The predicament of FinTechs in the environment of traditional banking sector regulation – an analysis of regulatory sandboxes as a possible solution*

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Abstract

Recently, “Financial Technology-companies” (FinTechs) are increasingly changing the financial services industry worldwide and impose considerable challenges for regulators tasked to solve the arising trade-off between sound regulation and innovation support. In this regard, regulatory sandboxes, which were recently introduced in several jurisdictions, provide a promising solution, as they imply a liberalization of regulatory requirements in order to enable FinTechs to test their innovative services. However, we observe that no comparable initiative exists in Germany even though the German regulator identified a need for action on this subject. Thus, based on an in-depth analysis of various sandbox models worldwide, this paper develops a set of own recommendations as a basis for the implementation of a sandbox concept which might be applicable in the German regulatory environment. To the best of our knowledge, this paper represents the first study of key international sandboxes as a basis to design guidelines specifically for the German financial market. Thereby, we contribute to the literature as we evolve an effective regulation within the new setting of innovative financial technologies. Moreover, our findings and implications contribute to the practical solution of current challenges faced by both regulators and affected companies. Even though our derived implications focus on the German financial sector, the results may potentially be applicable in further jurisdictions with similar regulatory requirements. Additionally, our analysis of various sandbox models worldwide can be used as a basis for further research, which focuses on other than the German financial markets.

Keywords: FinTech, financial sector, financial regulation, FinTech regulation, financial stability, regulatory sandbox, financial services industry, digital finance

JEL Classification: G21, G28, M13
1 Introduction

FinTechs are increasingly changing the financial services industry worldwide, as their novel business models do not only result in increasing competition within the financial markets (McKinsey, 2016), but also pose considerable challenges to regulators’ core mandates to ensure regulatory compliance and financial stability. Through their application of new technologies, FinTechs – comprising both incumbents and start-ups – already provide the entire range of financial services traditionally covered by established banks (Arner et al., 2016, Arner et al., 2017) and have become a significant segment within the traditional financial services sector in the meanwhile.

Beside their various opportunities to enhance efficiency and competition within the markets (Bank for International Settlements, 2017, Ernst & Young, 2017a, He et al., 2017), these highly innovative entities may also pose considerable risks to financial stability. This is because there is still uncertainty about how regulators should best apply their strict banking regulations to the novel settings of FinTech business models without simultaneously creating a major hurdle for innovation (Maume, 2017, Michaels and Homer, 2018, Gerlach et al., 2016, Herger, 2016, Brummer and Gorfine, 2014). Regulatory Sandboxes, which are recently developed and tested in several jurisdictions, provide a promising solution to the occurring trade-off between sound regulation and innovation support, without threatening financial stability or degrading consumer protection. This new approach typically implies a temporary liberalization or even exemptions from regulatory requirements to facilitate FinTechs to test their new services in a supervised environment (Financial Conduct Authority, 2015, He et al., 2017).

Despite the diversity of successful¹ and beneficial sandbox solutions already elaborated worldwide, we observe that to date no comparable initiative exists in Germany. In fact, so far only one legislation, which specifically addresses FinTech concerns, was implemented (Maume, 2017). However, Germany’s status as one of the major FinTech markets as well as the rapid diffusion of FinTechs in the highly regulated German financial sector (Dorfleitner et al., 2016) clearly indicate the growing need for the (local) regulator to provide explicit regulatory guidance for FinTechs by creating a contemporary and flexible solution. Based on the identified need for action in the German context and the high interest of the federal supervisory authority – the Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin) – in this

¹ In terms of usage and successful exits by market participants.
topic (Bundesanstalt für Finanzdienstleistungsaufsicht, 2016), we aim to develop a sandbox framework that is applicable in the German regulatory environment without compromising core regulatory objectives. Building on an in-depth analysis of the various sandbox models worldwide, a major objective of this paper is to develop an own set of recommendations as a basis for an accessible and sustainable sandbox implementation. Moreover, even though our derived implications focus on the German financial sector, the results may potentially be applicable in further jurisdictions with similar regulatory requirements. Additionally, our analysis of various sandbox models worldwide can be used as a basis for further research, which focuses on other than the German financial markets.

Several articles have already examined the similarities and differences among national sandbox solutions (Zetzsche et al., 2017, Jenik and Lauer, 2017). In contrast, our paper – to our best knowledge – represents the first study on key international sandboxes as a basis to design guidelines for a regulatory sandbox specifically for the German market and thereby contributes to the current discussion of an optimal design of sandbox concepts. If successfully implemented, the proposed regulatory sandbox framework has the potential to lower regulatory barriers for FinTechs and to create a level playing field while safeguarding the stability of the financial system as a whole. In the second place, we add to the recent literature on the evolution of FinTechs and thereby contribute to the general understanding of FinTech services and their various areas of operations (Arner et al., 2016, Zetzsche et al., 2017). Finally, by focusing on the German banking system, we contribute to the literature concerning existing regulatory frameworks and their approaches to govern FinTechs (Scholz-Fröhling, 2017, Maume, 2017, World Economic Forum, 2016).

In order to achieve our objective as well as to emphasize the need for action in the German context, this paper is structured as follows: Section 2 builds the theoretical framework of this paper. Herein, we firstly discuss our understanding of financial technologies and identify major representative FinTech markets worldwide. In order to explain the trade-off between sound regulation and innovation support, we address theoretical fundamentals of financial services regulation, specifically focusing on the German market and the lack of specialized FinTech regulation and supervision in Germany. After we introduced the regulatory sandbox as a concept that may contribute to the solution of this trade-off, section 2 concludes by systematically deriving relevant countries, which built the scope of our further analysis. From this basis, section 3 then provides an in-depth analysis of regulatory sandbox concepts already
implemented in those countries, which we identified as relevant for our study. Building on this, section 4 suggests our framework for the implementation of a regulatory sandbox concept in Germany. Finally, the paper concludes by offering concluding remarks, limitations of this study and proposed future research.

2 Theoretical background and Definitions

2.1 Digital Finance and FinTech

Regarding the term “FinTech”, we observe that – so far – no unique definition could be established (Dorfleitner et al., 2016, Ryu, 2018, Schueffel, 2016). Albeit the lack of agreement regarding the terms’ meaning there is consensus that “FinTech” is a composition of the words “Financial” or “Finance” and “Technology” (Arner et al., 2016, Dorfleitner et al., 2016, Gomber et al., 2017, Kim et al., 2016, Kuo Chuen and Teo, 2015, Ryu, 2018). However, regarding the meaning of FinTech some authors propose a functional, product or service oriented definition. E.g. Arner et al. (2016) refer FinTech to as technology based financial solutions and speak about a new marriage of information technology and financial services. Similarly, Kim et al. (2016), Kuo Chuen and Teo (2015), Ryu (2018) focus their definition on the use of new technology that enables the development of innovative, disruptive and differentiated financial services or products which have the potential to disrupt existing industry structures and boundaries (Philippon, 2016). On the other hand, one can use an institutional oriented definition in which a FinTech is referred to as a company or entity, both start-up or established, that develops and offers innovative financial services by using new technology. Thus, FinTechs usually represent some kind of innovator or disruptor (Dorfleitner et al., 2016, Gomber et al., 2017).² Since this paper addresses the regulation of financial institutions as well as new competitors entering the financial services sector, it follows the institutional approach for defining FinTechs.

Furthermore, based on offered products and services as well as underlying technological concepts, it is possible to systemize FinTechs. For instance, Dorfleitner et al. (2016) differ FinTechs in those offering funding services (crowdfunding, credit, factoring), asset management services (robo advice, social trading, personal finance management, banking), payment transactions and other services (such as insurance and platform based comparison

² Entities that, by developing revolutionary products and services with powerful displacement potentials, threaten established competitors. For further details see Deloitte (2014), AGV Banken (2015), Christensen et al. (2015).
tools). Similarly, Gomber et al. (2017) systemize FinTechs regarding the business functions digital financing, investment, money, payments, insurances and financial advice. In fact, numerous authors propose differing systemization approaches, even though one has to state, that all approaches are similar to each other (Arner et al., 2017, Bank for International Settlements, 2017, Maume, 2017, Brummer and Gorfine, 2014, Clifford Chance, 2017, He et al., 2017, Financial Stability Board, 2017, Arner et al., 2016, Philippon, 2016, Schindler, 2017). Moreover, using the comprehensive “Digital Finance Cube-concept” Gomber et al. (2017) further distinguishes FinTechs based on used technological concepts such as Blockchain, Near Field Communication and Big Data Analytics. However, due to this paper’s focus on regulatory issues, which result from FinTechs entering the financial services sector by offering innovative, disruptive and reinvented traditional financial services, the technological perspective is not covered in more detail.

From the traditional financial institutions’ point of view, there are ongoing discussions on how to deal with these new competitors. In general, both competitive and co-operative strategies are eligible (Gomber et al., 2017). However, one thing remains to be sure: Leaving FinTechs or digital movers unchecked could be quite dangerous for traditional financial institutions. Based on a 2016 study this may traditional banks cause to suffer a loss of 5.0% to 15.0% of their customer based interest and fee income within the next five years (McKinsey, 2016).

2.2 Developments and major representative FinTech markets worldwide

The FinTech sector has become a considerable segment within the traditional financial services sector, continuing to evolve rapidly. The development of FinTech markets worldwide can be illustrated by using different kind of data. For instance, the annual global FinTech funding volumes can be used to point out the FinTechs’ growth. According to “The Pulse of FinTech”, a regular study by KPMG, the annual global FinTech investments grew with a compound annual growth rate (CAGR) of more than 53.0% from 2011 (USD 2.4 billion) to 2017 (USD >31.0 billion), even though slowing down during the years 2016 and 2017 (KPMG, 2016, KPMG, 2017, KPMG, 2018). Moreover, the rising interest in FinTechs can be illustrated by using Google Trends’ data, which can be used to analyze the relative worldwide frequency of the search term “fintech” within a specific time frame:
Furthermore, since 2015 Ernst & Young publishes the “EY FinTech Adoption Index”, which aims at analyzing, comparing and illustrating the worldwide adoption of FinTech services. One key finding of the actual 2017 report is that on average 33% of all digitally active consumers across the surveyed 20 markets use FinTech services, compared to 16% in 2015. This development outlines the strong growth and current market penetration of FinTechs, which now achieve levels of market presence that can influence both industry standards and customer expectations. Having a closer look at the 2017 data, one can assert that particularly emerging countries (China, India, Brazil, Mexico and South Africa) have high adoption rates (46.4% on average), which may be due to the facts that these countries are characterized by not only having growing economies and tech-literate populations but also poor financial infrastructures and financially underserved populations (Ernst & Young, 2017b). The following table summarizes and compares the 2015 and 2017 FinTech adoption rates:

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3 In 2015, the study covered six markets.
<table>
<thead>
<tr>
<th>Country</th>
<th>FinTech adoption (%)</th>
<th>2015</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td></td>
<td>69</td>
<td></td>
</tr>
<tr>
<td>India</td>
<td></td>
<td>52</td>
<td></td>
</tr>
<tr>
<td>UK</td>
<td></td>
<td>14</td>
<td>42</td>
</tr>
<tr>
<td>Brazil</td>
<td></td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td></td>
<td>13</td>
<td>37</td>
</tr>
<tr>
<td>Spain</td>
<td></td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>Mexico</td>
<td></td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td></td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>South Africa</td>
<td></td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>US</td>
<td></td>
<td>17</td>
<td>33</td>
</tr>
<tr>
<td>Hong Kong</td>
<td></td>
<td>29</td>
<td>32</td>
</tr>
<tr>
<td>South Korea</td>
<td></td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Switzerland</td>
<td></td>
<td>27</td>
<td></td>
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<tr>
<td>France</td>
<td></td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>Netherlands</td>
<td></td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>Ireland</td>
<td></td>
<td>15</td>
<td>23</td>
</tr>
<tr>
<td>Singapore</td>
<td></td>
<td>8</td>
<td>18</td>
</tr>
<tr>
<td>Canada</td>
<td></td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Belgium &amp; Luxembourg</td>
<td></td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td>16</td>
<td>33</td>
</tr>
</tbody>
</table>

Table 1: FinTech adoption rates 2015 and 2017. Source of data (Ernst & Young, 2017b).

Regarding the anticipated development of FinTechs, Ernst & Young (2017b) estimates that global FinTech adoption may increase to 52% on average, with particularly strong developments in South Africa, Mexico and Singapore.

Finally, based on the illustrated development of FinTech markets worldwide it is possible to identify major FinTech markets, which are used as the basis for the further research in this paper. This identification process is conducted according to the following methodology: Firstly, countries with average and higher-than-average FinTech adoption rates in 2017 as well as countries with particularly strong expected growth rates for FinTech adoption are identified as major FinTech markets. Secondly, Hong Kong and South Korea are identified as major FinTech markets, since these countries have a considerable meaning for the global financial industry. As a result, the following countries are identified as major FinTech markets, thus building the basis for the following research in this paper:
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Markets</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average and higher-than-average FinTech adoption rates</td>
<td>Europe: Germany, Spain, UK</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>America: Brazil, Mexico, US</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Asia: China, India</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other: Australia, South Africa</td>
<td></td>
</tr>
<tr>
<td>Particularly strong expected growth in FinTech</td>
<td>America: Mexico</td>
<td>3</td>
</tr>
<tr>
<td>adoption rates</td>
<td>Asia: Singapore</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other: South Africa</td>
<td></td>
</tr>
<tr>
<td>Financial Hubs</td>
<td>Asia: Hong Kong, South Korea</td>
<td>2</td>
</tr>
</tbody>
</table>

Figure 2: Major FinTech markets.

Finally, since both Mexico and South Africa are identified as major FinTech markets by two criteria, in total there are 13 countries identified as major FinTechs markets.

### 2.3 Resulting regulatory predicaments

As already noted by the Financial Stability Board (FSB), FinTechs may have a “material effect on financial markets and institutions and the provision of financial services” (Financial Stability Board, 2017). In fact, FinTechs already provide the entire range of financial services and products traditionally covered by established banks (Arner et al., 2016, Arner et al., 2017). As well as the widespread adoption of new technologies offers various opportunities, like contributing to increasing innovation and enhancing efficiency in the financial services sector (Maume, 2017, Ernst & Young, 2017a, He et al., 2017, Bank for International Settlements, 2017), the exceptional rate of development of new business models also poses considerable challenge to regulators, supervisors and policymakers worldwide. Despite the fact that many FinTech activities and business models fall within the scope of traditional banking regulations (Financial Stability Board, 2017), there are still considerable uncertainties about how to apply the regulatory requirements, i.e. consumer protection, anti-money laundering, compliance and licensing, to FinTechs (Maume, 2017, Michaels and Homer, 2018). Complying with these stringent regulatory requirements would pose not only financial, but also organizational as well as personnel challenges to FinTechs, particularly in the case of start-ups, and thus represent a major hurdle for innovations (Gerlach et al., 2016, Maume, 2017, Herger, 2016, Brummer and Gorfine, 2014, Arner et al., 2016). For instance, total annual costs for a German bank to comply with the diverse requirements are estimated to be approximately EUR 9 billion (Niehoff and Hirschmann, 2014), making a market entrance for start-ups almost impossible.

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4 Also financial center, meant as a city or region with a high concentration and variety of major financial institutions, which provide the entire range of high-end banking and financial services on a national or international basis. For further details see Zhao et al. (2004).

5 Largely led by start-ups.
On the other hand, FinTechs also operate in business segments not yet covered by regulatory frameworks, thereby avoiding regulatory costs and oversight (Bank for International Settlements, 2017, Financial Stability Board, 2017, Accenture, 2016, Michaels and Homer, 2018). The resulting “regulatory gaps” (Bank for International Settlements, 2017) however, clearly contradict the core mandate of regulation to ensure a level playing field for incumbent firms and newcomers (He et al., 2017) and may moreover lead to new risks. Governments and regulatory authorities are aware of the need to provide clear regulatory guidance and thus are targeting an “optimal regulation” (Ernst & Young, 2017a) that promotes beneficial innovations and market competition without threatening financial stability and oversight or degrading consumer protections (Schleussner, 2017, Arner et al., 2016, Bank for International Settlements, 2017, Financial Stability Board, 2017, Arner et al., 2017, Treleaven, 2015, He et al., 2017, Brummer and Gorfine, 2014, Zetzsche et al., 2017, Dombret, 2016). To address this (economic) trade-off between sound regulation on the one hand and fostering innovation on the other hand, policymakers worldwide are currently developing and testing different approaches.

2.4 Regulatory requirements of FinTech business models

The banking sector is considered to be one of the most heavily regulated sectors worldwide (Clifford Chance, 2017, Schleussner, 2017). The fundamental mandates of financial regulation are to ensure the stability of the financial system, to create a level playing field between market participants and to protect consumers and investors (Bundesanstalt für Finanzdienstleistungsaufsicht, 2018b, Arner et al., 2016, He et al., 2017, Schleussner, 2017, Fest, 2008, Zetzsche et al., 2017). Four main types of regulation are of particular importance in the context of FinTechs: consumer protection, anti-money laundering, compliance and licensing (Maume, 2017, Schneider et al., 2016, Bank for International Settlements, 2017). For the purpose of this paper, hereinafter the German regulatory framework is observed to assess the regulatory consequences for the development of FinTech businesses and their range of permissible activities.

Under German law, FinTechs become subject to regulation and supervision, if they operate businesses which require a permission (i.e. a banking license) by the responsible regulators (§ 32 KWG). Those businesses include the provision of banking businesses (§ 1 sec. 1 KWG) and financial services (§ 1 sec. 1a KWG). To obtain a banking license, an entity is required –

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6 The requirement of a banking license is linked to the provision of banking businesses and financial services, independently of the use of new technologies and the innovativeness of products and services.
amongst others – to comply with specific capital requirements and to meet suitable organizational measures (e.g. internal risk-management) to run operations properly (§ 33 KWG). Subsequent to completed license-granting, ongoing organizational and reporting obligations, e.g. capital and liquidity requirements according to §§ 10, 11 KWG as well as the required adoption of internal safeguards concerning money laundering (§ 25h KWG) and compliance (§ 25a sec. 1 no. 3c KWG), must be complied with.\(^7\) Depending on the business model, a FinTech can also be subject to the license requirements of payment service providers (§ 1 sec. 1 ZAG) and electronic money issuers (§ 1 sec. 2 ZAG) according to §§ 10, 11 ZAG. However, in all cases licensing and supervision is exercised by the BaFin (§ 6 sec. 1 KWG, § 4 sec. 1 ZAG) (Deutsche Bundesbank, 2018).\(^8\)

The majority of FinTechs is expected to be subject to licensing in any way. For instance, if a FinTech takes deposits from customers or becomes a contracting party to a credit agreement, it requires a license in accordance to § 1 sec. 1 no. 1 or 2 KWG. For those FinTechs that offer investment advisory as in the case of robo advice, again a license according to § 1 sec. 1a KWG is necessary (Scholz-Fröhling, 2017). If, however, a FinTech acts with negligence and provides banking services without the required license, the entity can be fined or the management may even face imprisonment of up to five years (§ 54 KWG). To date, in Germany, merely § 2a VermAnlG, which excludes a FinTech in the crowdfunding sector from the publication requirement of an investment prospectus, represents a legislation specifically adopted for the FinTech business (Maume, 2017).

The analysis in the previous sections outlines several regulatory challenges in dealing with FinTechs. As already mentioned above, regulatory constraints serve to protect consumers as well as ensure the financial stability as a whole. However, the assumption of regulators that established and well-funded financial institutions have the capacities to comply with the legal provisions must not necessarily hold for young and financially weak FinTechs. Thus, the current regulatory framework poses significant market entry barriers for (potential) start-ups in the financial services industry. On the other hand, the addition of FinTechs to the banking industry could promote competition and hence increase consumer welfare. Nevertheless, notably regulatory entry barriers in the form of capital, liquidity and licensing requirements

\(^7\) § 2 sec. 1 no. 1-3 GWG.

\(^8\) Within the Single Supervisory Mechanism (SSM) however, those financial institutions which meet the definition according to Art. 4 sec. 1 no. 1 Capital Requirements Regulation (CRR) and additionally meet the European Central Banks’ (ECB) criteria of “significant institutions” (SI), are directly supervised by the ECB. For further details see European Central Bank (2014).
pose the greatest hurdle for their entry in the industry (Financial Services Authority, 2013). This is not in line with the BaFins’ statement that regulation must neither be exploit as entry barrier for newcomers and to protect incumbents, nor to (constantly) privilege newcomers. Also, the German regulator itself identified the need for action in this regard (Bundesanstalt für Finanzdienstleistungsaufsicht, 2016, PwC, 2017). Additionally to the intricacy of existing barriers to entry, the previous analysis outlines the trade-off between sound regulation and fostering innovation. Moreover, this regulatory trade-off is not only relevant in the financial services industry, but is also – from an economic point of view – relevant on a national basis: In order to remain competitive, national economies and its politicians should be aware of the positive relatedness between (technological and organizational) innovation and (economic) growth (Freeman, 1995, Brown et al., 2009). In this regard, the German government recognized the significance of the recent FinTech developments and launched the “FinTechRat” in March 2017, which aims at supervising trends in the financial technologies area, analyzing resulting opportunities and threats and advising the ministry of finance (Bundesministerium der Finanzen, 2017). Nevertheless, in order to foster innovation and contribute to innovative financial developments, newcomers need to be able to enter and compete in the market. Thus, the economic policy needs to be aware of the significant meaning of (regulatory) market entry barriers.

2.5 Regulatory Sandbox as potential solution

In developing new regulatory approaches for FinTech businesses, several jurisdictions, including the UK, Australia, the US, Hong Kong, Singapore, the Netherlands and Canada launched so called regulatory sandboxes (Accenture, 2016, Jenik and Lauer, 2017). These sandboxes typically imply a temporary liberalization or even exemptions from regulatory requirements to provide a “safe space” for FinTechs to test their new products, services and innovative business models in a live, but monitored environment under direct regulators’ supervision (He et al., 2017, Financial Conduct Authority, 2015). While testing their business models under this unburdened regulatory regime, FinTechs are moreover in a constant dialogue with the regulators, facilitating a mutual knowledge exchange (Bank for International Settlements, 2017, Maume, 2017). The collaborative concept is an attempt to strike a balance between the regulators’ competing objectives to promote innovation in financial services while safeguarding the financial regulations’ core mandates (Financial Stability Board, 2017, He et

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9 In this respect, it is noteworthy, that the increasing regulatory challenges imply an increasing demand for supportive services, which drives the “RegTech” developments. For further information see e.g. PwC (2017).
al., 2017, Bank for International Settlements, 2017). Thus, the sandbox concept may be a part of the solution of the above mentioned trade-off between sound regulation and fostering innovation as well as reduce (regulatory) market entry barriers, which ultimately may contribute to sustainable competitiveness and economic growth.

Historically, the theoretical basis of sandbox concepts originates from the information technology (IT) sector. Primarily in the context of software development, sandboxes provide an isolated testing environment for new codes before merging into the “live” system. This approach facilitates the identification of and protection against malfunctions or other changes that could inflict damage to the overall system resulting in potentially high costs (Oktavianto and Muhardianto, 2013, Goldberg et al., 1996, Wahbe et al., 1993). The migration of those sandbox concepts into the financial regulatory environment was pioneered by the UK’s Financial Conduct Authority (FCA) in November 2015 as a core component of its “Project Innovate” initiative (Financial Conduct Authority, 2017b). Afterwards, the application of sandbox concepts spread rapidly across various countries (Financial Stability Board, 2017). However, most introduced sandboxes are not constructed uniformly nor are they at the same stage of implementation (Bank for International Settlements, 2017, He et al., 2017), reflecting the differing size and maturity of the particular financial sectors and the flexibility of the regulatory frameworks already in place (Ernst & Young, 2017a, Financial Stability Board, 2017). However, albeit the diversity of existing models, the majority of sandboxes share some key characteristics and design components (Zetzsche et al., 2017, Bank for International Settlements, 2017, He et al., 2017, Jenik and Lauer, 2017). If successfully implemented, regulatory sandboxes have the potential to lower regulatory barriers and help to speed up the market introduction of a wide range of new services. Furthermore, the gathered information and valuable insights during the test period might assist regulators to gain better understanding of risks and how to adapt current and future regulation to FinTechs without stifling innovation (Financial Conduct Authority, 2015, Zetzsche et al., 2017, He et al., 2017, Jenik and Lauer, 2017, Ernst & Young, 2017a). Despite the benefits, to date no comparable initiative exists in Germany. However, the regularly organized workshops („BaFinTech“) and the creation of an internal FinTech task force,11 clearly express the high interest of the BaFin in this topic (Bundesanstalt für Finanzdienstleistungsaufsicht, 2017).

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10 i.e. rule-based vs. principle-based regime; for further details see Brummer and Gorfine (2014).

Building on the above derived list of major FinTech markets (see figure 2), an in-depth analysis of the respective sandbox solutions shall serve as a foundation to develop a set of recommendations for the concept of a regulatory sandbox specifically for the German market, which is in line with the regulatory framework and objectives. For this purpose the intersection of the above derived major FinTech markets with jurisdictions that already introduced an operational sandbox approach (Jenik and Lauer, 2017), represent the scope of this papers’ further analysis on the various sandbox designs:

![Diagram showing Major FinTech markets and regulatory sandbox in operation](image)

**Figure 3: Major FinTech markets in scope of regulatory sandbox analysis.**

### 3 Analysis of Regulatory Sandboxes

In order to analyze the as relevant derived regulatory sandbox concepts\(^{12}\) systematically we focus on certain assessment criteria: If provided, we focus on the sandboxes’ objective, the effective date and stage of implementation. Furthermore, we highlight specifications regarding the application process, eligibility criteria and limitations (e.g. participants, offered services, type and maximum number of clients, restrictions regarding the maximum exposure, customer safeguards, and disclosure). Finally, we emphasize the duration of the test as well as applicable regulatory “tools” and the questions whether and how the responsible authority provides assistance and collaborates with participating firms during the test period and when

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\(^{12}\) Scope of analysis, see figure 3.
transitioning out of the sandbox. As mentioned above, the following in-depth analysis of the respective sandbox solutions serves as a foundation for the development of a set of recommendations for a regulatory sandbox concept specifically for the German market, which is in line with the regulatory framework and objectives. Beyond that, a comprehensive table, which both summarizes and compares characteristics of the various sandbox approaches, is provided in the appendix.

**Regulatory Sandbox: UK**

As mentioned above, the FCA launched a comprehensive “Regulatory Sandbox” concept as a core component of its “Project Innovate”. The overall aim of Project Innovate is to foster competition and growth in the financial services industry by supporting small and large businesses that are developing products and services which could improve consumers’ experience and outcomes (Financial Conduct Authority, 2015). On this basis, the objective of introducing the regulatory sandbox is to promote competition through (disruptive) innovation. The projected framework shall offer the possibility to test products and services in a controlled environment, thereby reducing the time-to-market at potentially lower cost. Moreover, it strives to support the identification of appropriate customer safeguards for new products and services and achieving better access to finance (Financial Conduct Authority, 2015, Financial Conduct Authority, 2018c, Financial Conduct Authority, 2017b, Financial Conduct Authority, 2018b).

In this regard, the FCA developed its sophisticated regulatory sandbox, which was introduced in November 2015 and launched in June 2016 (Financial Conduct Authority, 2018a, Financial Conduct Authority, 2018c, Financial Conduct Authority, 2017b). The sandbox is open to both start-ups and incumbents as well as authorized and unauthorized firms. However, potential companies need to undergo an application process and meet certain criteria to participate in this concept (Financial Conduct Authority, 2018c). Moreover, the sandbox works on a cohort basis with two cohorts per year, thus offering two six-month test periods per year. For the first two cohorts the FCA received 146 applications of which 18 firms (cohort 1) and 24 firms (cohort 2) participated in the sandbox. Furthermore, 61 firms applied for participating in cohort 3 of which 18 were accepted by the FCA (Financial Conduct Authority, 2017b, Financial Conduct Authority, 2017a, Financial Conduct Authority, 2018d, Financial Conduct Authority, 2018e).

In more detail, applying companies need to explain its proposition, whether it is eligible and how it meets the FCAs’ default standards (Financial Conduct Authority, 2018a). The required eligibility is based on certain criteria: First of all, firms must be in scope, which means that the
companies’ planned innovation is designed for or supports the financial services industry. The new solutions need to be genuine innovations, thus differing significantly from existing ones. Furthermore, directly or indirectly through increasing competition, the companies’ innovations must lead to identifiable consumer benefit and the companies need to make clear why there is a “need for sandbox”. Finally, in order to be eligible, potential participants need to have done sufficient research regarding its innovation and need to be ready for testing it with real customers in real markets (Financial Conduct Authority, 2015, Financial Conduct Authority, 2018a).

Applicants must not only meet the required eligibility criteria but also a number of default standards, which were defined by the FCA. These encompass regulations regarding the duration for testing (three to six months), number of clients, customer selection, customer safeguards, disclosure, data and testing (Financial Conduct Authority, n/a). Finally, the FCA expects the testing companies to have a clear objective with the intended sandbox test (e.g. reducing costs to consumers) (Financial Conduct Authority, 2018c).

After reviewing the applications, the FCA decides which companies participate in the following cohort of the sandbox test. For each firm approved, the FCA dedicates a case officer who supports the participating company regarding the designing and implementing of the test. In general, the FCA works closely with participants in order to ensure appropriate customer safeguards being in place and mitigating potential harm during and after the test-period (Financial Conduct Authority, 2017b). Also, the FCA designed multiple tools to provide assistance during the test period and participation in the regulatory sandbox: First, the FCA designed a tailored authorization process specifically for unauthorized firms (restricted authorization). As a result, participating firms are allowed to test the agreed products and services (only), even though they are not able to meet the full requirements for a general, thus unlimited authorization. Moreover, the FCA can provide participating firms with no enforcement action letters, individual guidance or waivers. A no enforcement letter may be issued, if the FCA believes that the participating firms’ activities do not breach the FCAs’ requirements or harm its objectives and where the FCA is not able to assist with individual guidance and waivers. In this case, the FCA states that, as long as the test period lasts, no enforcement action against the company, respectively its intended activities, will be taken. Moreover, participating firms may often face uncertainties regarding existing regulatory requirements and whether and how they need to be applied in light of the intended activities. In
these cases, the FCA gives individual guidance regarding the interpretation of applicable regulations. Finally, in the case of unduly burdensome rules, the FCA may be able to waive or modify specific rules for testing companies. However, this tool is limited to the FCAs’ power and authority regarding the particular, questioned regulation (Financial Conduct Authority, 2015, Financial Conduct Authority, 2018c, Financial Conduct Authority, 2017c). At the end of a sandbox test and before transitioning out of the sandbox, all participants have to submit a final report. The report should summarize the outcomes and findings of the sandbox test as well as the next steps planned (e.g. regarding product development) (Financial Conduct Authority, 2017b).

**Regulatory Sandbox: US**

In the US, no comprehensive regulatory sandbox concept as compared to the UK exists. Rather, authors and representatives do not agree whether there is a regulatory sandbox in operation or not (Bologna, 2017, Jenik and Lauer, 2017, Accenture, 2016). However, independently from whether or not a regulatory sandbox exists in the US, one has to state, that this issue is not only discussed frequently\(^\text{13}\) but also that several regulatory initiatives, addressing innovation in the financial services sector, exist.

First of all, the Consumer Financial Protection Bureau (CFPB), one of many regulatory authorities in the complex and fragmented US financial regulatory system (Gerlach et al., 2016), launched its “Project Catalyst” in November 2012. This initiative is based on the CFPBs’ belief that innovative developments imply markets working better for both consumers and suppliers of financial services and products. The aim of Project Catalyst is to facilitate innovation in order to enable the development of both safe and beneficial products and services in the financial services sector. In this regard, the CFPB announced a threefold strategy, consisting of the establishment of communication channels with stakeholders,\(^\text{14}\) the development of programs and policies which support consumer-friendly innovation and finally the engagement in pilot projects as well as research collaborations (Consumer Financial Protection Bureau, 2016b). As a result, the CFPB developed the “Policy To Encourage Trial Disclosure Programs” and “Policy on No-Action Letters”. The rationale of the “Policy To Encourage Trial Disclosure Programs”, which became effective in October 2013, is to improve the way consumers receive information (e.g. regarding costs, benefits and associated risks) which are necessary to decide whether or

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\(^\text{13}\) For instance, discussions regarding the benefits and downsides of regulatory sandboxes in general and the question whether and how a sandbox should be implemented in the US (Allen, 2018).

\(^\text{14}\) e.g. entrepreneurs, innovative businesses, other regulators.
not to use certain financial products or services. This again should increase competition and transparency, imply improved consumer understanding and lead to better-informed decision-making. In this respect, the CFPB has the authority to waive, for a defined time frame, certain disclosure requirements for companies with innovative versions and ideas for disclosures (Consumer Financial Protection Bureau, 2016b, Consumer Financial Protection Bureau, 2013). Moreover, similar to the FCAs’ approach, the CFPB has the authority to issue no-action letters (“Policy on No-Action Letters”, issued February 2016). In such a letter, which (following a formal application of potential companies) can be issued by the CFPB, staffs state that there is no intention to recommend enforcement or supervisory action against the company. However, a no-action letter is, for instance, limited to a predetermined period and certain statutes or regulations as well as possibly limitations regarding the volume of transactions. Using this tool, the CFPBs’ aim is to prevent the regulatory framework in hindering innovation and to reduce regulatory uncertainties, which ultimately should promote the development of consumer-friendly innovations (Consumer Financial Protection Bureau, 2016b, Consumer Financial Protection Bureau, 2016a). To date, this tool was used only once in September 2017, issued to a company named “Upstart Network, Inc.”, an online lending platform (Consumer Financial Protection Bureau, 2017, Bologna, 2017).

A further initiative in the US took place in July 2016, when the “IRS Data Verification Modernization Act of 2016” was published. An initiative, which aims to automate and speed up taxpayers’ income verification process for legitimate business purposes. In this respect, verification should be conducted entirely automated, electronic, online and close to real-time (Mc Henry, 2016a).

Additionally, the “Financial Services Innovation Act of 2016” was published in September 2016. This initiative implements several actions to be conducted by agencies, whereas “agencies” comprise many regulatory authorities, boards, commissions etc. Each agency shall regularly identify and publish existing regulations, which both apply or may apply to financial innovation and the agency would consider to modify or waive. The act requires the agencies to set up a Financial Services Innovation Office (FSIO) in order to promote and assist financial innovations. In special circumstances and if appropriate, agencies shall, acting through its FSIO, waive existing regulations. The act enables firms that offer or intend to offer financial innovations to submit a petition to an agency. This may result in the agencies’ FSIO entering

\[15\] e.g a rule being burdensome.
an agreement with the requesting company, which implies modifications or waivers for regulations where the agency has authority. Within the time frame from receiving the petition until the determination, the respective authority may undertake no enforcement actions which are related to the financial innovations that are subjected to the petition (“Safe Harbor”) (Mc Henry, 2016b).

Finally, the U.S. Commodity Futures Trading Commission (CFTC) launched another FinTech initiative in May 2017, named LabCFTC. This initiative, which again is limited to the CFTCs’ authorities and overseen markets, the CFTC has a twofold purpose: Firstly, it aims at increasing regulatory certainty in order to encourage innovation, thus quality, resilience and competitiveness. Secondly, the CFTCs’ objective is to identify and utilize new technologies. In order to accomplish this goals, the CFTC fosters a proactive engagement with the innovator community, academia, students and professionals, its participation in studies and research, the collaboration and cooperation among the FinTech industry as well as the CFTF market participants and the financial regulators both at home and overseas (U.S. Commodity Futures Trading Commission, 2017).

**Regulatory Sandbox: Australia**

In 2015, the Australian Securities and Investments Commission (ASIC) launched an Innovation Hub to support FinTechs adequately navigate the relevant regulatory requirements. To achieve this objective, its key initiative was the creation of the ASIC’s regulatory sandbox framework in December 2016 (Australian Securities and Investments Commission, 2017b). This sandbox approach consists of a licensing exemption allowing FinTechs to test their products or services without the requirement of a financial services or credit licenses (Australian Securities and Investments Commission, 2017a, Australian Securities and Investments Commission, 2018b), while ensuring adequate consumer protection (Australian Securities and Investments Commission, 2017b). A further objective of the sandbox is the facilitation of innovation (Australian Securities and Investments Commission, 2017a) by accelerating time-to-market and access to capital (Australian Securities and Investments Commission, 2017b). Despite these benefits, by the end of April 2018 only five businesses were using the regulatory sandbox whereas one already exited the sandbox (Australian Securities and Investments Commission, 2018a). Similarly, a current survey reveals that only 1% of Australian FinTechs are currently using the regulatory sandbox, while 9% plan to use it in the next 12 months (Ernst & Young, 2017c).
To rely on the sandbox exemption, a FinTech must not be banned from providing financial services or from engaging in credit activities. Furthermore, the regulator explicitly excludes license-holders (i.e. established financial institutions) and is consequently eligible to early-stage financial institutions (i.e. start-ups) (Australian Securities and Investments Commission, 2017a, Ernst & Young, 2017a, He et al., 2017). A significant difference between the licensing exemption and the sandbox requirements of other financial regulators worldwide is the Australian “whitelist” approach, implying an automatic admission to the sandbox without an individual review by ASIC (Australian Securities and Investments Commission, 2017b). According to this, no formal application is required. Instead, the only requirement is a written notification and provision of certain information to the ASIC, before relying on the licensing exemption (Australian Securities and Investments Commission, 2017a). In contrast to this unique and comparatively flexible “whitelist” approach, the regulator prescribes strict qualitative as well as quantitative limitations concerning the operations of certain financial services or credit activities within the sandbox (Australian Securities and Investments Commission, 2017a). Amongst others, the ASIC provides a detailed list of financial services and credit activities that FinTechs are allowed to provide when utilizing the licensing exemption. However, issuing financial products or acting as a credit provider is not allowed under the exemption (Australian Securities and Investments Commission, 2017a, Australian Securities and Investments Commission, n/a).

Beside these product-specific requirements, further conditions have to be met to be able to rely on the relief of the licensing exemption. During the limited testing period of 12 month, the businesses may only provide services to up to 100 retail clients, while there are no limitations for wholesale or sophisticated clients. Yet, the total customer exposure may not exceed AUD 5 million. To maintain consumer trust and avoid systemic risk, the sandbox does not intend to waive any consumer protection requirements. Therefore, it specifies that every participant needs to comply with key consumer protection provisions and meet the disclosure and conduct requirements. In addition, the FinTechs must notify their clients that they rely on the licensing exemption and thus operate without license. Finally, the prescribed arrangement of adequate compensation schemes in case of losses as well as the implementation of dispute resolution procedures shall further ensure consumer protection (Australian Securities and Investments Commission, 2017a, Australian Securities and Investments Commission, n/a). Despite these strict specifications, the ASIC preserves the possibility to extent the testing period and/or the client limit (Australian Securities and Investments Commission, 2017a).
At the end of the sandbox period, the FinTechs can no longer rely upon the exemptions and are no longer allowed to continue operations, unless they have been granted a financial services or credit license. Similarly, they may proceed, if they have entered into an arrangement to provide services on behalf of a financial services or credit licensee, or if the ASIC has given individual relief extending the testing period (Australian Securities and Investments Commission, 2017a). Subsequent to the sandbox test, the participants are required to provide a short report of their experiences during the testing period (Australian Securities and Investments Commission, 2017a). However, neither does the regulator engage with the FinTechs prior to entering the sandbox, nor is a knowledge exchange officially stipulated between both parties during the testing (Zetzsche et al., 2017).

**Regulatory Sandbox: Singapore**

Over the past few years, the Monetary Authority of Singapore (MAS)\(^{16}\) has made some substantial investment to accelerate growth of the FinTech sector and implemented a range of supporting programs, positioning Singapore as a significant FinTech market (Monetary Authority of Singapore, 2018c). One key initiative was the formation of the FinTech & Innovation Group in August 2015, responsible for the development of regulatory policies and strategies relating to FinTechs (Monetary Authority of Singapore, 2018b). Finally in November 2016, the MAS released its "FinTech Regulatory Sandbox Guidelines" to provide a safe space for innovative firms to test their products and services while relaxing specific legal and regulatory requirements without deteriorating consumer protection and financial stability (Monetary Authority of Singapore, 2016a, Monetary Authority of Singapore, 2016b). The Sandbox is applicable for trials of new financial services by both (unregulated) FinTech start-ups and large (regulated and licensed) financial institutions (Monetary Authority of Singapore, 2016b, Monetary Authority of Singapore, n/a, Monetary Authority of Singapore, 2016c). Moreover, it is open to all interested firms with innovative financial services with no sectorial restriction on financial institutes (Monetary Authority of Singapore, 2016a). As there is no cohort scheme, applications to the sandbox can be submitted anytime (Baker McKenzie, 2017), so that by June 2018, four participants were actively using the sandbox (Monetary Authority of Singapore, 2018a) and one already exited the sandbox successfully (Fintech Singapore, 2017).

Based on the regulators’ precondition to solely offer financial services which include new or emerging technology, or which use existing technology in an innovative way, the temporary relaxation of specific legal and regulatory requirements is conducted on a case-by-case basis (Monetary Authority of Singapore, 2016a, Monetary Authority of Singapore, 2016b, Monetary Authority of Singapore, n/a). Examples of those requirements that may be relaxed apply to cash balances, credit rating, financial soundness, fund solvency and capital adequacy. However, the MAS emphasizes that the sandbox should not be understood as a means to circumvent legal and regulatory requirements and further clarifies that it will not compromise on requirements concerning consumer protection, prevention of money laundering and financing of terrorism (Monetary Authority of Singapore, 2016a).

A further criterion, which the regulator will evaluate before granting permission to enter the sandbox, is the applicants’ intention and ability to deploy the service in Singapore on a broader scale. To achieve the aspired well-defined space for experimentation, the test scenarios and boundary conditions, as well as the exit and transition strategy have to be clearly defined before entering the sandbox. The applicants are furthermore obliged to assess and mitigate significant risks and shall install appropriate safeguards to limit the consequences of failure for consumers and the financial system in collaboration with the regulator (Monetary Authority of Singapore, n/a, Monetary Authority of Singapore, 2016a). Similar to the Australian approach, the participants must notify its customers about the sandbox conditions and disclose the key risks, which the customer has to confirm. Despite these strict requirements, detailed specifications of the sandbox like the time frame, the maximum number as well as the type of customer and the maximum exposure are not predetermined by the guidelines. Instead, they are agreed on a case-by-case basis resulting in a cooperative and individually tailored solution (Monetary Authority of Singapore, 2016a).

During the testing period, which may optionally be extended, the sandbox can be discontinued by the regulator, if the participants are not capable to fully comply with the legal and regulatory requirements at the end of the sandbox period or in case of a breach of the agreed sandbox conditions (Monetary Authority of Singapore, 2016b, Monetary Authority of Singapore, 2016a, Monetary Authority of Singapore, 2016c). To prevent a forced termination of the sandbox, the participants are required to report to the MAS on agreed intervals (Monetary Authority of Singapore, 2016a). At the end of the sandbox period, the relaxation of the legal and regulatory requirements will expire, and the participants must exit the sandbox. However, the participants may proceed to deploy its financial service on a broader scale, if they fully comply with the
relevant legal and regulatory requirements and both MAS and the participants are satisfied that the sandbox has achieved its intended outcomes (Monetary Authority of Singapore, 2016a).

**Regulatory Sandbox: Hong Kong**

Hong Kong’s regulator and supervisor of the banking business, the Hong Kong Monetary Authority (HKMA), launched its Fintech Supervisory Sandbox (FSS) in September 2016 as part of a broader regulatory policy (Hong Kong Monetary Authority, 2018b, Hong Kong Monetary Authority, 2016). Further initiatives by the HKMA, like the FinTech Facilitation Office, were implemented to enable a solid development of the local FinTech sector and to promote Hong Kong as a major FinTech hub in Asia (Hong Kong Monetary Authority, 2018a).

The HKMAs’ sandbox is exclusively eligible to authorized financial institutions (i.e. license holders) and their partnering technology firms and consequently precludes start-ups and non-bank institutions (Hong Kong Monetary Authority, 2018b, Hong Kong Monetary Authority, 2016). It allows participants to conduct pilot trials without fully complying with the HKMAs’ supervisory requirements. Thereby they can gather real-life data and user feedback within a controlled environment, which furthermore reduces time-to-market of new technology products as well as their development costs (Hong Kong Monetary Authority, 2018b, Hong Kong Monetary Authority, 2016). Similar to the Singaporean approach, the HKMA does not release an extensive list of supervisory requirements that may be relaxed. Instead, relaxations will be discussed on a case-by-case basis with every individual applicant. Generally, all innovative FinTech products and services such as mobile payment services, biometric authentication, blockchain, robotics and augmented reality are in the focus of the sandbox, if they are intended to be launched in Hong Kong. In addition to external customers, also company staff members can be in the focus groups of targeted customers during the testing phase. From September 2016 to April 2018, 32 pilot trials were conducted in the sandbox, whereby 22 already exited and successfully rolled out their products and services. The tested FinTech products related largely to biometric authentication, soft tokens and chatbots (Hong Kong Monetary Authority, 2018b, Hong Kong Monetary Authority, 2016).

For the participation in the sandbox, the HKMA requires clearly defined terms concerning the scope, the timing and the termination of the pilot trials. Similarly, the HKMA strictly maintains on sufficient customer protection measures and reasonable risk management controls to

mitigate risks that arise from the incomplete compliance with supervisory requirements. Therefore, the HKMA clarifies that the sandbox shall not be understood as a means to bypass applicable supervisory requirements. Finally, the regulator requires the readiness of the systems and processes for the trial, which is moreover subject to close monitoring. The duration of the sandbox, exit arrangements, client limitations as well as the maximum exposure are not specified by the HKMA, but are instead agreed upon a case-by-case-basis in individual discussions (Hong Kong Monetary Authority, 2018b, Hong Kong Monetary Authority, 2016).

Alongside the HKMA’s sandbox approach, also the Hong Kong Securities and Futures Commission (SFC)\textsuperscript{18} (i.e. SFC Regulatory Sandbox) and the Hong Kong Insurance Authority (IA) (i.e. Insurtech Sandbox) each launched their respective sandbox solutions in September 2017 (Securities and Futures Commission, 2017b, Insurance Authority, 2018). While the HKMA’s sandbox only applies to authorized financial institutions, the SFC’s sandbox is applicable to both, corporations licensed by the SFC and start-up firms that intend to operate a regulated activity and utilize innovative technologies. Further requirements largely correspond to the HKMA, as also key investor protection requirements are not permitted to be relaxed (Securities and Futures Commission, 2017b, Securities and Futures Commission, 2017a). Likewise, the SFC can impose licensing conditions that limit the type and maximum exposure of those clients the firms plan to serve. Additionally, it can impose requirements to install adequate compensation schemes for investors, or to submit to periodic supervisory audits, facilitating a closer monitoring and supervision by the SFC (Securities and Futures Commission, 2017b, Securities and Futures Commission, 2017a). Lastly, the target audience of the IA sandbox are insurers authorized by the IA seeking for a controlled environment to test their Insurtech and other technology initiatives, which they intend to launch in Hong Kong. The IA prescribes analog principles applicable for the sandbox and does not publish an exhaustive list of supervisory requirements that may be relaxed, as each application will be evaluated on a case-by-case basis (Insurance Authority, 2018).

4 Proposal of a Regulatory Sandbox Concept for Germany

Despite the variety of successful\textsuperscript{19} and promising sandbox approaches worldwide, to date no such solution to the trade-off between sound regulation and promotion of innovation (in the


\textsuperscript{19} In terms of usage and successful exits of market participants.
financial sector) exists in Germany. However, as the previous analysis indicates, current regulatory concepts differ in several specifications, thus, there neither seems to be a “one size fits all solution” nor a general assessment regarding benefits and downsides of the applied concepts is possible. Nevertheless, we can use the findings of our in-depth analysis as a foundation to develop a set of recommendations for a regulatory sandbox concept specifically for the German market, which is in line with the regulatory framework\(^{20}\) and objectives. However, the analysis also indicates that despite the discretion in licensing and other supervisory requirements, most of the sandboxes remain strict on fundamental regulations relating to consumer protection and anti-money laundering. Thus, as often challenged by the BaFin (Bundesanstalt für Finanzdienstleistungsaufsicht, 2016), the core mandates of financial regulation to ensure the efficiency and stability of the financial system and to create a level playing field between market participants, are not compromised during the period of a regulatory sandbox.

Meanwhile the German banking supervisor BaFin\(^{21}\) realized the need for a certain degree of flexibility in the context of FinTech and has henceforth dedicated itself to their diverse concerns. Against the background of the BaFins’ objective to create a contemporary supervision without compromising its core mandates\(^{22}\) (Bundesanstalt für Finanzdienstleistungsaufsicht, 2016, Bundesanstalt für Finanzdienstleistungsaufsicht, 2018a), the aim of this section is to develop a sandbox framework which is applicable in the German regulatory environment. Similarly to the scrutiny of the legal and regulatory framework, also the regulators capacity as well as the market conditions of a particular country must be considered when developing a regulatory sandbox (Jenik and Lauer, 2017). However, as shown in section 2.3, both the global and national developments in the FinTech markets as well as Germany being identified as one of the major representative FinTech markets worldwide, clearly provide strong evidence of the need for action in this regard.

To facilitate the implementation of a regulatory sandbox in practice, the following suggestions are divided into three phases and address the same criteria as used in section 2 to analyze the respective sandbox concepts: The first phase concerns the FinTechs’ prerequisites to apply for the sandbox. Generally, the sandbox should be applicable for both, start-ups and incumbents.

\(^{20}\) A possibly implemented regulatory sandbox needs to be in line with relevant national and international law and its scope is limited to the national supervisors’ power and authority within the respective legislation.

\(^{21}\) According to § 6 sec. 1 KWG.

\(^{22}\) In line with § 6 sec. 2 KWG.
respectively licensed and unlicensed companies, that intend to operate regulated financial services\(^{23}\) under the BaFin. This all-embracing approach ensures a level playing field between market participants and thus cannot be confused with an economic promotion, which the BaFin has no mandate to (Bundesanstalt für Finanzdienstleistungsaufsicht, 2016). The proposed services should be innovative in the way that they include new technology or utilize existing technologies in a novel or reinvented way. In addition, the written application must contain clear and concrete information, how the firms plan to operate during the testing phase, which include distinct definitions of the test scenarios, targeted customers, the expected exposure as well as a clear exit and transition strategy. Moreover, the applicants are supposed to have safeguards and risk management controls already in place, which meet the BaFins’ requirements to appropriately protect consumers and the soundness of financial system during the sandbox period. Thus, risk identification and mitigation strategies depict important eligibility criteria to be permitted to participate in the sandbox. Finally, there shall not be any application-deadlines as under the cohort-approach in the UK, however, the FinTechs must demonstrate their organizational preparedness to conduct the trials and to enter the market within an adequate time frame before applying.

Secondly, the implementation of the testing-phase shall then be conducted in close cooperation with the supervisor. As the BaFin intends to review each business model individually (Bundesanstalt für Finanzdienstleistungsaufsicht, 2016), a case-by-case evaluation of adequate allowances and potential relaxations of specific regulatory requirements seems to be the most suitable approach in the German context. This facilitates both parties to jointly define clear boundary conditions such as the maximum number and type of clients as well as the maximum exposure and the time frame of the sandbox period. Similarly, an individual relaxation of certain regulations is eligible under this approach. Notably the authorization requirements according to § 33 KWG constitute a potential reference point in this respect, as amongst others the initial capital requirements of § 33 sec. 1 KWG may represent major hurdles especially to young firms. This alternative certainly requires the supervisor to thoroughly assess and balance those regulations that pose concrete issues or barriers to an individual FinTech and thus may be relaxed for a limited time, without putting the trust in the financial system at risk.

Furthermore, this principle-based sandbox approach enables the BaFin to react to each firm in an adaptive way, providing FinTechs with the flexibility they require in their respective stage.

\(^{23}\) According to § 1 sec. 1, 1a KWG.
of development. However, it must be clear that the core principles of consumer protection, anti-money laundering and countering the financing of terrorism policies (Bundesanstalt für Finanzdienstleistungsaufsicht, 2018a) will not be compromised at any time. The achievements of the already operating sandboxes suggest a time frame of participation of at least six months, during which the FinTechs have time to test their innovative products or services and to develop the capability to fully comply with the relevant regulatory requirements before exiting the sandbox. Finally, the trials shall be subject to close monitoring by the responsible supervisor. Therefore, he should request the participants to provide periodic reports. Since the ongoing supervision of institutions by the BaFin is executed in cooperation with the Deutsche Bundesbank, those reports and resulting consultation may also be conducted by the latter.

Thirdly, the exit from the sandbox and the transition to a fully-fledged financial institution represents the final stage of the sandbox-participation, if a FinTech succeeds to fully comply to all relevant regulations and furthermore demonstrates a reliable technology, which can operate under the same supervision requirements as authorized institutions. Otherwise, a FinTech is not allowed to continue operations as the relaxation of regulatory requirements expire. Either way, the participants should be induced to provide a final report of its experiences and suggestions to facilitate a knowledge-exchange, giving the supervisor the chance to learn and continuously improve the approach.

These general suggestions for guidelines, if adequately applied, would not only preserve the trust in the financial system but also counteract the BaFins’ concerns that sandboxes could potentially degrade consumer protections by creating a “supervision light” (Bundesanstalt für Finanzdienstleistungsaufsicht, 2016). On the contrary, a sandbox developed on this basis does not contradict any of the supervisors’ statutory duties and would moreover create a level playing field for market participants, which is clearly distinctive from a mere economic promotion of young start-ups. It would enable licensed as well as unlicensed start-ups and incumbents to test their innovative services in a controlled environment by the BaFin, thereby accelerating their time-to-market and access to capital. In summary, a German sandbox developed on this basis, could represent a sound solution to the above derived trade-off between encouraging innovation and ensuring compliance to regulations.

24 According to § 7 KWG.
5 Conclusion

With this study, we aimed at developing a sandbox framework that is applicable in the German regulatory environment without compromising core regulatory objectives. Capital, liquidity and licensing requirements imposed by financial regulations pose a major hurdle for young FinTechs to enter the markets. Economic growth and customer welfare through innovation, increasing consumer choice and lower prices in the course of an entry of new FinTechs would yet be restricted. Through its ability to reduce time-to-market for FinTechs, a regulatory sandbox is a useful approach to overcome the regulatory barriers to entry and to foster competition in the financial markets while ensuring consumer protection and financial stability. Building on an in-depth analysis of various sandbox models worldwide, which were identified as relevant systematically, we proposed an own set of recommendations as a basis for an accessible and sustainable sandbox implementation. These recommendations have the potential to contribute to the solution of the trade-off between sound regulation and innovation support. In doing so, we also contribute to different strands of literature regarding the evolution and general understanding of FinTechs and its services, the recent discussions of an optimal design of sandbox concepts and – specifically for the German market – the existing regulatory frameworks and their approaches to FinTech-supervision. In this regard, this study represents – to our best knowledge – the first study on key international sandboxes as a basis to design guidelines for a regulatory sandbox concept specifically for the German market. Hence, since the responsible regulator itself recognized a “need for action” in this regard (Bundesanstalt für Finanzdienstleistungsaufsicht, 2016), we not only contributed to the identified research gap in literature but also to the practical solution of current challenges that both regulators and affected companies face. However, even though our derived implications focus on the Germany financial sector, the results may potentially be applicable in further jurisdictions with similar regulatory requirements. Additionally, our analysis of various sandbox models worldwide can be used as a basis for further research, which focuses on other than the German financial markets.

Nevertheless, it is important to mention that this paper neither can provide a detailed regulatory framework for the German FinTech market and nor did we aim at this. Rather, we encourage to interpret this study as a “call for action” regarding the identified “need for action” by providing systematically derived general guidelines as a basis for further discussions and the implementation of a regulatory sandbox concept in Germany. Moreover, it is important to highlight that so far no empirical evidence regarding the assumed contribution of regulatory
sandboxes to the trade-off between sound regulation and innovation support exists. Notwithstanding, based on conceptual and qualitative considerations we expect this causality to exist most likely.

Partly derived from these limitations, we identified needs for future research. Firstly, subjected to accessible data, future research should empirically investigate the assumed interconnection of the existence of regulatory sandbox concepts and the resolutions of the identified trade-off. Additionally, it would be highly interesting to research on the question whether and how differing characteristics in national regulatory sandbox concepts imply differences in the efficiency and performance of those concepts, particularly in respect to the emergence and success of FinTechs. Since these questions are highly relevant for the sustainability and efficiency of both financial industries and thus the sustainable and long-lasting competitiveness of national economies, we encourage both practitioners and researchers to further focus on these issues.
## Appendix: Comparison of as relevant identified regulatory sandboxes

<table>
<thead>
<tr>
<th>Criteria</th>
<th>UK</th>
<th>US</th>
<th>Australia</th>
<th>Singapore</th>
<th>Hong Kong</th>
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<tbody>
<tr>
<td>General aspects</td>
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<td>Responsible Regulator</td>
<td>FCA</td>
<td>Several</td>
<td>ASIC</td>
<td>MAS</td>
<td>HKMA</td>
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<tr>
<td>Stage of implementation</td>
<td>In operation</td>
<td>In operation</td>
<td>In operation</td>
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<tr>
<td>Objective</td>
<td>The regulatory sandbox aims at delivering more effective competition in the interests of consumers by: • the ability to test products and services in a controlled environment • reducing the time-to-market at potentially lower cost • supporting the identification of appropriate consumer protection safeguards • better access to finance The overall aim of “Project Innovate” is to foster competitions and growth in financial services sector by supporting both small and large business, which develop products and services that genuinely improve consumers’ experience and outcomes.</td>
<td>The regulatory sandbox aims at assisting and supporting FinTechs to test their products and services in an environment with reduced regulatory requirements whilst safeguarding adequate consumer protection. Moreover, the concept aims at facilitating innovating, accelerating time-to-market and improving flexibility and access to capital.</td>
<td>The regulatory sandbox aims at assisting and supporting FinTechs to test their products and services in an environment with relaxed legal and regulatory requirements, however consumer protection and financial stability must not be deteriorated.</td>
<td>The regulatory sandbox helps to give regulatory certainty regarding risks that are relevant to the entities’ regulated activities. It provides a confined regulatory environment before innovative products and services are offered on a larger scale.</td>
<td>The regulatory sandbox aims at facilitating pilot runs to collect sufficient data in order to demonstrate that certain Insurtech applications can broadly meet relevant supervisory requirements. Moreover, before launching a product or service on a large scale, the sandbox firms should obtain real market data and user feedback in a controlled environment.</td>
</tr>
<tr>
<td>Scope/Content</td>
<td>Firms in the sandbox may be provided with “sandbox tools” to conduct the test within the regulatory framework, e.g. • restricted authorization • individual guidance • waivers • no enforcement action letters Sandbox firms are assigned a dedicated case office who supports the design and implementation of the test. The FCA works closely with sandbox firms to ensure that sufficient safeguards are in place and to mitigate potential harm during and after the test period.</td>
<td>Policy to Encourage Trial Disclosure Programs. The rationale is to improve the way consumers receive information, which are necessary to decide whether to use certain financial products or services. This again should increase competition and transparency, imply improved consumer understanding and lead to better-informed decision-making. In this respect, the CFPP has the authority to waive, for a defined period, certain disclosure requirements for companies with innovative versions and ideas for disclosures. Policy on No-Action Letters: The rationale is to prevent the regulatory framework in hindering innovation and reducing regulatory uncertainties, which ultimately should promote the development of consumer friendly innovations. Entities may formally submit a request for a No-Action Letter. In such a letter, the CFPP may state that there is no intention to recommend enforcement or supervisory action against the company. No-Action Letters may for instance be limited to a predetermined period and certain statutes or regulations as well as possibly limitations regarding the volume of transactions. IRS Data Verification Modernization Act of 2016: Initiative that aims to automate and speed up taxpayers’ income verification process for legitimate business purposes.</td>
<td>The framework consists of three components: • Existing flexibility or exemptions provided by law • FinTech licensing exemptions applicable to certain products or services • Individual licensing exemptions Only licensing requirements are waived, not regulations.</td>
<td>Relaxation of specific legal and regulatory requirements for operating MAS-regulated functions on a case-by-case basis. Legal and regulatory requirements that may be relaxed consist e.g. • fund solvency and capital adequacy • license fees Requirements that must be maintained consist • consumer protection • prevention of money laundering and financing of terrorism • fit and proper criteria particularly on honesty and integrity</td>
<td>No relaxation of regulatory requirements, which are key to investor protection. Sandbox firms must comply with the applicable financial resources requirements.</td>
</tr>
<tr>
<td>Flexibility</td>
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The verification process should be conducted entirely automated, electronic, online and close to real-time in order to prevent delays for FinTech companies and banks that rely on leveraging data and technology to make faster, informed decisions for consumer and small business lending.

Financial Services Innovation Act of 2016: This act requires agencies (e.g. regulatory authorities, boards, commissions) to
- identify and publish a list of existing regulation that apply or may apply to financial innovation and that the agency would consider modifying or waiving
- establish a FSIO in order to promote and assist financial innovations as well as eventually waive existing regulations

The act further enables entities that offer or intend to offer financial innovations to submit a petition to an agency in order to reach individual agreements regarding modifications or waivers for certain regulations.

LabCFTC: Initiative by the CFTC that aims at increasing regulatory certainty in order to encourage innovation and to identify and utilize new technologies.

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| Eligibility to apply for participation | Sandbox is open to
both start-ups and incumbents
authorized and unauthorized firms |
| Applications must
explain proposition
meet the default standards (e.g. duration, number of customers, customer selection and safeguards)
meet the eligibility criteria (firm in scope? Genuine innovation? Consumer benefit? Need for a sandbox? Ready for testing? Background research?) |
| Exemption excludes license-holders (established financial institutions) and covers mostly early-stage financial institutions (start-ups). |
| The regulatory sandbox is applicable for trials of new financial services by both (unregulated) FinTech start-ups and large (regulated and licensed) financial institutions. |
| The regulatory sandbox only applies to authorized financial institutions (i.e. license holders) and their partnering technology firms, excluding start-ups and non-bank institutions. |
| The Sandbox is applicable to corporations licensed by the SFC and start-ups that intend to operate a regulated activity under the Securities and Futures Ordinance (SFO). |
| The regulatory sandbox only applies to insurers authorized by the IA. |

| Targeted customers? | Sandbox firms are expected to source (potential) customers by themselves. The appropriate type of customers is expected. |
| Retail, wholesale and sophisticated clients. No sectorial restrictions. |
| Sandbox firms can choose the type of targeted customers. No limitations, specifications or sectorial restrictions. Agreed on a case-by-case basis. |
| Company staff members or focus group of selected customers. Agreed on a case-by-case basis. |
| SFC can impose licensing conditions, which limit the types of clients. |
| External customers, which can give live and real data or selected group of the insurers’ staff. Clear definition of targeted users on a case-by-case basis. |
### Targeted products / services?

<table>
<thead>
<tr>
<th>Products and services allowed to be tested:</th>
<th>Financial services that are not similar to already offered ones. Thus, financial services must include new or emerging technologies, or use existing technologies in an innovative and different way.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Financial services (giving financial advice and dealing with certain products such as listed Australian securities, deposits and payment products, however, no issuing of financial products allowed)</td>
<td>All innovative FinTech products and services, e.g. mobile payment services, blockchain, robotics, augmented reality, biometric authentication.</td>
</tr>
<tr>
<td>• Credit activities (limited to activities as intermediary or assistant and further limitations such as volume, however, no allowance to act as a credit provider)</td>
<td>All under the SFO regulated activities that utilize innovative technologies.</td>
</tr>
</tbody>
</table>

### Targeted region?

| Sandbox firms must have intention and ability to deploy its financial services in Singapore. However, the broader scale deployment is not limited to Singapore. | Technology initiatives must be intended to be launched in Hong Kong. |

### Transition plan for full development / actions following the sandbox test

<table>
<thead>
<tr>
<th>The sandbox firms must submit a final report summarizing the outcomes of the test before transitioning out of the sandbox. The report also should summarize the sandbox firms' findings and next steps.</th>
<th>At the end of the testing period, the sandbox firms are not allowed to continue operations, unless:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• they granted a financial services or credit license</td>
<td>• they entered into an arrangement to provide services on behalf of a financial services or credit licensee</td>
</tr>
<tr>
<td>• the ASIC has given it individual relief extending its testing period</td>
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</tr>
</tbody>
</table>

### Limitations

#### Entry criteria

| Sandbox firms are expected to have a clear objective. Tests are expected to be conducted on a small scale. Sandbox firms are expected to have clear testing plans, including: |
| --- | --- |
| • timeline and key milestones | • sandbox firms must have no more than 100 retail clients |
| • measures to evaluate the success of the sandbox test | • have a total client exposure not exceeding AUD 5 million |
| • testing parameters (e.g. duration, customers, transaction limit) | • comply with consumer protection requirements |
| • customer safeguards | • have adequate compensation arrangements |
| • risk assessment | • have both internal and external dispute resolution procedures in place |
| • exit strategy | To rely on the licensing exemption, the sandbox firms must have adequate resources to ensure customer protection and adequate safeguards to ensure customer protection and adequate safeguards to ensure customer protection |

Further criteria: Sandbox firms are:
- are responsible for securing partners
- required to have a significant UK presence
- (usually) required to have a UK bank account

### Sandbox evaluation criteria:

| Sandbox firms must be pre-specified. | At the end of the sandbox period, the sandbox firms must exit the sandbox. The sandbox firms may proceed to deploy their financial services on a broader scale, if they can fully comply with the relevant legal and regulatory requirements. |

| Sandbox firms can request a removal or variation of some or all of the imposed licensing conditions, once they have demonstrated a reliable technology. | The sandbox firms must have an exit strategy if the pilot run has to be terminated unsuccessfully. |

<table>
<thead>
<tr>
<th>Fresh criteria: Sandbox firms are</th>
<th>Clear defined exit and transition strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>• are responsible for securing partners</td>
<td>• Clearly defined exit and transition strategy</td>
</tr>
<tr>
<td>• required to have a significant UK presence</td>
<td>• Clearly defined exit and transition strategy</td>
</tr>
<tr>
<td>• (usually) required to have a UK bank account</td>
<td>To rely on the licensing exemption, the sandbox firms must have adequate resources to ensure customer protection and adequate safeguards to ensure customer protection</td>
</tr>
</tbody>
</table>

### Terminations arrangements

| Sandbox firms can request a removal or variation of some or all of the imposed licensing conditions, once they have demonstrated a reliable technology. | At the end of the sandbox period, the sandbox firms must exit the sandbox. The sandbox firms may proceed to deploy their financial services on a broader scale, if they can fully comply with the relevant legal and regulatory requirements. |

| The sandbox firms must have an exit strategy if the pilot run has to be terminated unsuccessfully. | To rely on the licensing exemption, the sandbox firms must have adequate resources to ensure customer protection and adequate safeguards to ensure customer protection |

### Principles applicable for the Sandbox:

<table>
<thead>
<tr>
<th>SFC can impose requirement to install adequate compensation schemes for investors or to submit to periodic supervisory audits. Sandbox firms may face close monitoring and supervision by the SFC</th>
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</tr>
</thead>
<tbody>
<tr>
<td>• Well-defined boundary and conditions of the trial</td>
<td>• Adequate risk management controls to meet of the relevant supervisory requirements</td>
</tr>
<tr>
<td>• Adequate risk management controls to meet of the relevant supervisory requirements</td>
<td>• Adequate safeguards to ensure customer protection</td>
</tr>
<tr>
<td>• Adequate resources</td>
<td>• Adequate safeguards to ensure customer protection</td>
</tr>
<tr>
<td>• Development of an exit strategy</td>
<td>• Adequate safeguards to ensure customer protection</td>
</tr>
</tbody>
</table>

### Further criteria: Sandbox firms are
- are responsible for securing partners
- required to have a significant UK presence
- (usually) required to have a UK bank account

<table>
<thead>
<tr>
<th>sandbox firms must</th>
<th>Clearly defined exit and transition strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>have no more than 100 retail clients</td>
<td>To rely on the licensing exemption, the sandbox firms must have adequate resources to ensure customer protection and adequate safeguards to ensure customer protection</td>
</tr>
<tr>
<td>have a total client exposure not exceeding AUD 5 million</td>
<td>Clearly defined exit and transition strategy</td>
</tr>
<tr>
<td>comply with consumer protection requirements</td>
<td>To rely on the licensing exemption, the sandbox firms must have adequate resources to ensure customer protection and adequate safeguards to ensure customer protection</td>
</tr>
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<td>have adequate compensation arrangements</td>
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</tr>
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</tr>
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</table>

To rely on the licensing exemption, the sandbox firms must have adequate resources to ensure customer protection and adequate safeguards to ensure customer protection.
### Exit criteria / Exit strategy for test failure

<table>
<thead>
<tr>
<th>The sandbox will be discontinued when</th>
</tr>
</thead>
<tbody>
<tr>
<td>• the achievement of the intended purpose is unclear</td>
</tr>
<tr>
<td>• the sandbox firm is not capable to fully comply with the relevant legal and regulatory requirements at the end of the sandbox period</td>
</tr>
<tr>
<td>• a flaw has been discovered in the financial service, which cannot be resolved within the duration of the sandbox and the risks outweigh the benefits</td>
</tr>
<tr>
<td>• MAS terminates the sandbox due to breaches of agreed sandbox conditions</td>
</tr>
<tr>
<td>• the sandbox firm exits the sandbox</td>
</tr>
</tbody>
</table>

### Duration

| The sandbox operates on a cohort basis, 2 cohorts per year, each test period 6 months. Long enough to enable statistically relevant data to be obtained from the test. | 12 months, extension option for another 12 months. | Limited. Agreed on a case-by-case basis. | Limited. Agreed on a case-by-case basis. |

### (Max.) number of customers

<table>
<thead>
<tr>
<th>MAX. number of customers</th>
</tr>
</thead>
<tbody>
<tr>
<td>• FCA sets a strict limit to the size of the test (small scale testing)</td>
</tr>
<tr>
<td>• Customer set should be big enough to obtain statistically relevant data</td>
</tr>
<tr>
<td>Sandbox firms are requested to disclose information regarding the test, e.g. available compensation in the event of failure.</td>
</tr>
<tr>
<td>• Retail: maximum of 100 clients</td>
</tr>
<tr>
<td>• Wholesale: unlimited</td>
</tr>
</tbody>
</table>

### Max. exposure

| Not specified. Sandbox firms have to state and justify quantifiable limits such as transaction thresholds or cash holding limits. |
| The exposure of each retail client to deposit products, simple managed investment schemes, securities, government bonds and payment products in relation to which services are provided must not exceed AUD 10,000. |
| The amount of credit under a credit contract in relation to which services are provided must not exceed AUD 25,000. |
| The sum insured under a general insurance contract in relation to which services are provided must not exceed AUD 50,000. |
| The total maximum exposure of all clients taking part in the testing must not exceed AUD 5 million. |

The SFC may revoke the license if the sandbox firms fail to meet regulatory requirements.
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