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Fintech Innovation and Regulation - The Case of Regulatory Sandbox in Hong Kong

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Abstract: The article provides an in-depth analysis of the impact of Fintech on the regulation of financial markets, and the Regulatory Sandbox as a supplement to traditional regulatory methods which helps to respond to new challenges. The rapid development of Fintech has changed the situation of the financial market and brought a certain impact and influence to the traditional financial market. Through the case research of Hong Kong's Regulatory Sandbox, this article comprehensively introduces Hong Kong's current Fintech Regulatory Sandbox. Moreover, it analyses and summarizes its strengths, such as consumer protection measures, and other points worth learning. At the end of the article, it puts forward an outlook on future financial regulatory trends along with advice and action plans, such as promoting cross-border regulatory cooperation. These proposals aim to help regulators better adapt to the challenges in the Fintech era and protect the health and transparency of financial markets, in parallel with sustainable development of financial innovation.

Keywords: Fintech; Financial Innovation; Regulatory Sandbox; Financial Regulation; Hong Kong

1. Introduction

With the rapid evolution of the global financial sector, financial technology (Fintech) has become a rapidly emerging and growing field that has reshaped financial services and financial markets, driving them into a new round of profound change.

However, the rapid changes in this area have triggered a series of regulatory challenges that require regulators to innovate new regulatory approaches to maintain market health, posing entirely new challenges to traditional regulators. As technology brings increasing regulatory complexity, traditional regulatory models often struggle to quickly keep pace with technological innovation. In addition, the high leverage and market risks associated with financial derivatives are prone to regulatory challenges such as market manipulation and misconduct, which require more effective regulatory approaches.

At this point, regulatory sandboxes have emerged as a new type of regulatory tool with the potential to play a huge role in balancing innovation and risk management. Regulatory sandboxes can provide partially regulated experimental environments for Fintech companies, allowing them to test new technologies and products, while regulators can closely monitor and assess the potential risks of their innovations. It offers a new way to address traditional regulatory challenges while helping to advance financial product innovation.

This study will delve into how Fintech is changing the regulation of financial markets, incorporating a case study of a regulatory sandbox in Hong Kong to analyse how a regulatory sandbox can help in addressing traditional regulatory challenges. It will culminate in recommendations for actions that regulators need to take to help them adapt to changing technologies and markets, maintain the stability of the financial system and promote innovation.

2. Literature Review

The definition of Fintech was first proposed by Charnes. With the further integration of finance and technology, many scholars have supplemented the definition of Fintech. Li and Wu believe that with the development of Internet technology, there have been many disruptive innovations in the financial industry, and Fintech is becoming more and more popular in the fields of mobile payment, loans and personalised investment. Wo´jcik discovered the close integration of finance and technology, which can be said to be accelerated by COVID-19. Prophecies of Fintech disruption and disintermediation of the financial sector can be traced back to its birth story, including M-Pesa on smartphones and cryptography-driven Bitcoin.

Fintech innovation is a double-edged sword, which can not only improve the efficiency of the financial system but also increase the risks and challenges of industry regulation. Goldstein believes that due to lack of experience and lagging regulation, it is difficult to achieve the dynamic balance between FinTech innovation and regulation. Kane summarised the relationship between financial innovation and financial regulation as a game process of “regulation-innovation-deregulation-re-innovation”.

The basic purpose of the regulatory sandbox is to facilitate the development of Fintech, in particular to support the “disruptive innovation” activities carried out by start-ups. In this sense, it constitutes a sub-proposition of Fintech regulation. Many jurisdictions have modernised their legal and regulatory frameworks for payment services, adopting an activity-based and risk-focused approach. Modernisation efforts are aimed at promoting safety, efficiency, innovation and competition. Against this backdrop, regulators should change their regulatory philosophy, actively develop Fintech regulation, adopt the regulatory sandbox model and encourage Fintech innovation.

3. Emerging Issues at the Regulatory Level

3.1 Increased Complexity of Market Risks

The rapid development of financial technology (Fintech) and the continuous evolution of financial markets have caused the traditional regulatory model to face unprecedented complexity. This phenomenon is particularly evident in the diversity of new market products and the rapid development of new financial technologies. The emergence of new and emerging financial products and the updating of trading strategies have increased the complexity of the market. Today's Fintech firms have introduced a wide variety of new financial instruments and investment products, which in turn have given rise to more complex risk management strategies. Traditional financial regulation is often based on established regulatory and supervisory frameworks that may be difficult to adapt to the emerging financial models and products brought about by Fintechs. Traditional regulators need the ability to keep up with the pace of innovation, to iterate on regulatory policies and regulations, and to maintain monitoring and assessment of the risks that may arise from new technologies.

As Fintech evolves, the market risk of finance is also gradually increasing, which poses new challenges to the stability of the financial system. Financial markets, such as the futures market, usually involve highly leveraged transactions, and while high leverage can increase potential returns for investors, it also creates a high degree of risk exposure for investors and the market. This risk may be magnified again by the involvement of Fintechs. The emergence of Fintechs provides opportunities for more retail investors to engage in highly leveraged transactions, potentially multiplying the risks and impacting the stability of the financial system.

Market manipulation and misconduct are more likely to occur in highly leveraged financial markets, and the development of Fintech may provide new tools and channels for market manipulation, which would have a serious negative impact on normal market operations and investor confidence.

These factors make the management of market risks increasingly complex and require greater vigilance on the part of regulators, as well as more effective regulatory and monitoring mechanisms to address them.

3.2 The Conflict between Regulation and Innovation Has Become More Prominent

The rapid development of Fintech and emerging financial products has led to complex conflicts between regulation and innovation, with traditional financial regulation being somewhat rigid. Traditional financial regulation is usually based on long-standing historical regulations, but these regulations do not apply to new financial products and services arising from the introduction of Fintech. The rigidity of traditional regulation makes it difficult for regulators to adapt to the rapid pace and diversity of innovation in the Fintech sector.

Specifically, traditional regulatory rigidity may lead to regulatory lag, as traditional regulations often require a lengthy legislative process, whereas the rapid pace of innovation in Fintechs may result in a regulatory lag that prevents regulators from responding promptly to the challenges of emerging financial products and services. And leading to innovation restrictions, traditional regulatory regulations usually limit the scope of activities and business models of financial institutions to safeguard the stability of financial markets and investor protection. However, such rigid regulations can inhibit innovation in Fintechs, and the regulatory standards of traditional financial institutions do not apply to Fintechs and their new business models. It will also result in high compliance costs, with traditional financial companies and Fintechs often needing to invest significant resources to ensure business and product compliance to meet traditional regulatory requirements. High compliance costs will pose a threat to the survival and competitiveness of Fintech startups.

The conflict between regulation and innovation requires us to find the right balance, and a new approach to regulation that safeguards the stability of financial markets while supporting Fintech innovation is needed. The primary role of regulators needs to be to maintain financial market stability while protecting the rights of investors. But the current state of affairs requires regulators to find a delicate balance between actively encouraging Fintech innovation and effectively managing potential risks, helping to improve the efficiency of financial markets while reducing economic costs and providing better financial services. For the time being, if regulators wish to better balance the relationship between innovation and risk, they can do so by establishing an appropriate regulatory framework that promotes the healthy development of Fintech innovation while ensuring the stability and sustainability of financial markets.

4. Basic Concept of Regulatory Sandbox

With the rapid development of financial technology (Fintech), regulatory sandboxes have become an increasingly popular method of regulatory innovation on an international scale. The regulatory sandbox is a financial regulatory innovation mechanism founded by the UK. Since it was first introduced by the Financial Conduct Authority (FCA) in 2015, it has become an important tool for promoting Fintech innovation and regulation on an international scale. The Monetary Authority of Singapore (MAS) launched the Regulatory Sandbox in 2016 to provide a pilot mechanism similar to the Regulatory Sandbox for Fintech companies to promote Fintech innovation. The Regulatory Sandbox, also known as the Regulatory Testing Ground for Innovation, is an environment that provides a degree of exemption or relief from regulatory requirements through cooperation between regulators and Fintech companies so that Fintech companies can test and launch new products, services or business models in a relatively safe range. This mechanism aims to balance the relationship between Fintech innovation and financial stability while protecting the safety and stability of the financial system. It provides a more flexible and inclusive regulatory environment for innovators while allowing regulators to better understand the operation of new technologies and business models to develop regulatory policies that are more responsive to market needs.

5. Why Should We Introduce Regulatory Sandboxes

In the face of the rapid evolution of Fintech and the complexity of financial markets, the introduction of regulatory sandboxes may become a forward-looking regulatory approach. As a new type of regulatory tool, it can provide a regulated experimental environment for financial innovation, and promote financial innovation while maintaining regulatory feasibility and risk controllability.

5.1 Necessity

5.1.1 Promoting Innovation

Regulatory sandboxes provide a regulated experimental environment for financial firms, allowing them to test new technologies, products and services without having to face the full range of compliance requirements in a traditional regulatory environment. This flexibility encourages financial innovation and helps financial markets to discover and develop new solutions that improve market efficiency and user experience.

5.1.2 Maintaining Regulatory Viability

Regulatory sandboxes are not a means of deregulation. Regulators still have the right to supervise and evaluate experimental projects running in regulatory sandboxes, and by piloting them in a smaller area, regulators can better understand the potential risks and benefits of new technologies, and experimental data provided by sandboxes can be used to adjust and optimise regulatory policies accordingly.

5.1.3 Reducing Innovation Risks

Regulatory sandboxes provide a step-by-step approach for Fintech companies to advance product and service development and innovation, enabling them to progressively validate their innovations in a regulated environment. This helps to help reduce the risk of financial innovation by allowing Fintechs to test their ideas within the regulatory sandbox and make improvements based on the customer and regulatory feedback they receive, without having to immediately face full market competition and risk.

It provides a way in which financial innovation can be balanced with regulation in a way that facilitates the development of Fintechs while safeguarding, to some extent, the stability and regulatory viability of financial markets.

5.2 What Could We Expect?

5.2.1 Understanding Market Dynamics

Regulators can better observe changes in products and services and gain a deeper understanding of market dynamics through the regulatory sandbox, an experimental and innovative environment for Fintech companies and other innovators. The rapid pace of change in the Fintech sector often makes it difficult for traditional regulators to keep up, but in a regulatory sandbox, while financial companies test new Fintech technologies, products and services, regulators can intuitively observe, keep abreast of, and communicate with emerging technology trends promptly, maintaining good links and feedback. This will help regulators better respond to changes in the market and develop more targeted regulatory policies.

5.2.2. Identify Regulatory Needs

Regulatory sandboxing is a collaborative approach to regulation that helps regulators better identify regulatory needs for new technologies and products. Financial firms and other market participants often have some knowledge of the financial sector and technological expertise, and regulators can use this opportunity to work with them and use their expertise to help identify regulatory needs. Fintech companies may be able to provide their views on cutting-edge new technologies and their predictions of their impact on the market, which will help regulators to develop more effective regulatory policies and regulations to safeguard the health and stability of the market.

5.2.3 Balancing Innovation and Regulation

The adoption of regulatory sandboxes can also help promote a balance between financial innovation and regulatory compliance. Fintech companies in a regulatory sandbox can provide regulators with relevant information on how their products and services will comply with compliance requirements, helping regulators gain insight and enhance regulatory transparency. Help regulators better balance innovation and compliance, and safeguard compliance while supporting the growth of innovation. Regulatory sandboxes provide an opportunity to allow Fintech companies to test their innovations in a relatively low-risk environment, which protects their incentives to innovate from the innovator’s point of view and can help them with compliance testing.

5.2.4 Helping all Parties Work Together to Address Challenges

Difficulties and challenges involved in the financial sector are often industry-wide and require a joint response from all participants. The Regulatory Sandbox provides a platform for regulators, Fintechs and other market participants to work together to examine and address issues facing the industry, such as how to address new challenges and risks posed by data privacy, cybersecurity and anti-money laundering compliance. By communicating and working together in the platform, all parties can address these challenges more effectively, thereby promoting the sustainable development of Fintech innovation and safeguarding the stability and transparency of financial markets.

As an innovative regulatory approach, the Regulatory Sandbox helps regulators and other market participants to better address the emerging risks and challenges of Fintech and financial market regulation through cooperation and information sharing.

By observing new financial products being tested in regulatory sandboxes, regulators can better understand market dynamics, identify regulatory needs, promote a balance between innovation and compliance, and work with other participants to address industry challenges. In the following discussion, we will delve into the practical operation of regulatory sandboxes and their effectiveness in market regulation.

6. GFIN, Regulatory Sandbox in the UK and the U.S.

6.1 Global Financial Innovation Network

The Global Financial Innovation Network (GFIN) was officially launched in January 2019 by a group of international financial regulators and related organizations, including the Financial Conduct Authority (FCA) and the World Bank Group. This initiative built upon the FCA's earlier 2018 proposal to establish a global regulatory sandbox. GFIN is a network of 29 organizations dedicated to supporting financial innovation for the benefit of consumers. It currently has a network of over 60 members and observers committed to supporting financial innovation. There are ten regulators from different countries in its Coordination Group, including the Financial Conduct Authority (FCA) of the United Kingdom, the Australian Securities & Investments Commission (ASIC), and the Consumer Financial Protection Bureau (CFPB) of the United States. Its goal is to provide a more efficient means for innovative firms to interact with regulators across borders, helping them navigate regulatory frameworks as they scale their products and services internationally. GFIN offers a pilot program that allows firms to test innovative products, services, or business models in multiple jurisdictions. GFIN also hope to foster collaboration among financial regulators, creating a framework for sharing experiences and best practices on innovation-related topics, ultimately harmonising regulatory approaches to emerging financial technologies.

6.2 Regulatory Sandbox in the UK

The UK's Financial Conduct Authority (FCA) launched its pioneering regulatory sandbox in November 2015 to foster Fintech innovation while ensuring regulatory compliance. This sandbox allows fintech firms to test products with real consumers under FCA supervision and also gives advice to help them navigate complex regulations and accelerate market entry. The sandbox promotes early-stage innovation by providing regulatory support, which enhances firms' access to investment and growth opportunities.

Open to authorised firms, unauthorised firms seeking authorisation, and tech companies partnering with UK-regulated entities, the sandbox prioritises consumer benefits, focusing on proposals that promote genuine innovation and support the financial services industry.

6.3 Regulatory Sandbox in the U.S

The development of regulatory sandboxes in the United States is characterized by a decentralized approach, unlike the more unified approach in the United Kingdom, driven by both state and federal initiatives.

In 2018, Arizona became the first U.S. state to launch a Fintech sandbox, offering exemptions from certain state laws. This model inspired other states, with Wyoming and Utah launching their own sandboxes in 2019—Wyoming notably focusing on blockchain and digital assets making it a leading state in digital financial policy.

At the federal level, regulatory progress has been slower. The Consumer Financial Protection Bureau (CFPB) was the first regulatory agency to establish a dedicated Fintech office focused on studying Fintech and supporting innovations that enhance consumer welfare. In 2019, the Consumer Financial Protection Bureau (CFPB) introduced the Compliance Assistance Sandbox, offering guidance but not full legal exemptions, primarily supporting consumer financial services like lending and payments. As states continue to explore and implement regulatory sandboxes, the U.S. approach remains varied, allowing for flexibility in regulatory innovation but also creating challenges for firms operating across jurisdictions.

7. Application of Regulatory Sandbox in Hong Kong and Implications

Hong Kong has been at the forefront of Fintech, and started exploring the regulatory sandbox model as early as 2016. As an international financial centre, Hong Kong has a stable and open market environment and a complete system of laws and regulations, which provides a good ecological environment for Fintech enterprises. Hong Kong has its unique advantages in the construction of regulatory sandboxes. Hong Kong has a high degree of freedom in the financial market, a stable legal environment, and is one of the most important financial centres in the world, with well-developed financial infrastructures and channels for capital circulation. This financial market advantage enables the regulatory sandbox to truly interface with the financial market and promote the development of financial technology enterprises.

7.1 Categories of Regulatory Sandboxes in Hong Kong

Fintech innovation has received great attention from Hong Kong’s regulators. The Securities and Futures Commission (hereinafter referred to as the SFC), the Hong Kong Monetary Authority (hereinafter referred to as the HKMA) and the Insurance Authority (hereinafter referred to as the IA), as the three regulators in Hong Kong respectively, have established their own regulatory sandboxes. The HKMA is one step ahead, having launched its regulatory sandbox in 2016. Each of the three regulators has its own strengths in terms of operational concepts, entry thresholds, testing processes, exit mechanisms, etc., and works in tandem with each other. A Hong Kong-style regulatory sandbox system comprising the “three pillars” of banking, securities and insurance has been formed.

7.1.1 Regulatory Sandbox of the Hong Kong Securities and Futures Commission (SFC)

In September 2017, the SFC launched its regulatory sandbox. Participating institutions are allowed to enter the sandbox upon issuance of their licences, and on the premise of maintaining market integrity and protecting consumers, this group of licensed institutions is allowed to use brand new technology to conduct experimental activities in the scope of activities regulated under the Securities and Futures Ordinance (“SFO”) and/or the Anti-money Laundering Ordinance (“AMLO”). Under Schedule 5 of the SFO, regulated activities refer to the following 10 types of business: dealing in securities, dealing in futures contracts, leveraged foreign exchange trading, advising on securities, advising on futures contracts, advising on institutional finance, providing automated trading services, providing securities margin financing, providing asset management and providing credit rating services. The licences corresponding to the types of business held by a licensed corporation are commonly known as Licence 1 to Licence 10, i.e. the above 10 categories. In total, there are 12 types of regulated activities prescribed by the SFC in Hong Kong, and licences for Type 11 and Type 12 regulated activities relating to OTC derivatives have not yet been implemented. The crypto industry may be closest to the Type 1 securities trading licence, Type 7 licence to provide automated trading services, and Type 9 licence to provide asset management.

The SFC has set different regulatory requirements for entities engaged in different businesses, such as a Type 1 securities dealing licence for distributors of virtual asset funds. For central platforms providing virtual asset trading services, they are required to apply to the SFC for a Type 1 Securities Trading and Type 7 Provision of Automated Trading Services Licence before they can provide securities-based token trading services. Bitcoin futures, on the other hand, are considered “futures contracts” because they are traded on traditional exchanges and subject to their rules and require a Type 2 futures contract trading licence to operate a bitcoin futures trading business.

7.1.2 Hong Kong Monetary Authority’s Supervisory Sandbox

The HKMA launched the Fintech Supervisory Sandbox (FSS) in September 2016, which allows banks and their technology partners to invite a limited number of customers to participate in pilot Fintech projects without having to fully comply with the HKMA’s supervisory requirements, to facilitate the collection of data and user feedback to increase the speed of product updates and reduce development costs.

The HKMA announced the 2.0 upgrade in September 2017, one year after the launch of the Fintech Regulatory Sandbox. Sandbox 2.0 adds a new Fintech Supervisory Chatroom to facilitate enhanced communication between Fintech companies and the HKMA. It also introduces the establishment of a Regtech ecosystem and the launch of services related to cross-border financial services and cross-border testing arrangements.

The HKMA’s Sandbox 3.0 was launched in November 2021, followed by the launch of the Regulatory Fintech Sandbox 3.1 Pilot Programme, which aims to provide funding support to Fintech projects falling within the HKMA’s regulatory remit at the development stage and to assist institutions in commercialising and applying the results to the industry.

As of the end of November 2023, a total of 322 Fintech projects have been piloted in the HKMA’s sandbox, of which 229 were conducted by banks in collaboration with technology companies. Bio-authentication, technologies involved include, among others, soft tokens, chatbots, distributed ledger technology, application programming interfaces (APIs), compliance technology, optimised mobile apps and other eight categories of technologies, of which compliance technology accounted for 161 of the projects.

7.1.3 Regulatory Sandbox of the Hong Kong Insurance Authority (IA)

The Hong Kong Insurance Authority (IA) and the Securities and Futures Commission (SFC) launched the Regulatory Sandbox for InsurTech on the same day in 2017. For insurers that plan to launch innovative technologies in Hong Kong but are unsure whether they are compliant with Hong Kong regulations, the IA may grant authorisation to enter the sandbox for trials, during which the authority is required to verification of the insurer's risk control at any time and there is a mechanism for consumers to withdraw from the trial at any time with compensation.

While each of the three regulators in Hong Kong has introduced its own regulatory sandbox, officials have allowed the cross-border application of regulatory sandboxes and provided cross-border Fintech projects with "one point of entry", facilitating collaboration between the HKMA, SFC and IIA, and providing cross-border Fintech projects with on-demand access to the sandboxes of the three regulators.

7.2 Thresholds for Access to the Regulatory Sandbox in Hong Kong

7.2.1 Hong Kong Securities and Futures Commission (SFC)

Eligible entities for the Hong Kong SFC Sandbox shall be licensed and the activities to be tested shall be regulated activities under the Securities and Futures Ordinance and/or the Anti-Money Laundering Ordinance as mentioned above. They are required to use innovative technology and operate in good faith to bring better products and services to investors for the benefit of Hong Kong's financial services industry. To reduce the risk to investors during the sandbox trial period, the SFC may impose licensing conditions, such as requiring the operator to undergo regular supervisory verification.

7.2.2 Hong Kong Insurance Authority (IA)

The IA's InsurTech Sandbox is open to insurers planning to launch InsurTech and other technology projects in Hong Kong.

Pilot projects need to have clear scope and conditions such as time and duration, size and type of insurance business, etc. Other requirements include the need for insurers to have risk management controls and customer protection.

7.3 Key Points of the Hong Kong Regulatory Sandbox Test

7.3.1 Hong Kong Securities and Futures Commission (SFC)

The SFC believes that the sandbox should not be regarded as a means of circumventing regulation and will not relax the relevant regulatory requirements. Eligible entities will still be required to comply with all applicable laws and regulations during the trial period in the sandbox.

The reliability of the financial services provided by the platform operator and its internal control system will be tested and monitored at the initial stage and will be subject to more rigorous monitoring and supervision by the SFC, or more intensive communication with the platform operator.

At the same time, qualified entities are required to have investor protection measures in place, and are required to inform customers that their products or services are operated in a sandbox, and to fully disclose potential risks and all compensation arrangements.

7.3.2 Hong Kong Monetary Authority (HKMA)

While the HKMA allows banks and their technology partners to operate in the Sandbox without having to fully comply with the HKMA's regulatory requirements, banks should not take advantage of the regulatory requirements applicable to the Sandbox. The HKMA has not listed all the regulatory requirements that may be relaxed in a sandbox environment and requires those intending to enter the sandbox to contact and discuss with the HKMA to allow for flexibility at the regulatory level.

At the same time, banks licensed to use the sandbox will need to define the boundaries of the trial (e.g. scope and phases, timing and termination arrangements); safeguards for customers (e.g. risk disclosure to customers, compensation for financial losses, and exit from the trial); and enhancement of risk management measures and intensive monitoring of the trial of the technology.

7.3.3 Hong Kong Insurance Authority (IA)

Similar to the HKMA, the IA considers it necessary to provide flexibility to the existing regulatory requirements to facilitate the development of InsurTech in Hong Kong, provided that the subject of the trial meets the requirements of the following principles: clear scope and conditions (e.g. time and duration, size and type of business, etc.); adequate risk management controls; customer protection system; adequate resources (to demonstrate that the InsurTech project is ready for testing); and exit strategy. testing) and exit strategy, etc.

7.4 Regulatory Sandbox Exit Mechanism in Hong Kong

7.4.1 Hong Kong Securities and Futures Commission (SFC)

An eligible entity may apply to the SFC to withdraw or vary some or all of its licensing conditions and exit the sandbox if it can demonstrate that its innovative Fintech technology is reliable and fit for purpose and that its internal risk controls are adequate to deal with the identified risks. After exit, the Eligible Entity may carry out its activities under the supervision of the SFC in the same manner as other platform operators operating outside the Sandbox.

If the SFC considers that an Eligible Entity does not meet the above requirements, it will revoke its licence and exit the Sandbox.

7.4.2 HKMA and IA

The HKMA and the IA have a similar approach to exit as the SFC, and both require participating entities to provide investors with an exit mechanism and a compensation mechanism or a means of redress.

7.5 Implications of Hong Kong's Fintech Regulatory Sandbox for Other Regions in China China

Hong Kong's regulatory sandbox was established earlier and started and developed faster than other regions in the China. Drawing on the experience of Hong Kong's regulatory sandbox will help establish and improve the China's version of a financial regulatory sandbox, and it is worthwhile to learn from and pay attention to the following major aspects.

7.5.1 Establishment of Segmented Regulatory Sandboxes and "One Point" Access

In Hong Kong, three different financial regulators have set up different regulatory sandboxes. For example, the HKMA focuses on innovation in banking products and services, while the SFC and IIA have regulatory sandboxes focusing on other areas. Subdividing regulatory sandboxes by different categories of financial products allows for more targeted zoning and accurate support for innovation in different areas, in a way that better understands, manages and supports the characteristics and risks of each type of financial product.

While setting up regulatory sandboxes with different zones, the "one point" access method can help different sandboxes coordinate each other's operation, which can be used to unify and collaborate sandboxes between different provinces in China, facilitating cross-region communication and testing.

7.5.2 Flexible Setting of Different Regulatory Requirements

After a participating entity has applied, individual communication and investigation will be conducted to set different regulatory requirements flexibly. The HKMA has set out in the Sandbox Operating Principles the appropriate regulatory flexibility arrangements for individual discussions with banks and their partner technology companies. The individual communication and investigation approach can be seen as a form of targeted supervision, allowing regulators to have more flexibility in setting supervisory requirements according to the particular circumstances and risk levels of the participating entities, thereby providing a more appropriate regulatory framework that better supports innovation.

However, it is important to note that there is a need to balance regulatory flexibility and robustness in implementation to ensure that the flexibility set does not lead to regulatory loopholes to maintain the healthy development of the financial system.

7.5.3 Establishment of Consumer Protection Measures

The HKMA has set out the requirements for customer protection measures in its Operating Principles: "Measures to safeguard the interests of customers during the trial period will generally include measures in the areas of selection of customers who understand the risks involved and who voluntarily participate in the trial, complaint handling, compensation for any financial loss suffered by customers, and arrangements for customers to withdraw from the trial. "

The Hong Kong Securities and Futures Commission (SFC) has similarly made it clear that qualifying entities are required to have adequate investor protection measures in place, requiring disclosure of information and the establishment of compensation arrangements that can be provided.

The IA has also clearly spelt out the customer protection requirements in the Sandbox Principles, which require risk disclosure to customers as well as the making of appropriate arrangements, such as allowing customers to withdraw from the pilot scheme (e.g. refund of premiums) or compensating them for financial losses resulting from the failure of the pilot.

7.5.4 Establishment of an Information Feedback Mechanism

The Fintech Regulatory Sandbox 2.0 set up by the HKMA has set up a Fintech Regulatory Chat Room (the Chat Room) to facilitate the HKMA's communication of feedback with banks and technology companies during the trial period of Fintech programmes in the Sandbox.

The UK's Fintech Regulatory Sandbox likewise has a similar information feedback mechanism. The Financial Conduct Authority of the UK has set up a dedicated contact system in the sandbox to facilitate communication with the trial projects, and after the projects have passed the application vetting process, a commissioner will be sent to communicate with the applicant organisations to jointly formulate a specific trial plan, which will be followed up by a dedicated person in the course of the trial.

The establishment of an information feedback mechanism helps to maintain smooth communication among all parties in the trial, which can not only help the participating subjects understand the regulatory sandbox and the relevant regulatory measures but also provide timely feedback on the trial situation to all parties, to facilitate timely adjustments.

7.5.5 Establishment of Certain Subsidised Projects

The HKMA's Sandbox 3.0 and 3.1 trial programmes are both set up to further support innovation. Sandbox 3.0 supports up to HK$1 million for eligible R&D trial projects to apply to the Public Sector Trial Scheme under the Innovation and Technology Commission (ITC). The provision of funding support can help start-ups or innovative projects tide over the financial difficulties at the initial stage, and bring new impetus to the industry as a whole by supporting new products or services with potential.

The establishment of funding programmes is an active support for financial innovation, which helps nurture and develop promising start-ups and projects, promotes a virtuous cycle in the market, prevents potential new products from failing to survive in the initial stage due to "bad money-driving out good money", and facilitates the development of the financial industry in the direction of greater competitiveness and sustainability.

8. Future and Recommendations

8.1 Future Regulatory Trends

As Fintech continues to evolve, financial market regulation will face a new set of challenges and opportunities in the future. This section will explore future regulatory trends and provide personal insights and recommendations on the outlook for financial market regulation.

8.1.1 Digital Regulation

In the future, regulation will become more digital and intelligent. Regulators may make deep use of advanced technologies such as big data analytics, artificial intelligence and machine learning to monitor market behaviour and risks. This will help regulators to be able to identify abnormal trading and market manipulation more quickly and accurately and improve market transparency and safety.

8.1.2 Cross-border Regulation

The convergence of Fintech and financial markets will prompt regulators to take a more cross-border approach to regulation. When regulation is no longer limited to national borders, but across different countries and regions, to safeguard the stability of the future global financial market, cooperation and information sharing between international regulators will become an important trend in future regulation, and jointly prevent future global financial market risks.

8.1.3 Expansion of Regulatory Sandbox

The regulatory sandbox model will be further expanded and improved in the future. In the future, the regulatory sandbox will not only be limited to the initial testing of financial product innovations but will also be integrated into a wider range of financial market regulatory experiments and policy adjustments. Regulators will be able to use the regulatory sandbox more flexibly to adapt to changes in the market and safeguard the adaptability of regulatory policy to financial innovation.

8.1.4 Compliance and Data Privacy

Safeguarding compliance and protecting data privacy will be the focus of future regulation. With the development of Fintech, data security and privacy protection will become a core regulatory concern. Regulators will strengthen the regulation of financial companies' data use and privacy policies to protect the rights of investors and consumers.

8.2 Recommendations

8.2.1 Strengthen Regulatory Technology Capacity Building

Against the backdrop of the rapid development of Fintech, regulators need to develop the RegTech capabilities of their supervisors. Regulators must have sufficient appropriate Fintech knowledge and skills to understand the future regulatory challenges and regulatory needs of Fintech and financial markets. Modern regulators cannot just limit themselves to formulating policies and regulations but also need to go deeper into emerging technologies such as data analytics, artificial intelligence, and blockchain to help them better monitor the market, identify potential risks, and address market challenges. Enhanced regulatory technology capabilities of regulators will help them perform their regulatory duties more effectively and protect the healthy operation of the market.

8.2.2 Develop Flexible Regulatory Policies

Future regulatory policies to face Fintech and new financial innovations need to be flexible in order to adapt to the constant changes in the market. The rapid development of Fintech and financial markets means that regulatory policies need to be constantly reviewed and updated to help them adapt to market innovations. This requires regulators to review existing regulations, policies and regulatory standards, and make certain updates and iterations to avoid them becoming barriers to the development of Fintech and financial markets. Regulators also need to take preparatory measures to make future financial regulation flexible enough to take swift measures to protect investors' rights and interests and market stability when market risks increase.

8.2.3 Promote Cross-border Regulatory Cooperation

Cross-border regulatory cooperation will be the key to addressing global market risks in the future. Regulators should actively promote international financial regulatory cooperation and establish mechanisms for information sharing and regulatory collaboration. Fintech and financial markets are global, and in the future, market risks and challenges may not be limited by national borders. Through cross-border communication and regulatory cooperation, regulators can better understand and respond to global issues, jointly set standards and rules, and promote the stability, safety, and healthy development of global financial markets.

Third, the internationalization of Chinese banks is also facing great difficulties. The business philosophy of Chinese banks is still backward, and the scale of assets and liabilities is still mainly blindly expanded. Additionally, the current risk management system of Chinese banks cannot meet the needs of international development of banks and will face greater risks. Last but not the least, Chinese banks are also facing great talent pressure, and it is urgent to recruit relevant talents to better support their international development strategy.

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Author Contributions

Yuting Tan: Writing, Original draft, Conceptualization, Methodology. Yuzhu Tan: Review & Editing. All authors reviewed the results and approved the final version of the manuscript.

Availability of Data and Materials

The data on which the study is based were accessed from a repository and are available for downloading through the following link:

https://www.osc.ca/sites/default/files/2021-03/nr_20190131_gfin-webpage-content.pdf

https://www.hkma.gov.hk/chi/key-functions/international-financial-centre/Fintech/Fintech-supervisory-sandbox-fss/#cross-sector- Fintech-services

https://www.ia.org.hk/sc/aboutus/insurtech_corner.html

https://www.hkma.gov.hk/chi/key-functions/international-financial-centre/Fintech/Fintech-supervisory-sandbox-fss/#cross-sector- Fintech-services

Conflicts of Interest

The authors declare that they have no conflicts of interest to report regarding the present study.

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