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Rethinking the Regulatory Sandbox for Financial Innovation: An Assessment of the UK and Singapore

Christopher Chen

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Abstract: After the UK launched the first regulatory sandbox regime in 2016, the approach was quickly transplanted to numerous other countries as a means of promoting innovation, improving competition and enhancing financial inclusion. However, it remains unclear whether the approach can effectively achieve the relevant policy goals and thus justify the differential regulatory treatment. This chapter provides a broad overview of the regulatory sandbox regime and examines its potential benefits and problems. The chapter then provides some empirical evidence by analyzing the sandboxes awarded in the UK and Singapore between 2016 and 2018 with the aim of identifying what the businesses awarded the sandboxes are doing, the services they provide and their current regulatory status against the backdrop of the financial technology revolution. These cases provide a basis on which to assess the effectiveness of the regulatory sandbox approach in its infancy stage and provide some reflections for regulators.

Keywords: Financial technology, Fintech, Regulatory sandbox, Financial innovation, Financial regulation

1 Introduction

This chapter examines the use of regulatory sandboxes as a tool for promoting a variety of policy objectives, such as increased innovation and greater financial inclusion, amid the rise of fintech in a sector marked by intensive regulation. In addition, we examine whether the regulatory sandbox approach has effectively achieved the relevant policy goals. In other words, can the sandbox regime justifiably provide temporary regulatory exemptions for the sake of promoting new technological applications in the financial services sector? The chapter seeks to provide an early assessment of the sandbox approach by examining the sandboxes awarded in the UK and Singapore between 2016 and 2018.

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Fintech is a catchword that refers to the use of new technology in the financial industry to complement and potentially address any deficiencies in firms' existing financial services (e.g., peer-to-peer lending/borrowing for individuals who might not have a good credit score). The phenomenon appears in all corners of the financial market ranging from banking-related services (e.g., peer-to-peer lending and cross-border payments) and insurance (e.g., insurance services with smart contract and automated payment features) to fundraising (e.g., crowdfunding and initial coin offerings), capital market operations (e.g., robot financial advice) and even backoffice operations (e.g., the use of blockchain in post-trade settlements and clearing). Although the use of technology is not new in the financial sector (e.g., automatic teller machines),[1] the rapid growth in computing power and the rise of the internet and Big Data have transformed the traditional financial models. In this regard, the use of fintech has helped to revamp many of the traditional financial services (e.g., peerto-peer lending bypassing traditional commercial banks), provide more convenience (e.g., payment via mobile phones), and improve the level of financial inclusion, especially in developing markets and sectors.[2] Some markets have also embraced fintech to maintain or increase the level of competition in the financial sector.

However, the fintech phenomenon has also generated some regulatory concerns and legal risk. Given that a breach of financial regulations will often lead to criminal penalties[3] and/or sometimes result in a firm leaving the market[4] and that the existing regulations already place a heavy burden on financial institutions, there is also a need to balance the needs of the regulated and unregulated entities.[5] First, new financial technologies do not necessarily change the nature of finance and the same old problems may persist. For example, in recent years, many Chinese peer-to-peer lending platforms have been plagued by fraud.[6] Similarly, financial advice based on algorithms may not be immune from human manipulation and money laundering remains an issue as long as firms handle their own cash flows. Thus, regulators certainly have an interest in regulating the use of fintech by licensed financial institutions and the new technology firms that are venturing into financial services.

Second, aside from the issue of whether regulators should regulate fintech, the threshold question remains as to whether a fintech service or product falls within the ambit of the financial regulations in a given market. For example, a practical issue may be whether an issuance of crypto-coins should be deemed as 'securities' in that a prospectus may be required in principle or as a kind of currency or commodity. In these cases, the interpretation and application of the existing regulations may generate some uncertainties for the market participants. A regulator may also be reluctant to issue a clear guidance before understanding the nature of a new fintech service.

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[1] See Arner, Barberis and Buckley (2017), pp. 378 *et seq*.

[2] Jenik and Lauer (2017).

[3] E.g., Banking Act Sect. 4 (Singapore); Banking Ordinance Sect. 11 (Hong Kong).

[4] Some countries might grant regulators the power to liquidate a firm for conducting illegal financial services. E.g., *Digital Satellite Warranty Cover Ltd v Financial Services Authority* [2013] UKSC 7.

[5] Zetzsche et al. (2018), pp. 31–32.

[6] Feng (2018).

These issues have given rise to the idea of the regulatory sandbox. As explained in Sect. 2 below, by some offering short-term exemptions, the sandbox approach can buy some time for regulators, incumbent financial institutions and new technology firms to try out new services with minimal legal risk. This legal certainty can allow firms to apply new innovative technologies and services that might benefit the market and the general public in the long run. However, the fundamental question remains as to whether the sandbox approach has achieved its policy objectives and whether the approach has been over-used. If the latter is true, it is arguable whether the regulatory sandbox approach is still justifiable.

Although it is apparent that the long-term effects of the regulatory sandbox approach and the fintech phenomenon may take some time to emerge, this chapter examines some preliminary empirical evidence on the sandboxes awarded in the UK and Singapore between 2016 and 2018 to provide some early insights into the workings of the regulatory sandbox regime in the fintech era. Rather than revealing whether the sandbox approach is sustainable, our analysis of the existing sandboxes aimstoprovideinsightsintotheearlypracticalapplicationsoftheregulatorysandbox approach.

The remainder of this chapter is organized as follows. In Sect. 2, we provide a general discussion of the regulatory sandbox approach and its pros and cons. Section 3 offers some empirical evidence based on the sandboxes awarded in the UK and Singapore between 2016 and the end of 2018. Based on this empirical evidence, the chapter offers some policy reflections on the implementation of the regulatory sandbox approach. Section 4 concludes the chapter.

2 The Rise of the Regulatory Sandbox

2.1 Regulatory Sandbox in a Nutshell

In general, a regulatory sandbox is a 'framework set up by a financial sector regulator to allow small scale, live testing of innovations by private firms in a controlled environment (operating under a special exemption, allowance, or other limited, timebound exception) under the regulator's supervision.'[7] The sandbox provides 'regulated and unregulated entities with the opportunities to test, pursuant to a testing plan agreed and monitored by a dedicated function of the relevant [regulator], innovative products or services, business models, or delivery

[7] Jenik and Lauer (2017), p. 1.

mechanisms, related to the carrying out of financial services.'[8] The idea refers to 'a regulatory 'safe space' for experimentation with new approaches involving the application of technology to finance.'[9] A regulatory sandbox can create an environment in which businesses can test products with less risk of being punished by the regulator for non-compliance. In addition, the regulators may require applicants to incorporate appropriate safeguards to insulate the market from the risks associated with their innovative business.[10] In this regard, the regulatory sandbox approach represents a kind of 'structured experimentalism' and is one of the four main approaches for dealing with fintech and innovation.[11] Therefore, a 'key tenet in the new regulatory initiatives is regulatory suspension in the test environment.'[12]

The objectives of the regulatory sandbox regime vary depending on the country. A common goal is to promote competitive innovation, market competition and more efficiency in the market.[13] In emerging markets, a major motive may be to promote financial inclusion[14] because sandboxes can 'enable innovations that are likely to benefit excluded and underserved customers.'[15] On the macro level, the sandbox regime is expected to contribute to economic growth[16] or serve to maintain the competitiveness of a market as a financial center.[17] According to a joint report issued by three European regulatory authorities, the objectives of a regulatory sandbox may also include enhancing firms' understanding of the expectations and application of the existing regulatory framework to innovative business models and to increase the regulatory authorities' knowledge of financial innovation.[18]

The sandbox regime was first launched in the UK in December 2015. Since then, the approach has been quickly adopted around the world. One report notes that '[r]egulatory sandboxes have been widely adopted as an innovative regulatory initiative.'[19] This is perhaps the quickest transplantation of a regulatory regime in history. For example, in the Asia Pacific, Singapore, Malaysia, Australia and Thailand all issued their first versions of the regulatory rules regarding regulatory

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[8] ESMA, EBA and EIOPA (2018).

[9] Zetzsche et al. (2018), p. 45.

[10] Zetzsche et al. (2018), p. 64.

[11] Zetzsche et al. (2018), p. 35.

[12] Chiu (2017), p. 747.

[13] Zetzsche et al. (2018), p. 45 and 68; Jenik and Lauer (2017), p. 1.

[14] UNSGSA FinTech Working Group and CCAF (2019), pp. 28–30.

[15] Jenik and Lauer (2017), p. 2.

[16] Zetzsche et al. (2018), p. 68.

[17] E.g., Singapore aims to be a smart financial centre. Monetary Authority of Singapore, Fintech Regulatory Sandbox (Consultation Paper P005-2016) 1.1.

[18] ESMA, EBA and EIOPA (2018), pp. 18–19.

[19] UNSGSA FinTech Working Group and CCAF (2019), p. 7.

sandboxes in 2016.[20] In Northeast Asia, Taiwan and South Korea[21] both passed laws allowing regulatory sandboxes in 2018, after Japan's financial regulator launched the 'FinTech Proof-of-Concept Hub' in 2017.[22] In Hong Kong, the three financial regulators each have their own regulatory sandbox regime, with the Hong Kong Monetary Authority first adopting the policy in September 2016,[23] followed by the securities and insurance regulators in September 2017.[24] Regulatory sandboxes have also been introduced in a variety of European countries, including Spain, France, Germany, Austria, Belgium, Bulgaria, Cyprus and Estonia.[25]

In addition, regulatory sandboxes have been extended to the international level, i.e., as cross-border regulatory sandboxes. For example, the UK's FCA proposed the Global Financial Innovation Network (GFIN) and Global Sandbox in August2018.[26]The GFIN was launched in January 2019 with 25 members at the time of writing.[27]The Monetary Authority of Singapore promoted the ASEAN Financial Innovation Network (AFIN)[28] for Southeast Asia with other stakeholders including the International Finance Corporation (under the World Bank Group), ASEAN Bankers Association and Japan.[29]

Although the regulatory sandbox regimes around the world share some similar features, there are some variations. First, in some countries anyone can apply for a sandbox (e.g., Singapore and the UK), whereas in other countries they are limited to existing financial firms. For example, the Hong Kong Monetary Authority's Fintech Supervisory Sandbox is limited to licensed banks (although they may collaborate with technology firms).[30] Second, in terms of timing, some countries (e.g., Singapore) accept applications on a rolling basis, while others (e.g., the UK) accept and review

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[20] For Malaysia, see Bank Negara Malaysia (2016); For Australia, see Australian Securities & Investment Commission (2017). For Thailand, see Bank of Thailand (2016), pp. 30 and 63.

[21] See the Financial Technology Development and Innovative Experimentation Act (Taiwan), promulgatedon31January2018,andtheSpecialActonPromotionandVitalizationofConvergence of Information and Communications Technology (South Korea), passed on 20 September 2018.

[22] Gehrke (2018).

[23] Hong Kong Monetary Authority on the Fintech Supervisory Sandbox. Available at: https://www.hkma.gov.hk/eng/key-functions/international-financial-centre/fintech-supervisory-sandbox.shtml. Accessed 31 March 2020.

[24] Hong Kong Securities and Futures Commission on the SFC Regulatory Sandbox. Available at: https://www.sfc.hk/web/EN/sfc-fintech-contact-point/sfc-regulatory-sandbox.html. Accessed 31 March 2020; Hong Kong Insurance Authority on the Insurtech Corner. Available at: https://www.ia.org.hk/en/aboutus/insurtech_corner.html. Accessed 31 March 2020.

[25] ESMA, EBA and EIOPA (2018), pp. 40–41.

[26] See FCA website. Available at: https://www.fca.org.uk/publications/consultation-papers/globalfinancial-innovation-network. Accessed 31 March 2020.

[27] See FCA website. Available at: https://www.fca.org.uk/firms/global-financial-innovation-network. Accessed 31 March 2020.

[28] See AFIN website. Available at: https://afin.tech/. Accessed 31 March 2020.

[29] See AFIN website. Available at: https://afin.tech/index.php/2017/11/02/afin-partners/. Accessed 31 March 2020.

[30] See Hong Kong Monetary Authority website. Available at:https://www.hkma.gov.hk/eng/key-functions/international-financial-centre/fintech-supervisory-sandbox.shtml. Accessed 31 March 2020.

applications in batches. Third, in terms of the legal foundations, some markets (e.g., Taiwan and South Korea) require the legislative body to pass a law, whereas other markets allow sandboxes to be created based on the existing regulatory guidelines or rules (e.g., Malaysia and Australia). Fourth, the sandbox approach implies that some regulatory standards can be relaxed at least on a temporary basis. However, while some markets clearly lay out the bottom-lines to which the regulator will not yield, othersarenotclearonthisissue.Forexample,inSingapore,certainrulesclearlyhave to be followed by the sandbox applicant in any event, including the confidentiality of customer information, fit and proper criteria regarding honesty and integrity, the handling of customers' money and assets by intermediaries and the prevention of money laundering and the financing of terrorism.[31] Fifth, in addition to a one-size-fits-all standard application process, a regulator may provide a fast-track process for certain applicants. For example, Singapore introduced the 'sandbox express' in late 2018 to facilitate sandbox applications for certain types of services (e.g., insurance brokerage or remittance) that the regulator deemed to be relatively low risk or as having known risks that can be easily contained.[32]

Another difference is the availability of other forms of exemptions other than a regulatory sandbox. For example, in the UK, other than a regulatory sandbox, a firm may apply for restricted authorization before full authorization. In other words, firms can apply for a limited license to offer financial services. At the end of experiment period, a firm may apply to have the restrictions lifted and acquire full authorization to offer full financial services under the supervision of the FCA. In addition, the FCA may issue a waiver or no action letter to a firm to provide some certainty to fintech firms if the regulator agrees not to pursue the firm for offering financial services illegally within the confines of the waiver or letter.

Similarly, the Australian Securities and Investments Commission (ASIC) has implemented a three-pronged approach for fintech. First, a technology firm can apply to work with an existing financial institution, which will act as the principal facing the clients. [33] Second, ASIC can offer more specific fintech licensing exemptions,[34]which appear to be limited to existing financial firms, for small-scale experiments with regard to limited types of services. [35] Third, ASIC may provide some relief on a case-by-case basis, such as standard applications (following published ASIC policies),minorandtechnicalapplications(involvingtheapplicationofexistingpolicies to new situations) and new policy applications (which require a form review by ASIC).[36] In contrast, in Singapore, the guidelines for regulatory sandboxes do not clearly mention other alternatives such as waivers, no action letters or other

[31] Monetary Authority of Singapore (2016) Annex A.

[32] Monetary Authority of Singapore (2018), pp. 4–5.

[33] Australian Securities & Investment Commission (2017), RG257.26 to 28.

[34] ASIC Corporations (Concept Validation Licensing Exemption) Instrument 2016/1175, Sect. 4.

[35] ASIC Corporations (Concept Validation Licensing Exemption) Instrument2016/1175, Sects.5–6; Australian Securities and Investment Commission (2017), RG257. 18–19.

[36] Australian Securities & Investment Commission (2009), RG51.6.

exemptions, even though technically the financial regulator may provide some exemptions or waivers whenever the legislation allows.[37]

With respect to procedure, regulators can implement a combination of legal tools. For example, in the UK, the FCA may issue participants in the sandbox regime with no-action letters with regard to an agreed scope of activities, usually in regard to regulatory compliance at her than consumer safeguards.[38] In contrast, in some places, the regulators may issue temporary or conditional licences to facilitate sandboxes.[39] Nevertheless, the conditions attached to a sandbox are usually not made public.

2.2 *Benefits and Concerns of the Regulatory Sandbox Approach*

The regulatory sandbox approach seems to have been well received by the industry and can provide a number of benefits. First, it might help to improve the interaction between the financial regulator and the industry, especially for firms within the technology sphere. As has been noted, '[a] sandbox may potentially change the nature of the relationship between regulators and financial services providers toward a more open and active dialogue.'[40] In this way, the regulatory sandbox approach allows 'regulators to proactively seek new firms or *pre-regulates*, moving away from the previous position of being passive and reactive.'[41] Thus, the experimental period can enableregulatorstogainagreaterunderstandingofparticularfintechapplicationsand assess the innovation and risks of such applications[42] before determining the appropriate regulatory actions or strategies, instead of implementing a one-size-fits-all approach.

Second, by controlling the regulatory risk and liability, the sandbox approach can promote more financial innovation and competition in the market, and incentivize financial firms to accelerate their digital transformation.[43] Moreover, the sandbox approach provides 'pre-defined entry (and exit) criteria [that may] provide greater transparency and replicability than prior approaches' (e.g., doing nothing or partial exemption).[44] Thus, the approach may be more flexible for the regulators and market participants.

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[37] E.g., Banking Act Sect. 15D (Singapore).

[38] Chiu (2017), p. 748.

[39] Zetzsche et al. (2018), pp. 58–59.

[40] Jenik and Lauer (2017), p. 1; Zetzsche et al. (2018), p. 78.

[41] Chiu (2017), p. 747.

[42] Zetzsche et al. (2018), p. 79; ESMA, EBA and EIOPA (2018), p. 16.

[43] Zetzsche et al. (2018), p. 78.

[44] Zetzsche et al. (2018), p. 64.

However, the sandbox regime also raises some concerns. First, the sandbox approach may send a negative signal to the market and potential users[45] when it is clear that the sandbox firms are not fully regulated and the end-users may not be fully protected. Depending on the scale, a sandbox does not change the fact that the service providers are experimenting with real customers, who may still suffer losses or be subject to misconduct. The customers may also perceive a sandbox as a kind of endorsement by the regulators.[46] Moreover, if the conduct requirements are unclear for a particular firm in a sandbox, there may be little protection for financial consumers.[47] In some countries (e.g., Singapore) the regulators clearly state that the customers of sandbox firms cannot rely on the financial consumer protection dispute resolution regimes (although this is usually disclosed to customers).[48]

Second, there are some concerns relating to the lack of standardization and its impact on cost reduction,[49] given that sandboxes are often awarded separately with different conditions, which may also lead to a lack of transparency in how sandboxes are awarded.[50] In addition, at the macro level, the use of regulatory sandboxes might create an imbalance between the existing financial firms and unregulated technology firms[51] becausethesandboxapproachprovidessomeleewayforfintechfirms(atleast temporarily) to operate while the traditional financial institutions are still subject to the full regulations. This imbalance may also raise some fairness concerns.

Third, the sandbox approach does not resolve the underlying challenges and dilemmas in dealing with the junction between finance and technology. In particular, the question remains as to what comes under the scope of the financial regulator and what happen after the end of a sandbox? An underlying assumption of the regulatory sandbox approach is that new services might fall wholly or only partly within the scope of the existing regulatory framework, which may not be the case. In addition, although sandboxes are not meant to last forever (at least at this moment), it is unclear what will happen after the completion of a sandbox.

Thus, the question remains as to whether the benefits will materialize or whether some of the above mentioned concerns will decide the future of the regulatory sandbox approach. To make the approach effective, it has been suggested that 'sandboxes need to be made smarter and equipped to self-monitor activity within them, as opposed to just being a process-driven application method for entry, typically for a limited time, to a regulatory safe space, as they are currently.'[52] Furthermore, Professor Chiu argues that the 'sandbox regimes should focus on

[45] Zetzsche et al. (2018), p. 79.

[46] ESMA, EBA and EIOPA (2018), p. 35.

[47] ESMA, EBA and EIOPA (2018), pp. 35–36.

[48] The Monetary Authority of Singapore's website for experimenting in the sandbox. Available at: http://www.mas.gov.sg/Singapore-Financial-Centre/Smart-Financial-Centre/FinTech-Regulatory-Sandbox/Experimenting-in-the-sandbox.aspx. Accessed 31 March 2020.

[49] Zetzsche et al. (2018), p. 79.

[50] Zetzsche et al. (2018), p. 80.

[51] Zetzsche et al. (2018), p. 80.

[52] Zetzsche et al. (2018), p. 46.

governance rather than promoting innovation,'[53] because promoting innovation might affect the objectivity (i.e., desire to service new firms, rather than to regulate) and rationality of the regulator in designing new regulatory policies.[54]

3 Early Assessment of Cases in the UK and Singapore

In this Section, we present some empirical evidence on the sandboxes awarded in the UK and Singapore and offer some preliminary assessments of the early implementation of the regulatory sandbox regime. The UK and Singapore are leading international financial centers and both markets are keen to attract fintech businesses. In addition, as illustrated below, despite the hype, the two markets also show some contrasts in the practices related to sandboxes.

Before presenting the data, it is important to understand the limitations of this chapter. First, the publicly available information does not cover the conditions applicable to each sandbox. Thus, it is difficult to determine the rules or conditions that the regulators were willing to relax to give the fintech firms more room to experiment. Hence, we can only speculate from the information available on the internet. Second, because it may take some time before the longer-term effects of the regulatory sandbox approach become clear, we can only provide some early assessments based on known data. Thus, the future implications of the sandbox approach will require a longer-term study.

In the following sections, we first describe the respective regulatory sandbox regimes in the UK and Singapore. In addition to briefly outlining the general legal requirements, we present some empirical evidence on the sandboxes awarded thus far. We then evaluate the current state of the regulatory sandbox approach based on the evidence from the two markets.

3.1 United Kingdom

In October 2014, the FCA initiated Project Innovate to encourage innovation in the interests of consumers and promote competition through disruptive innovation. The project aimed to help new fintech firms to meet the FCA's eligibility criteria and to better understand the regulatory policies and strategies. The idea of a regulatory sandbox was subsequently introduced in December 2015.

To evaluate whether a fintech firm should be granted a sandbox, the FCA considers a number of factors. For example, the applicant must have some consumer protection mechanism (e.g., limiting its services to some customers or enabling customers to

[53] Chiu (2017), p.765.

[54] Chiu (2017), p. 745.

Table 1 Numbers of applications and awarded sandboxes in the UK

Cohort	Number of applications	Number of awards	%
Cohort 1	69	14	20.29
Cohort 2	77	31	40.26
Cohort 3	61	18	58.65
Cohort 4	69	29	42.03
Total	276	92	33.33

Source Available at https://www.fca.org.uk/firms/regulatory-sandbox. Accessed 31 March 2020

complain to the Financial Ombudsman Services). The FCA also considers whether an applicant is ready to conduct testing, secure outsource partners and have a significant UK presence.[55] The FCA requires an applicant to have a UK bank account,[56] which is likely to help UK customers to seek compensation (if there are sufficient funds in the account). Each sandbox is then assigned a dedicated case officer to 'help firms understand how their innovative business models fit within the regulatory framework.'[57]

Between the launch of the sandbox regime in 2015 and the end of 2018, there were four cohorts of applicants (about every half year per cohort). Table 1 shows the numbers of applications and cases accepted in the first four cohorts.

Table 1 shows that the UK attracted quite a number of applications (compared with Singapore and most other countries). The acceptance rate varies by cohort, ranging from as low as 20% (in Cohort 1) to as high as 42% (Cohort 4). The overall acceptance rate after four cohorts is 33.33%. Of the 92 cases awarded a sandbox, 87 cases have started testing and we can draw some information from the FCA's website about how those firms' intended to use technology.

We can analyze the 87 cases that were tested or are still testing from several angles. First, in terms of the technology applied, only 8 (9.2%) of the sandboxes in the UK clearly indicated using artificial intelligence, whereas 34 (39.08%) claimed to apply distributed ledger technology, notably in the fields of payment services and capital markets.[58] Because we can only observe what has been disclosed by the FCA or on the firms' websites, the actual rates of adoption of artificial intelligence and blockchain technology could be higher. The use of blockchain could include helping customers to pay money to another entity (e.g., Billon or Epiphyte), the issuance or transfer of shares or securities (e.g., Nivaura or Otonomous), assisting firms in conducing compliance or the know-your-customer process (e.g., Tradle) and personal data management (e.g., Nuggets). In contrast, far fewer sandbox winners clearly

[55] Financial Conduct Authority (2017–2020).

[56] Financial Conduct Authority (2017–2020).

[57] Financial Conduct Authority (2017), par. 2.4.

[58] The FCA also noted in 2017 that distributed ledger technology was the most popular technology used across the first two cohorts. Financial Conduct Authority (2017), par. 3.8.

indicated they would be using artificial intelligence. In these cases, the applications mainly focus on asset management (e.g., Beekin) and analyzing financial actions or behaviors (e.g., nViso or Moneyhub Enterprises).

Second, in terms of the identity of the applicant, at least 9 of the 87 (10.34%) applications were from existing financial firms (usually banks) with the rest being start-ups or technology companies. Interestingly, applications were also received from non-profit organizations (e.g., Citizens Advice UK).[59] Thus, the bulk of the sandboxes in the UK were issued to new entrants, although a number of banks did participate in the sandbox regime.

Third, we may fit those sandboxes into different sectors in the financial market. The financial market is traditionally divided into three main pillars: banking, insurance and the capital markets. However, there could be some challenges in designating a sector for fintech firms because in some cases, the firms appear to straddle two or more traditional fields. In addition, payment services may be difficult to categorize because, although traditionally dominated by the banking sector, in recent years, we have seen a flurry of third-party payment service providers that operate independently of commercial banks.

Thus, this chapter divides the sandboxes into five broad categories:

(1) services related to the provision of credit, deposit-taking, trade finance and money exchanges or otherwise those involving traditional banking services (but excluding domestic or cross-border payment and remittance);
(2) services related to the capital markets, including the primary market and the issuance of securities, the secondary market and trading, investment/asset management (which may include some private banking business), financial advisory services and derivatives;
(3) insurance-related services, including the provision of insurance, insurance intermediaries or aggregators, claim processing and other auxiliary services;
(4) payment-related services, including third-party payment solutions and remittance (but excluding crypto-currencies); and
(5) other services that cannot be classified into any of the above.

This classification largely follows the traditional demarcation of the banking, capital market and insurance sectors, except that we isolate payment services (from banking) as a separate class to highlight the widespread use of fintech in payment services.

Based on this classification, we can observe the distribution of the regulatory sandboxes in the UK after the first four cohorts. The distribution of the sandboxes by sectoral lines is shown in Fig. 1 below.

Figure 1 above clearly shows that the majority of the sandboxes (31 out of 87, 35.63%) were for capital market-related services, followed by payment services and insurance. There is also a considerable number of cases relating to other services. In contrast, only eight cases clearly concern traditional banking services if we take out payment services.

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[59] Our result is consistent with the FCA's assessment after the first two cohorts. Financial Conduct Authority (2017), par. 3.5.

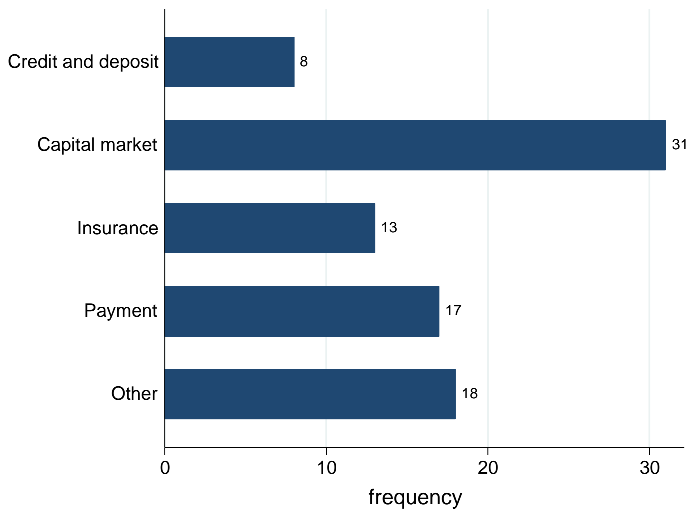

Fig. 1 Distribution of sandboxes by sector

Except for two cases, the traditional banking service sandboxes are mostly related to loans or savings. However, only two of the six banking service providers clearly provide loans (e.g., Nextday Property and Salary Finance) with the rest focusing on savings management, mortgage eligibility and the application of credit lines. The two cases that are not related to lending or savings involve the use of digital identity tokens for applying for bank accounts (Communist First Credit Union) and a governance model with distributed ledger technology to develop decentralized applications (NatWest, a bank).

Of the 31 sandboxes focusing on capital market-related services, 11 (35.48%) involve raising finance by issuing securities with another three cases (9.68%) concerning the trading of securities. Most of the applications in the primary and secondary markets (11 of 14 cases) clearly indicate using distributed ledger technology. Of the other applications, seven cases (22.58%) concern asset or investment management and nine cases (29.03%) concern financial advisory services in addition to a sole case concerning hedging and derivatives. Among the advisory and asset management service providers, artificial intelligence (5 out of 11 cases) is the most prominent type of technology deployed.

Most of the insurance-related sandboxes (8 out of 13, 61.54%) are related to the provision of insurance protection with two cases (15.38%) offering intermediary services and three cases (23.08%) involving other auxiliary services (e.g., tracking a customer's driving behavior or helping clients to transfer their pensions).Some of the fintech-based insurers combine automation with smart contracts (e.g., FloodFlash or Etherisc), while some adapt the traditional model to provide customers with more benefits (e.g., savings premiums).

In addition to classifying the sandboxes along the traditional sectoral lines, we regroup them by function. For this purpose, regardless of the financial sector, we identify three major functions: raising funds (by loans, offering securities or other methods), managing financial conditions and financial advisory services. Of the 87 sandboxes in the UK, only 13 (14.94%) clearly focus on helping customers to raise funds, 18 (20.69%) concern some form of financial management and 11 (12.64%) provide financial advice, which largely reflects that nearly 20% of the cases concern payment services and another 20% concern other services. Thus, only a minor proportion of the sandboxes in the UK actually focus on 'finance,' with most of the sandboxes concerning other finance-related or support services.

In a paper published in 2017, the FCA stated that '[t]he first year of operation provides an early indication that the sandbox has been successful in meeting its overall objective.'[60] The FCA's self-assessment showed that 75% of firms accepted into the first cohort (77% for second cohort) had successfully completed testing and that around 90% of the firms that completed testing in the first cohort continued to develop wider markets.[61] The FCA noted that testing in the sandbox helped firms to raise finance from potential investors due to the higher degree of legal certainty.[62]The FCA also recognized that the sandboxes allowed the regulator to work with innovators to build appropriate consumer protection safeguards for the new products and services.[63] In Section C below, we provide some early reflections based on the data from the first two years of the regulatory sandbox regime.

3.2 Singapore

Similar to the UK, Singapore has been actively pursuing fintech to maintain Singapore's position as an international financial (and financial technology) center. The Monetary Authority of Singapore (MAS) started evaluating the sandbox regime after the UK launched the concept. Eventually, in November 2016, the MAS published the Fintech Regulatory Sandbox Guidelines,[64] which state that the MAS will provide support to increase efficiency, manage risks better, create new opportunities and improve people's lives. [65] The guidelines state that licensed financial institutions and other interested firms can apply for a sandbox.[66] However, the MAS also makes it clear that sandboxes are not suitable for firms that propose to implement services that are similar to those already offered, unless the applicants can demonstrate some differences. In this case, the MAS will only consider the

[60] Financial Conduct Authority (2017), par. 2.7.

[61] Financial Conduct Authority (2017), par. 2.9.

[62] Financial Conduct Authority (2017), paras. 2.10 and 2.11.

[63] Financial Conduct Authority (2017), paras. 2.17 and 2.18.

[64] Monetary Authority of Singapore (2016).

[65] Monetary Authority of Singapore (2016), par. 5.2.

[66] Monetary Authority of Singapore (2016), par. 2.2.

application if the firm has conducted due diligence to understand the environment and ensure that the proposed service has a reasonable chance of surviving.[67]

The MAS does not predetermine the industry sectors or areas in which fintech services may be applied. When reviewing a sandbox application, the MAS considers whether the application includes new technology or uses existing tools in an innovative way, whether the application addresses a problem or offers benefits to the customer/industry, whether the applicant intends to deploy the service in Singapore on a broader scale after the sandbox (or otherwise contribute to Singapore in other ways), whether the test outcome or boundary conditions are clearly defined and reported to the MAS, whether significant risk has to be addressed and whether the applicant has acceptable exit and transition strategies.[68] After the sandbox period expires, the applicant is expected to continue providing the services on a broader scale if the MAS is satisfied with the outcome and the firm is able to comply with the legal and regulatory requirements.

Nonetheless, the MAS was rather cautious in awarding sandboxes. In contrast with the UK, the MAS had only awarded six sandboxes by the end of 2018. In terms of sectors, three of the six sandboxes (50%) are related to insurance (PolicyPal, Inzsure and MetLife), one concerns digital advisory services (Krystal Advisors), one is about money changing (Thin Margin) and one focuses on cross-border remittance (TransferFriend). The limited sample suggests that the MAS awarded sandboxes to certain targeted industries and thus it could be argued that each sandbox represents a separate service sector (or type of service).

Furthermore, in a consultation paper on the sandbox express regime published in November 2018,[69] the MAS stated that it wished to create 'a set of predefined sandboxes, to complement the existing customized sandboxes.'[70] The objective is to provide faster options for firms to bring innovative ideas to the market for testing and to reduce the time and resources required to make an application.[71] For this purpose, the MAS proposed three main areas for pre-defined sandboxes, namely, insurance broking, recognized markets and remittances.[72] If a service falls under one of these pre-defined sandboxes, the MAS will only review essential factors such as whether the applicant's stakeholders are fit and proper and whether the proposed service or product is sufficiently technologically innovative.[73] A pre-defined sandbox usually implies a small scale operation and full disclosure of its status to customers.[74]For example, for a pre-defined sandbox for insurance broking, no more than 1,000 transactions can be made within the stated period,[75] a maximum volume of S$5 billion

[67] Monetary Authority of Singapore (2016), par. 5.5.

[68] Monetary Authority of Singapore (2016), par. 6.2.

[69] Monetary Authority of Singapore (2018).

[70] Monetary Authority of Singapore (2018), par. 2.2.

[71] Monetary Authority of Singapore (2018), par.2.3.

[72] Monetary Authority of Singapore (2018), par. 3.1.

[73] Monetary Authority of Singapore (2018), par. 3.4.

[74] Monetary Authority of Singapore (2018), par. 3.6.

[75] Monetary Authority of Singapore (2018), par. 4.2.

(about US$3.8 billion) is set for market operators (e.g., an exchange)[76] or a maximum of S$100,000 (about US$77,000) for remittance services.[77] However, at the time of writing, the 'sandbox express' regime had not yet come into effect.

3.3 Evaluation of the Sandbox Approach

Because the approach is still in its infancy, it would not be prudent to make any early predictions of how the sandbox regime can accommodate fintech innovation. However, we can make some preliminary judgments based on the experiences in the UK and Singapore. Comparing the two countries, it is clear that the UK has attracted a larger pool of applications for sandboxes and has a higher award rate. In contrast, Singapore's approach is rather cautious, and it remains to be seen how the newly proposed regulatory sandbox express will progress. However, it is too early to determine whether the UK regime is too easy or the Singapore system is too difficult.

It is evident that the longer-term effects of the sandbox regimes in enhancing innovation and boosting the economy will need more time to surface. One report has indicated that the early sandboxes in some markets were neither necessary nor sufficient to promote financial inclusion.[78] In addition, there is a danger that the regulators might divert more resources to 'prioritize resource-intensive sandbox programs over more comprehensive innovation policies, market engagement strategies, or financial inclusion programs.'[79]

This chapter provides some early reflections on the nature of the sandboxes awarded in the UK and Singapore between 2016 and 2018. First, it is unclear whether the sandbox approach has attracted technology firms (especially those that do not seem to be concerned about financial regulations in the first place) to volunteer to be regulated. By inviting certain firms to apply for sandboxes, the regulators appear to assume that particular services fall within their regulatory scope. However, whether specific services definitely fall within the scope of the regulatory authorities is a legal question that requires careful analysis. Although the sandbox regime may have simply deferred the question, the issue will not disappear and still has to be addressed on a firm-by-firm basis.

Judging by the number of sandbox applications, it appears that there is still ample room to attract more fintech firms. Although the UK accounts for the lion's share of the sandbox applications, the FCA still issued fewer sandboxes than the number of fintech firms in the market. For example, a report published by the accounting firm

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[76] Monetary Authority of Singapore (2018), par. 5.2.

[77] Monetary Authority of Singapore (2018), par. 6.2.

[78] UNSGSA FinTech Working Group and CCAF (2019), pp. 30–31.

[79] UNSGSA FinTech Working Group and CCAF (2019), p. 30.

Ernest and Young in 2016 lists 138 fintech firms operating in the capital market (broadly defined).[80] This figure is considerably larger than the total number of sandboxes awarded in the UK and Singapore combined and does not take into account other fintech firms in the banking, insurance and payment services sectors.

There should be no doubt that the sandbox regime will help regulators to develop a greater understanding of the application of technology in the financial services sector. However, it is possible that a number of fintech firms will remain outside the existing regulatory framework until the threshold question (i.e., whether a service is a regulated activity) is clarified. Again, it will remain to be seen whether the sandbox regime can provide a means to incorporate technological advancement in the regulatory framework.

Second, do sandboxes help firms to raise finance? We do not possess the firm-level data needed to address this question. Moreover, at a more macro level, due to the limited sample of countries, we cannot determine whether regulatory sandboxes help fintech firms to attract finance. According to a report published by the accountancy firm KPMG, Singapore attracted significant amounts of investment (including venture capital, private equity and merger and acquisitions) between 2016 and early 2018. However, perhaps due to the shorter time-frame, there is no perceivable pattern in terms of the amount of finance invested per quarter. For example, nearly US$100 million was invested in the third and fourth quarters of 2016, before dropping to as low as $20 million in the first quarter of 2017 and then rising to over $120 million in the third quarter of 2017.[81] The 2018 data also show a wide swing from as low as US$10 million in the first quarter to over $60 million in the second quarter.[82]

Similarly, the KPMG report does not appear to show that the regulatory sandbox regime in the UK had any impact on financing activities. For example, between the first quarter of 2016 and the second quarter of 2017, the amount invested in fintech (including venture capital, private equity and merger and acquisitions) in the UK did not exceed US$0.4 million per quarter (even less than 2015), although the figures rebounded later in 2017, rising to $1.7 million in the fourth quarter of 2017, $13.1 million in the first quarter of 2018 and $3 million in the second quarter.[83] Therefore, in the two years following the launch of the regulatory sandbox regimes in the UK and Singapore, there is no convincing evidence that the sandboxes helped fintech firms to raise finance.

Third, the evidence from the UK and Singapore raises the question of whether the firms that were awarded sandboxes were sufficiently innovative to justify differential legal treatment. Although some sandboxes clearly applied technology to areas not covered by the existing financial firms, there are a number of potential counterexamples that suggest the regulatory sandboxes were not necessarily awarded based on the innovativeness of their technology. For example, Lloyd's Banking Group was awarded a sandbox by the FCA for 'an approach that aims to improve the

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[80] Ernst & Young (2016).

[81] KPMG (2018), p. 51.

[82] KPMG (2018).

[83] KPMG (2018), p. 38.

experience for branch customers aligned with the online and over the phone experience.'[84]Barclays Bank was awarded a sandbox for a 'RegTech proposition which tracks updates to regulations within the FCA Handbook and aligns their implementation to Barclays' internal policies.'[85] However, it is unclear what regulatory requirements or legal risks apply to improving customers' branch experiences or developing a regtech tool to track the UK's financial regulations. It is not that those services have no merit or do not involve technology. Rather, if the purpose of a sandbox is to reduce the legal risk and promote innovation, it is unclear from the short description provided by the FCA why those services might need a sandbox. In other words, because a bank can arguably improve the branch experiences of its customers and/or develop a regtech tool without regulatory implications, a sandbox appears unnecessary. Accordingly, on a general level, the regulators should provide more publicly accessible information on the types of technology involved and the reasons for awarding sandboxes. Otherwise, the regulatory sandbox regime could be used for bragging purposes rather than real merit, especially in places that award large numbers of sandboxes.

Fourth, another yardstick is what happens after the end of the sandbox period. In Singapore, of the six sandboxes awarded by the end of 2018, most succeeded in acquiring regulatory licences after the completion of the sandbox experiment. One is operated by a licensed insurance company (MetLife), while another three firms continued to be licensed after the expiration of the sandbox (PolicyPal, Krystal Advisors and ThinMargin). However, one firm (TransferFriend) ceased to be licensed after the end of sandbox. Another firm (Inzsure) is still completing the sandbox experiment and thus it is unclear whether it will continue to be licensed.

In the UK, of the 87sandboxes awardedbeforetheend2018,45firmsareincluded in the Financial Services Register maintained by the FCA.[86] Although the FCA claims that 'the majority of sandbox firms have required authorization in order to conduct testing,'[87] a search of the register revealed that this is not necessarily the case. While Cohort 4 is still ongoing at the time of writing, six firms in the cohort (of 27 sandboxes) are already licensed firms in the UK. With the previous cohorts, 15 of the 18 firms in Cohort 1 (83.33%), 16 of the 24 firms in Cohort 2 (66.67%) and eight of the 18 firms in Cohort 3 (22.22%) continue to be licensed *post* sandbox.[88]Although the regime has not been operating long enough to produce reliable data, the rate seems to be dropping. Although we could not find any information on the other 42 firms in the FCA's register, these firms may be licensed in other countries or may have changed their business names. Of the 44 firms for which we could obtain licensing

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[84] FCA website. Available at: https://www.fca.org.uk/firms/regulatory-sandbox/cohort-1. Accessed 31 March 2020.

[85] FCA website. Available at: https://www.fca.org.uk/firms/regulatory-sandbox/cohort-3. Accessed 31 March 2020.

[86] See FCA website. Available at: https://www.fca.org.uk/firms/financial-services-register. Accessed 31 March 2020.

[87] Financial Conduct Authority (2017), par. 2.5.

[88] This is in line with the FCA's self-assessment in 2017. See Financial Conduct Authority (2017), par.2.9.

information in the UK, at least 24 are licensed as agencies and/or insurance distributors and 16 are licensed for payment or money services. This is in line with the distribution of the sandboxes according to the financial sector.

4 Conclusion

In conclusion, in this chapter, we examine the sandboxes awarded in the UK and Singapore to provide a preliminary assessment of the sandbox regimes in the two markets. We find that the UK, which pioneered the concept in the financial sphere, has attracted numerous sandbox applications and the FCA seems to be willing to award a relatively high proportion of sandboxes. In contrast, Singapore has adopted a more cautious approach by targeting specific sectors. However, there are signs that the MAS might be willing to award more sandboxes in certain sectors in the future with the proposed regulatory sandbox express regime.

Overall, the long-term effects of the regulatory sandbox approach remain to be seen, as any effects in promoting financial innovation, improving financial inclusion or maintaining market competitiveness should take some years to surface. The early applications between 2016 and 2018 suggest that most of the sandboxes awarded in the UK were for capital market or payment services, with blockchain being a popular technology. In contrast, the insurance and traditional banking sectors account for a relatively small proportion of the sandboxes, especially with respect to the size of the banking and insurance markets. In contrast, Singapore initially implemented a more cautious approach by targeting the insurance and foreign exchange and remittance services markets (with three and two sandboxes, respectively, of the six sandboxes awarded). However, other than the one case for digital advisory services, it is unclearwhethertheMASwillgrantmoresandboxesforcapitalmarketandtraditional banking-related services. Moreover, in both markets, most of the sandboxes were not directly concerned about raising finance. Thus, because most of the sandboxes were awarded to finance-related firms the regime may help to improve the provision of financial services. Whether these finance-related firms should to continue to receive temporary exemptions through regulatory sandboxes is a question that the regulators will need to consider in the future.

The early evidence from the UK and Singapore suggests that there are some concerns that may require the attention of the regulators. First, it is unclear whether the sandboxes have successfully attracted technology firms (or existing financial institutions) to experiment with the use of new technologies in the provision of financial services. In addition, although it is difficult to measure how innovative a service is based on simple descriptions, there are signs that some sandboxes are not necessarily awarded based on factors other than the innovativeness of the technology, which could increase the likelihood of the sandbox regime being abused by some market participants. If this is the case, it may imply that the regulators are awarding sandboxes for the sake of having sandboxes rather than serving real policy goals in some situations.

Furthermore, there is no clear evidence thus far that the regulatory sandbox regime has helped firms raise more finance due to the higher legal certainty. Although many firms continue to be licensed after completing the regulatory sandbox, there are some warning signs that more and more firms may be dropping off the radar. If this is the case, this might in turn challenge the validity of the regulatory sandbox regime and the award process.

Overall, regulators should provide more transparency on the sandbox application process and the content of the successful applications. The additional information would help potential customers to ascertain what they are dealing with and may help other market participants to pick up the pace without having to over-spend on research and development. Moreover, releasing more information to the public would help improve the credibility of the regulators' decisions in awarding short-term legal exemptions and support the long-term future of the sandbox regime.

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