, FORBES (Dec. 14, 2015), <https://www.forbes.com/sites/falgunidesai/2015/12/14/the-fintech-revolution/#458b7ddd249d> [<https://perma.cc/LU9T-BUEX>]; see also MARC LABONTE, CONG. RES. SERV., R44918, WHO REGULATES WHOM? AN OVERVIEW OF THE U.S. FINANCIAL REGULATORY FRAMEWORK (2017).

57. KAROL K. SPARKS, THE KEYS TO BANKING LAW: A HANDBOOK FOR LAWYERS 20 (2d ed. 2017).

58. Pub. L. No. 111-203, 124 Stat. 1376 (2010).

59. See Sparks, *supra* note 57, at 41. Such new agencies include the Bureau of Consumer Financial Protection; Financial Stability Oversight Council; Federal Insurance Office; Offices of Minority and Women Inclusion; Investor Advisory Committee; Office of Credit Ratings; Credit Rating Agency Board; Office of Financial

These regulations can cost the world's largest financial institutions up to \$4 billion a year⁶⁰ and present a serious challenge to new FinTech entrants, who enter the market without the long-standing financial regulatory compliance culture of incumbent financial institutions.⁶¹ Navigating this complex assemblage of state and federal statutes and administrative rules has left many FinTech firms in a regulatory framework which feels both over- and under-inclusive. This is a consequence of both federalism in the U.S. banking system and the decision by many regulatory bodies to regulate through enforcement of existing rules rather than developing new provisions specifically tailored for FinTech.⁶²

1. FinTech in the Federal Regulatory System

There remains a great deal of uncertainty around how FinTech firms fit into the larger financial oversight structure.⁶³ Without a clearly established federal regulatory scheme, the U.S. economy cannot fully realize the potential of the FinTech Revolution. With regards to FinTech wealth management and financial planning services, regulators have struggled to develop policies for data control and security for nontraditional financial actors.⁶⁴ Concerns also remain over what fiduciary duties FinTech firms may owe to those whose data they process.⁶⁵ For example, while banks have fiduciary duties to protect their clients' information, the reach of such duties becomes complicated with the introduction of FinTech in-

Literacy; Office of Financial Research; Office of Housing Counseling; Office of Fair Lending and Equal Opportunity; and the Office of Financial Protection for Older Americans. *Id.*

60. See PWC, *supra* note 53, at 13.

61. See, e.g., Kristin Broughton, *The Good Reason Why Banks Make Bad Fintech Partners*, AM. BANKER (Nov. 3, 2017), <https://www.americanbanker.com/news/the-good-reason-why-banks-make-bad-fintech-partners> [https://perma.cc/5TTG-N8WP].

62. See GEORGETOWN UNIV. CTR. FOR FIN. MKTS. AND POLICY, *THE COMPLEX REGULATORY LANDSCAPE FOR FINTECH: AN UNCERTAIN FUTURE FOR SMALL AND MEDIUM-SIZED ENTERPRISE LENDING* 13 (2016), http://www3.weforum.org/docs/WEF_The_Complex_Regulatory_Landscape_for_FinTech_290816.pdf [https://perma.cc/EMQ8-T9SW].

63. See Richard Magrann-Wells, *Fintech Firms Hurt by Lack of Regulatory Clarity*, AM. BANKER (July 18, 2016, 9:30 AM), <https://www.americanbanker.com/opinion/fintech-firms-hurt-by-lack-of-regulatory-clarity> [https://perma.cc/JRJ8-PQLM].

64. See Lamont Black et al., *Promise and Peril: Managing the Uncertainty of Rapid Innovation and a Changing Economy*, FED. RESERVE BANK OF CHI. (2017), <https://www.chicagofed.org/publications/chicago-fed-letter/2017/388> [https://perma.cc/5SBJ-GFXE].

65. Zetsche, *supra* note 10, at 25.

intermediaries who move and store that information outside of consumers' view.⁶⁶ The rise of FinTech cross-border lending and payment services also raises concerns about the legal validity and jurisdictional enforceability of smart contracts which underlie such transactions.⁶⁷ Furthermore, the advent of cryptocurrencies has also raised questions of federal regulation. For example, raising capital via digital currencies "may be considered a sale of securities, commodities, or the presale of a product, or some combination thereof."⁶⁸ These are just a few examples of how FinTech currently operates in a state of regulatory ambiguity.

Although FinTech firms are not directly regulated by any federal bank regulatory agency, in the sense that they are not subject to any direct supervision or examination,⁶⁹ such firms do not operate entirely outside the current regulatory framework. Some FinTech firms are indirectly supervised through their relationships with incumbent financial institutions. For example, as a consequence of Know Your Customer (KYC) regulations imposed by the U.S. Financial Crimes Enforcement Network (FinCEN),⁷⁰ banks which underwrite and take deposits from FinTech firms have passed along those regulatory requirements to their FinTech partners.⁷¹ This indirectly forces some FinTech firms to establish procedures for complying with the Bank Secrecy Act/Anti-Money Laundering (BSA/AML) laws, placing at least some of the FinTech market under the jurisdiction of federal regulators, such as FinCEN and the U.S. Treasury Department's Office of Foreign Assets Con-

66. Black et al., *supra* note 64.

67. See FIN. STABILITY BD., FINANCIAL STABILITY IMPLICATIONS FROM FINTECH 19 (June 27, 2017), <http://www.fsb.org/wp-content/uploads/R270617.pdf> [<https://perma.cc/4ATY-NZ26>].

68. *Examining Opportunities and Challenges in the Financial Technology ("Fintech") Marketplace: Hearing Before the Subcomm. on Fin. Insts. & Consumer Credit of the H. Comm. on Fin. Servs.*, 115th Cong. 5 (2018) (statement of Brian Knight, Dir., Program on Financial Regulation and Senior Research Fellow, Mercatus Center at George Mason University).

69. CTR. FOR REG. STRATEGY, AMERICAS, DELOITTE, THE EVOLVING FINTECH REGULATORY ENVIRONMENT: PREPARING FOR THE INEVITABLE 2 (2017), <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/regulatory/us-aers-the-evolving-fintech-regulatory-environment.pdf> [<https://perma.cc/QB3X-6BSQ>] [hereinafter EVOLVING FINTECH].

70. See generally Dan Ryan, *FinCEN: Know Your Customer Requirements*, HARV. L. SCH. F. ON CORP. GOVERNANCE AND FIN. REG. (Feb 7, 2016), <https://corpgov.law.harvard.edu/2016/02/07/fincen-know-your-customer-requirements/#1> [<https://perma.cc/8TVY-HEEK>].

71. See EVOLVING FINTECH, *supra* note 69.

trol (OFAC).⁷² Furthermore, FinTech firms which directly or indirectly provide financial services to consumers may be subject to the jurisdiction of the Consumer Financial Protection Bureau (CFPB), as such consumer laws are applied based on the products or services offered, rather than the kind of institution providing such products or services.⁷³ As the market still operates largely in the twilight of federal regulation, a major concern for FinTech investors,⁷⁴ investments are discouraged and the U.S. market may be failing to realize the full benefits of FinTech innovation.

2. FinTech in the State Regulatory System

States have traditionally played a leading role in regulating lending, including interest and fee limitations.⁷⁵ However, the cross-border characteristics of financial technology mean that FinTech firms are disadvantaged by inefficient state-by-state regulations that their bank competitors do not face.⁷⁶ For example, nationally-chartered banks and federally-insured state-chartered banks are able to lend nationwide, while FinTech firms must be licensed in every state in which they do business.⁷⁷ Furthermore, federally-chartered and insured banks are able to export their home states' interest laws to out-of-state borrowers, while FinTech firms are governed by the *borrowers'* home state interest regulations.⁷⁸ FinTech firms are likewise disadvantaged for money transmission services relative to their bank competitors. Whereas banks are often exempt from state money transmittal statutes, FinTech firms must obtain a license for each state in which they provide services.⁷⁹

72. *Id.*

73. See Joseph E. Silvia, *Regulating FinTech*, NAT'L L. REV. (Dec. 24, 2016), <https://www.natlawreview.com/article/regulating-fintech> [<https://perma.cc/NX2J-8J2B>].

74. See Nicholas Elliott, *Where Fin-Tech Is Struggling with Regulation*, WALL ST. J.: RISK AND COMPLIANCE J. (Nov. 24, 2015, 2:57 PM), <http://blogs.wsj.com/riskandcompliance/2015/11/24/where-fin-tech-is-struggling-with-regulation/> [<https://perma.cc/Q8BT-TEE5>].

75. Brian R. Knight, *Federalism and Federalization on the Fintech Frontier 9–10* (Mar. 2017) (unpublished manuscript) (on file with the Mercatus Center at George Mason University), <https://www.mercatus.org/system/files/mercatus-knight-federalism-fintech-v1.pdf> [<https://perma.cc/KAN5-MLM2>].

76. Brian R. Knight, *Modernizing Financial Technology Regulations to Facilitate a National Market 1* (July 2017) (unpublished manuscript) (on file with the Mercatus Center at George Mason University).

77. See *id.* at 1–2.

78. See *id.*

79. Kevin V. Tu, *Regulating the New Cashless World*, 65 ALA. L. REV. 77, 86–87 (2013).

This state-by-state approach to regulation may not have been a major impediment to financial services in an earlier time of our nation's history, but in the era of the FinTech Revolution such fragmented regulatory structure impedes the introduction of new financial service models.⁸⁰ This risks depriving the U.S. market of financial innovation benefits, such as improved access to financial services and greater market liquidity.⁸¹ Across the fifty state jurisdictions, licensing requirements vary widely, including which activities prompt licensure and what standards are needed to be qualified as compliant.⁸² This variation imposes significant transaction costs onto FinTech firms who face the uncertain question of whether their products and services fall within a particular state's laws. Such firms may be forced to choose among: (1) bearing the cost of possibly unnecessary licensing and compliance programs, (2) foregoing licensing and risking penalties in the event a state regulator deems their activities to be within the purview of the relevant statute(s), or (3) postponing the development of financial services innovation until there is greater regulatory clarity.⁸³ In any event, this fragmentation inhibits the expansion of the FinTech Revolution and deprives the U.S. market of its potential benefits.

C. *Examining the Status Quo: Regulating Through Inaction*

Before examining ways regulators may adapt to new financial technology, found in Part III, it is worth analyzing the current state of regulation in more depth. Although the current framework presents FinTech firms with uncertainty and market fragmentation, inefficiency alone does not necessarily call for new regulation. In fact, it is worth discussing the argument for *inaction*: resisting regulation until the FinTech Revolution matures and regulators can better assess the full breadth of its impact before diverting resources to legislative action or rule promulgation.

80. See Lalita Clozel, *State Regulators Balk at OCC Fintech Charter*, AM. BANKER (Aug. 19, 2016), <https://www.americanbanker.com/news/state-regulators-balk-at-occ-fintech-charter> [<https://perma.cc/PU3P-V4AT>] (discussing the debate between advocates for a national chartering scheme and state-by-state regulation).

81. See, e.g., Laura Noonan, *Banks Use Fintech to Make Up for Lost Time on Financial Inclusion*, FIN. TIMES (April 23, 2019), <https://www.ft.com/content/091c9dd0-4b36-11e9-bde6-79eae5acb64> [<https://perma.cc/ZGT6-Y24H>]; Andy Kearns, *5 Ways Fintech is Helping the Unbanked and Underbanked Population in 2018*, MEDIUM (May 2, 2018), <https://medium.com/fintech-weekly-magazine/5-ways-fintech-is-helping-the-unbanked-and-underbanked-population-in-2018-54f22417d0b1> [<https://perma.cc/BXN6-F7RH>].

82. See Knight, *supra* note 76, at 17.

83. Tu, *supra* note 79, at 109–110.

If regulators respond too early to innovation, they risk regulating it out of existence by imposing prohibitive regulatory costs before such innovation has had a chance to gain a market foothold. Laissez-faire economic principles have been applied to financial technology in the past and, in the context of online banking, with success. Online banking was introduced to the United States in 1980.⁸⁴ However, just three years later the technology was abandoned,⁸⁵ and it wasn't until the mid-1990s that it was successfully relaunched to American consumers.⁸⁶ Even at the turn of the twenty-first century, regulation as applied specifically to online banking was still in its infancy.⁸⁷ That delay in regulatory response highlights the defining characteristic of a wait-and-see approach to regulation. Although we might speculate as to the impact of regulation on consumer adoption of the technology, it would have been a waste of resources had regulators responded to the initial introduction of online banking. This example lends support to the proposition that regulators should wait until an innovation has passed some market-based critical mass threshold—which indicates its permanency—before acting.

While online banking may have benefited from a wait-and-see model, today's FinTech market has already developed to a level of economic maturity that demonstrates it is here to stay. As discussed earlier, the FinTech market encompasses hundreds of firms,⁸⁸ including dozens of "unicorns,"⁸⁹ all of which contribute to a transactional valuation north of one trillion dollars.⁹⁰ Therefore, although innovation can benefit from regulatory inaction until a new technology has surpassed some threshold measurement, the FinTech Revolution has convincingly surpassed such a threshold.

Furthermore, a wait-and-see approach may have worked in a period where innovation and consumer adoption of new technology was slower, but it appears out of place in the face of an eco-

84. Zimmerman, *supra* note 8.

85. *Id.*

86. Arner et al., *supra* note 11, at 1307.

87. See, e.g., David C. Chou & Amy Y. Chou, *A Guide to the Internet Revolution in Banking*, 17 INFO. SYS. MGMT. 47, 51 (2000) (discussing open legal questions for internet banking); David Carse, Deputy Chief Exec., H.K. Monetary Auth., Keynote Address at the Symposium on Applied R&D: Enhancing Global Competitiveness in the Next Millennium 4 (Oct. 8, 1999), <https://www.bis.org/review/r991012c.pdf> [<https://perma.cc/8KUM-JEA9>] (“[O]ur approach to the regulation and supervision of e-banking is still at an early stage.”).

88. Su, *supra* note 51.

89. See Williams-Grut, *supra* note 48.

90. See STATISTA, *supra* note 52.

conomic movement characterized by both rapid firm growth and market penetration. Take, for example, China, which initially adopted a laissez-faire approach to FinTech only to discover that the world's fourth biggest money market fund, Alibaba's Yu'e Bao, had developed in its backyard within just nine months.⁹¹ Today Yu'e Bao is the largest money market fund in the world.⁹²

Yu'e Bao shows how a non-traditional financial institution went from "too-small-to-care" to "too-big-to-fail" within the space of nine months. This exponential growth represents a direct challenge to the otherwise more gradual approach towards regulating innovations and stakeholders because it has skipped the "too-large-to-ignore" phase when regulators would have started to contact and request compliance of said entity.⁹³

Given this new market dynamism, the wait-and-see or laissez-faire approach to regulating no longer seems appropriate for the times. If the FinTech Revolution is to facilitate expansive market growth in new firms and technology, then policymakers must adapt their regulatory models to preserve stability in the financial markets. The question remains, however, as to what the new approach to regulation should resemble.

III. TOWARD SMART REGULATION

Regulation can be described as a chase, where innovation leads and regulation follows. However, as the pace of such innovation in the financial sector quickens, the lag between economic activity and regulatory response increases the risk of financial instability. This Part analyzes how regulators may adapt to rapid financial technology innovation by developing "smart regulation." Smart regulation, as the term is used in this Note, refers to dynamic and flexible regulatory frameworks, which "focus attention on legal instruments that foster technological innovation while providing safeguards against technological risks."⁹⁴ This Part describes FinTech smart regulation as developing in three stages: (1) a testing and piloting environ-

91. See Dirk Zetzsche et al., *Regulating a Revolution: From Regulatory Sandboxes to Smart Regulation* 15 (Univ. of Lux. Working Paper No. 2017-006, 2017).

92. Yifan Xie & Chuin-Wei Yap, *Meet the Earth's Largest Money-Market Fund*, WALL ST. J. (Sept. 13, 2017), <https://www.wsj.com/articles/how-an-alibaba-spinoff-created-the-worlds-largest-money-market-fund-1505295000> [<https://perma.cc/VKD2-8TDR>].

93. Arner et al., *supra* note 11, at 1310 (footnotes omitted).

94. REGULATING TECHNOLOGICAL INNOVATION: A MULTIDISCIPLINARY APPROACH 52 (Michiel A. Heldeweg & Evisa Kica eds., 2011).

ment wherein regulators examine innovations in financial services, (2) an expansion of the regulatory environment through special charters for FinTech firms, and (3) the adoption of financial technology by regulators to better monitor the market and inform decision making.⁹⁵ From one stage to the next, regulatory complexity increases, as does the operational space for FinTech. This Part examines these stages in turn, addressing each stage's respective potential, limitations, and challenges.

A. *Testing the Bounds: From Threshold Exemptions to Regulatory Sandboxes*

The first stage of developing smart regulation is the construction of testing environments in which FinTech firms may be able to pilot their products and services within regulatory safe harbors. The two main approaches governments have used in this endeavor are threshold exemptions and sandboxes, each with respective advantages and drawbacks.

1. Threshold Approaches to FinTech

Several countries have taken steps toward incorporating threshold approaches into their regulatory structure by exempting FinTech firms that fall below some measurement of market size. For example, in the United Kingdom's crown dependency of Jersey, digital currency exchanges with an annual turnover of less than £150,000 are exempt from registration requirements.⁹⁶ Likewise in Australia, firms providing financial services for low volume, non-cash payment facilities⁹⁷ do not need to comply with certain regulatory requirements.⁹⁸ These policies are intended to provide new firms, which because of their size pose a *de minimis* threat to economic stability, with the benefit of regulatory breathing room to

95. This paper builds off of the premise of four stages of smart regulation articulated in Zetzsche et al., *supra* note 91, at 56.

96. Zetzsche et al., *supra* note 91, at 20.

97. "Low value non-cash payment facility" means a non-cash payment facility in relation to which all of the following apply: (a) the total amount available for making non-cash payments under all facilities of the same class issued by that issuer and held by any person at any one time does not exceed \$1,000; (b) the total amount available for making non-cash payments under all facilities of the same class issued by that issuer does not exceed \$10,000,000 at any time; (c) the facility is not a component of another financial product. *ASIC Corporations (Non-cash Payment Facilities) Instrument 2016* (Cth) reg 211 (Austl.).

98. *Id.*; see also Zetzsche et al., *supra* note 91, at 19.

test out new business models and technology before having to invest in compliance programs.⁹⁹

However, while threshold approaches may provide small firms with some regulatory relief and thus promote innovation, benefits to this approach will be narrow. For example, space for regulatory relief under a threshold model will be inherently limited. Additionally, given the FinTech Revolution's rapid firm growth and market penetration,¹⁰⁰ the window of time that firms exist under threshold bars will likely be shortened. Such shortened windows of time may potentially lead to inefficient allocations of resources in establishing legal thresholds. Therefore, while threshold exemptions may allow regulators to promote FinTech innovation while safeguarding stability, the limitations associated with said approach suggest it would be best when coupled with another testing policy.

2. Regulatory Sandboxes

Countries across the globe have responded to demand for smart regulation of FinTech by implementing regulatory testing environments known as "sandboxes." In the context of finance, a sandbox creates an environment for FinTech innovators to test new products or services with greater flexibility or even exemption from existing regulation.¹⁰¹ The concept comes from the world of software development, where a sandbox describes a closed testing environment designed for experimenting safely with web or software projects.¹⁰² By allowing new financial products and services to operate in the real world under limited conditions, firms will be

99. See, e.g., DAVID W. PERKINS ET AL., CONG. RESEARCH SERV., IF11195, FINANCIAL INNOVATION: REDUCING FINTECH REGULATORY UNCERTAINTY 1 (2019), ("If policymakers determine that particular regulations are unnecessarily burdensome or otherwise ill-suited to a particular technology, they might exempt companies or products that meet certain criteria from such regulations.").

100. See, e.g., discussion on Alibaba's Yu'e Bao, *supra* Part II.

101. See EY, AS FINTECH EVOLVES, CAN FINANCIAL SERVICES INNOVATION BE COMPLIANT? 10 (2017), [http://www.ey.com/Publication/vwLUAssets/ey-the-emergence-and-impact-of-regulatory-sandboxes-in-uk-and-across-apac/\\$FILE/ey-the-emergence-and-impact-of-regulatory-sandboxes-in-uk-and-across-apac.pdf](http://www.ey.com/Publication/vwLUAssets/ey-the-emergence-and-impact-of-regulatory-sandboxes-in-uk-and-across-apac/$FILE/ey-the-emergence-and-impact-of-regulatory-sandboxes-in-uk-and-across-apac.pdf) [https://perma.cc/TH2J-DU4Q].

102. See *What is a Regulatory Sandbox?*, BBVA (Nov. 20, 2017), <https://www.bbva.com/en/what-is-regulatory-sandbox> [https://perma.cc/BZX9-D2SG]; see also FIN. CONDUCT AUTH., REGULATORY SANDBOX (2015), <https://www.fca.org.uk/publication/research/regulatory-sandbox.pdf> [https://perma.cc/JD9P-B399]; John M. Casanova et al., *FinTech and Regulatory Sandboxes in the UK, Hong Kong and Singapore*, SIDLEY AUSTIN: SIDLEY UPDATE (Sept. 6, 2017), <https://www.sidley.com/-/media/update-pdfs/2017/09/20170901—banking-and-financial-services-update.pdf> [https://perma.cc/6RC5-J362].

incentivized to invest in innovative technologies without fear of regulatory reprisal for non-compliance. Meanwhile, regulators benefit from observing firms operating within sandboxes to better incorporate technologies into the broader regulatory system.

First launched in the United Kingdom,¹⁰³ FinTech sandboxes are now operational in more than a dozen countries.¹⁰⁴ Although each jurisdiction's sandboxes vary somewhat, they generally include the following design components: (1) eligibility requirements, (2) time-bound restrictions, (3) operational parameters, and (4) termination provisions. First, regulators assess applications from firms to determine whether their products or services meet the eligibility requirements for the sandbox. This may include whether the applicant fits within the sandbox's objective (e.g., financial inclusion such as targeting financially excluded or underserved populations or communities)¹⁰⁵ or whether the product or service is already covered under existing laws.¹⁰⁶ Second, the time period in which firms may operate within the sandbox is typically limited, with periods ranging from six to twenty-four months (although extensions are possible).¹⁰⁷ Third, while firms within sandboxes are exempt from certain regulations, they are nonetheless still required to operate within certain parameters, which may include compliance with certain risk management and soundness regulations or limitations placed on the number of retail clients.¹⁰⁸ Often testing firms must also provide compensation arrangements in the event of losses.¹⁰⁹ Finally, sandboxes typically specify when a firm's participation in the sandbox may be terminated (e.g., non-compliance with the operational parameters or voluntary withdrawal by the firm from the program).¹¹⁰

While sandboxes offer a great deal of potential benefits, including reducing the time and cost of getting innovations to the

103. See EY, *supra* note 101, at 4, 13.

104. See Zetsche et al., *supra* note 91, at 27.

105. See Ivo Jenik & Kate Lauer, *Regulatory Sandboxes and Financial Inclusion* 6 (Oct. 2017) (working paper) (on file with Consultative Group to Assist the Poor), <http://www.cgap.org/sites/default/files/Working-Paper-Regulatory-Sandboxes-Oct-2017.pdf> [<https://perma.cc/7JZC-CMEV>].

106. See Zetsche et al., *supra* note 91, at 32.

107. See *id.* at 35.

108. See, e.g., Jenik & Lauer, *supra* note 105, at 3; Zetsche et al., *supra* note 91, at 40–41.

109. See, e.g., Jenik & Lauer, *supra* note 105, at 3 (discussing compensation funds); Zetsche et al., *supra* note 91, at 42 (discussing professional indemnity insurance).

110. See Zetsche et al., *supra* note 91, at 37–38.

marketplace and enabling greater communication between regulators and FinTech firms, the programs are not without their drawbacks. For one, firms who are accepted into the sandbox initiatives may receive an unfair advantage over those who are rejected. This is particularly true if the selection criteria is vaguely defined and non-transparent, thus raising the risk of selection bias and favoritism. However, regulators can reduce this risk by articulating clear, objective guidelines for admission to the sandbox program.

Furthermore, the case-by-case admissions process and size of sandboxes means they do not benefit from the economies of scale found in rulemaking or legislation.¹¹¹ However, the added cost of establishing and maintaining regulatory sandboxes may be offset by the value of information obtained from such programs, which can be used to develop more efficient regulations when such innovations are incorporated from the sandbox into the broader regulatory scheme. Therefore, the potential benefits of sandboxes are best realized when regulators take the lessons learned from the experimentation stage and apply them to the second stage of smart regulation's development: special charters.

B. Establishing Special Purpose Charters for Non-Depository Institutions

In the United States, a discussion regarding special purpose charters for FinTech firms has already developed. In 2015, then-Comptroller of the Currency Thomas J. Curry announced an initiative for developing a regulatory framework to respond to innovations in the financial sector by incorporating FinTech into the federal banking system.¹¹² The following year, the Office of the Comptroller of the Currency (OCC), the independent bureau of the U.S. Department of the Treasury charged with chartering, regulating, and supervising national banks,¹¹³ published a white paper outlining its intention to allow certain FinTech firms to apply for special purpose national bank (SPNB) charters.¹¹⁴ Doing so would provide FinTech firms clarity in operating similarly to banks under

111. *See id.* at 40.

112. *See* Thomas J. Curry, Comptroller of the Currency, Remarks Before the Federal Home Loan Bank of Chicago (Aug. 7, 2015), <https://www.occ.gov/news-issuances/speeches/2015/pub-speech-2015-111.pdf> [<https://perma.cc/8J4S-KC3C>].

113. *About Us*, OFF. OF THE COMPTROLLER OF THE CURRENCY, <https://www.occ.gov/about/what-we-do/mission/index-about.html> [<https://perma.cc/ZD3J-BYNG>].

114. OFF. OF THE COMPTROLLER OF THE CURRENCY, EXPLORING SPECIAL PURPOSE NATIONAL BANK CHARTERS FOR FINTECH COMPANIES (2016) [hereinafter OCC December 2016 Report], <https://www.occ.gov/topics/responsible-innovation/>

full-service charters and bring FinTech firms under OCC's uniform supervision.¹¹⁵ Such a proposal would allow qualifying FinTech firms to enjoy all the powers granted by the National Bank Act,¹¹⁶ which would both resolve the legal ambiguity issues at the federal level and allow FinTech firms to lend nationwide unhampered by state-by-state licensure requirements.

1. Limitations of Special Purpose National Bank Charters

While the OCC's proposal is a promising start, it is not without its limitations. First, due to the requirements and costs to obtain and maintain such charters, the OCC's proposal may only be available to larger, more established FinTech firms. At least one critic has argued this would disadvantage smaller companies and disturb the balance of the marketplace.¹¹⁷ This objection could be resolved if the OCC modified its SPNB charter program into tiers based on each applicant's size. Several nations in Asia, including South Korea, India, and China, have introduced tiered licensing models as a means of encouraging innovation in the banking sector while balancing oversight and regulatory costs.¹¹⁸ Such a modification would allow smaller FinTech firms to receive the benefits of a national charter while being exempt from certain regulatory requirements until they grow and assume more regulatory oversight.

A second limitation of the SPNB charter is that many FinTech firms might not provide services which fit neatly within the traditional requirements necessary to acquire such charters.¹¹⁹ Under the OCC's view, a special purpose national bank may limit its activities to either fiduciary activities or to at least one of the following three core banking functions: receiving deposits, paying checks, or lending money.¹²⁰ Therefore, the OCC may wish to issue new guidance for non-depository FinTech firms which have developed ser-

comments/special-purpose-national-bank-charters-for-fintech.pdf [https://perma.cc/BZD6-SQ5C].

115. *Id.* at 2.

116. 12 U.S.C. § 38 (1874).

117. See Hannah Levitt, *OCC's Fintech Charter Plan Draws Debate*, MARKETWATCH (June 23, 2017), <https://www.marketwatch.com/story/occs-fintech-charter-plan-draws-debate-2017-06-23> [https://perma.cc/WQ9M-NJRR].

118. See Arner et al., *supra* note 11, at 130–36.

119. See Perianne Boring, *You Down With OCC—FinTech Firms See Promise In Special Bank Charter*, FORBES (Jan. 27, 2017), <https://www.forbes.com/sites/perianneboring/2017/01/27/you-down-with-occ-fintech-firms-see-promise-in-special-bank-charter/#33e356b32e17> [https://perma.cc/C9KL-9KRH].

120. See OCC DECEMBER 2016 REPORT, *supra* note 114, at 3 (citing 12 C.F.R. § 5.20(e)(1)).

vices that have evolved beyond traditional banking functions. Additionally, it is unclear how the OCC may modernize capital requirements to fit with new FinTech business models which significantly differ from depository institutions. This may be particularly relevant for firms with significant percentages of assets in the form of cryptocurrencies. Although the OCC has acknowledged such concerns through its comment process, it remains unclear what alternative approaches it may use to determine appropriate capital requirements for SPNB chartered companies.¹²¹

2. Legal Challenges to Special Purpose National Bank Charters

While the OCC's proposal for a SPNB charter has garnered the support of a number of FinTech firms and the American Banking Association,¹²² state banking regulators have responded with hostility and legal challenges.¹²³ These lawsuits allege non-depository institutions are not engaged in the "business of banking" and therefore cannot be chartered without explicit authorization from Congress.¹²⁴ It is worth noting that special purpose charters are not new—they are already issued by the OCC to non-depository institutions, including trust banks, credit card banks, and bankers' banks.¹²⁵ However, for those institutions, the OCC operates alongside explicit congressional authorization.¹²⁶ The OCC argues that explicit congressional authorization is not a prerequisite. Rather, the National Bank Act grants the bureau broad authority for issuing charters and interpreting "the business of banking," which, as discussed above,¹²⁷ it views as extending beyond receiving deposits.¹²⁸

The OCC has already faced legal defeats on the issue from a district court ruling, which held the National Bank Act "unambiguously requires that . . . only depository institutions are eligible to

121. See OFF. OF THE COMPTROLLER OF THE CURRENCY, OCC SUMMARY OF COMMENTS AND EXPLANATORY STATEMENT: SPECIAL PURPOSE NATIONAL BANK CHARTERS FOR FINANCIAL TECHNOLOGY COMPANIES 10–11 (2017), <https://www.occ.gov/topics/responsible-innovation/summary-explanatory-statement-fintech-charters.pdf> [<https://perma.cc/N7KY-UY37>] [hereinafter OCC MARCH 2017 COMMENTS].

122. See, e.g., Boring, *supra* note 119; Levitt, *supra* note 117.

123. See, e.g., Conf. of Bank Supervisors v. Off. of the Comptroller of the Currency, No. 17-CV-00763, 2017 WL 1488257 (D.D.C. Apr. 30, 2018); Vullo v. Off. of the Comptroller of the Currency, No. 1:17-CV-03574, 2017 WL 6512245 (S.D.N.Y. Dec. 12, 2017).

124. Complaint at *3, *Conference of Bank Supervisors*, 2017 WL 1488257; Complaint at *2–3, *Vullo*, 2017 WL 6512245.

125. See OCC MARCH 2017 COMMENTS, *supra* note 121, at 14.

126. *Id.*

127. See OCC DECEMBER 2016 REPORT, *supra* note 114.

128. *Id.*

receive national bank charters from OCC.”¹²⁹ This issue will likely be litigated for many years to come—although there is reason to believe the OCC may ultimately triumph. The Supreme Court has already found the phrase “business of banking” to be ambiguous and, if the Comptroller’s interpretation is reasonable, such interpretation would be accorded “controlling weight.”¹³⁰ However, to the extent such lawsuits do present a serious threat to the proposal, Congress could respond by granting the OCC explicit authorization as a means of preempting any further legal challenges.¹³¹

C. RegTech: Seizing Financial Technology for Regulators

In order to regulate effectively in the rapidly transforming financial services market, regulators will need to match the technological development of FinTech with a similar degree of technological development in the regulatory system. Regulatory technology (“RegTech”) offers such a solution. Large financial institutions—which, in response to the post-GFC regulatory requirements, began to heavily invest in risk management and compliance systems—have been the main driver in the development of RegTech.¹³² Much of the attention on RegTech has been focused on its promise to lower compliance costs for companies.¹³³ How-

129. *Vullo v. Off. of the Comptroller of the Currency*, 378 F. Supp. 3d 271 (S.D.N.Y. 2019).

130. *NationsBank of N.C., N.A. v. Variable Annuity Life Ins. Co.*, 513 U.S. 251, 257 (1995) (citing *Chevron, U.S.A., Inc. v. Nat. Res. Def. Council, Inc.*, 467 U.S. 837, 844 (1984)).

131. Although Congress could respond by granting explicit authorization to the OCC, there has yet to form a broad consensus of how Congress would address FinTech regulation. *Compare* Financial Services Innovation Act, H.R. 6118, 114th Cong. (2016) (requiring federal regulators to create a Financial Services Innovation Office to encourage innovation in the financial industry and permitting Covered Persons to petition regulators for an alternative compliance plan) *with* Press Release, Senator Jeff Merkley, Ranking Member, U.S. Senate Comm. on Banking, Hous. and Urban Affairs (Minority Office), Brown, Merkley Push Back on OCC’s Plan for Financial Technology Charter (Jan. 9, 2017), <https://www.merkley.senate.gov/news/press-releases/brown-merkley-push-back-on-occs-plan-for-financial-technology-charter> [<https://perma.cc/B76X-UYVH>].

132. *See, e.g., Zetzsche, supra* note 10, at 8; Douglas W. Arner, Ja’nos Barberis & Ross P. Buckley, *FinTech, RegTech and the Reconceptualization of Financial Regulation*, 37 Nw. J. INT’L L. & BUS. 371, 384–85 (2017).

133. *See, e.g.,* DELOITTE, THE FUTURE OF REGULATORY PRODUCTIVITY, POWERED BY REGTECH 4 (2017), <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/regulatory/us-regulatory-future-of-regulatory-productivity-powered-by-regtech.pdf> [<https://perma.cc/4NCV-JUS7>]; KPMG, THE NEXUS BETWEEN REGULATION AND TECHNOLOGY INNOVATION: HOW FINANCIAL SERVICE FIRMS CAN GAIN GREATER STRATEGIC ADVANTAGE, REDUCE COSTS, AND HARMONIZE COORDINATION 2

ever, this section focuses on RegTech's potential as used by governments to meet the challenges of regulating in the FinTech Revolution. The idea is to develop network systems between financial service firms and regulators as part of the licensing process to monitor and analyze large volumes of financial data in real time.¹³⁴ By allowing more effective monitoring of compliance and reporting data, RegTech promises to help regulators map out contagion in the financial markets, quickly identify systematic risks, and better manage future economic crises.¹³⁵

The use of technology by governments to monitor and enforce regulation is not a new concept. For example, the Securities and Exchange Commission (SEC) has been actively involved in using regulatory technology since the 1980s to monitor securities trades.¹³⁶ However, similar to FinTech, RegTech is not the concept of technology's application in a particular field, but rather the *degree* and *kind* of its application. Stated differently, new advances in technology, such as artificial intelligence (AI) and big data, now present regulators with the opportunity to adapt the regulatory system into a framework to capture, manage, and analyze large volumes of real-time market transactions. One of the most promising areas for regulators to use this aggregation of data is BSA/AML and KYC laws. By monitoring compliance in real-time, regulators would be better able to detect suspicious transactions and quickly direct resources to investigate.¹³⁷ Furthermore, regulators could use data collected from RegTech along with agent-based models (ABMs) to simulate the economic consequences of proposed policy changes.¹³⁸ ABMs are already used in traffic control, epidemiology, and even battlefield conflict analysis, and are now starting to be

(Apr. 2017), <https://assets.kpmg.com/content/dam/kpmg/us/pdf/2017/03/reg-tech-pov2.pdf> [<https://perma.cc/EDX3-G2KL>]; Elena Mesropyan, *RegTech Companies in the US Driving Down Compliance Costs to Enable Innovation*, MEDICI (Feb. 25, 2017), <https://gomedici.com/regtech-companies-in-us-driving-down-compliance-costs-innovation/>; [<https://perma.cc/8XWY-ZQVN>].

134. See Arner, Barberis & Buckley, *supra* note 132, at 374.

135. See Stefano Battiston et al., *Complexity Theory and Financial Regulation*, 351 SCI. 818 (2016), <http://science.sciencemag.org/content/sci/351/6275/818.full.pdf> [<https://perma.cc/E6WM-7NLT>].

136. See Arner, Barberis & Buckley, *supra* note 132, at 397.

137. See *id.* at 398; see also DOUGLAS W. ARNER ET AL., CFA INST. RSCH. FOUND., FINTECH AND REGTECH IN A NUTSHELL, AND THE FUTURE IN A SANDBOX 15 (2017), <https://www.cfapubs.org/doi/pdf/10.2470/rfbr.v3.n4.1> [<https://perma.cc/X4DJ-KNEL>].

138. GOV'T CHIEF SCI. ADVISER ON FINTECH, GOV'T OFF. FOR SCI., FINTECH FUTURES: THE UK AS A WORLD LEADER IN FINANCIAL TECHNOLOGIES 49 (2015) [hereinafter GOS Report], <https://www.gov.uk/government/uploads/system/uploads/>

developed within academia to analyze economic systems as well.¹³⁹ Similar to how modeling and data analytics are used in other complex systems, such as environmental ecosystems and social networks, RegTech may offer regulators a new method of stress-testing financial systems.¹⁴⁰

The development of such a system comes with a number of challenges, most notably regulators' own ability to manage and process such increased amounts of data¹⁴¹ and to balance innovation and regulation.¹⁴² In 2015, the United Kingdom's Government Office for Science published a report outlining steps governments may take toward developing RegTech systems while addressing these concerns.¹⁴³ To modernize regulatory infrastructure, governments should invest in data mining analytic tools, which use algorithms to identify anomalies, patterns, and correlations within large data sets and then develop predictive models.¹⁴⁴ Furthermore, governments may wish to invest in new visualization tools to allow policymakers to better analyze data drawn from multiple sources.¹⁴⁵ These investments should also be complemented with new training and educational programs for regulators.

In developing new data reporting requirements, regulators must also balance the need for new regulatory oversight, the consequential costs imposed on financial service firms, and the desire to promote innovation. Regulators can reduce reporting costs and improve efficiency for the financial services market through simplification and harmonization initiatives. For example, regulators could collaborate with other jurisdictions to harmonize reporting stan-

attachment_data/file/413095/gS-15-3-fintech-futures.pdf [https://perma.cc/CY75-RGJA].

139. Battiston et al., *supra* note 135, at 819.

140. *See id.* at 81–89.

141. *See* Arner, Barberis & Buckley, *supra* note 132, at 404 (“From a technological standpoint, the development of RegTech is not a major challenge. The primary limitation may instead come from the regulators' own ability to handle and process the increased amount of data generated through technology.”).

142. *See* GOS REPORT, *supra* note 138, at 49 (“There is the possibility that financial regulation and requests for increasing amounts of data are hindering the capacity of traditional financial institutions to operate and more importantly innovate.”).

143. *Id.*

144. *Id.* at 50; *see generally* Alexander Furnas, *Everything You Wanted to Know About Data Mining but Were Afraid to Ask*, ATLANTIC (Apr. 3, 2012), <https://www.theatlantic.com/technology/archive/2012/04/everything-you-wanted-to-know-about-data-mining-but-were-afraid-to-ask/255388/> [https://perma.cc/CJG4-X5EA].

145. GOS REPORT, *supra* note 138, at 50.

dards, implement standardized compliance tagging, and share information between regulators with overlapping jurisdictions.¹⁴⁶ Furthermore, regulators should make a concerted effort to engage with FinTech actors on issues where either side feels efficiency can be improved. For example, companies may propose new, more cost-effective ways to collect data, while regulators can promote the development and use of uniform compliance systems, such as open-source tools.

RegTech offers regulators a new model of interacting with regulated market participants and ensuring financial stability within the marketplace. Just as FinTech has been utilized by private actors to transform the financial services market, RegTech offers regulators a means to adapt the existing regulatory framework to respond to the challenges posed by rapid and continuous financial innovation.

CONCLUSION

A decade into the FinTech Revolution, the question of how the U.S. regulatory system will accommodate new innovations in the financial services market remains to be answered. While FinTech is not new, the growth of financial products and services being offered by non-traditional financial firms presents new challenges to regulators in managing and protecting market stability. The rapid growth and market penetration which characterizes the FinTech Revolution has demonstrated that regulators can no longer remain inactive and must take necessary steps to adapt the regulatory system to meet the challenges of an increasingly decentralized and innovative financial market. Governments around the globe have already begun to take steps toward developing smart regulatory systems to balance innovation and the preservation of market soundness. By drawing on these experiences, U.S. regulators can better integrate FinTech into the American financial regulatory framework, thereby ensuring the U.S.'s economic competitiveness and ability to realize the full benefits of financial innovation.

146. *Id.* at 49.