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# FROM FINTECH TO TECHFIN: THE REGULATORY CHALLENGES OF DATA-DRIVEN FINANCE

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*Financial technology ("FinTech") is transforming finance and challenging its regulation at an unprecedented rate. Two major trends stand out in the current period of FinTech development. The first is the speed of change driven by the commoditization of technology, Big Data analytics, machine learning and artificial intelligence. The second is the increasing number and variety of new entrants into the financial sector, including pre-existing technology and e-commerce companies. This Article considers the impact of these new entrants with their typically large pre-existing non-financial services customer bases. These firms (loosely termed "TechFins") may be characterized by their capacity to leverage the data gathered in their primary business into financial services. In other words, TechFins represent an "Uber*

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*moment" in finance. This shift from financial intermediary (FinTech) to data intermediary (TechFin) raises implications for incumbent financial services firms, FinTech startups and regulators. This seachange calls for analysis to underpin regulatory approaches with a view to balancing the competing interests of innovation, development, financial stability and consumer protection.*

**Keywords**: Big Data, FinTech, TechFin, Financial Regulation, Supervision, Enforcement, Algorithms, RegTech, Protected Factors, SMEs, Lending, Payment Systems, Robo-Advice, Crowdfunding

> *There are two big opportunities in [the] future financial industry. One is online banking, all the financial institutions go online; the other one is internet finance, which is purely led by outsiders . . . the financial industry needs spoilers to make a revolution.*[1]
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> Jack Ma, Alibaba, 2013

## INTRODUCTION

This Article focuses on the trend of non-financial firms (such as technology, e-commerce and telecommunications companies) entering financial services businesses and the associated regulatory and legal challenges which are already arising. China has been at the forefront of this change, with Alibaba raising the profile of its entry into the financial services sector with the creation of Ant Financial in 2016[2] and

1. Lydia Guo, *Alibaba: Shaking up Chinese Finance*, FIN. TIMES, July 1, 2013 (China), https://www.ft.com/content/0cae83c4-c936-367c-9bf8-d5a082c9597e.

2. Alibaba's financial services activities (including payment services) are now bundled in a separate finance holding company, Ant Financial, of which Alibaba is the controlling shareholder. Ant Financial runs Alipay (https://intl.alipay.com/), the largest payments network worldwide, with 300 million customers, and WeBank, which offers short-term loan services to Chinese customers shopping on Alibaba.com. *See Alipay Rolls Credit for Consumers*, PYMNTS.COM (Mar. 7, 2017), http://www.pymnts.com/news/2015/alipay-rolls-credit-for-consumers/. Ant Financial also runs MyBank, which similarly focuses on micro lending, but tends to take on greater credit risk than Tencent's WeBank as it lends money from its own balance sheet rather than acting as an intermediary between borrowers and lenders. Further, Ant Financial runs a wealth management platform named Yu'e Bao, which emerged from the eponymous money market fund launched in June 2013 and is now among the world's five largest money market funds by assets. Alibaba's "decision" to separate Ant into a separate licensed financial ser-

with its founder, Jack Ma, often said to have coined the term "TechFin."[3]

This trend may be less obvious in other countries (perhaps due to their more developed regulatory or financial systems) but it is nonetheless happening. Amazon (U.S.),[4] Apple

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vices holding company—albeit under its continued control—by renaming and subsidiarizing Alipay in Oct. 2014 was the direct result of fears over possible systemic risk arising from both Alipay and Yu'e Bao, resulting in a new drive in China to build a regulatory system to address FinTech. *See* Weihuan Zhou, Douglas Arner & Ross Buckley, *Regulation of Digital Financial Services in China: Last Mover Advantage?,* 8 TSINGHUA CHINA L. REV. 25, 36–39 (2015).

3. Zen Soo, *TechFin: Jack Ma Coins Term to Set Alipay's Goal to Give Emerging Markets Access to Capital*, SOUTH CHINA MORNING POST (Dec. 2, 2016, 9:38 PM), http://www.scmp.com/tech/article/2051249/techfin-jack-ma-coins-term-set-alipays-goal-give-emerging-markets-access. While Jack Ma may have built the leading business model and perhaps inspired the term with the quote at the beginning of this Article (and the significant OpEd in China's *People's Daily* in which it appeared), it does not appear that he actually coined the term "TechFin". Moreover, there is no clear consensus on the meaning of the term. *See* Chris Skinner, *Is It FinTech or TechFin (Part I)*, DIGITALIST MAG. (Jan. 7, 2016), http://www.digitalistmag.com/customer-experience/2016/01/07/fintech-or-techfin-03925833; Chris Skinner, *Is It FinTech or TechFin (Part II)*, DIGITALIST MAG. (Jan. 11, 2016), http://www.digitalistmag.com/resource-optimization/2016/01/11/fintech-or-techfin-2-03926161. These two pieces appear to be the first published references to the term and argue—contrary to Jack Ma's definition—that in fact TechFin is about incumbent financial services firms using technology to transform their businesses. For the first use of TechFin as defined by Ma and also the approach we take in this Article, see Janos Barberis, *From FinTech to TechFin: Data Is the New Oil*, ASIAN BANKER (May 15, 2016), http://www.theasianbanker.com/updates-and-articles/from-fintech-to-techfin:-data-is-the-new-oil. For yet another view, see Ryan Shea, *FinTech Versus TechFin: Does Technology Offer Real Innovation or Simply Improve What is Out There?*, THOMSON REUTERS: INSIDE FIN. AND RISK (Jul. 26, 2016), https://blogs.thomsonreuters.com/financial-risk/fintech-innovation/fintech-versus-techfin-technology-offer-real-innovation-simply-improve/ ("*Fintech* companies are driven by the desire to apply emerging technologies to radically alter the financial landscape. *TechFin* companies, in contrast, apply technology to enhance existing financial capabilities. A less disruptive, more incremental approach." (emphasis in original)). Thus, in Shea's definition, TechFin is incremental, while FinTech seeks disruption (similar to that of Skinner and contrasting to the approach of Ma and the authors of this Article). However, there was an Australian company apparently formed in 2013 called Techfin that probably deserves the credit for the term (and whose business actually focuses on financing technology). *See* TECH FIN, http://www.techfin.com.au/ (last visited Apr. 6, 2017) (this website is now defunct).

4. Amazon Lending is provided by Amazon Capital Services. *See* Alistair Barr, *Amazon Offering Loans to its Online Sellers*, THOMSON REUTERS (Sep. 27,

(U.S.),[5] Facebook (U.S.),[6] Google (U.S.),[7] Microsoft (U.S.),[8] Uber (U.S.),[9] Samsung (Korea),[10] KakaoTalk (Korea),[11]

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2012), http://www.reuters.com/article/net-us-amazon-lending-idUSBRE88Q1CC20120927. The practice is described as an outreach service from Amazon to small businesses. *See* Georgia McIntyre, *Spotlight on Amazon Lending: Is It Right For You?*, FUNDERA (Mar. 22, 2017), https://www.fundera.com/blog/amazon-lending. Moreover, Amazon has announced its "Amazon Cash" feature is gradually entering into the banking space. *See* Maria LaMagna, *Amazon's Next Customer: Americans Who Don't Have a Bank Account*, MARKETWATCH (Apr. 27, 2017), http://www.marketwatch.com/story/amazons-next-customer-americans-who-dont-have-a-bank-account-2017-04-04.

5. *See* APPLE PAY, http://www.apple.com/apple-pay/ (last visited Nov. 3, 2017).

6. *See* Sally Davies, Duncan Robinson & Hannah Kuchler, *Facebook Targets Financial Services*, FIN. TIMES (Apr. 14, 2014), https://www.ft.com/content/0e0ef050-c16a-11e3-97b2-00144feabdc0; Elena Mesropyan, *Why Facebook Is a Dark Horse in the Financial Services Industry*, LET'S TALK PAYMENTS (Oct. 21, 2016), https://letstalkpayments.com/why-facebook-is-a-dark-horse-in-the-financial-services-industry.

7. *See* GOOGLE WALLET, https://www.google.com/wallet (last visited Nov. 3, 2017). Google is also foreseen to become a financial services hub. At the time of this writing, Google offered mortgage and insurance comparison services in the United States. *See* Charlotte Henry, *Is Google Banking on Financial Services?*, COMPUTER BUS. REV. (Jan. 14, 2016), http://www.cbronline.com/news/verticals/consumer-markets/is-google-banking-on-financial-services-4785109.

8. *See* PYMNTS, *It's Official: Microsoft Is Licensed To Do Payments*, PYMNTS.COM (Apr. 7, 2015), http://www.pymnts.com/news/2015/its-official-microsoft-is-licensed-to-do-payments ("Microsoft was approved for its Idaho license on March 24, 2015, and no other state has yet issued a license, according to mortgage information service NMLS. However, Microsoft told FinCEN that it plans to operate as a money services business in all 50 U.S. states."); *Microsoft Wallet*, MICROSOFT, https://www.microsoft.com/en-us/store/p/microsoft-wallet/9nblgggzlm1p (last visited March 20, 2017) ("Pay for your purchases the easy and more secure way with Microsoft Wallet and your Windows phone. Keep your payment cards, rewards and membership cards all in one place, so you have your cards available when and where you need them. It's easy, convenient, and more secure than using your credit card alone.").

9. *Cf.* UBER VEHICLE SOLUTIONS, https://www.uber.com/en-AU/drive/vehicle-solutions/ (last visited Mar. 22, 2018).

10. *See* Claire Reilly, *Samsung Pay Launches in Australia, Time to Ditch Your Wallet (and Your Train Ticket?)*, CNET (June 16, 2016, 4:39 PM), https://www.cnet.com/au/news/samsung-pay-launches-in-australia/.

11. KakaoTalk is a popular messaging app company based in Korea; it launched Kakao Pay and became the first firm to be granted a banking license for online operations. *See* Cynthia Kim, *Kakao, KT Surge After South Korea Grants Online Banking Permits*, BLOOMBERG TECH. (Nov. 29, 2015),

Tencent (China),[12] and Vodafone (U.K., India, and Africa),[13] all offer various forms of payment, lending, and other financial services.

As these established tech firms enter the world of finance, important questions arise: how do these firms fit within the framework of financial regulation?[14] To what extent do their

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https://www.bloomberg.com/news/articles/2015-11-29/south-korea-grants-kakao-kt-led-groups-permits-for-online-banks.

12. Tencent runs a payment platform (Tenpay, accounting for approximately 20–30% of Chinese online payments) as well as a virtual bank named WeBank (an intermediary between borrowers and lenders) that operates a no-collateral micro-lending service called Weilidai. *See* Juro Osawa, *Tencent's WeChat App to Offer Personal Loans in Minutes*, WALL ST. J. (Sept. 11, 2015, 3:21 AM), https://www.wsj.com/articles/tencent-to-add-personal-loan-feature-to-wechat-app-1441952556. Loans do not require collateral or guarantees provided the borrower makes it onto a "white list" put together by the WeBank and WeChat teams. Weilidai has more than 20 million white list users, 660,000 active borrowers, and a loan balance of 7.5 billion yuan. *See also* Isabella Zhong, *Chinese Stocks Cashing in on Internet Finance Boom*, BARRONS (Feb. 24, 2016), https://www.barrons.com/articles/chinese-stocks-cashing-in-on-internet-finance-boom-1456299418.

13. For example, M-PESA, Vodafone's mobile payment platform, is active in India and Kenya; in the latter country, Vodafone has partnered with Kenya's Equity Bank to launch M-KESHO, a co-branded financial product that utilizes the M-PESA platform and agent network to offer expanded banking services like interest-bearing accounts, loans, and insurance. *About Us*, M-PESA, https://www.mpesa.in/portal/customer/AboutMpesa.jsp (last visited Jan. 1, 2018); Financial Access Initiative, *M-KESHO in Kenya: A New Step for M-PESA and Mobile Banking*, NYU WAGNER BLOG: ANALYSIS AND OPINION ON POLICY, NEWS, AND RESEARCH (May 27, 2010), http://www.financialaccess.org/blog/2015/7/16/m-kesho-in-kenya-a-new-step-for-m-pesa-and-mobile-banking. In the U.K., Vodafone is directly working with financial services organizations to improve the services they provide by using technology, including offering wearable technology for investment analysts to monitor market trends customized to their business, implementing mobile-enhanced authentication, and a number of other innovations. *See Ready Finance Tech Guide – Investment Banking*, VODAFONE, http://www.vodafone.co.uk/business/file/1418044689345_RFUK2016-23-Ready-Finance-tech-guide-Investment-banking.pdf.

14. COMMONWEALTH OF AUSTRALIA, FINANCIAL SYSTEM INQUIRY INTERIM REPORT 4–45 (2014); Basel Comm. on Banking Supervision, *Sound Practices: Implications of Fintech Developments for Banks and Bank Supervisors*, BANK FOR INT'L SETTLEMENTS 14–21 (Aug. 2017) [hereinafter *Sound Practices*], https://www.bis.org/bcbs/publ/d415.pdf (referring to TechFins as "BigTech", but focusing on website providers. The TechFin concept discussed in this paper is broader since it looks as data generation as origin of TechFin business models; data can also be generated from any type of traditional or e-business, such as shopping platforms – Amazon, etc.).

activities signal arbitrage opportunities and deficiencies in the current regulatory system?

This Article begins to tackle these questions. Following this introduction, in Part I, we seek to describe the features that distinguish TechFin companies from other financial sector participants, in particular incumbent financial institutions and FinTech startups. In Parts II and III, we outline the opportunities created by TechFins as well as the reasons for regulatory concern, before analyzing the policy options available to regulators in responding to TechFin in Part IV.

## I.
## FinTechs and TechFins, Digitization and Datafication

> *Six decades into the computer revolution, four decades since the invention of the microprocessor, and two decades into the rise of the modern Internet, all of the technology required to transform industries through software finally works and can be widely delivered at global scale. . . . In some industries, particularly those with a heavy real-world component such as oil and gas, the software revolution is primarily an opportunity for incumbents. But in many industries, new software ideas will result in the rise of new Silicon Valley-style start-ups that invade existing industries with impunity. Over the next 10 years, the battles between incumbents and software-powered insurgents will be epic. Joseph Schumpeter, the economist who coined the term "creative destruction," would be proud.*[15]
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> Marc Andreesen, Andreesen Horowitz, 2011

### A. *Features of FinTech & RegTech*

"FinTech" in its broadest sense[16] refers to the use of

15. Marc Andreesen, *Why Software Is Eating the World*, Wall St. J. (Aug. 20, 2011), https://www.wsj.com/articles/SB10001424053111903480904576512250915629460.

16. We admit difficulties in defining FinTech with legal certainty. For evidence of the FinTech multiverse of definitions, see generally Patrick Schueffel, *Taming the Beast: A Scientific Definition of FinTech*, 4 J. Innovation Mgmt. 32 (2016). The same is true for TechFin. Hence, we prefer the term "TechFin" to be understood more as one describing a perspective rather than serving as a formal definitional concept.

technology to deliver financial solutions.[17] The rise of FinTech is a long-standing process, spanning three eras to date[18], that has recently accelerated.[19] The ever-present use of technology in finance is gradually putting pressure to transit from regulations designed to control human behavior to a regulator looking at supervising automation processes.[20] In other words, FinTech growth has elicited the need for RegTech.[21] "RegTech" is a contraction of the terms "regulatory" and "technology",[22] and describes the use of technology, particularly information technology ("IT"), in the context of regulation, monitoring, reporting and compliance.[23]

Prior to the 2008 Global Financial Crisis, FinTech was driven by incumbent financial institutions and their spending on technology to support their operations, for instance, in the context of risk management and internet banking. It often took place in close partnership with regulators, for instance, in the context of development of electronic payment (e.g.,

17. Doulgas W. Arner, Jànos Barberis & Ross P. Buckley, *The Evolution of FinTech: A New Post-Crisis Paradigm?*, 47 GEO. J. INT'L L. 1271, 1272 (2016).

18. *Id.* at 1276.

19. *See generally* ERNST & YOUNG, EY FINTECH ADOPTION INDEX 2017: EXECUTIVE SUMMARY (2017).

20. For a discussion of the impact of Big Data on the economy, see generally DELOITTE & AEGIS BUS. SCH., OPPORTUNITIES IN TELECOM SECTOR: ARISING FROM BIG DATA (2015), https://www2.deloitte.com/content/dam/Deloitte/in/Documents/technology-media-telecommunications/in-tmt-opportunities-in-telecom-sector-noexp.pdf.

21. *See* INST. OF INT'L FIN., REGTECH IN FINANCIAL SERVICES: TECHNOLOGY SOLUTIONS FOR COMPLIANCE AND REPORTING 5–8 (2016), http://www.iif.com/publication/research-note/regtech-financial-services-solutions-compliance-and-reporting.

22. ERNST & YOUNG, INNOVATING WITH REGTECH (2016), http://www.ey.com/Publication/vwLUAssets/EY-Innovating-with-RegTech/$FILE/EY-Innovating-with-RegTech.pdf.

23. *See* Douglas W. Arner, Jànos Barberis & Ross P. Buckley, *FinTech, RegTech and the Reconceptualization of Financial Regulation*, 37 NW. J. INT'L L. & BUS. 371 (2017).

SWIFT[24] and Visa)[25] and securities (e.g., NASDAQ) systems.[26] Since 2008, however, the major catalyst for FinTech development has been a new wave of FinTech startups.[27] While the novelty of this trend can be challenged, with previous examples found in the early 1980s (e.g., Bloomberg)[28] and in the 1990s (e.g. PayPal),[29] there is no denying that there has been a dramatic increase in new entrants into financial services in the past ten years.[30]

The distinctions emerge not as to *what* (i.e. technology in finance) but as to *who* (i.e. type of market participant—startups or incumbents).[31] The new wave of FinTech in the decade since the Global Financial Crisis has tended to develop from the bottom up, i.e. it is born mostly in agile startups that seek to disrupt (e.g., BitCoin),[32] compete with (e.g., Lending-

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24. *SWIFT history*, SWIFT, https://www.swift.com/about-us/history (last visited Apr. 21, 2017).

25. For a discussion of how Visa continues to form FinTech partnerships, see *Visa Hunts Australian and New Zealand Fintech Start-ups with Launch of Contest*, AUSTRALIAN FINTECH, https://australianfintech.com.au/visa-hunts-australian-and-new-zealand-fintech-start-ups-with-launch-of-contest/ (last visited Apr. 21, 2017).

26. For a history of Nasdaq's FinTech partnerships, see *Empowering FinTech Innovation*, NASDAQ, http://business.nasdaq.com/campaigns/fintech (last visited Apr. 21, 2017).

27. *See* Laurens Kolkman, *Bank-less Future: How FinTech Start-ups Might Take Over the Financial System*, KPMG (Mar. 2, 2016), https://home.kpmg.com/nl/en/home/social/2016/03/bank-less-future-how-fintech-start-ups-might-take-over-the-financial-system.html; Chris Myers, *FinTech's 'Third Wave' Is Coming, And It Will Change Everything*, FORBES (Oct. 3, 2016, 4:06 PM), https://www.forbes.com/sites/chrismyers/2016/10/03/fintechs-third-wave-is-coming-and-it-will-change-everything/#7903f61c6026.

28. *See* Robin Wigglesworth, *The Bloomberg Terminal: Clunky, Costly, Addictive, Ubiquitous*, FIN. TIMES (July 8, 2015), https://www.ft.com/content/5d6c2d9c-1f61-11e5-ab0f-6bb9974f25d0; 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.

29. MICHAEL CHESHER, RUKESH KAURA & PETER LINTON , ELECTRONIC BUSINESS & COMMERCE 56 (2003).

30. Samantha Barnes, *Peer-to-Peer Lending – Disruption for the Banking Sector?*, INTERNATIONAL BANKER (Feb. 9, 2015), https://internationalbanker.com/banking/peer-peer-lending-disruption-banking-sector/.

31. *See* Jorge Ruiz, *Citi's Story of Innovation*, *in* THE FINTECH BOOK: THE FINANCIAL TECHNOLOGY HANDBOOK FOR INVESTORS, ENTREPRENEURS AND VISIONARIES 203 (Susanne Chishti & Janos Barberis eds., 2016).

32. *See* Rainer Böhme, Nicolas Christin, Benjamin Edelman & Tyler Moore, *Bitcoin: Economics, Technology, and Governance*, 29 J. OF ECON. PERSP.

Club),[33] do business with (e.g., Dwolla),[34] or be acquired by (e.g., Fidor),[35] incumbent financial institutions.[36] This new startup trend—combined with post-crisis regulatory reforms driving structural change within the industry—is pushing incumbent financial institutions to increasingly focus on technology in order to compete with the threat posed by emerging startups.[37]

RegTech as a phenomenon likewise has origins dating to before the 2008 Global Financial Crisis.[38] Similar to FinTech, it has received a major impetus in the past ten years as finan-

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213, 214 (2015); Everett Rosenfeld, *Forget Currency, Bitcoin's Tech Is the Revolution*, CNBC (Nov. 13, 2014, 10:22 AM), http://www.cnbc.com/2014/11/13/forget-currency-bitcoin-tech-could-disrupt-massively.html; James Eyers, *Bitcoin Could Disrupt Banks Warns Westpac Boss*, THE SYDNEY MORNING HERALD (Sep. 8, 2015, 8:57 PM), http://www.smh.com.au/business/banking-and-finance/bitcoin-could-disrupt-banks-warns-westpac-boss-20150908-gjhjnk.html.

33. Sriharsha Reddy & Krishna Gopalaraman, *Peer to Peer Lending, Default Prediction-Evidence from Lending Club*, 21 J. OF INTERNET BANKING & COM. 1, 2 (2016) .

34. Jeremy Quittner, *Dwolla Dashboard to Give Banks Deep Analysis on Mobile Use*, AM. BANKER (May 16, 2011, 5:19 PM), https://www.americanbanker.com/news/dwolla-dashboard-to-give-banks-deep-analysis-on-mobile-use.

35. LTP Team, *Fidor Bank Acquired by France's BPCE Groupe*, LET'S TALK PAYMENTS (July 29, 2016), https://letstalkpayments.com/fidor-bank-acquired-by-frances-bpce-groupe/.

36. Ian Pollari & Jan Reinmueller, *Building Effective Fintech Partnerships 'The Digital Future' for Banks*, KPMG (Feb. 10, 2017), https://home.kpmg.com/au/en/home/insights/2017/02/effective-fintech-partnerships-enable-banks-succeed-digital-innovation-trail-fs.html; Marika Vilen, *The Fintech Startups Partnership Model*, THOMSON REUTERS: ANSWERS ON (Jan. 5, 2017), https://blogs.thomsonreuters.com/answerson/fintech-startups-partnership-model/; Rene Lacerte, *Is 2017 The Year Bank–Fintech Partnerships Hit Product/Market Fit?*, FORBES (Feb, 13, 2017, 8:00 AM), https://www.forbes.com/sites/forbesfinancecouncil/2017/02/13/is-2017-the-year-bank-fintech-partnerships-hit-productmarket-fit/- 28ef623b3c6e.

37. Nathaniel Popper, *'Fintech' Start-Up Boom Said to Threaten Bank Jobs*, N.Y. TIMES (Mar. 30, 2016), https://www.nytimes.com/2016/03/31/business/dealbook/fintech-start-up-boom-said-to-threaten-bank-jobs.html?_r=0; Emma Dunkley, *Fintech Start-Ups Put Banks Under Pressure*, FIN. TIMES (Sept. 12, 2016), https://www.ft.com/content/ce8fa350-737f-11e6-bf48-b372cdb1043a; Clara Guibourg, *McKinsey Warns Banks That Fintech Startups and Alternative Finance Pose Threat to Traditional Banking's Profits*, CITY A.M., http://www.cityam.com/225503/mckinsey-warns-banks-fintech-startups-and-alternative-finance-pose-threat-traditional.

38. DELOITTE, REGTECH IS THE NEW FINTECH: HOW AGILE REGULATORY TECHNOLOGY IS HELPING FIRMS BETTER UNDERSTAND AND MANAGE THEIR

cial institutions have been driven to spend on new risk management and compliance systems.[39] However, in contrast to FinTech, RegTech has been more of a top-down phenomenon in which technology providers have responded to demand from large incumbent financial institutions and regulators to address the objectives of decreasing regulatory and compliance requirement costs, and increasing market monitoring capacity, respectively.[40] Given the significant amounts being spent,[41] this process is having a transformational impact on underlying financial institution systems as well as employment.[42] It is also providing significant opportunities not only for technology (e.g., IBM)[43], information (e.g., Thompson Reuters, Bloomberg) and advisory firms, but also for star-

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RISKS 4 (2016), https://www2.deloitte.com/content/dam/Deloitte/ie/Documents/FinancialServices/IE_2016_FS_RegTech_is_the_new_FinTech.pdf.

39. Elena Mesropyan, *RegTech Companies in the US Driving Down Compliance Costs to Enable Innovation*, LET'S TALK PAYMENTS (Feb. 25, 2017), https://letstalkpayments.com/regtech-companies-in-us-driving-down-compliance-costs-innovation/; KPMG, REGULATORY TECHNOLOGY SERVICES (REGTECH): PREPARING YOUR FINANCIAL INSTITUTION FOR THE FUTURE 1 (2016), https://home.kpmg.com/content/dam/kpmg/sg/pdf/2016/11/sg-regulatory-technology-services.pdf.

40. James Eyers, *Welcome to the New World of 'Regtech'*, AUSTL. FIN. REV. (June 20, 2016), http://www.afr.com/technology/welcome-to-the-new-world-of-regtech-20160619-gpmj6k; Beverley Head, *ASIC Plays in RegTech Sandbox*, INNOVATIONAUS.COM (Feb. 8, 2017), http://www.innovationaus.com/2017/02/ASIC-plays-in-RegTech-sandbox/; KEVIN PETRASIC ET AL., WHITE & CASE, REGTECH RISING: AUTOMATING REGULATION FOR FINANCIAL INSTITUTIONS (2016), https://www.whitecase.com/publications/insight/regtech-rising-automating-regulation-financial-institutions.

41. *The Ever-Increasing Costs of Compliance*, THOMSON REUTERS (May 21, 2015), https://www.thomsonreuters.com/en/articles/2015/ever-increasing-cost-of-compliance.html.

42. *See, e.g.*, Richard Partington, *Banks Trimming Compliance Staff as $321 Billion in Fines Abate*, BLOOMBERG (Mar. 23, 2017, 8:01 PM), https://www.bloomberg.com/news/articles/2017-03-23/banks-trimming-compliance-staff-as-321-billion-in-fines-abate; Chanyaporn Chanjaroen, *StanChart Says Almost "Over Hump" on Costly Compliance Upgrades*, BLOOMBERG (Mar. 24, 2017, 5:00 PM), https://www.bloomberg.com/news/articles/2017-03-23/stanchart-says-almost-over-hump-on-costly-compliance-upgrades.

43. *See IBM Closes Acquisition of Promontory Financial Group*, CISION: PR NEWSWIRE (Nov. 22, 2016, 8:15 PM), http://www.prnewswire.com/news-releases/ibm-closes-acquisition-of-promontory-financial-group-300367181.html (last visited Apr. 7, 2017).

tups.[44] RegTech itself is not limited to the financial sector, although this has been where its most important evolution has so far occurred.[45] The next stage in the evolution of RegTech will likely be in response to demand from regulators seeking to use technology to improve their own regulatory capabilities and enhance regulatory outcomes,[46] including through the capacity to undertake near real time surveillance of the markets they are charged with supervising.[47]

The 2008 Global Financial Crisis opened a new era of FinTech, marked by the arrival of waves of new startups delivering either directly (P2P, B2C) or indirectly (B2B) new technologies to be used in finance.[48] Almost a decade later, RegTech has emerged, representing both a more efficient and a more effective way to support compliance and reporting functions but also a totally new approach to understanding regulation as it shifts from supervision by humans to supervision by machines and analysis of data. Both FinTech and RegTech echo the Andreesen Horowitz vision that "software is eating our world," with the financial and compliance industry

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44. *See Thomson Reuters Further Strengthens KYC Managed Services and Legal Entity Data Through Clarient and Avox Acquisitions*, THOMSON REUTERS (Feb. 6, 2017), https://www.thomsonreuters.com/en/press-releases/2017/february/thomson-reuters-strengthens-kyc-managed-services-and-legal-entity-data-through-clarient-and-avox-acquisitions.html.

45. Andrew Cornell, *RegTech Joins the C-Suite*, ANZ BLUENOTES (Feb. 14, 2017), https://bluenotes.anz.com/posts/2017/02/regtech-joins-the-c-suite/.

46. *See* Cathie Armour, *Regtech will extend the long arm of market supervisors*, AUSTL. FIN. REV. (Apr. 4, 2017), http://www.afr.com/opinion/columnists/regtech-will-extend-the-long-arm-of-market-supervisors-20170404-gvd31u#ixzz4ddvZyYW0.

47. Arner, Barberis & Buckley, *supra* note 23; Henry T.C. Hu, *Too Complex to Depict? Innovation, 'Pure Information,' and the SEC Disclosure Paradigm*, 90 TEX. L. REV. 1601 (2012).

48. DEUTSCHE BANK, FINTECH 2.0: CREATING NEW OPPORTUNITIES THROUGH STRATEGIC ALLIANCE (2016), http://cib.db.com/insights-and-initiatives/white-papers/FinTech_2_0_Creating_new_opportunities_through_strategic_alliance.htm#gsc.tab=0.

being digitized[49] but not yet datafied (to use the framework of Viktor Mayer-Schonberger and Martin Kukier[50]).

### B. *Features of TechFin*

TechFins start with technology and data and subsequently add financial services to their value-chain.[51] They need to be approached differently than FinTechs.[52] They typically begin with their data and access to customers. They then move into the world of finance by leveraging their access to data and customers in an effort to out-compete incumbent financial firms or FinTech startups.

This is the critical distinction between a TechFin, a FinTech startup and a traditional financial institution. The former begins with relationships with customers in a non-financial services setting, collects massive amounts of data from those relationships, and then seeks to make use of that data. Initially, it may sell the data to financial services providers or leverage its customer relationships by serving as a conduit through which its customers can access financial services provided by a separate institution. Later, it may provide financial services directly itself.

A FinTech is typically a startup that identifies a "pain point" in financial services,[53] something incumbents do poorly or not at all (perhaps as a result of regulatory changes or lack of digital customer focus), and seeks to provide a remedy for the pain point, with the goal of selling the solution service di-

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49. *Cf.* Marc Andreesen, *Why Software is Eating the World*, WALL ST. J. (Aug. 20, 2011), https://www.wsj.com/articles/SB10001424053111903480904576512250915629460 ("[T]he financial services industry has been visibly transformed by software over the last 30 years. Practically every financial transaction, from someone buying a cup of coffee to someone trading a trillion dollars of credit default derivatives, is done in software. And many of the leading innovators in financial services are software companies . . . ").

50. *See* VIKTOR MAYER-SCHÖNBERGER & KENNETH CUKIER, BIG DATA: A REVOLUTION THAT WILL TRANSFORM HOW WE LIVE, WORK, AND THINK (Houghton Mifflin Harcourt 2013).

51. Shea, *supra* note 3.

52. *See* Skinner, *supra* note 3.

53. Matthew Smith, *When Technology Trumps Finance*, FINSIA (Apr. 11, 2017), http://www.finsia.com/insights/news/news-article/2017/04/11/when-technology-trumps-finance.

rectly to customers or to an incumbent, or by selling itself to an existing financial services firm.[54]

Traditional financial services firms, such as banks, typically start with a banking relationship with customers and have only recently begun to even consider supplementing their risk analysis of customers by using more broadly derived data.[55]

The provider with the most accurate, detailed and extensive digitalized information about a customer is best placed to analyze that information and data to price credit and insurance services for that customer (through datafication: the process of analyzing and using data).[56] Traditionally that provider has been the customer's bank,[57] initially armed with a detailed questionnaire completed by the customer as to income, expenses, objectives, experience and risk tolerance, and fortified over time by the bank's knowledge of the customer's financial history. However, banks may no longer enjoy this advantage, or at least not for long.[58]

The data superiority of TechFins comes from information obtained from various sources that combine to provide a comprehensive, data-based view of their customers' (and given their size, eventually entire economies', and potentially the world's) preferences and behaviors. This data may, for instance, be generated from:

- software companies (e.g., Microsoft and Google) aggregating information about users' activities;

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54. Imran Gulamhuseinwala, Thomas Bull & Steven Lewis, *FinTech Is Gaining Traction and Young, High-Income Users are the Early Adopters*, 3 J. FIN. PERSP., no. 3, Winter 2015, at 16, 18.

55. We discuss traditional banking only. Quantitative and algorithmic traders are beyond the scope of our analysis.

56. Jens-Erik Mai, *Big Data Privacy: The Datafication of Personal Information*, 32 INFO. SOC'Y 192, 193 (2016).

57. Edward J. Stone, *Using Customer Data Effectively*, 16 BANKS INS. REP. 1, 6 (2000).

58. We admit that we do not know how many data points a bank has stored in its database. We speculate banks have access to more and better data than they have traditionally used, and TechFin is likely to push banks to use a greater share of data which they control. Even so, certain data points generated at the front end (client interface) are beyond the bank's influence.

- hardware companies (e.g., Huawei, Tesla, Apple) and Internet-of-Things ("IoT"[59]) companies utilizing sensors which continually monitor usage behavior and location;
- social media services (e.g., Facebook[60] and Tencent) and search engines (e.g., Google[61] and Baidu), providing insight into social preferences and activities;
- e-commerce (e.g., Amazon, Alibaba, or major retail chains with large market shares e.g. Wal-Mart), providing insight into consumer demand and payment history;[62] and
- telecommunications services providers (e.g., Vodafone), providing data on mobile activities.[63]

The data provided by each of these five sources is typically expansive, covers a large proportion of the population of the reference markets, and is often deep in terms of the number of data points that can be gathered with respect to any given individual.[64]

TechFins moving further into financial services, the way analogous Chinese corporations (e.g., Baidu, Tencent, Alibaba) have done, can assemble relatively quickly much of the information the customer's bank or asset manager possesses, and supplement it with their very detailed knowledge of

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59. Leading to the equation "IoT x FinTech = FinTernet of Things". *See* Sachin Modak, *The "Fin"-ternet of Things: How IoT Affects Financial Services*, FINTECH FINANCE, http://www.fintech.finance/01-news/the-fin-ternet-of-things-how-iot-affects-financial-services/ (last visited [Apr. 27, 2018]).

60. Steve Lohr, *The Age of Big Data*, N.Y. TIMES: SUNDAY REV. (Feb. 11, 2012), http://www.nytimes.com/2012/02/12/sunday-review/big-datas-impact-in-the-world.html; OLAF ACKER, ADRIAN BLOCKUS & FLORIAN PÖTSCHER, STRATEGY&, BENEFITING FROM BIG DATA: A NEW APPROACH FOR THE TELECOM INDUSTRY 10 (2013).

61. Leonard Klie, *Apple and Google Yield Control Over Consumer Data*, CRM MAG., Jan. 2016, at 14, 14.

62. *See* Barberis, *supra* note 3.

63. Nick McKenzie & Richard Baker, *Your Mobile Phone Records and Home Address for Sale*, SYDNEY MORNING HERALD (Nov. 16 2016), http://www.smh.com.au/business/your-mobile-phone-records-and-home-address-for-sale-20161116-gsqkwe.html.

64. The founder of Alibaba, Jack Ma, has stated that Alibaba holds on average 20,000 to 25,000 data points on any individual client. Jack Woo, Head of Business Solutions, DTZ Cushman & Wakefield, Presentation, China's Financial Innovation (Oct. 15, 2015).

the many other aspects of the customer's choices and preferences.[65] These preferences can then be processed through algorithms that have established correlations between certain preferences and credit-worthiness,[66] so as to provide a much more nuanced assessment of credit-worthiness than anything a bank could previously have done on its own.

The amount of data will be more extensive if data sources are combined. Facebook, Amazon, and Alibaba are now all doing exactly this in the context of payments in India—a competition which is likely to be played out in an increasing range of markets around the world.[67] As Alibaba's experience has shown, the combining of data sources provides the basis for further expansion of related financial services offerings, particularly lending (to consumers and SMEs) as well as cash and investment management (e.g., money market funds to hold cash in between transactions without the need for the cash to exit to a traditional financial institution).[68] Once the client relationship is established, TechFins can easily expand their service offerings due to the trust the client relationship generates.[69]

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65. Barberis, *supra* note 3.

66. Mikella Hurley & Julius Adebayo, *Credit Scoring in the Era of Big Data*, 18 YALE J.L. & TECH. 148, 163 (2016).

67. The recent announcement of WhatsApp (owned by Facebook) entering the payment space in India is a confirmation. *See* Simon Mundy, *WhatsApp Plans Indian Digital Payments*, FIN. TIMES (Apr. 5, 2017), https://www.ft.com/content/5a1623c4-192d-11e7-a53d-df09f373be87. This echoes Alibaba taking 40% stake in Paytm in India. *See* Digbijay Mishra & Samidha Sharmal, *Alibaba Will Hold 40% Stake in Paytm's E-Comm Entity*, TIMES INDIA (Feb. 3, 2017, 6:30 PM), http://timesofindia.indiatimes.com/business/india-business/alibaba-will-hold-40-stake-in-paytms-e-comm-entity/articleshow/56947046.cms.

68. *See* Mundy, *supra* note 67.

69. The fact that Chinese technology companies have been able to enter financial services spaces faster than their U.S. counterparts can be due to two factors: first, a large regulatory arbitrage whereby interest payable on e-wallets was higher than traditional bank accounts and second, the perception that financial secrecy of customers is better kept by a private institutions than a public, state owned bank, especially in the context of tax reporting. The perception of trust is changing even in developed economies. A recent Accenture survey has pointed out that millennials found Google and Amazon "attractive alternatives to traditional financial providers." ACCENTURE, FINANCIAL PROVIDERS: TRANSFORMING DISTRIBUTION MODELS FOR THE EVOLVING CONSUMER 4 (2017), https://www.accenture.com/t20170111T041601Z__w__/us-en/_acnmedia/Accenture/next-gen-3/DandM-Global-Research-

### C. *Delineation*

In order to draw a line between FinTechs and TechFins, it is helpful to first look at their similarities. For example, both FinTech and TechFin capitalise on the economies of scale and scope offered by technology (including, but not limited to, network effects).[70] However, while FinTechs may build or acquire data sets over time (such as peer-to-peer lending platforms) and are frequently focused on data analysis (with algorithms integrating data from various sources[71]), FinTechs are focused primarily on finance and the application of "Tech" to deliver improved "Fin."

While financial institutions have digitized, or are about to digitize themselves, technology companies have been digital and data-driven from day one. This extends to their business models, whereby banks generate interest and fees (digitizing money), while Google and Facebook sell information (monetizing data).[72] The digitization of bank processes does not translate into the change of business model that could make them TechFin companies. In short, a FinTech is a *financial* intermediary while a TechFin is a *data* intermediary.

TechFins rely on large-scale data sets and businesses developed in their primary course of business, which they then put to use in financial services. They may do so by considering, or even providing, the front-end of financial services, i.e. the link between financial intermediary and client.[73] When providing services, they may rely on de-individualized datasets; aggregating huge amounts of data in order to verify assumptions as

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Study/Accenture-Financial-Services-Global-Distribution-Marketing-Consumer-Study.pdfla=EN.

70. Bernardo Nicoletti, The Future of FinTech: Integrating Finance and Technology in Financial Services 268 (2017); Nav Athwal, *The Top Five Fintech Marketplaces*, Forbes (Sept. 25, 2015, 3:10 PM), https://www.forbes.com/sites/navathwal/2015/09/25/the-top-five-fintech-marketplaces/#5faf2a2a735c=.

71. Examples include automatized customer relationship management tools (such as Squirro) or market sentiment analysts (such as Amareos). Squirro, https://squirro.com/ (last visited Nov. 3, 2017); Amareos, https://www.amareos.com/ (last visited Nov. 3, 2017).

72. Puneet Sikka, *How Facebook and Other Social Networks Monetize Users' Data*, Market Realist (Sept. 26, 2014, 3:29 PM), http://marketrealist.com/2014/09/different-social-networks-making-use-users-data/.

73. This function has led to their description as "Financial Services Overlay Providers" or "Financial over the top providers."

to the client's solvency, payment behavior, savings discipline, and other relevant factors. All in all, for TechFins, data accumulation and analytics are key, beginning with self-developed algorithms that look directly for data correlations, and later advancing to machine learning and AI.

### D. *TechFin Stages*

The push of a TechFin into financial services typically comes in three stages. In the first stage, a tech firm takes advantage of its data intensive, front-end (i.e. customer connected) business model, in one of two ways. First, it may license out aggregate data to incumbent financial institutions or FinTechs (enabling data analytics, e.g. in the context of lending or investment decisions). Second, though less likely in the early going, they may test out their data sets and sell the results to financial institutions (so that the using institutions can gather information on correlations, e.g., Thomson Reuters).

In the second stage, the TechFin uses these datasets to guide its own business decisions, for instance in improving risk management when lending money to small sellers (Amazon) or when enabling optimal payments (Alipay[74]).

In the third and final stage, given the superiority of their data, one would expect some of these TechFins to begin offering financial services and thus provide very stiff competition to incumbent banks and other regulated entities,[75] either by virtue of monopolizing client access (and using specialized licensed intermediaries for certain services at the back-end of the value chain) or by providing full service via their own platforms.[76]

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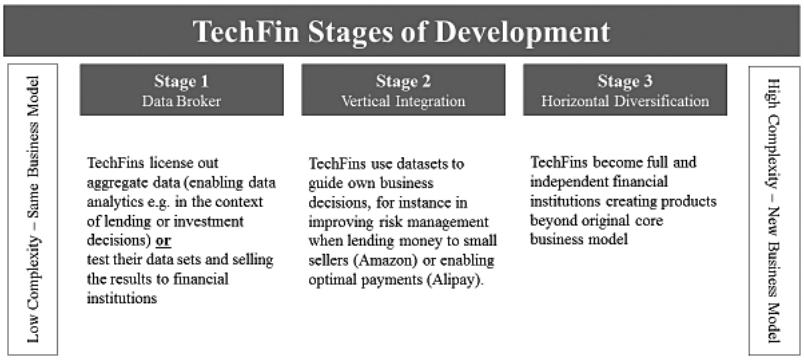
74. *See* Barberis, *supra* note 3.

75. Tech platforms (i.e. Alibaba) are taking a similar approach to supermarkets allowing third parties to sell financial services on their own platform. *See* Eva Xiao, *Jack Ma's Ant Financial To Build an Open Marketplace for Finance Products*, TECH ASIA (Mar. 29, 2017, 3:03 AM), https://www.techinasia.com/ant-financial-to-launch-caifu-hao. In the future we can expect them to monitor best sold products and replace them with a self-branded version, similar to how discount supermarkets (or e-commerce) in Europe and the United States have replaced third party best sellers with their own products.

76. The Basel Committee on Banking Supervision's consultative document refers to these business models as ones of "relegated banks" and "disintermediation." We deem this terminology misleading, however, since the TechFins, rather than abolishing intermediation (as disintermediation sug-




IBM Watson is an example of a tech firm providing its technology to financial services firms but at the same time accessing ever-increasing amounts of data which can be used to enhance its own technology and analytics capabilities.[77]

As a tech firm moves from having no involvement in financial services to stage one, or from stage one to stage two, the core issue from a regulator's perspective is when the tech firm turns into a regulated financial institution, if not it would leave open risks of regulatory arbitrage and unfair competition. Some activities clearly attract regulation, such as when client funds are taken onto the institution's own balance sheet, when discretion over client money is exercised, or when client assets are pooled. However, formal banking and financial services characteristics may materialize, generally speaking, rather late in the game. Most TechFins will reach the second stage before applying for any authorization for some type of regulated activity; and depending on the jurisdiction, many may be providing credit or sophisticated payment services to individuals or to small and medium enterprises (SMEs) without having sought any authorization (although the timing of when authorization is sought varies widely).[78]

Financial regulation in many countries attaches an authorization requirement for intermediaries seeking to access

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gests), assumes the intermediary function, or at least the valuable parts of it. *Sound Practices*, *supra* note 14, at 14–21.

77. *Watson Financial Services,* IBM, https://www.ibm.com/watson/financial-services/ (last visited Apr. 21, 2017).

78. See *supra* notes 4–13 for examples.

clients' funds, either in a bank account or a security deposit.[79] For instance, authorization requirements for deposit-taking arise because client assets become those of the intermediary while the client receives in return an (unsecured) claim against the intermediary.

Financial regulation also often attaches upon the solicitation of clients, marketing, or arranging of financial services.[80] In the TechFin world, however, clients often voluntarily contact the TechFin provider for certain services. Technically speaking, this may not be a solicitation, marketing, or arranging, and thus would fall outside financial regulatory authorization requirements.[81] This is because TechFins do not seek access to the client's assets, but rather to the client's data: from that, all else follows.

For instance, a platform such as Facebook, Amazon, or Alibaba functions as an access point for multiple clients to other businesses, some of which may be licensed (payment providers,[82] credit institutions), while others (such as simple shops) are not. This is one of the defining characteristics of TechFins: they derive their influence from access to data rather than access to money.[83]

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79. *See, e.g.*, *Corporations Act 2001* (Cth) s 911A (Austl.); VERORDNUNG DER EIDGENÖSSISCHEN FINANZMARKTAUFSICHT ÜBER DIE BEKÄMPFUNG VON GELDWÄSCHEREI UND TERRORISMUSFINANZIERUNG IM FINANZSEKTOR [GwV-FINMA], [FINMA Anti-Money Laundering Ordinance] June 3, 2015, SR 955.033.0 (Switz.).

80. *See, e.g.*, FINRA, RULE 2210; *Corporations Act 2001* (Cth) s 1018A (Austl.);Loi 2016-1691 du 9 décembre 2016 relative à la transparence, à la lutte contre la corruption et à la modernisation de la vie économique [Law 2016-1691 of December 9, 2016 on Transparency, the Fight Against Corruption, and the Modernization of Economic Life], Journal Officiel de la Republique Francaise [J.O.] [Official Gazette of France], Dec. 10, 2016; *Securities and Futures Act* ss 272A, 272B, 275 (Sing.);

81. From an accelerator standpoint, it was seen in practice how regulators have various understandings of social media platforms and how they work in the context of cross-border marketing. If a U.S. registered user shares on his/her Twitter and Facebook account an opportunity to register for a trading account but his/her friend base is international, is this cross-border marketing? How can this be monitored?

82. For example, Facebook lists its payment licenses within 49 U.S. states. *Money Transmitter Licenses*, FACEBOOK, https://www.facebook.com/payments_terms/licenses (last visited Apr. 9, 2017).

83. Barberis, *supra* note 3.

However, where TechFins do get direct access to client funds, such as through Alipay's money market funds,[84] they then will (or at least should) usually be subject to mandatory regulation. But even so, where the part of the business that must be licensed is quarantined in a subsidiary of the Tech mother company, only a tiny fraction of the overall data set and algorithms will be subject to regulation and supervision. Accordingly, regulators will have access only to tiny portions of the conglomerate that generates the risks.

Development from stage one to three can happen rather rapidly. For instance, Alipay introduced Yu'e Bao and its associated mobile application "Alipay Wallet" in June 2013.[85] Yu'e Bao is essentially an online money market fund in which Alipay customers can invest money left in their Alipay accounts and earn interest at rates which are generally higher than those offered by banks.[86] Yu'e Bao does not require minimum investment amounts, and allows withdrawals at any time.[87] In addition, as up to 90 percent of Yu'e Bao funds are invested in interbank deposits at 29 large banks, including the big state-owned ones, investment in Yu'e Bao is seen as low risk and secure.[88] With these advantages over conventional financial products, Yu'e Bao quickly became China's largest online

84. Tracey Xiang, *Alipay's 10 Years: From Payment Service to Online Finance Pioneer*, TECHNODE (Dec. 8, 2014), http://technode.com/2014/12/08/alipays-ten-years-from-payment-service-to-online-finance-pioneer/; *Alipay Yu'e Bao is Largest Money Market Fund in China*, ALIZILA (Oct. 28, 2013), http://www.alizila.com/alipay-yue-bao-is-largest-money-market-fund-in-china/.

85. Jon Russell, *China's Alipay Relaunches Its E-Payment App as Alipay Wallet with Online-to-Offline Payments*, NEXT WEB (Jan. 18, 2013), https://thenextweb.com/asia/2013/01/18/alipay-wallet/#.tnw_439CO2Jv.

86. For a good introduction to Yu'e Bao, see Moran Zhang, *Alibaba's Online Money Market Fund Yu'E Bao: 8 Things You Need to Know*, INT'L BUS. TIMES (Mar. 11, 2014, 5:45 AM), http://www.ibtimes.com/alibabas-online-money-market-fund-yue-bao-8-things-you-need-know-1560601. *See also* ALIBABA GROUP, https://bao.alipay.com/yeb/index.htm (last visited Nov. 14, 2017) (official website of Yu'e Bao).

87. Zhang, *supra* note 86. We note that these features may not be unique to Yu'e Bao. FinTechs in the field of money market funds offer services with similar characteristics. For instance, Acorn (U.S.) allows you to invest spare change by rounding up your card expenses. *See* Benzinga, *Acorns: The Company That's Changing the Way Millennials Invest*, NASDAQ (Jan. 31, 2017, 8:25 AM), http://www.nasdaq.com/article/acorns-the-company-thats-changing-the-way-millennials-invest-cm740620.

88. Zhang, *supra* note 86.

money market fund[89] and the fourth largest worldwide.[90] After only one year, Yu'e Bao had 100 million investors and 570 billion yuan (or more than $90 billion) of assets under management. Amounting to an average investment size per investor of only approximately $800, Yu'e Bao offers "microinvestment" on a very large scale.[91] It is not surprising that this development prompted a change in approach of Chinese regulators and policymakers.[92] In fact, in April 2017, just four years after its establishment, Yu'e Bao—with then $165 billion under management—became the largest money market fund in the world, overtaking incumbent JP Morgan's US government money market fund with $150 billion under management.[93]

Prior to becoming subject to regulation, TechFins often build a data-driven, international market presence, develop their network in order to build economies of scale and gather an enormous amount of data. They may influence financial activity without yet being financial intermediaries by providing data to the intermediaries or by serving as the conduit between their existing customers and a financial services provider.[94]

In addition to cultural differences between non-financial entrants into the financial sector, it is also the speed of these developments that provides a particular challenge for regulators. We return to this discussion in more detail in Part II.

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89. *Id.*

90. TJUN TANG, YUE ZHANG & DAVID HE, BOS. CONSULTING GRP., THE RISE OF DIGITAL FINANCE IN CHINA: NEW DRIVERS, NEW GAME, NEW STRATEGY 4 (2014), http://image-src.bcg.com/Images/BCG_The_Rise_of_Digital_Finance_in_China_Oct_2014_tcm52-129223.pdf.

91. *Id.*

92. Weihuan Zhou, Douglas W. Arner & Ross P. Buckley, *Regulation of Digital Financial Services in China: Last Mover Advantage*, 8 TSINGHUA CHINA L. REV. 25 (2015).

93. *Cf.* Louise Lucas, *Chinese Money Market Fund Becomes World's Biggest*, FIN. TIMES, Apr. 26, 2017, https://www.ft.com/content/28d4e100-2a6d-11e7-bc4b-5528796fe35c.

94. As discussed previously, TechFin firms can also act as a financial marketplace to understand the most popular products and services, acquire data, and then decide whether or not to provide this information directly. *See supra* note 75.

### E. *Over Time the Distinction will Disappear*

At the moment there are stark differences between traditional financial institutions, FinTech startups and TechFins. However, over time, these differences will progressively diminish as the importance of data analytics in finance and financial institutions increases. For instance, large international banks may buy from various sources many more aggregated data sets than they currently do and factor this data into their business decisions in addition to seeking to better analyze and use their proprietary data. And some TechFins may ultimately apply for full banking and financial services licenses and become global financial conglomerates, in the manner of Ant Financial, or establish permanent co-operations such as Tencent's wealth platform Licaitong which closely cooperates with licensed asset manager China Asset Management. Over time, we predict the terms FinTech and TechFin will fall out of use, and these activities will be known simply as "finance" or "banking." "E-commerce" provides an apt analogy: ten years ago buying products on-line was engaging in e-commerce. Today, in many countries, it is simply shopping.

We are concerned with what happens in the meantime—in the next 10 to 15 years—and with how regulators will respond to the massive challenges these changes will pose for them.

## II.
## OPPORTUNITIES

In addition to furthering innovation and competition generally,[95] TechFins provide new opportunities. At least three such opportunities are worth considering in more detail.

95. The usefulness of competition cannot be stated per se, but must be assessed for each market separately in light of systemic risk concerns. While some markets (for instance Germany) are deemed "over-banked," others could benefit from an enhanced level of competition. *See, e.g.*, Deborah Healey & Rob Nicholls, *Enhancing Competition: Challenges for Australian Retail Banking*, 28 J. BANKING & FIN. L. & PRAC. 48 (2017) (holding that an enhanced level of competition in Australia could further benefits for consumers).

### A. *Reducing Transaction Costs*

First, the technology and data underlying TechFins facilitate reduction of transaction costs. For financial institutions, the transaction costs for any given financial contract—checks on client background, determining the contract type, relying on and filling out the contract form, "signature runs" to get approval by authorized staff—are fixed costs per contract. If technology can assist in standardizing and automating these procedures, after the initial investment in software and server set-up (which are sunk costs), transaction costs per additional contract will be very low. Under these conditions, financial institutions can process a large volume of contracts at very low cost.

Reduction of transaction costs, however, is not unique to TechFins: this has been the driving force for much FinTech innovation and for most kinds of IT innovation.[96] For instance, reduction of transaction costs is the most important underlying rationale for the development of traditional interbank electronic payment systems, and explains the significant advantage that distributed ledger technologies have over other, older technologies.[97]

### B. *Improved Business and Risk Management*

Second, as data matters for business decisions, the big data approach applied by TechFins should improve business decisions. This is because TechFins' data sets are typically of better quality than those of traditional financial institutions in two ways. First, the data sets are more comprehensive. Traditional banks see only the back-end of the business transactions—the cash flow processed over its bank accounts, accompanied by some (more or less correct) qualitative statements by the client on their projected income and expenses. The front-end comprises the client relationship—customer product preferences, which other network participants contacted the client and for which reasons, which contracts were entered

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96. ALAN MCQUINN, WEINING GUO & DANIEL CASTRO, POLICY PRINCIPLES FOR FINTECH 5 (2016), http://www2.itif.org/2016-policy-principles-fintech.pdf.

97. KIM KAIVANTO & DANIEL PRINCE, RISKS AND TRANSACTION COSTS OF DISTRIBUTED-LEDGER FINTECH: BOUNDARY EFFECTS AND CONSEQUENCES 2 (2017), Cornell arXiv:1702.08478.

into and terminated, and which goods were returned and why. All of this information, foreclosed to the traditional bank, is vital, as it enables a TechFin to form a far more accurate picture than can any bank, in close to real time, of the real financial position of the business to which they are considering extending credit, insurance, or other financial services. The TechFin will know if certain cash represents a loan from another source or income from customer sales. The TechFin will know if the retailer or manufacturer enjoys low or high rates of product returns, and will be able to infer to some extent from this whether its customers are happy and satisfied. This access to data from the front-end relationship that TechFins often have with customers gives TechFins a significant advantage over traditional financial institutions.

Moreover, TechFins' data sets may comprise a much larger cross-section of society and the economy than those of traditional financial institutions. This is because TechFins originate from a place unrelated to financial services. They leverage data generated from social media and general economic activity into financial services to an extent which is unattainable for established financial institutions. With this additional information they are able to predict not only economic upward and downward cycles with greater certainty—and adjust their strategy accordingly—but also predict customer and client behavior.

For instance, correlations may indicate that people who buy a choker-chain for their dog are less creditworthy than those whose choice of dog leash indicates they own a more gentle animal; so credit premiums for the former may go up. Or the purchase of door stoppers to prevent one's doors from damaging one's walls may correlate with being a conscientious homeowner and slightly more creditworthy.[98] Or a telecom provider derives credit scores from the use across time of telecommunication devices,[99] and will unintentionally and proba-

98. Paul Schulte, FinTech Book Launch: Paul Schulte on FinTech (Sept. 4, 2015).

99. *See* Olga Kharif, *No Credit History, No Problem: Lenders Now Look at Phone Data*, AUSTL. FIN. REV. (Nov. 27, 2016, 7:13 PM), http://www.afr.com/technology/no-credit-history-no-problem-lenders-now-look-at-phone-data-20161127-gsylwf; Davis Bundi Ntwiga & Patrick Weke, *Credit Scoring for M-Shwari Using Hidden Markov Model*, 12 EUR. SCI. J. 176, 176–77 (2016); TAMARA COOK & CLAUDIA MCKAY, CGAP & FSD KENYA, HOW M-SHWARI WORKS: THE STORY SO

bly unknowingly grant lower credit scores to Orthodox Jews who do not use their phones on Saturdays.

It will be the challenge of the next decade to identify which correlations detected by the data analytics tools are random and which may function as an appropriate basis for prudent business decisions.[100] Big data analytics are based on correlations rather than causations, but given that correlations hint at the underlying causations, these correlations provide the path for future research.[101]

### C. *Financial Inclusion*

Third, TechFins could facilitate financial inclusion by replacing the need, common in traditional banking, for interpersonal relations.[102]

#### 1. *SME and Consumer Loans*

In the past, relationship banking was characterized by a high level of personal trust deriving from a long-standing business relationship between the bank and its clients.[103] In big data terms, the relationship banker located at a branch collected an enormous number of data points on its clients based on multiple transactions and information gathered (discussions, business lunches, referrals from other clients, etc.).

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FAR 6 (2015), https://www.cgap.org/sites/default/files/Forum-How-M-Shwari-Works-Apr-2015.pdf.

100. For example, Facebook has applied for a patent to use friend connections as a metric to derive creditworthiness for the purpose of loan origination by a bank. *See* Robinson Meyer, *Could a Bank Deny Your Loan Based on Your Facebook Friends?*, ATLANTIC (Sept. 25, 2015), https://www.theatlantic.com/technology/archive/2015/09/facebooks-new-patent-and-digital-redlining/407287/.

101. *See* Gil Press, *Big Data News Roundup: Correlation vs. Causation*, FORBES (Apr. 19, 2013, 10:23 AM), https://www.forbes.com/sites/gilpress/2013/04/19/big-data-news-roundup-correlation-vs-causation/#68ca6bab5db4; Ben Rossi, *Causation and Correlation: A Big (Data) Headache*, INFO. AGE (Dec. 3, 2015), http://www.information-age.com/causation-and-correlation-big-data-headache-123460611/.

102. *See* Susan Wolfe, *Banks Seek Balance of Interpersonal Relationships, Online Convenience*, MINTEL (May 20, 2014), http://www.mintel.com/blog/finance-market-news/banks-seek-balance-of-interpersonal-relationships-online-convenience.

103. *See* Ross P. Buckley, *The Changing Nature of Banking and Why It Matters*, *in* RECONCEPTUALISING GLOBAL FINANCE AND ITS REGULATION 9, 9–13 (Ross P. Buckley, Emilios Avgouleas & Douglas W. Arner eds., 2016).

These data points were collected, however, in an unsystematic, erratic way and many remained with the individual banker. Today, for small clients, relationship banking has been replaced by the "rule of the quants." The costs of traditional relationship banking have become too high for small clients. Institutions can either transfer these costs to clients (by asking them to pay fees) or internalize them. Yet retail clients are reluctant to pay fees, and banks are very reluctant to undertake unprofitable business. The result is that institutions stop offering services to small clients. Financial institutions focus relationship services on large clients with either large volumes, transaction sizes, or portfolios. Small businesses and consumers are left with either standardized services which lack personal support and advice, or are excluded altogether from financial services.

The origins of this development towards one-size-fits-all financial services for individual clients are twofold: transaction costs and risk. As outlined above, both transaction costs and risk will be driven down by TechFins. In particular, the costs for an automated contract are more or less the same regardless of volume. Once automated (and in the absence of costly regulation), it will be the risks associated with the transaction which determine intermediaries' business strategies and decisions.

On the risk side, the big data approach should also drive change. For instance, the general assumption (embedded for instance in the Basel III framework)[104] is that lending to small firms is high risk.[105] While small firms employ most people in most economies, generally speaking, small firms are more likely to fail given their lack of an equity cushion and the ambivalence from both business partners and the state when it comes to keeping the firm alive in troubled times. We may also see a lack of professionalism in management. In turn, we have seen credit extension to small firms reduced to low levels,[106]

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104. *See* BASEL COMM. ON BANKING SUPERVISION, BANK FOR INT'L SETTLEMENTS, BASEL III: A GLOBAL REGULATORY FRAMEWORK FOR MORE RESILIENT BANKS AND BANKING SYSTEMS (2010), https://www.bis.org/publ/bcbs189.pdf.

105. *See, e.g.*, FIN. SYS. INQUIRY, INTERIM REPORT: SMALL- AND MEDIUM-SIZED ENTERPRISES (2014), http://fsi.gov.au/publications/interim-report/03-funding/small-med-enterprises/.

106. *See* EUROPEAN BANKING AUTH., REPORT ON SMES AND SME SUPPORTING FACTOR 65 (2016), https://www.eba.europa.eu/documents/10180/1359456/EBA-Op-2016-04++Report+on+SMEs+and+SME§upporting-ac-

promoting regulatory responses in some countries.[107] In a similar vein, credit to consumers is restricted based on rough, broad categories. For instance, retirees may have difficulties getting loans, given that many banks impose age caps on certain loans.[108]

Based on better data sets and data analytics as described above, TechFins may be able to better adjust credit rates to the risk (i.e. the client) at hand, and "re-personalize" the financial relationship via algorithms. Data-based finance could be simultaneously more personal and more inclusive: more attuned to individuals' real risk profiles (if the data-based methodology is sound, which of course is a sizable "if"), and more inclusive given that it could affordably provide "personalized" financial services at a much lower cost per client.[109]

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tor.pdf ("Following the financial crisis, SME bank lending has suffered a significant backdrop in volume, from a peak of _95 billion in mid-2008 to approximately _54 billion in 2013/2014.").

107. European legislature added to the European legislation implementing Basel III, the Capital Requirements Regulation (EU) No. 575/2013, a SME Supporting Factor, by introducing a deduction in capital requirements for exposures to SMEs by applying the SME SF of 0.7619 to capital requirements calculated under the Basel III accord. *See* EUROPEAN BANKING AUTH., *supra* note 106, at 66–74.

108. *See* Sophie Elsworth, *Older Australians into Their Eighties Approved for Home Loans*, NEWS.COM.AU (Apr. 24, 2015, 6:03 PM), http://www.news.com.au/finance/older-australians-into-their-eighties-approved-for-home-loans/news-story/9fd4e014da30760dc3a93916e58aca75 (citing RateCity's database stating that the number of lenders with *no* maximum age restriction has fallen from 88 per cent last year to 76 per cent this year, and citing the Australian Bankers' Association's chief executive officer Steven Munchenberg emphasizing responsibility lending restrictions apply before approving loans to customers to ensure they can meet repayments, with serviceability being a key consideration); *Lending Guidelines*, GUARANTOR HOME LOAN, http://www.guarantorhomeloan.com.au/lending-guidelines (last visited Apr. 20, 2017); Lorna Bourke, *Too Old for a Mortgage*, CITYWIRE ASIA (June 9, 2010), http://citywireasia.com/news/too-old-for-a-mortgage/a403797?section=money. *Contra* Esther Shaw, *Mortgage Lenders Lift Upper Limits to Help Solve an Age-Old Problem*, GUARDIAN (Oct. 17, 2016), https://www.theguardian.com/money/2016/oct/17/mortgage-lenders-lift-upper-age-limits-solve-problem (discussing some mortgage lenders in the United Kingdom and United States); Marcie Geffner, *You're Never Too Old for a Mortgage*, BANKRATE (Aug. 22, 2011), http://www.bankrate.com/finance/mortgages/never-old-mortgage-1.aspx.

109. However if a TechFin were to only focus on a too-narrow subset of the customer base (i.e. retired people, thin credit files) it may over-expose itself to the risk of that specific demographic in case of a change not cap-

This rationale of big data finance underlies Amazon's lending programme to small business sellers and Alipay's consumer loan offerings.[110] We assume that, as with most TechFin businesses, Amazon and Alipay are pursuing a trial-and-error approach, training their algorithms "on the job" rather than looking for a perfect first time approach.[111] While this approach facilitates change, it also provides reason for concern. We discuss this further in Part III.

2. *Developing Countries*

Both aspects discussed above—lower transaction costs and better access to risk-related data—also explain the remarkable tech-based financial inclusion prompted by TechFins in developing countries, such as through M-PESA and M-KESHO.[112] While the details are beyond the focus of this Article,[113] we note that technology tried and proven in an environment of (more or less) weak public institutions should also work in Western countries. Examples include the pure mobile phone-based M-PESA operations offered in societies where a large

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tured in the algorithm. Regulators would consider this a concentration risk and may require higher capital to be set aside to reflect the non-diversify nature of the loan-book.

110. Nandita Bose, Thomson Reuters, *Amazon Is Going To Start Offering Business Loans to Sellers in China*, BUSINESS INSIDER (June 29, 2015, 2:04 AM), http://www.businessinsider.com/r-exclusive-amazon-to-offer-loans-to-sellers-in-china-7-other-countries-2015-6?IR=T.

111. For example, Amazon has stopped its loan program targeting students after only 6 weeks of operation. *See* Shahien Nasiripour, *Amazon and Wells Fargo Terminate Student Loan Partnership*, BLOOMBERG (Aug. 31, 2016, 4:10 PM), https://www.bloomberg.com/news/articles/2016-08-31/amazon-and-wells-fargo-terminate-student-loan-partnership.

112. *See* AFRICAN DEVELOPMENT BANK GROUP, FINANCIAL INCLUSION AND INTEGRATION THROUGH MOBILE PAYMENTS AND TRANSFER (2012); *M-KESHO in Kenya: A New Step for M-PESA and Mobile Banking*, FIN. ACCESS INITIATIVE: BLOG (May 27, 2010), http://www.financialaccess.org/blog/2015/7/16/m-kesho-in-kenya-a-new-step-for-m-pesa-and-mobile-banking.

113. *See generally* Ross P. Buckley & Sarah Webster, *FinTech in Developing Countries: Charting New Customer Journeys*, CAPCO INST. J. FIN. TRANSFORMATION, Nov. 2016, at 151, 151–59; Ross Buckley, Jonathan Greenacre & Louise Malady, *The Regulation of Mobile Money in Malawi*, 14 WASH U. GLOBAL STUD. L. REV. 435 (2015); DIRK A. ZETZSCHE, ROSS P. BUCKLEY & DOUGLAS W. ARNER, DIGITAL INCLUSIVE FINANCE (forthcoming 2017).

share of the population cannot read and write.[114] While we note that the costs of these services reflect the less-competitive environment in which they operate, by advancing financial inclusion these TechFins provide a valuable contribution by allowing a far broader range of people to enjoy the benefits of access to financial services.

## III.
## Financial Law and Regulation Challenges

As a result of their continuing evolution, TechFins create a number of challenges for both society and regulators alike. The impact of artificial intelligence and data analytics on individuals and the financial system is uncertain and, from a financial regulatory perspective, a potential source of risk.

### A. *Systemic Issues*

#### 1. *False Predictions*

Data correlations, if not tested for causation, raise the risk of false predictions.[115] If the algorithm is wrong at a systematic level,[116] the data advantage of TechFin firms may be at risk. Furthermore, as soon as the TechFin firm has reached a certain size, the insolvency of the TechFin may impair firms linked to it. For instance, if a TechFin provides a website that links its customers to an authorized financial services provider, the bank or financial services firm's prospects may be simultaneously adversely affected with those of the TechFin.

If TechFins were licensed, regulators would seek to mitigate infection risks. The systemic dimension of algorithms is covered by what financial lawyers refer to as "model risk."[117] Financial regulation asks the licensed entity to review its mod-

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114. Janet Kamana, *M-PESA: How Kenya Took the Lead in Mobile Money*, Mobile Transaction (Apr. 7, 2014), https://www.mobiletransaction.org/m-pesa-kenya-the-lead-in-mobile-money/.

115. Hector Zenil, Algorithmic Data Analytics, Small Data Matters and Correlation Versus Causation 16 (2013), Cornell arXiv:1309.1418.

116. *See* Joshua A. Kroll, Joanna Huey, Solon Barocas, Edward W. Felten, Joel R. Reidenberg, David G. Robinson & Harlan Yu, *Accountable Algorithms*, 165 U. Pa. L. Rev. 633, 683 (2017) (analyzing "techniques that formalize fairness" and "constrain the machine learning process so that learned decision rules have specific well-defined fairness properties").

117. Ignacio Crespo, Pankaj Kumar, Peter Noteboom & Marc Taymans, *The Evolution of Model Risk Management*, McKinsey & Company (Feb. 2017),

els regularly and justify model assumptions unique to the authorized firm vis-à-vis the regulator.[118] Furthermore, if TechFins were licensed, regulators would require diversification in order to undo concentration risk. This would counter, for instance, a business model focused on servicing only very narrowly selected parts of society. While the regulation would not be foolproof, some safeguards are installed; so that at least in times of crisis, regulators have some idea as to the origin and underlying activity of the regulated entity.

2. *Protected Factors*

TechFins should be held to standards similar to those to which licensed entities are held, in order to avoid discriminatory practices towards the public. Indeed, within the financial services industry, the law often protects certain values by disallowing discrimination based on certain factors, which we term "protected factors."[119] Yet the efficiency of these stipulations

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http://www.mckinsey.com/business-functions/risk/our-insights/the-evolution-of-model-risk-management,.

118. For instance, for U.S. nationally chartered banks, the OCC's Preopening Examination "may be broad in scope and include an evaluation of the bank's final plans to identify, measure, monitor, and control all relevant risks." OCC, *Comptroller's Licensing Manual: Charters* 47 (Sep. 2016), https://www.occ.treas.gov/publications/publications-by-type/licensing-manuals/charters.pdf. For IT risks, in particular, the bank is subject to the Uniform Rating System for Information Technology (URSIT), designed to uniformly assess financial institution and service provider risks introduced by information technology. *See* OFFICE OF THE COMPTROLLER OF THE CURRENCY, COMPTROLLER'S HANDBOOK: BANK SUPERVISION PROCESS 57 (2007), https://www.occ.gov/publications/publications-by-type/comptrollers-handbook/pub-ch-ep-bsp.pdf; JOINT COMM. OF THE EUROPEAN SUPERVISORY AUTHS., JOINT COMMITTEE DISCUSSION PAPER ON THE USE OF BIG DATA BY FINANCIAL INSTITUTIONS 27–36 (2016) (for Europe).

119. U.S. federal law provides for two fair lending statutes: the Equal Credit Opportunity Act (ECOA), 15 U.S.C. §§ 1691–1691f., and the Fair Housing Act, 42 U.S.C. §§ 3601–3619. Also note that:

> The ECOA prohibits discrimination in any part of a credit transaction. The ECOA applies to any extension of credit, including extensions of credit to persons, small businesses, corporations, partnerships, and trusts. The Fair Housing Act applies to residential real estate-related transactions. Both of these acts prohibit discrimination based on race, color, religion, sex, or national origin. The ECOA also prohibits discrimination based on age, marital status, receipt of public assistance, or the exercise of a right under the Consumer Credit Protection Act. The Fair Housing Act also pro-

may be threatened by data analytics. For instance, if data analytics show a certain race or gender generally has a better credit score, that better score could derive from existing biases against other races or genders. There are also studies arguing that analytics-based booking systems discriminate on the basis of race or other protected factors.[120] Algorithms can certainly discriminate wrongfully against certain groups of people.[121]

Combining this data-led discrimination with automated decisions "may simultaneously systematize and conceal discrimination."[122] The more data analytics substitute for human judgement, the more important it will be to shield protected factors from abuse and enforce anti-discrimination laws, in order to avoid a new type of racial or other profiling which could result in denial of credit and services for certain demographics.[123]

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> hibits discrimination based on disability or familial status. Generally, discrimination in a credit transaction against persons because they are (or are not) members of a group previously categorized violates the ECOA and, if the transaction is related to residential real estate, violates the Fair Housing Act.

OFFICE OF THE COMPTROLLER OF THE CURRENCY, COMPTROLLER'S LICENSING MANUAL 99 (2016), https://www.occ.gov/publications/publications-by-type/licensing-manuals/charters.pdf.

120. *See, e.g.*, Yanbo Ge, Christopher R. Knittel, Don MacKenzie & Stephen Zoepf, *Racial and Gender Discrimination in Transportation Network Companies* (Nat'l Bureau of Econ. Research, Working Paper No. w22776, 2016), https://ssrn.com/abstract=2861708 (explaining that drivers for Uber Technologies Inc. in Boston cancelled rides for men with black-sounding names more than twice as often as for other men and that black people in Seattle using Uber and Lyft Inc. faced notably longer wait times to get paired with drivers than white customers).

121. *See* Sarah Ludwig, *Credit scores in America Perpetuate Racial Injustice. Here's How*, GUARDIAN (Oct. 13, 2015), https://www.theguardian.com/commentisfree/2015/oct/13/your-credit-score-is-racist-heres-why. In the context of TechFin, Uber's algorithm has been qualified as discriminatory. *See* Gillian B. White, *Uber and Lyft Are Failing Black Riders*, ATLANTIC (Oct. 31, 2016), https://www.theatlantic.com/business/archive/2016/10/uber-lyft-and-the-false-promise-of-fair-rides/506000/.

122. Kroll et al., *supra* note 116, at 642, 680 (exploring how algorithms can further discrimination). *See also* Solon Barocas & Andrew D. Selbst, *Big Data's Disparate Impact*, 104 CALIF. L. REV. 671, 677 (2016) ("[D]ata mining holds the potential to unduly discount members of legally protected classes and to place them at systematic relative disadvantage.").

123. *See* Kroll et al., *supra* note 116, at 683 (analyzing "techniques that formalize fairness" and "constrain the machine learning process so that learned decision rules have specific well-defined fairness properties").

While banking and discrimination based on income and wealth go hand in hand, regulators have imposed safeguards to ensure that protected factors are upheld. For instance, in some jurisdictions financial institutions must provide an affordable payments account; in others the institutions are required to serve all parts of society. The way in which protected factors are enforced varies from country to country. However, most efforts attach these duties to entities which meet the traditional definition of a financial services provider—which TechFins will typically only do in the latter stages of their development (discussed above in Part I)—and most of these efforts limit discriminatory decisions taken by individuals. Their applicability to the unforeseen consequences of algorithms and machine learning is as yet very unclear.

### B. *Real Power, Unreal Responsibility*

#### 1. *Denial of Services*

TechFin also makes an impact at the individual level. For instance, let us assume that in fact the people that buy a choker chain (in the example above) do not intend to use it for their own dog but instead intend it as a gift to another. Using the chain as a proxy would result in incorrect pricing of credit or insurance. Algorithms can, of course, be much more sophisticated. For instance, algorithms may also consider whether the same customer purchases dog food and sanitary articles for dogs and is shown on pictures uploaded on social media with dogs as the basis for the conclusion that this purchaser warrants a higher cost of credit or insurance premium.

However, this example can easily be turned around. Let us assume that the housemaid is in charge of purchasing items for the dog, and likes to display pictures of herself walking the dog. The maid would be penalized by the higher premium while the dog owner would not. While on a system-wide basis these statistical outliers will be evened out—there are not many people employing housemaids that use their personal account for job-related shopping—the credit and insurance pricing for those individuals who do will be inaccurate. This is a somewhat trivial example, but it is easy to imagine more severe interference with human lives, perhaps resulting in the denial of credit and service.

Further, we may see non-users suffer from financial and other forms of exclusion. This also means that in a data-driven world, opting to not share personal data may make you de facto a second class, digital citizen: the best products, prices and opportunities will only be provided to those consenting to share their data with the predictive algorithm of the TechFin.

If big data applications are used for background checks, the front-end interactions could rectify the problem. If big data is used at the front-end, however, rectification will be unavailable given the data-driven approach of the TechFin business model: the factors considered for calculating the premium will not be revealed and there will be no one to whom clients can turn for a remedy. TechFins could accordingly substantially impact people and yet bear little responsibility for that impact; with little recourse available to customers.

If TechFins were licensed, these problems would be mitigated. The impact of business decisions on clients is covered by a multitude of customer, client and investor protection laws which require, at minimum, (a) transparency of terms, and (b) a contact point for recourse and customer complaints.[124] And last, but not least, a regulator will be on standby, ready to step in to protect the consumer and punish the TechFin.[125] While these solutions are far from perfect, financial regulation

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124. *See* JOINT COMM. OF THE EUROPEAN SUPERVISORY AUTHS., *supra* note 118, at 27–36.

125. To help protect consumers and punish the TechFin, the OCC runs HelpWithMyBank.gov, ensuring easy access to the regulators. *See Consumer Protection*, OFFICE OF THE COMPTROLLER OF THE CURRENCY, https://www.occ.gov/topics/consumer-protection/index-consumer-protection.html (last visited Nov. 17, 2017) ("Ensuring fair access and equal treatment to national bank customers is a fundamental part of the OCC's mission. OCC bank examiners evaluate compliance with consumer laws and regulations, and the agency takes enforcement actions when necessary. OCC customer service representatives assist national bank customers with questions and complaints, and the agency provides advisories and public service announcements to help consumers understand their rights, banking rules, and the risks associated with products and practices."). The mandate of European financial regulators has been broadened recently to include consumer protection, prompting the European Banking Authority (EBA) to issue a number of standards in this field. *See Consumer Protection and Financial Innovation*, EUROPEAN BANKING AUTHORITY, https://www.eba.europa.eu/regulation-and-policy/consumer-protection-and-financial-innovation (last visited Nov. 17, 2017).

can provide some safeguards, particularly for vulnerable consumers.

2. *Pay for Display*

Given that TechFins may dominate the front-end customer relationship and their marketing-fee driven business models, "pay for display" schemes often predominate rather than selection of services or products for display based on quality or price. For instance, in many countries, the paid announcements in Google's search function dominate the top positions. We can expect that similar priorities exist in other TechFin models which are seemingly provided for free to customers, although their customers are in fact paying a price of sorts by providing commercial firms with both access to, and data about, themselves. Linking this tech-based strategy with financial services creates serious concerns for consumer choice and market efficiency.

For instance, imagine a TechFin presenting its investment fund selection based on the fees the fund pays to the TechFin rather than on merits or customer demand (as determined by big data analytics) or of social media data being used to target less educated and financially un-savvy people for high-cost predatory loans and risky financial products.[126] Financial regulation is designed to mitigate such abuses. For instance, the issues associated with shelf fees for mutual funds in the United States are well known and have prompted regulatory responses (including mandatory disclosure and outright bans),[127] while in the EU financial services firms must disclose whether their preselection of financial products is independent and neutral (as opposed to dependent and potentially biased by kickbacks

126. For example, Facebook data could allow people to target ads on the basis of the sexual orientation of people, without their consent to reveal it. *See* Miguel Helft, *Marketers Can Glean Private Data on Facebook*, N.Y. TIMES (Oct. 22, 2010), http://www.nytimes.com/2010/10/23/technology/23facebook.html.

127. See JOEL SELIGMAN, THE TRANSFORMATION OF WALL STREET: A HISTORY OF THE SECURITIES AND EXCHANGE COMMISSION AND MODERN CORPORATE FINANCE (3rd ed. 2003) for regulations of shelf-fees dating back to the 1970s. *See also* Jason Zweig, *Mutual Fund Fees: A Bad Incentive Fades Away*, WALL ST. J. (Feb. 26, 2016, 10:25 AM), http://blogs.wsj.com/moneybeat/2016/02/26/mutual-fund-fees-a-bad-incentive-fades-away/.

paid from third parties).[128] Fees received by the investment firms must not impair compliance with the investment firm's duty to act honestly, fairly, and professionally in accordance with the best interests of its clients.[129] As for predatory lending, financial law often imposes fair lending policies, and charges regulators with enforcing these duties against lenders.[130] Again, while this financial regulation is not perfect, it does at least seek to counter misbehavior. None of this occurs as yet in the world of unlicensed tech firms.

3. *Fiduciary Status*

The conceptual legal question of whom TechFins owe duties to matters. Financial law assigns to financial advisers, asset managers, and fund managers the status of a fiduciary, which means that all of their business activities must be aligned with the interests of their clients.[131] Similar safeguards will typically be missing for customers, clients and investors when dealing with TechFins in their early stages of development, as at this stage TechFins often only supply data or function merely as conduit between the supply (i.e. financial institutions) and the demand side.

Whether the institution is subject to fiduciary obligations matters. To the same extent that TechFins may tailor products to the customer's needs, data-driven micro-segmentation

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128. *See* Directive 2014/65/EU, art. 24, of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Directive 2002/92/EC and Directive 2011/61/EU, 2014 O.J. (L 173/349) [hereinafter *MiFID II*].

129. *See id.*

130. *See* OFFICE OF THE COMPTROLLER OF THE CURRENCY, *supra* note 118, at 78 ("Each bank that lends has a responsibility to help meet the credit needs of its communities, consistent with safe and sound lending practices, and has an obligation to ensure fair access and equal treatment to all bank customers.").

131. Indeed, the SEC in the United States is currently reviewing if automated investment advisors (or robot-advisors) have a fiduciary duty. *See* Stephen Cohen et al., Dechert LLP, *SEC Staff Issues Guidance Update and Investor Bulletin on "Robo-Advisers"*, JD SUPRA (Mar. 15, 2017), http://www.jdsupra.com/legalnews/sec-staff-issues-guidance-update-and-31449/. Similarly, following the DAO hack, where the structure of a smart-contract was maliciously exploited, there is still debate as to whether or not "code is law." The question is whether the participant legally or wrongfully gained $50 million. *See* Lukas Abegg, Code is Law? Not Quite Yet, CoinDesk (Aug. 27, 2016), http://www.coindesk.com/code-is-law-not-quite-yet/.

could unlock income-generating insights which draw on customer weaknesses. For instance, TechFins can adjust prices upward for customers who are either insensitive to price or unwilling to switch products and providers. While exploitation of brand loyalty, inertia, or ability and willingness to pay more would violate financial law requirements to treat customers fairly, honestly, and in a non-discriminatory manner,[132] the fact that financial law is inapplicable grants TechFins undesirable opportunities.

### C. *Further Issues*

The list of potentially troublesome issues above is not comprehensive. For instance, given the network effects and economies of scale of both information and software markets that underpin TechFins, oligopoly risk is significant, and requires a response from antitrust/competition law. This is because the quality of algorithms fueled by data, as well as access to that data (not the financial licence and its related minimum capital and legal requirements) will operate as the barrier to entry.

Another issue not addressed here relates to the taxation of TechFins. Where are TechFin services to be subject to tax? In addition to traditional tax criteria such as principal office location, people employed and productive operations, alternatives include the location of (1) servers, (2) software design,

132. In the United States, it is the OCC's mission to ensure that national banks and federal savings associations operate in a safe and sound manner, provide fair access to financial services, treat customers fairly, and comply with applicable laws and regulations. See 12 U.S.C. § 1(a) (2012) ("There is established in the Department of the Treasury a bureau to be known as the 'Office of the Comptroller of the Currency' which is charged with assuring the safety and soundness of, and compliance with laws and regulations, fair access to financial services, and fair treatment of customers by, the institutions and other persons subject to its jurisdiction."). For Europe, see JOINT COMM. OF THE EUROPEAN SUPERVISORY AUTHS., *supra* note 118, at 22. In Australia, ASIC was established to perform the function of "monitoring and promoting market integrity and consumer protection in relation to the Australian financial system . . . [and] payments system." S*ecurities and Investments Commission Act 2001* (Cth) s 12A(2)–(3). In Japan, the Financial Services Agency was establish to perform similar functions in "ensuring stability of Japan's financial system, protection of depositors, insurance policyholders and securities investors." Financial Services Agency, FINANCIAL SERVICES AGENCY, http://www.fsa.go.jp/en/about/pamphlet.pdf.

(3) software programming (code writing), (4) clients whose data are gathered, and (5) clients targeted by TechFin algorithms. Further issues stem from data protection: Who owns the data?[133] Is there a "right to be forgotten,"[134] and if so, who can enforce this right and where can it be enforced? We also see issues of contract law, private international law, and civil procedure law: what type of contracts will users and TechFins engage in, which country's laws (i.e. which minimum consumer protection standards) will apply, which courts will have jurisdiction, and how will clients' recourse be ensured?

Finally, the data points TechFins have on a person create a fully commercialized digital identity.[135] Who owns the property rights in this identity? Is there a right to provide access to one's digital identities to other service providers?

Since this Article focuses on financial regulation (at the conjunction of financial regulation and data management), these questions are left for further research. Suffice it to say, however, that as regulators learn more about the activities of TechFins, they will be able to better respond to the above challenges. Regulators will learn even more if TechFins are regulated; at a minimum by the imposition of reporting requirements.

### D. *Why Do We Care?*

To make a long story short, while financial regulation may address several shortcomings arising from improper use of financial data, TechFins in their early stages of development will often be outside the scope of this regulation. For instance, ex-

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133. *See* Barb Darrow, *The Question of Who Owns the Data is About to Get a Lot Trickier*, FORTUNE (Apr. 6, 2016), http://fortune.com/2016/04/06/who-owns-the-data/; P.H., *The Incorporated Woman*, ECONOMIST: SCHUMPETER BLOG (June 27, 2014), http://www.economist.com/blogs/schumpeter/2014/06/who-owns-your-personal-data.

134. *See* EUROPEAN COMMISSION, FACTSHEET ON THE "RIGHT TO BE FORGOTTEN" RULING, ec.europa.eu/justice/data-protection/files/factsheets/factsheet_data_protection_en.pdf (last visited Apr. 21, 2017); Charles Arthur, *Explaining the 'Right to be Forgotten' – The Newest Cultural Shibboleth*, THE GUARDIAN, May 14, 2014, https://www.theguardian.com/technology/2014/may/14/explainer-right-to-be-forgotten-the-newest-cultural-shibboleth.

135. *See generally* Ian Grayson, *Establishing Digital Identity Causing Problems as Users Giving Away Too Much*, AUSTL. FIN. REV., Oct. 4, 2016, http://www.afr.com/news/special-reports/digital-identity/establishing-digital-identity-causing-problems-as-users-giving-away-too-much-20161003-grtom7.

isting financial laws may provide for exemptions for SME lending on which TechFins could rely. Further, functioning as a mere conduit (a "web page") between clients and financial institutions does not submit the conduit to the laws applicable to financial institutions, even if the institution comes to depend upon the conduit and the collapse of the latter may imperil the former.

Although TechFins control access to clients, they are not subject to the "solicitation," "marketing," or "arranging" rules originally written for those who control access to clients. Further, data delivery to financial institutions is a regulated activity only in some countries, and even in those countries, only under strictly defined conditions typically limited to rating agencies and market data providers.[136] In turn, the shortcomings of TechFin activity may not be addressed, which will leave clients, investors and potentially significant participants in the financial system exposed to the impact and risk of unregulated big data analytics.[137]

Financial intermediaries should be experts in processing financial information so as to channel cash flows to their most efficient use, in terms of expected risk–return ratios. This normative principle is challenged by TechFins. If TechFins have better data than traditional financial institutions, TechFins may provide the financial intermediary function more effectively. However, TechFins, at least today, operate for the most part in an unregulated environment. Until the third stage when they adopt financial services licenses (as discussed above in Part I), TechFins are subject neither to client/customer/

136. For the regulations imposed on credit rating agencies in the United States, see generally Dodd–Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, 124 Stat. 1376 (2010) (requiring form disclosure of data for credit rating agencies). Note recent attempts to modernize data delivery from investment companies to the SEC. *See* Press Release, SEC. & EXCHANGE COMM'N, SEC Adopts Rules to Modernize Information Reported by Funds, Require Liquidity Risk Management Programs and Permit Swing Pricing, https://www.sec.gov/news/pressrelease/2016-215.html. For Europe, see Regulation (EC) No. 1060/2009, of The European Parliament and of The Council of 19 September 2016 on Credit Rating Agencies, 2009 O.J. (L302); *MiFID II*, *supra* note 128 (discussing data reporting providers that govern approved publication arrangements (APA), consolidated tape providers (CTPs) and approved reporting mechanisms (ARMs)).

137. Our concerns are shared by the Basel Committee on Banking Supervision. *Sound Practices*, *supra* note 14, at 26.

investor protection rules nor to measures that ensure the functioning of financial markets and prevent the build-up of systemic risk—these being the three pillars of modern financial regulation.[138]

Moreover, from the perspective of licensed intermediaries, TechFins provide unbalanced, and arguably unfair, competition. The fixed costs of an initial license and the ongoing costs of supervision and related reviews by accountants and others will mean licensed intermediaries bear higher costs than unlicensed ones. In the long run, licensed intermediaries are doomed to lose in such a contest, given their higher cost-base and limited flexibility to respond to competitive challenges.

There are three ways to respond. First, we can remove some or all parts of regulation for financial institutions. While there are some aspects of regulation which may be overly burdensome and hinder innovation and arguably should be removed,[139] it is not the purpose of this Article to analyze each and every rule imposed by financial regulation. Moreover, deregulation would not solve the underlying problem as long as *some* regulation remains for financial institutions, and in light of the experience of the Global Financial Crisis, that some regulation will remain is a very likely outcome, even on the most extreme view.

Second, we could consider combining the strengths of financial institutions and TechFins. Potential solutions include, (1) allowing authorized institutions to rely on TechFin data in addition to their own (insourcing rules), and (2) allowing TechFins to acquire licensed institutions under a merger model). However, in the absence of proper regulation, TechFins are unlikely to forego opportunities. As to solution (1), authorized institutions cannot be sure that they will get all, or, in particular, the most valuable, data. As to solution (2), if TechFins are seriously interested in buying authorized entities, depending on the laws of the individual jurisdiction concerned, they may be able to do so, but for the most part they

138. *See* Dirk A. Zetzsche, *Investment Law as Financial Law: From Fund Governance over Market Governance to Stakeholder Governance?*(Center for Business and Corporate Law, Working Paper No. 003, 2013).

139. *See* Dirk A. Zetzsche, Ross P. Buckley & Douglas W. Arner, *FinTech, RegTech and Smart Regulation? Of Deregulation, Leniency, Piloting and Regulatory Sandboxes* (forthcoming 2017).

have so far refrained from such acquisitions, perhaps due to legacy issues and (more likely) due to the negative impact of regulation on their business model. And where they have set up licensed subsidiaries, they have submitted only a tiny fraction of their data to supervision.[140]

Third, we could analyze in detail the areas in which TechFins threaten the fundamentals of financial regulation and ensure that these are safeguarded by some regulatory response to TechFins. This is what we pursue in the remainder of this Article.

### E. *Difference from FinTech?*

From a regulatory point of view, to what extent do TechFins differ from FinTechs? We have seen FinTechs seeking regulatory niches. For instance, crowdlending has relied on the peer-to-peer lending exemption in many European countries,[141] while German crowdfunding platforms initially utilized the fact that certain debt contracts were not deemed "securities" or "deposits" under German law.[142]

TechFins and most FinTechs share the propensity to avoid the regulatory system as long as they can,[143] something they have in common with traditional financial sector participants as well, as witnessed in the context of "shadow banking" and regulatory arbitrage to minimize regulatory constraints and costs. TechFins and FinTechs are different animals, however. In particular, we see two main differences between TechFins and FinTechs in the form of the client/investor dimension and the systemic risk dimension of regulation discussed above.

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140. *See supra* Part II.

141. FIN. CONDUCT AUTH., A REVIEW OF THE REGULATORY REGIME FOR CROWDFUNDING AND THE PROMOTION OF NON-READILY REALISABLE SECURITIES BY OTHER MEDIA (2015), https://www.fca.org.uk/publication/thematic-reviews/crowdfunding-review.pdf.

142. For Australia, see Leigh Schultz & Domenic Mollica, *The regulation of crowdfunding in Australia: where are we and what's to come?*, AUSTL. BANKING & FIN. L. BULL. (2015).

143. Larry D. Wall, *Avoiding Regulation: FinTech versus the Sharing Economy*, FED. RESERVE BANK OF ATLANTA (Sept. 2016), https://frbatlanta.org/cenfis/publications/notesfromthevault/09-avoiding-regulation-fintech-versus-the-sharing-economy-2016-09-29.

First, as to the client protection dimension of financial regulation: the first and foremost asset of financial services providers is their clients' trust. Without trust, clients will not place their money with the provider.[144] TechFins start with the client relationship and then add the financial dimension. TechFins create trust in a world unrelated to financial services and then leverage this trust in the financial sphere. Due to the fact that the trust is created in a non-financial setting, clients may be less cautious when exposed to the TechFin's additional financial services. The fact that a client has experience with the technology or e-commerce services of a TechFin and is comfortable with these services provides the basis for the transition into financial services.[145] Even more so, due to the TechFin's grip on its client data, the TechFin may select clients on the basis of loyalty and comfort with data-driven contact, and build their business from there.

Second, as to the systemic risk dimension: size creates systemic risk.[146] FinTechs as problem-driven firms, and though they aim to grow large, they tend to start small.[147] As such, indirect regulation by licensed entities may suffice to address systemic risks.[148] In contrast, TechFins are often very significant firms outside of financial services prior to stepping into the financial sector. Due to their sheer size, TechFins are connected to many institutions from the moment they enter stage 1, such as when the TechFin functions as a conduit to licensed institutions. Moreover, due to their data power, TechFins exercise influence over connected financial institutions from the

144. Torben Hansen, *Understanding Trust in Financial Services: The Influence of Financial Healthiness Knowledge, and Satisfaction*, 15 J. SERVICE RES. 280, 280 (2012); Katherine Tyler & Edmund Stanley, *The Role of Trust in Financial Services Business Relationships*, 21 J. SERVICES MKTG. 334 (2007).

145. See *supra* note 69 on changing perceptions of trust.

146. Luc Laeven, Lev Ratnovski & Hui Tong, *Bank Size and Systemic Risk*, IMF STAFF DISCUSSION NOTE (May 2014), https://www.imf.org/external/pubs/ft/sdn/2014/sdn1404.pdf.

147. Daniel Drummer et al., *Fintech: Challenges and Opportunities*, MCKINSEY & CO. (May 2016), https://www.mckinsey.de/files/160525_fintech_english.pdf.

148. *See generally The Evolving Fintech Regulatory Environment,* DELOITTE, https://www2.deloitte.com/content/dam/Deloitte/us/Documents/regulatory/us-aers-the-evolving-fintech-regulatory-environment.pdf (last visited Apr. 21, 2017).

moment they enter stage 1, and often tend to control whole market segments when entering stage 3.

The result of trust and control over important market participants in financial services being placed in the hands of the few has led to major financial crises. As examples, we point to the early-2000s accounting frauds[149] and the infamous role of rating agencies[150] and systemically important financial institutions (SIFIs) in the Global Financial Crisis.[151] Note that accounting firms and rating agencies are mere data providers linked to the system (like TechFins in stage 1), while SIFIs are typically very large (like TechFins in stage 3).[152] Both types are strictly regulated today.[153] The more TechFins move into financial services, the more it will be necessary to consider how to protect society from their failures—in terms of both service quality and financial stability.

## IV.
## Policy Considerations

Many businesses today do not want to be financial institutions because of the associated regulatory burdens,[154] but do want to tap into financial institution profits. Put simply, in the

149. *See, e.g.*, Sean Farrell, *The World's Biggest Accounting Scandals*, The Guardian (July 22, 2015), https://www.theguardian.com/business/2015/jul/21/the-worlds-biggest-accounting-scandals-toshiba-enron-olympus; C. William Thomas, *The Rise and Fall of Enron*, J. Acct. (Apr. 1, 2002), http://www.journalofaccountancy.com/issues/2002/apr/theriseandfallofenron.html.

150. Amanda J. Bahena, *What Role Did Credit Rating Agencies Play in the Credit Crisis?* (Mar. 2010), www.colorado.edu/AmStudies/lewis/ecology/rolecreditagencies.pdf.

151. *Too-Big-to-Fail and Moral Hazard*, Fin. Sys. Inquiry (Dec. 7, 2014), http://fsi.gov.au/publications/interim-report/05-stability/too-big-to-fail/.

152. *See* Mustafa Yuksel, *Identifying Global Systemically Important Financial Institutions*, Res. Bank of Austl. Bull., Dec. 2014, at 63, https://www.rba.gov.au/publications/bulletin/2014/dec/pdf/bu-1214-8.pdf.

153. *See, e.g.*, Siegfried Utzig, *The Financial Crisis and the Regulation of Credit Rating Agencies: A European Banking Perspective* (ADBI Working Paper Series No. 188, 2010), https://www.adb.org/sites/default/files/publication/156043/adbi-wp188.pdf.

154. *See* Robert M. Adams & Jacob Gramlich, *Where Are All the New Banks? The Role of Regulatory Burden in New Bank Formation*, 48 Rev. Indus. Org.181(2016); Sean M. Hoskins & Marc Lebonte, An Analysis of the Regulatory Burden on Small Banks (2015), https://fas.org/sgp/crs/misc/R43999.pdf.

present regulatory environment, Techfins often will not "pay" for the concerns and risks they generate. They will not suffer from reduced business space within which to operate due to regulation, nor will they have to pay regulatory fees, and, frankly, will often also manage to avoid national taxes. Nonetheless, TechFins may increasingly aim to take the most attractive and easily accessible portions of financial services business. Our concern is not for the banks' well-being: as market actors they need to face market realities and adapt to competition provided by technology. However, if the competition from these unregulated entities destabilizes the *regulated* financial institutions, the rise of TechFins may well reduce client protection and promote systemic risks. *This* is our concern.

### A. *Costs of Doing Nothing*

We have already defined as a core issue that TechFins in their early stages do not meet the definition of financial activity, or whether they are financial institutions as opposed to mere data providers is at least unclear.

If we do nothing, the uneven playing field will persist—authorized intermediaries will lose business, the level of compliance will be gradually undermined, and the role of enforcement agencies will be weakened as their mandates will be too narrow. Potential systemic risk may build up unobserved, unmitigated and uncontrolled, and, looking longer-term, the next global financial crisis may well come from TechFins rather than from authorized financial institutions.

This poses a significant risk to society. There is already some evidence for the systemic dimension of TechFins. We have already mentioned the example of Yu'e Bao becoming the fourth largest money market fund in the world within one year (and the largest within four years), leading to a hasty response from Chinese regulators.[155] There are other examples: when Amazon's cloud computing data center in Hong Kong failed, the SEC's website, as well as many consumer oriented services (e.g., NetFlix) went down.[156] And we can safely assume the systemic importance of Amazon and Alibaba in their SME

155. *See supra* Part II.

156. Elaine Ou, *Can't Stream Netflix: The Cloud May Be to Blame*, BLOOMBERG VIEW (Mar. 2, 2017, 8:00 AM), https://www.bloomberg.com/view/articles/2017-03-02/can-t-stream-netflix-the-cloud-may-be-to-blame.

niche markets and M-PESA for consumers in some African countries,[157] so that the TechFins' existence is a precondition for the well-being of many individuals and enterprises in those countries.

One could respond that the early stage TechFin conduit function is merely one of data delivery, which is not a special activity warranting regulation. Yet data provision in a highly concentrated market has prompted regulators to require financial institutions to diversify their data sources. The difference with TechFins is that for them, data delivery is a back-end function, while they also provide front-end, overlay services to the financial institutions (as discussed above in Part I). TechFins' conduit function cannot be addressed by diversification requirements since the financial institution cannot change the "service provider" as readily as it can a back-end relationship: terminating the cooperation with the TechFin would cost the financial institution the link to its most precious asset: its clients.

### B. *Costs of Catch-All Mandatory Licensing*

On the other hand, catch-all mandatory licensing for data analytics is likely to stifle innovation. We have highlighted the potential social benefits of TechFin. TechFin has the ability to fill gaps in the provision of financial services, such as Ant Financial's targeting of Tier 2 cities and the provision of SME finance, an area in which the traditional Chinese financial services industry has performed poorly (which is one of the motivations for initially light regulation of TechFin activities in China),[158] so regulators would be ill-advised to interfere too early. The same is true for the examples of mobile money providers such as M-PESA, which although far from being perfect have delivered valuable financial inclusion to the neglected rural parts of the Global South.

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157. *See, e.g.*, Kiarie Njoroge, *Report: This is What Would Happen to Kenya's Economy If M-Pesa Was to Collapse*, NAIROBI NEWS (Nov. 30, 2016), http://nairobinews.nation.co.ke/news/treasury-report-reveals-fears-m-pesas-critical-role-economy/; Frank Jacob, *The Role of M-Pesa in Kenya's Economic and Political Development*, *in* KENYA AFTER 50, RECONFIGURING EDUCATION, GENDER, AND POLICY 89 (Mickie Mwanzia Koster et al. eds., 2016).

158. *See* Douglas W. Arner & Jànos Barberis, *FinTech in China: From The Shadows*, J. FIN. PERSP., Winter 2015, at 78, 83.

### C. *Other Regulatory Options*

#### 1. *Stretching Existing Definitions*

We could make rules made for the analog era fit by stretching existing definitions, such as "solicitation," "marketing" and "arranging." Regulators pursuing this path, however, will face protracted court cases. They may win some cases, but uncertainty will prevail for years. Moreover, a general stretching of definitions may prove overly burdensome for innovative firms and stifle innovation. For instance, if we re-read "solicitation" etc. to include websites, regulation could extend to include all website providers. In turn, to the extent we discuss stretching definitions we would need to discuss exemptions, as otherwise enforcement will be impossible (too many to supervise) or powerless. However, the established reference mechanisms for carve outs (assets on the balance sheets, under management, etc.) do not fit, so an entirely new approach would be required to tackle TechFin issues.

A variant of this approach lies in delegation rules.[159] This hints at the core of the underlying problem which is that the legal nature of the relationship between conduit (TechFin) and intermediary is uncertain. If it was a service agreement, delegation rules might apply and indirect supervision could be presented as solution. However, in a delegation relationship the control is vested in the delegating entity rather than the delegate (as it should be). As such, the rules on delegation would seem unfit to deal with TechFins, where the control often lies in the Big Data entity.

#### 2. *Private Law Alternatives*

As a private law alternative we could consider imposing joint liability for damages on the back-end financial institution and the TechFin at the front-end. This is similarly insufficient. First, private law disregards the systemic risk dimension. Second, the segments of society financial law seeks to protect are particularly vulnerable, but non-litigious: the poor rarely sue. Moreover, in the absence of additional legislation, plaintiffs

159. *Cf. Sound Practices*, *supra* note 14, at 32 (recommending that banks should have appropriate processes for outsourced operations, including FinTech firms, and asking the banks to outline the responsibilities and to maintain controls for outsourced services).

face significant challenges in court, given the difficulties of gathering evidence and the costs of civil procedure. If we legislate, however, we best get it right.

3. *Open Data Policy?*

Proponents of open data might suggest that one way of dealing with TechFins is to reduce the value of data by providing access to the data to everyone, so that all entities could build algorithms. However, this solves only one side of the problem: data access. Other aspects of the problem remain unsolved. First, the algorithms used may well be profoundly misleading and harm protected factors. Second, the creation of an open data world itself runs into legal barriers such as data protection issues and would, if it ever happens, take years.

4. *Fight Fire with Fire: Independent Data Banks*

Another market-based solution is reliance on Data Banks. These would act as data repositories that are controlled by end users instead of the FinTech or the TechFin. This would support the current move towards data sovereignty and digital identity. The user would grant various access rights to their data depending on the products or service sought. The selected provider would then adjust their offered services based on the user's issued data and the proprietary algorithm of the firm. The customer could then better compare providers and which products & services are the most competitive. However, this model still suffers from initial data collection and certification as well as differentiation between data ownership and control. Additionally, the market price for raw data creates little economic incentives for customers to care about data sovereignty. Finally, the reprivatization of data which underlies this concept requires a cross-border data access regime which will require years of coordination among regulators across the globe to create, and which is thus unlikely to come in the next decade with which we are concerned. We thus argue in favor of a moderate regulatory intervention.

### D. *A Balanced Risk Analysis*

A balanced risk analysis follows the evolution of any business from (1) too small to care, to (2) too large to ignore, and

then to (3) too big to fail ("TBTF").[160] As TechFins often do not seek access to client funds directly, many established financial regulatory thresholds will fail to be triggered by their entrance onto the financial services scene. Yet TechFins can be much more influential than they would seem. In order to set appropriate thresholds, regulators must develop new criteria. These could include an overall number of data points, or holding data on a significant share of a population in the reference market, as both figures reflect a substantial data set.

From there, traditional risk analysis would look at both the systemic and client perspectives. Systemic risk measures should apply as soon as TechFins become essential to financial stability. Whether this is the case depends on the TBTF or too complex to fail ("TCTF") tests. If a TechFin is an essential facility for one important bank (e.g., it is the bank's main data analytics provider), we could apply an infrastructure analogy and require diversification of data delivery channels. This is, however, old news, given the analogies provided by rating service agencies. If the TechFin is, however, the main client channel for one important bank or for many banks which together are of systemic importance, we would rather compare the TechFin to the importance of a new CEO and a new business model rather than to infrastructure. To the same extent that a new bank CEO and other key staff would be subject to regulatory scrutiny, we would ask the TechFin to meet the "fit and proper" requirement, and ask for adequate resources to maintain that function on the part of the TechFin. This is where the systemic risk perspective indicates a case for regulation of TechFin.

The need for regulation is confirmed when looking at the customer/client/investor protection dimension: if TechFins can impact individuals, regulators should care. However, regulation cannot correct all faults in a society—it can only focus on the important ones. Thus, once the impact of the TechFin passes a certain threshold, regulators should step in in order to ensure appropriate gathering and processing of client data.

160. *See* Arner, Barberis & Buckley, *supra* note 17.

## E. *Towards a Middle Ground*

### 1. *Licensing Requirement for Data Gathering and Analytics*

It follows from the above that regulators should require authorization for data gathering and analytics when used for financial services, either directly as a financial services provider, or indirectly as a conduit for data delivery or access to customers. This policy proposal is subject to some qualifications.

We recommend first to impose information rights for regulators linked to data gathering and analytics only. In order to support enforcement, the TechFin should be asked to declare its jurisdictional scope by reporting (upon market entry as well as periodically thereafter) on: (a) its data gathering, (b) the location of its clients, and (c) its data delivery (if any) to intermediaries. If a TechFin refuses to cooperate by declining to disclose its jurisdictional scope, regulators could enforce their laws by imposing a variant of geoblocking called "datablocking" (i.e. no data from that jurisdiction may be used).

In order to exempt most insignificant business, in terms of data gathering and data analytics, a generous exemption threshold is in order. For instance, if a deep data analysis on a single person amounts to 25,000 data points,[161] a company that processes the data of 400,000 people in a deep fashion (i.e. manages 10 billion data points) in one market may be unlikely to generate systemic risk (unless the market is tiny). So "ordinary" firms could be given the choice of generating and analyzing fewer client specific data points for more than 400,000 clients, or over 25,000 data points on correspondingly fewer than 400,000 clients. This threshold should exclude almost all non-data businesses, although obviously this is only an example and these figures would have to be adjusted to market size.[162]

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161. Note that this figure is taken arbitrarily. It is inspired by Jack Ma's statement on how much data Alibaba generates on one single customer. The real number may be higher or lower, respectively. The figures in our example would then be adjusted accordingly.

162. For instance, thresholds appropriate for tiny Luxembourg or Liechtenstein are unfit for giant China. However, given that both Luxembourg or Liechtenstein are part of the European Single Market, a market definition including all EU/EEA countries is suitable.

Once the TechFin reaches a certain size that indicates it is reaching the "too large to ignore" threshold, regulators should have access to the TechFin's data-based business models and algorithms in order to ensure sound methods and adherence to protected factors relevant to that reference market. For instance, regulators should be empowered to require data analytics to demonstrate process regularity, including the upholding of protected factors, and to review the specifications underlying the algorithms as well as the commitments embedded in its code.[163] In addition to enforcing fair treatment and protected factors for TechFins above this threshold, the review requirement will assist in reducing undue processes in subthreshold TechFins. In light of the expectation that successful firms will be subject to a process regularity review, venture capitalists and other institutional investors will require evidence for process regularity prior to financing TechFins.

Once regulators come to the conclusion that the TechFin is of systemic importance (for instance, since TechFin data is essential for a systemically significant financial institution, or since the TechFin provides the main client access for several financial institutions which together are of systemic significance), we recommend measures to control and limit the systemic risk posed. In the first case, this could require the significant financial institution to diversify its data sources. In the second case, we recommend (a) structural requirements for TechFins (quarantine provisions as to "Fin" with respect to entity, IT, capital; minimum capital for maintenance and cleanup; and country-by-country segregation of activities) and (b) empowering regulators to shut down the activity (while preserving customer data), or to appoint a commissioner to run the quarantined TechFin part of the business in the public interest.

2. *Impact on FinTech?*

In addition to regulating TechFins, our proposed approaches could affect some FinTech firms. We note, however,

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163. Computer systems review and testing is an art in itself. *See* Joshua A. Kroll et al., *Accountable Algorithms*, 165 U. PA. L. REV. 633 (2017) (suggesting ex ante system design requirements, including commitments, as a precondition of effective systems monitoring). Technology in this field is rapidly evolving, however, and so is regulatory expertise.

that our indicated generous size-based exemption will likely not affect FinTech firms until they have reached a significant size.

If our proposed threshold is passed, a FinTech firm is likely to meet the two requirements set out for TechFins: trust and control. While we are far from arguing that all Fintech firms should be subject to regulation,[164] we see no reason to exempt FinTechs from our authorization requirement. This would be unwieldy given that the line between FinTechs and TechFins is one of perspective rather than content. As a side effect, rendering data-gathering and analytics for financial services subject to licensing would also respond effectively to calls of licensed entities for equal treatment. However, rather than entering a regulatory "arms race" of innovation in which both regulators and society likely to lose given the speed of innovation, our proposal addresses the core of the issue which is the trust and control which a typical TechFin business model entails, and which, if unaddressed, could prove damaging to customers and the financial system.

## CONCLUSION

We need banking but we don't need banks anymore.[165]

Usually (and probably incorrectly) attributed to Bill Gates, 1994.

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164. Such a call would be ill-advised in light of the openness to innovation a financial system requires.

165. Eli M. Noam, Professor of Fin. and Econ., Columbia Bus. Sch., Electronics and the Dim Future of Banks, Address at the Conference on Electronic Banking of the Fujitsu Research Institute (Jan. 1996) (quoting Edward Neumann, Banking's Role in Tomorrow's Payment Systems: Insuring a Role for Banks, Address at the Bankers' Roundtable (June 1994)), http://www.columbia.edu/dlc/wp/citi/citinoam13.html. Bill Gates is frequently cited as having said "[b]anking is necessary, but banks are not." *E.g.*, Dan Schatt, VIRTUAL BANKING: A GUIDE TO INNOVATION AND PARTNERING 55 (2014); Brett King, BANK 3.0: WHY BANKING IS NO LONGER SOMEWHERE YOU GO, BUT SOMETHING YOU DO 56 (2012); Andrew Grant & Gaia Grant, THE INNOVATION RACE: HOW TO CHANGE A CULTURE TO CHANGE THE GAME 14 (2016); Tim Price, INVESTING THROUGH THE LOOKING GLASS: A RATIONAL GUIDE TO IRRATIONAL FINANCIAL MARKETS (2016); Jessica Xiaotong Zhang, *Bill Gates Said That 'Banking Is Necessary, Banks are Not' But Banks Are Still Around Today*, LINKEDIN PULSE (Jan. 4, 2017), https://www.linkedin.com/pulse/bill-gates-said-banking-necessary-banks-still-around-today-zhang; Ravi Venkatesan, *Banking is Necessary. Banks are not*, LINKEDIN PULSE (Feb. 14, 2016), https://www.linkedin.com/pulse/banking-necessary-banks-ravi-venkatesan; R. Gandhi, Deputy Governor, Res. Bank of India, Valedictory

In the same way Andreesen suggests that technology has now caught up to its potential in the internet context, much the same may now be said about technology and finance. Whether Bill Gates ever said words to the effect of those above, whoever did first say them was certainly ahead of their time in the 1990s.[166] Today technological reality has perhaps caught up to their vision. As we have suggested throughout this Article, TechFin may be the single most important development in financial services going forward, as digitization enables datafication.[167]

First, TechFins are not simply a progression of FinTechs but instead represent a brand new type of market participant. They have their origin in Tech or e-commerce environments which are typically connected to a multitude of clients (both consumers and/or small businesses) and a very deep well of data. As TechFins reach a significant size, they have often already established an international network and gathered a very meaningful dataset. This data gives them a real advantage in the provision of financial services. TechFins may first enter the world of finance by providing their data, either raw or processed, to established financial services firms and/or FinTech startups, but over time the likelihood is that many will start providing financial services directly to their customers.

Second, TechFins may be able to provide far more efficient financial services for society. In particular, they may reduce transaction costs and improve decision-making by using or providing a more comprehensive dataset than that to which established financial intermediaries have access. Both advantages together could result in an increased level of financial

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Speech at the FIBAC 2016 "New Horizons in Indian Banking" Conference (Aug. 17, 2016), http://www.bis.org/review/r160822b.htm.

166. *See* Amy Cortese & Kelley Holland, *Bill Gates Is Rattling the Teller's Window*, BLOOMBERG (Oct. 31, 1994, 12:00 AM), https://www.bloomberg.com/news/articles/1994-10-30/bill-gates-is-rattling-the-tellers-window. *See also* Bill Gates & Melinda Gates, *2015 Gates Annual Letter: Our Big Bet for the Future*, GATESNOTES 16–19, https://al2015.gatesnotesazure.com/assets/media/documents/2015_Gates_Annual_Letter_EN.pdf.

167. *The Impact of Datafication on Strategic Landscapes*, ERICSSON 4-6, https://www.ericsson.com/res/docs/2014/the-impact-of-datafication-on-strategic-landscapes.pdf (last visited Apr. 21, 2017). *See also* VIKTOR MAYER-SCHONBERGER & KENNETH CUKIER, BIG DATA: A REVOLUTION THAT WILL TRANSFORM HOW WE LIVE, WORK AND THINK (2014).

inclusion for SMEs, consumers and the underprivileged in both developed and developing parts of the world.

Third, established thresholds for the imposition of financial regulation such as the solicitation of customers, deposit-taking, pooling of assets, or discretion over client assets may often fail to subject TechFins to regulation. In turn, regulators will be unable to enforce customer protection measures and to monitor and mitigate systemic risk. Moreover, protected factors in society may often be put at risk, at times unwittingly, by TechFins.

Fourth, if financial regulation matters in furthering market efficiency[168] and customer protection,[169] TechFins should be subjected to it when offering financial services. Moreover, TechFins will provide uneven competition to established licensed intermediaries if they are both unrestricted by risk and compliance considerations in the build-up phase of their business model, and they do not bear the minimum costs of a regulated entity in terms of compliance and capital costs.

Fifth, in the world of TechFin, most customers give their data away for free, looking for some side service, so "following the money" (as traditional financial law does) is likely to fail. "Following the data" may provide an alternative, however. This alternative is not a mere policy choice, it is a necessity in a world where the value of data exceeds the value of traditional production if measured by market valuation. In a world where data is the new currency and where special legislation regulates intermediaries managing financial assets owed to and owned by others (as banks and asset managers do), it is a pressing need to adequately regulate "data intermediaries" in addition to financial intermediaries given that both pose similar risk to individuals and society.

Regulators should consider defining financial data gathering and analytics as a regulated activity, if the activity exceeds certain size thresholds. A threshold set as coverage of a percentage (perhaps 1–5%) of the overall population in the refer-

168. *See* Randall Dodd, *The Economic Rationale for Financial Market Regulation*, FIN. POL'Y FORUM DERIVATIVES STUDY CTR. (Dec. 2002), www.financialpolicy.org/fpfspr12.pdf.

169. *See Consumer Protection Framework in Financial Services*, FIN. SYS. INQUIRY, http://fsi.gov.au/publications/interim-report/06-consumer-outcomes/consumer-protection-framework-in-financial-services/ (last visited Apr, 21, 2017).

ence market may reflect the segregating line between "too small to care" and "too large to ignore." Above this threshold, TechFin regulation should focus on information gathering and ensuring regulatory access to data-based business models in order to ensure sound analytical methods and adherence to protected factors relevant to that reference market. If the risk analysis arising from the regulatory inquiry reveals systemic risk—for instance, because TechFin data is essential for one significant financial institution, or because the TechFin provides the main client access for several financial institutions which together are of systemic relevance—systemic risk prevention measures should apply.