

# Research on the Impact of Financial Technology on Bank Systemic Risk

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**Abstract.** Systematic risk prevention is an issue that the regulatory authorities attach great importance to. The report of the 19th National Congress of the Communist Party of China required to improve the financial supervision system and keep the bottom line of avoiding systematic financial risks. Under the current economic background, it is of great practical significance to study the impact of financial technology on the systematic risk of commercial banks, which is related to the stability of bank operations in the era of financial technology, and helps the regulatory authorities grasp the relationship between supporting the development of financial technology and strengthening financial supervision. Based on the concept of financial technology and its influencing factors, this paper analyzes the impact of financial technology on the management risk of commercial banks. Finally, this paper puts forward countermeasures and suggestions from the aspects of system supervision and digital transformation. The research of this paper is of great significance to the risk management of commercial banks and financial industry.

**Keywords:** Systemic risk; Bank liquidity creation; Intermediary effect.

## 1. Introduction

In recent years, a prominent feature of China's financial development is the rapid rise of fintech, driven by an explosive growth in new technologies such as cloud computing and blockchain [1]. Under the relatively loose policy of regulatory authorities, China's fintech is developing rapidly. It makes up for the shortcomings of traditional financial services through scene innovation, big data analysis and combined with financial product innovation, which has the advantages of low cost, fast speed and wide coverage. The 14th Five-Year Plan proposes the "steady development of fintech", which points out its development direction in the next five years or even more from multiple perspectives. On December 31, 2021, the People's Bank of China issued the financial technology (FinTech) development planning (2022-2025), put forward the key tasks of eight aspects, including sound financial technology management system, etc., the tasks are consistent with the "difference" development direction, the measures are clearer, for the future healthy and orderly development of financial science and technology laid a deep foundation.

## 2. Concept definition

### 2.1 The Conceptual Definition of Fintech

The fintech version is Fintech in English, which can be literally interpreted as the combination of finance and technology. "Finance" + "technology" is also using technology to improve and optimize financial services. Existing definition of financial science and technology, the mainstream is the financial stability council (FSB) the definition of financial technology, namely refers to the use of technology for financial innovation, can form a new business model, applications, business processes or financial products, can have a substantial impact on financial markets and institutions and the provision of financial services.

In similar concepts, Internet finance and digital finance have similar meanings to fintech. Internet finance in domestic earlier literature appeared more, and abroad is more called "financial technology" or "electronic finance", the core content of both through technological innovation to improve the financial service efficiency or quality, and the main mode of Internet finance such as P2P and third-

party payment also belong to financial technology, so this paper that Internet financial more like the transition stage of financial technology development in China, as time development may gradually merge into the concept of financial technology system, become consistent with the international mainstream concept. From intuitive understanding, the Internet financial tendency refers to the Internet companies engaged in financial business, and digital financial is refers to the traditional financial institutions and Internet companies using digital technology for investment and financing, payment and other new financial business model innovation, compared with financial technology more prominent technology application in finance, define more clear and neutral, gradually become the mainstream of relevant literature now [2].

To sum up, according to the FSB's definition of fintech, this paper defines the concept of fintech as the financial innovation brought about by the application of emerging technologies in the financial field.

## **2.2 The Concept and Definition of Bank Systemic Risk**

At present, there has not been a clear and unified definition of systemic risk, the literature on the definition of the main can be divided into risk infection, harm scope and affect the real economy three angles, but there are the following common, namely focus on the financial system or its key part of the risk, and highlight the externalities of systemic risk, spillover effect and infectious effect [3]. The currently widely used systemic risk is defined as that proposed by the Financial Stability Board (FSB) in 2009, which is the risk of loss of economic value or confidence in an important part of the financial system, and which is likely to have a significant negative impact on the real economy.

To sum up, this paper defines the systemic risk of banks as the risk that banks are adversely affected by external or internal shocks, and the adverse impact spreads to other financial institutions, causing a significant negative impact on the operation of the financial system and even the real economy.

## **3. Theoretical Analysis of Fintech Impact on Bank Systemic Risk**

The process of bank systemic risk is usually when a single bank is adversely affected by the economic impact, which not only leads to the accumulation of its own risks, but also the risks of individual banks will overflow to other financial institutions, causing a chain reaction of the financial system, thus leading to a systemic crisis. There are various explanations in the academic community for the causes of bank systemic risks, mainly from three perspectives: the degree of adverse impact of an individual bank, the associated transmission of the risk of an individual bank to other financial institutions, and the regulatory avoidance. From the above perspective, the development of fintech may increase the risks of banks themselves, and improve the speed and complexity of bank risks to other subjects, and the fintech avoidance of regulation, which will increase the systemic risk of banks under the background of fintech.

### **3.1 Strengthen the Risk of Individual Banks**

On the one hand, the development of fintech has promoted the financial innovation of banks. The innovation of bank product form and service process innovation makes the bank risks more complex and diversified, and it also puts forward higher requirements for the risk control level of banks. On the other hand, with the continuous development of fintech, fintech companies outside the banking system have become competitive with banks in many businesses, increasing the vulnerability of banks. Under the influence of the above two factors, the risk level of an individual bank will improve, and the risk of individual banks will continuously strengthen and overflow into the financial system, ultimately affecting the level of systemic risk.

First of all, in the era of fintech, banks have made financial innovation by cooperating with fintech companies or developing fintech themselves, which may bring new risks to banks, make the risk sources of individual banks more diversified, and then affect the systemic risk of banks. The

connotation of fintech is the financial innovation driven by science and technology, which can be reflected in the innovation of bank financial products and financial service processes. While the development of fintech leads to the innovation of bank financial products and the development of emerging businesses, which may cause the risk exposure of maturity mismatch, multi-layer nesting and high leverage, and aggravate the accumulation of banks' own risks. Moreover, because regulation often lags behind compared with financial innovation, the changes of bank risks brought about by the development of financial technology cannot be detected and contained in the early stage of financial innovation, which leads to increasing the difficulty of bank risk control, thus affecting the risk level of the whole financial system.

Secondly, banks and fintech companies also compete in payment and settlement, asset management, loans and other businesses, which has caused a direct or indirect impact on the banking business. Based on the theory of financial vulnerability, under the condition that banks are particularly dependent on unstable resources, products and customers, some adverse changes will increase the probability of heavy losses, so banks have a certain vulnerability. With the business competition of fintech companies, the banking business income and operating costs may be affected, thus reducing the stability of the bank operation, increasing the risk exposure of the banks themselves, and then exacerbating the level of systemic risk spillover of the banks.

### **3.2 Accelerating and Complicating the Risk of Associated Contagion**

Fintech accelerates the linked contagion of risks in individual banks, and makes the risk-linked contagion more complicated, increasing the systemic risk spillover of banks. With the continuous innovation of fintech under the development of financial service mode and the trend of financial mixing is becoming increasingly obvious, the business connection between banks and other financial institutions becomes closer and closer, which accelerates the contagion of individual bank risks in the financial system. Fintech can enhance systemic risk-associated contagion in banks from the following perspectives:

First of all, fintech may cooperate and penetrate with banks in business and technology to traditional financial institutions and financial systems. Under the impact of fintech, many banks have begun to actively develop fintech. The typical countermeasure is that banks should cooperate with fintech companies. Some large banks have also begun to recruit fintech talents to improve their fintech level. With the help of fintech, banks began to explore intelligent investment consulting, blockchain, intelligent risk control and other fields, in order to improve their own operational level and reduce operational risks. The close cooperation between banks and fintech companies has also created their reliance on fintech services providers, which can cause risk contagion to banks when fintech companies go bankrupt.

Secondly, fintech has a technology spillover effect on banks, and banks may produce new risks when applying emerging technologies. Banks are using emerging technologies to reduce operating costs, but they may also pose new risks due to the lack of traditional manual audits. Although big data, artificial intelligence and other technologies have been recognized in the application level, but too much reliance on algorithm technology may cause untimely loss and strain, there and other technical loopholes, thus containing new risks. Moreover, due to the characteristics of automatic and rapid decision-making of procedures, once individual bank risks occur, they may quickly gather and infect them, increasing the possibility of systemic risk occurrence.

Thirdly, the asset overlap and functional intersection between fintech and banks will increase the correlation between financial entities, and the tight financial network structure is more likely to cause the transmission of systemic risks among banks [4]. The relationship between fintech and banks ranges from subversion, to cooperation, and then to symbiosis. They constantly integrate based on their respective advantages, and intersect in operating assets and functions, which makes the network structure between banks and fintech and between banks more compact, creating opportunities for systemic risks to infect among banks.

### **3.3 Regulatory Avoidance Leads to an Increase in Systemic Risk**

According to the theory of evasive financial innovation, one of the motives of financial institutions to conduct financial innovation is to avoid regulation. When the profit opportunities outside the regulation are large enough, financial institutions tend to bypass the regulatory restrictions to obtain greater benefits through innovation [5-7]. This theory holds that there is a dynamic game process between financial innovation and regulation of "innovation and regulation": when the profit opportunities outside the regulation are large enough, financial institutions tend to innovate to avoid regulation; when the risk caused by innovation is too large and may even harm the stability of the financial system, the regulatory authorities will take stricter regulatory measures to limit financial innovation.

Regulatory avoidance of fintech will lead to legal risks and information technology risks, which leads to the increase of systemic risk. In terms of legal risks, the innovation of fintech leads to its rapid update and iteration speed, which is prone to the problems of the inapplicability of existing laws and regulatory gaps. The lag of supervision makes the potential risks of fintech accumulate continuously, resulting in the increase of the probability of systemic risks. In terms of information technology risks, although financial innovation based on artificial intelligence, big data and other technologies has become more and more widely applied, which seems to make financial transactions more transparent, in fact, the algorithm behind it still has the nature of "black box", which leads to the emergence of new information asymmetry. For example, the algorithm mechanism behind the current popular intelligent investment consulting business is often questioned. The opacity of the algorithm and the lack of the algorithm audit plaque lead to the improvement of information asymmetry. At the same time, because different customers rely on the same or more similar algorithms, the convergence of transaction decisions makes the resonance phenomenon of the financial market more significant. If the basic algorithm of intelligent investment consulting is wrong, it is likely to cause the "domino" effect of risk transmission and cause disastrous consequences. In addition, the regulatory avoidance of fintech also aggravates the information asymmetry between regulators and financial institutions, posing greater challenges to the regulatory identification and mitigation of information technology risks, and threatening the stability of the financial system.

## **4. Suggestions**

### **4.1 Commercial Banks' Advice on Fintech Development**

#### **4.1.1 Strengthen the internal risk control of banks**

As the development of modern fintech will aggravate the systemic risks of banks to some extent, commercial banks should strengthen their internal risk control and management to avoid the risk loopholes due to their own improper management, and thus overflow their own risks to the financial system. We should establish a management system with clear rights and responsibilities and sound systems, optimize internal governance, and enhance the strength to combat risks. At the same time, under the impact of fintech, banks should also explore a mature and effective fintech risk control mode, apply big data technology, artificial intelligence and other technologies to all links of risk control, and enhance the ability of risk identification and early warning.

#### **4.1.2 Actively face the digital wave and use fintech "online + offline"**

As the reduction of bank liquidity creation will significantly improve the systemic risks of banks, banks should more actively face the challenges of fintech to their own business, starting from improving their own service quality and efficiency, so as to reduce the negative impact of bank liquidity creation, and thus reduce their systemic risks. Digitization has become an irreversible trend. Banks should take the initiative to embrace fintech and make all-round innovation in products, services, channels and other aspects. In terms of products, banks should use fintech to improve the design of related products, and make use the advantages of big data and other information

technologies to design more diversified financial products to meet the needs of different customers. At the same time, give full play to the advantages of "online + offline" to form an omni-channel mode of "online + offline" cooperation and integration. Online, improve the use experience of electronic banking such as mobile banking APP, and accelerate the digitalization of public business, and seize the development opportunities of fintech. Offline, promote the intelligent construction of outlets, optimize the customer business handling experience. Through various services and channel optimization, improve the competitiveness in the business, thus conducive to banks to control their own risks and systemic risks spillover effect.

#### **4.1.3 Conduct differentiated digital transformation**

Due to the heterogeneous development of financial technology on the bank systemic risk, and the bank systemic risk is affected by the development of their own financial technology, banks should not blindly single digital transformation, but should clarify their own development positioning, and formulate appropriate digital transformation strategy for their own advantages and disadvantages. The decision of whether to set up a fintech subsidiary should depend on its own situation, and do not blindly follow the trend. For the banks that have established their fintech subsidiaries, they should pay more attention to the possible risks caused by fintech. Especially for smaller banks, such banks are relatively vulnerable, and the digital transformation is characterized by a large amount of early investment and a long return cycle, which may threaten the financial stability of banks. Therefore, smaller banks should focus on digital transformation, use fintech to better leverage their business advantages, and find a balance between profit and risk.

### **4.2 Regulators Should Respond to Fintech Development Advice**

#### **4.2.1 Use fintech to establish a fintech regulatory system**

The development of fintech brings about the innovation of products and services, and also increases the diversity of risks, which puts forward higher requirements for financial regulation. Therefore, the regulatory authorities need to make appropriate use of fintech to improve the efficiency of financial regulation. With the deepening of financial technology application in practice, Banks and other financial institutions for the application scope of financial technology, if regulators can not take corresponding regulatory measures to regulate financial technology use, the information asymmetry problems in the financial system may become more serious, regulatory arbitrage and systemic risk will follow. Financial regulatory authorities should make full use of fintech and establish a scientific and effective fintech regulatory system. Firstly, it is necessary to improve the regulatory standards of data collection, technology application, and product innovation; secondly, establish a digital regulatory system to share key information and data, ensure the timeliness and safety of shared data, and use algorithms for automated risk monitoring and manual regulation. Finally, to create a flexible and appropriate regulatory environment to provide the soil for the healthy development of fintech, and prevent the occurrence of systemic risks to achieve the balance between regulation and innovation.

#### **4.2.2 Implement differentiated supervision and formulate reasonable supervision standards**

In view of the heterogeneous impact of fintech, the regulatory authorities should carry out differentiated supervision for different types of banks, try to avoid the "one-size fits all" supervision methods, and adopt more flexible and efficient supervision means. Set different regulatory threshold for different banks, automatic, differentiated risk warning, such as for strong innovation ability and risk control advantages, can give greater space for innovation. Determine scientific and reasonable financial supervision methods and supervision, promote financial innovation on the premise of effectively preventing systemic risks, and promote the benign development of the banking industry [8-10].

## 5. Conclusion

The development of fintech has had a huge impact on banks' business, service mode and even organizational structure, deepened the internal contact of financial institutions, profoundly changed the communication mode and speed of financial risk, and made the financial risk network increasingly intertwined. Systemic risk prevention is an issue that regulatory authorities attach great importance to. The report to the 19th National Congress of the CPC calls to improve the financial regulatory system and keep the bottom line that systemic financial risks do not occur. Under the current economic background, it is of great practical significance to study the impact of fintech on the systemic risks of commercial banks, which is related to the robustness of the banking operation in the era of fintech, and to help the regulatory authorities to grasp the relationship between supporting the development of fintech and strengthening financial supervision. Based on the concept of financial technology and its influencing factors, this paper analyzes the impact of financial technology on the management risk of commercial banks. Finally, this paper puts forward countermeasures and suggestions from the aspects of system supervision and digital transformation. There are still some deficiencies in this paper, such as the lack of quantitative analysis such as data, which can be expanded and analyzed from research methods and perspectives in the future to enrich the research achievements in financial risk management.

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