

# Research on Financial Risk Management of Free Trade Port under the Revolution of Digital Economy

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**Abstract:** The commencement of the full implementation phase of Hainan's free trade port building project signifies the initiation of Hainan's endeavour to establish a free trade port with distinct Chinese attributes. The maintenance of financial security in the Hainan Free Trade Port is crucial for ensuring the stable and quick development of the port, particularly in light of the accelerated speed of financial opening in its construction. In the realm of digital finance, the concept of interconnectivity and data exchange is achieved through the transformation of prospective financial data into information chains. Digital finance has emerged as a significant component of the digital economy, exerting a substantial influence on the rebuilding of the financial ecological value system and the formation of the nascent financial services industry. Nevertheless, the expeditious advancement of digital banking has engendered a range of risk management concerns. These include the swift transmission and progression of risks inside the realm of digital finance, the escalation of data security and compliance challenges, and the augmented complexity of market regulation. This study examines the issue of digital financial risk management by assessing the current situation and trends in digital financial development. It analyses the unique characteristics of digital financial risks compared to traditional financial risks and considers the current state of financial development in Hainan. The study explores the risks that should be mitigated during the development of Hainan's free trade port and proposes measures to ensure the financial security of the port. The ultimate goal is to facilitate the sustainable development of Hainan's free trade port.

**Keywords:** Free trade port, Financial risk, Digital economy, etc.

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## 1. Introduction

In recent years, China has witnessed continuous advancements in its financial services and digital channel innovation. This progress has led to important advances in the digital economy, resulting in the rapid development of digital finance. Currently, the evolution of digital finance is seeing a shift from basic digitization to intelligence, representing an unavoidable trajectory for the future advancement of digital finance. The increasing significance of the digital economy in global economic restructuring has led to a growing focus on the advancement of digital finance. The Financial Technology Development Plan (2022-2025) and the Guiding Opinions of the General Office of the China Banking and Insurance Regulatory Commission on the Digital Transformation of the Banking and Insurance Industry, jointly designed and issued by the People's Bank of China (PBOC) and the China Banking and Insurance Regulatory Commission (CBIRC) prior to the State Council's institutional reform on 10 March 2023, provide clear definitions of the general concept, development objectives, key tasks, and implementation guarantees of digital financial transformation. These documents were formulated in response to the risk characteristics associated with the digital transformation of the finance sector. The objectives and assurances of execution. Digital finance has numerous benefits, including cost reduction for businesses and enhanced user experience. Moreover, it fosters innovation within the financial services sector, leading to the emergence of novel financial service models like "Ant Credit Pay" and "Loans". Nevertheless, the progress of digital banking is hindered by other challenges, including the swift transmission and growth of risks, inadequate capacity for data security, and complex market regulation. This paper aims to examine the

challenges faced by digital finance in managing risks during the development of the digital economy era. It proposes recommendations to address these challenges, including expediting the establishment of an intelligent risk management system, ensuring data security and fostering a compliant legal environment. Additionally, it suggests the implementation of a market supervision system to effectively mitigate and control the risks associated with digital finance, thereby fostering the sustainable growth of the digital finance industry. On the occasion of the 30th anniversary of the establishment of a special economic zone in Hainan, General Secretary Xi Jinping delivered a significant address. He highlighted the decision made by the CPC Central Committee to endorse the development of a pilot free trade zone encompassing the entire island of Hainan. Additionally, the committee expressed its support for Hainan's gradual exploration and steady advancement in constructing a free trade port that embodies distinctive Chinese characteristics. The establishment of a policy and institutional framework for the free trade port will be implemented in a systematic and phased manner. The "Overall Programme for the Construction of a Free Trade Port in Hainan," announced on June 1, 2020, has established a comprehensive schedule and plan for the development of Hainan's free trade port. This signifies the transition of Hainan's efforts in constructing a free trade port with distinct Chinese characteristics into the stage of complete implementation. The Hainan Free Trade Port, being a special economic region characterised by a significant level of openness, holds a prominent position in China's financial landscape. Its exceptional degree of capital flow facilitation and financial innovations have the potential to impact the stability of the Free Trade Port's financial system in the face of various risks. When designing the financial system of

Hainan Free Trade Port, it is crucial to recognise the significance of responsibly mitigating various risks, establishing a comprehensive risk prevention and control framework, and safeguarding the financial stability of Hainan Free Trade Port. The examination of the financial stability of the Hainan free trade port in relation to the advancement of the digital economy has the potential to uphold the steadiness of the domestic economy and facilitate the efficient and expeditious growth of China's economy during the course of its liberalisation and transition.

## **2. Literature Review**

### **2.1. Current Status and Trends in Digital Finance**

The pace of technological advancements has facilitated the rapid progression of digital finance. The evolution of digital finance is characterised by three key elements: digitalisation, universality, and innovation. The future trajectory of digital finance will likely exhibit advancements in speed, security, intelligence, and convenience. These advancements can be mostly observed in the following areas.

#### **2.1.1. Increasing networking**

The future trajectory of digital finance is anticipated to progress towards comprehensive, rapid, and highly intelligent networking. This advancement will involve the widespread adoption of technologies such as Internet finance, mobile payment, and blockchain. Firstly, the increasing popularity of smartphones and the continuous advancements in mobile payment technology have led to a growing adoption of mobile payment for consumer transactions. The convenience and security offered by mobile payment systems are expected to have a positive impact on the development of digital finance. Secondly, blockchain technology, known for its decentralised nature and its ability to provide tamper-proof and secure transactions, holds significant potential in the realm of digital finance. It can be applied in various areas, including the issuance of digital currencies, financial transactions, and settlement and clearing processes between financial institutions. Lastly, the integration of online and offline channels in digital financial products and services is gradually becoming a reality. Artificial intelligence (AI) can assist financial institutions in conducting risk assessments, customer analysis, and investment decisions, among other tasks. This integration and the utilisation of AI can enhance the efficiency and accuracy of financial services provided by institutions, ensuring that users can access smooth, efficient, and secure financial services.

#### **2.1.2. Increased integration of fintech with the real economy**

The booming development of the digital economy will vigorously drive the healthy development of digital finance. Various institutions and enterprises are paying more and more attention to the use of digital technology to develop the financial industry. Digital technology, especially the digital RMB, will play an increasing role in the real economy, driving the integration of finance and the real economy. At present, China's digital RMB is in a leading position in the field of global legal tender digital currency, and the pilot construction has been expanded from the original "10+1" pilot region to 23 regions in 15 provinces and municipalities. By the end of August 2022, the cumulative number of transactions in the pilot areas was 360 million, with a value of

100.04 billion yuan, and the number of merchant shops supporting digital RMB exceeded 5.6 million. Digital RMB has been able to continuously expand its application scenarios in the real economy and give full play to its payment and settlement functions to meet the demand for domestic and international RMB settlement and clearing, and to realise the integrated development of fintech and the real economy.

#### **2.1.3. Financial regulation will focus more on digital finance**

At present, the digital financial business in China mostly comprises prominent technological companies such as Tencent Financial, Ant Gold Service, and Jingdong Financial. These companies possess the necessary qualifications to offer a range of financial services, including payments, fund sales, insurance, and securities. Additionally, they leverage the Internet to extend their sales operations nationwide. This expansion leads to the transfer of financial risks across banks and regions, thereby complicating local and sector-specific oversight. Consequently, this gives rise to issues that are absent in traditional finance, such as shadow banking, illicit fundraising, and virtual currencies. The failure to promptly identify these risks and implement robust steps to manage and eliminate them is anticipated to result in significant financial and asset-related damages. Hence, it is imperative for regulators to stay updated on the advancements in digital finance, engage in proactive collaboration to establish a systematic and rational regulatory framework, enforce regulations in compliance with legal standards, and enhance regulatory coordination to effectively oversee the digital finance sector.

#### **2.1.4. Financial risk prevention is further strengthened**

The future of the digital financial industry presents a significant challenge in terms of risk management and control. The ongoing advancements in technology, as well as the evolution of business practises and services, will contribute to the enhanced fortification of financial risk prevention. Digital financial firms must enhance their risk awareness, bolster internal control measures, enhance their risk management system, and consistently enhance their safety and reliability in response to illicit fundraising and other criminal activities facilitated by digital money.

## **2.2. Status of Financial Industry Development in Hainan Free Trade Harbour**

### **2.2.1. Background**

The financial industry assumes a significant part in the development of the free trade port. The Programme explicitly highlights the initiative to enact policies aimed at enhancing the liberalisation of the financial sector in Hainan Free Trade Port. This initiative aligns with global standards of openness and prioritises meeting the investment and financing requirements of the local real economy. Additionally, it emphasises the objective of establishing Hainan as a regional international financial centre, thereby creating a financial gateway for the "21st Century Maritime Silk Road." Over the course of the previous two years, the financial market industry in Hainan has demonstrated ongoing enhancements, with notable improvements in the quality and efficiency of financial services. Additionally, the region has witnessed significant advancements in regional financial reform. In the forthcoming period, the financial sector in Hainan will be integrated with the strategic framework of the free trade port initiative. This integration aims to actively enhance cross-

border trade, investment, and financing facilitation, among other areas, in order to achieve significant advancements. The ultimate objective is to attract global financial resources to accumulate in the region of Qiong. The Hainan Free Trade Port is actively engaged in the promotion of financial reform and innovation, while simultaneously embracing external openness. It consistently underscores the importance of maintaining a bottom line approach to financial risk in order to safeguard financial security.

### 2.2.2. Current status of operations

The consistent distribution of dividends resulting from the

Month		AUG	SEP	OCT	NOV	DEC
TOTAL		100.0	100.0	100.0	100.0	100.0
LPR reduction pip		5.1	7.1	5.5	6.1	5.7
LPR		1.0	0.5	3.9	0.4	0.9
LPR addition pip	Sum	93.9	92.4	90.6	93.5	93.4
	(LPR, LPR+0.5%)	15.2	19.9	12.8	20.0	30.4
	(LPR+0.5%, LPR+1.5%)	35.9	27.4	32.0	29.8	28.0
	(LPR+1.5%, LPR+3%)	13.7	15.6	20.0	17.9	13.8
	(LPR+3%, LPR+5%)	17.6	16.2	10.4	11.6	13.9
	LPR+5% and above	11.5	13.3	15.4	14.2	7.3

**Figure 1.** Share of each interest rate band for RMB loans of financial institutions in Hainan Province, 2019 (after reform)  
Unit: %

Data source: Financial Operation Report of Hainan Province (2020).

The magnitude of cross-border RMB business has seen consistent growth, accompanied by an expansion of the market base. Throughout the entirety of the year 2019, Hainan Province witnessed cross-border Renminbi (RMB) settlements with a total of seven newly established countries or regions. Additionally, there was a notable increase in the number of firms engaging in cross-border RMB transactions, with a total of 291 new entities participating in such activities. Between the months of January and November in the year 2020, the province of Hainan had a notable growth in its cross-border RMB revenues and payments, amounting to 26.636 billion yuan. This figure represents a substantial year-on-year increase of 25.1 percent.

As of November 2020, the province of Hainan has a total

establishment of Hainan's free trade port has facilitated various endeavours, including policy support, system innovation, and infrastructure optimisation. These efforts have contributed to the sustained growth of the financial industry, as well as the gradual advancement of financial reform and opening up. Consequently, the overall quality of development within the port has experienced notable enhancements.

1. The process of interest rate marketization was expedited, resulting in a substantial decrease in financing costs.
- 2.

of 3,695 firms engaged in trade-related foreign exchange receipts and payments. Among these, 1,731 enterprises were newly established, indicating a significant year-on-year growth of 3.9 times. The offshore resale trade witnessed a significant increase in the scale of foreign exchange-related income and expenditure, reaching a total of USD 1.25 billion. This represents a substantial growth of 8.8 times compared to the previous year. The year-on-year increase in foreign exchange payments made by offshore tax-exempt firms amounted to USD 2.66 billion, representing a growth rate of 2.2 times.

Financial reform has been consistently advocated for and has resulted in numerous advancements in innovation. Hainan Free Trade Port, as a prominent national financial reform pilot, has successfully implemented several pioneering initiatives within the domestic context.

China's First - Commercial Real Estate Mortgage-Backed Securities for Tourism and Vacation Destinations
China's First - Domestic and Foreign Specialty Drug Expense Reimbursement Medical Insurance and Universal Commercial Supplementary Medical Insurance
China's First - Qualified Foreign Limited Partner Fund
China's First - FT full-featured cross-border two-way RMB fund pooling business for multinational group companies
China's First - Land Rental Asset Securitization Products

**Figure 2**"Firsts" in Hainan's free trade Port Financial Market

## 3. Research Process

### 3.1. Analysis of the evolution of risk in digital finance as distinct from traditional finance

#### 3.1.1. Liquidity risk

The market exhibits notable attributes such as substantial trade volumes, significant liquidity, and short maturities, hence rendering the issue of runs typically prevalent in the currency market. The currency market has a relatively low level of investment risk, which consequently garners significant attention and participation from a wide range of investors. Nevertheless, in the event of unfavourable market

developments, investors tend to promptly withdraw their investments to mitigate potential losses. Consequently, financial institutions that heavily rely on cash for investment purposes may encounter difficulties in managing substantial redemption volumes within a limited timeframe, thereby instigating liquidity risks. Maturity mismatch is an often observed issue in both traditional banking institutions and digital financial platforms. Commercial banks generate their primary source of profit by capitalising on the interest differential between deposits and loans. However, when there is an unjustified discrepancy in the maturity of these financial instruments, it becomes very susceptible to payment

difficulties, hence exposing the bank to liquidity risk. Digital financial platforms, like "Yu'E Bao" and "Wealth" exhibit maturity mismatches and are susceptible to liquidity problems. The majority of customers on digital financial platforms exhibit risk aversion tendencies, prioritising the safety of their principal investment. To cater to these preferences, the platform offers customers the option of T + 0 redemption, allowing them to withdraw their funds immediately. However, the platform itself does not always have the capability to provide T + 0 redemption for its own investments. In the event of platform issues or market fluctuations, a significant number of customers may seek to redeem their investments, creating a challenge for the platform to generate sufficient cash reserves to accommodate these requests. Consequently, this situation gives rise to liquidity risk. Liquidity risk is mostly induced by market fluctuations, particularly as a result of the response of interest rates. Interest rates, as a mechanism inside a market economy, exert a significant regulatory influence on the market, hence impacting market prices, investor expectations, and other related factors. When alterations in interest rates occur, they frequently result in adverse consequences, including the emergence of liquidity problems.

### **3.1.2. Credit risk**

Credit risk, also known as default risk, refers to the inherent uncertainty around the possibility that one party involved in a transaction may be unable to fulfil its contractual commitments in a timely manner, leading to a financial loss for the counterparty. The primary factor contributing to this particular sort of risk is the presence of knowledge asymmetry between the two involved parties. The credit risk and accompanying asset price increase as the information gap between the two parties widens. The increasing advancements in technology and enhancements in the financial system have accentuated the discernible disparity between the credit risk associated with traditional finance and digital finance. In the realm of conventional finance, the extent of information accessible to both parties involved in a transaction is constrained, hence elevating the likelihood of transactional default. Consequently, the return on assets is correspondingly elevated, aligning with the attributes of heightened risk and commensurate return. Digital finance, leveraging advanced Internet technology, overcomes the constraints and delays inherent in the conventional financial framework, thereby expanding the temporal, spatial, and transactional scope. Digital finance has revolutionised the settlement of financial transactions by enabling them to be conducted in a digital format. This advancement has resulted in significant reductions in both time costs and artificial operation costs. Furthermore, digital finance has transcended geographical boundaries, thereby expanding the geographic scope within which transactions can take place. Additionally, it has facilitated transactions between individuals who were previously unfamiliar with each other, thereby extending the transactional possibilities beyond those involving acquaintances. Simultaneously, digital banking exhibits attributes such as transactional openness and virtuality, which inevitably augment the likelihood of credit risk. The lack of synchronisation between the updating and iteration of financial products and financial supervision results in the inability of financial supervision to keep pace with the innovation of digital financial products. This is further compounded by the absence of a comprehensive credit system, thereby exacerbating the risk of credit default.

### **3.1.3. Systemic risk**

Systemic risk, alternatively referred to as non-diversifiable risk, pertains to the type of risk that is incapable of being mitigated through diversification strategies, mostly owing to variables originating from within or outside the system. The potential for digital financial systemic risk to transform into a financial crisis exists to a certain degree. Traditional financial crises are commonly described as being of substantial magnitude but not necessarily catastrophic. Due to their notable impact, the majority of these crises are typically resolved through intervention by government authorities, a trend that is notably observable in financial institutions like commercial banks. Digital finance, in contrast to traditional finance, is distinguished by its inherent qualities and its origin from the concepts of being "too interconnected to fail" and "too fast to save." By leveraging computer network technology, digital finance overcomes the limitations of conventional financial transactions, enabling the integration of financial markets across various temporal and spatial boundaries. Against the backdrop of economic globalisation, any issues arising within one link of the financial system tend to swiftly propagate risks outward, ultimately culminating in a financial crisis. Contemporary digital finance places greater emphasis on scientific and technological advancements, as well as internet technology, in comparison to conventional finance. It exhibits a higher degree of information disclosure and dissemination velocity. Digital finance operates within a comprehensive information chain, enabling rapid transaction processing. However, any disruption in a single link within this chain can lead to an immediate collapse of the entire information network, posing challenges for timely remediation.

## **3.2. The dilemma of digital financial risk management**

### **3.2.1. Risk transmission and evolution of digital finance is fast**

The digital financial system operates as an interconnected mechanism, wherein a singular risk event possesses the potential to exert a significant influence on the entirety of such system. The transmission of these risks has implications not only for the digital financial system, but also for the broader financial system and potentially other markets and sectors. The inherent intricacy of digital financial hazards gives rise to the possibility of additional complexities in the transmission process, resulting in the emergence of novel forms of risk. One of the contributing factors to the transfer of risk is the presence of information asymmetry. The risk assessment of digital financial products holds significant importance throughout the execution of digital financial business activities. Any inaccuracies in the risk assessment can potentially result in substantial losses for investors or institutions. Cross-market risk is an additional element of risk transfer. The domain of digital financial industry encompasses a vast array of activities. In the event of a risk materialising, it has the potential to propagate across several sectors and markets, thus impacting the entirety of the financial market. The technical infrastructure serves as the fundamental component of digital finance, and the progress of digital financial operations depends on a diverse range of technologies. However, in instances where technological advancements are incomplete or vulnerabilities exist, there is a potential for system failure or unauthorised access to data, consequently giving rise to a multitude of risks. Diverse

countries or areas may exhibit variations in regulatory norms, which in turn can lead to the propagation of digital financial risks.

The primary catalysts for the progression of digital financial risk are credit, legal, technological, and market elements. Credit risk, being a non-systemic risk, possesses the potential for diversification, albeit not complete diversification. Consequently, digital financial platforms may incur losses in the presence of credit risk. The development of digital finance necessitates reliance on legal support and supervision to mitigate legal risks. However, financial regulation often lags behind financial development, a characteristic that is particularly evident in digital finance due to its innovative nature. Consequently, insufficient regulation exacerbates the emergence and evolution of digital financial risks. The influence of technological hazards on digital finance is significant, as the assurance provided by technology is crucial for ensuring the safety and dependability of digital financial systems. Market volatility frequently leads to price variations in financial products, including digital financial products. However, it is important to note that market fluctuations can have both positive and negative repercussions. In instances where they have adverse effects, investors may incur losses. The development of digital finance is influenced by various drivers, including credit, legal, technological, and market issues. These drivers are often interconnected and contribute to the acceleration of the evolution of digital financial risks.

### **3.2.2. Exacerbation of data security and compliance issues**

The operation of digital finance necessitates the collection, processing, and storage of substantial quantities of user data and private information. Any improper conduct during these processes can result in information leakage and non-compliance with data utilization and sharing regulations. These issues present substantial risks to the information security of financial users. One aspect to consider is the limited utilization rate of financial data. Financial organizations must prioritize the establishment of consistent data definitions during the data collection process, owing to the unique attributes of financial data. These attributes include the abundance of data sources, the intricate and dynamic structure of the data, as well as the potential for incoherence or conflicting information across distinct datasets. The dispersion of important data management authority and tasks within financial institutions typically leads to challenges in coordinating cross-departmental, cross-domain, and cross-system data governance. This situation incurs significant costs and difficulties, ultimately hindering the full exploration of the value inherent in financial data. However, there is a noticeable deficiency in the level of understanding regarding financial data protection. Numerous financial institutions, particularly those of smaller and medium sizes, continue to exhibit a narrow-minded approach by prioritizing business expansion while disregarding security risks. These institutions allocate limited capital towards research and development in financial technology, exhibit ambiguity and meticulousness in defining job responsibilities, lack a proficient and structured team for data analysis, and fail to emphasize the cultivation of employees' awareness regarding financial data security. Consequently, a conducive environment fostering a culture of data security remains absent. Certain organizations tend to rely solely on a multitude of security products for data security protection,

neglecting to establish a strong synergy among financial data governance products, technologies, and skilled personnel. This approach poses a concealed risk to the security of financial data and the smooth functioning of financial institutions.

### **3.2.3. Increased difficulty in market regulation**

Digital finance exhibits several key characteristics, namely, a high level of complexity, rapidity, frequency, and risk. Consequently, the management of digital financial risks encounters numerous obstacles, with the heightened complexity of market regulation being a significant obstacle. Firstly, it is important to address the issue of the ineffectiveness and unreliability of regulatory efforts. The digital financial market is characterized by rapid transaction speed, substantial transaction volume, and complex transaction data. In order to effectively regulate this market, the regulatory body must allocate significant human, material, and financial resources. However, the limited resources available to the regulatory body pose challenges in meeting the evolving needs of market supervision. Consequently, the effectiveness and reliability of the regulatory body's oversight are subject to serious doubt. Furthermore, there is a lack of progress in both the regulatory regulations and technology methods. The utilization of blockchain technology has significantly contributed to the mitigation of fraudulent activities and other forms of risk management. However, it is important to acknowledge that the implementation of blockchain in the financial sector also introduces novel dangers. The intricate and specialized characteristics of blockchain technology have resulted in a limited comprehension of blockchain finance among the general populace. Consequently, certain unethical individuals may exploit the concept of blockchain finance to engage in fraudulent activities. The existing financial regulatory framework is insufficient in meeting the regulatory requirements and technical capabilities demanded by the continuously evolving fintech products. Consequently, it is imperative to consistently revise and enhance these regulations to protect market stability and security. Additionally, a significant obstacle arises in the form of cross-border transactions and the associated regulatory frameworks. Regulatory norms and standards exhibit variability among countries and regions, so necessitating regulators to enhance international collaboration and coordination. This is crucial for efficiently managing risks within the digital financial sector, thereby rendering regulation notably more challenging.

## **3.3. Risks to be avoided in the construction of Hainan's free trade harbour**

### **3.3.1. Risk of economic fluctuations due to interest rate marketisation**

Currently, the process of marketizing China's interest rate is at the phase of experimental progress. The primary objective of financial reform in the Hainan Free Trade Zone (FTZ) is to liberalize restrictions on RMB deposit interest rates, enhance RMB cross-border transactions, decrease reliance on foreign currencies in bilateral trade, optimize trade and investment efficiency, and enhance the local currency settlement system. This makes Hainan FTZ a pioneering entity in promoting interest rate marketization reform and serving as a frontier for financial opening.

The process of interest rate marketisation yields advantages in terms of financial openness, but it also amplifies the vulnerabilities of the financial sector, exacerbates

macroeconomic swings, and heightens the likelihood of financial crises. According to the data presented in Figure 3, the implementation of interest rate marketisation in certain countries, encompassing both advanced economies and developing nations with limited financial infrastructures, is expected to result in increased volatility in GDP growth. In general, the likelihood of a financial crisis in an open financial system experiences a notable increase subsequent to the marketization of interest rates. Hence, it is imperative to prioritize the mitigation of potential volatility in the financial markets and economic progress of Hainan's free-trade ports while undergoing interest rate marketization. Additionally, it is crucial to prevent the transmission of such oscillations to the financial system beyond Hong Kong.

### **3.3.2. Cross-border capital arbitrage risk**

The primary framework for financial liberalization in Hainan's free trade port is the unrestricted and facilitated movement of capital across borders. This arrangement serves as a fundamental pillar in promoting the liberalization and facilitation of international commerce and investment within Hainan's free trade port. Nevertheless, it is imperative to take precautionary measures to mitigate the potential hazards associated with arbitrage when allowing the movement of capital across borders.

The implementation of cross-border RMB trade settlement in the Hainan Free Trade Port and the offshore RMB foreign exchange market presents an opportunity for arbitrage advantages, serving as a gateway for China's foreign exchange activities. If the occurrence of arbitrage indirectly impacts the variations of the exchange rate in the free trade port, it might potentially lead to heightened volatility in the foreign exchange market. This, in turn, may have adverse effects on the smooth functioning of international trade activities inside the Hainan Free Trade Port. The implementation of financial incentives within the free trade port of Hainan, along with the relaxation of foreign debt restrictions for firms, is expected to result in a notable disparity between the economic conditions inside and outside the port. In this scenario, the potential outcome involves the potential participation of international arbitrage funds in the practice of free trade port arbitrage. The cross-border investment and financing channels available in Hainan's free trade harbor exhibit greater breadth compared to those within the domestic market. Consequently, this facilitates heightened levels of cross-border exchange rate and carry arbitrage operations. The occurrence of cross-border capital arbitrage has the potential to not only intensify fluctuations in exchange rates, but also impact the customary progression of interest rate marketization and capital liberalization. Hence, it is imperative to implement stringent regulations on the atypical movement of cross-border capital in order to safeguard financial stability within the free trade harbor.

### **3.3.3. Cross-border arbitrage risk under trade**

The free trade port in Hainan plays a significant role in China's foreign commerce by serving as a crucial gateway. Its primary objectives include enhancing openness and discovering innovative approaches to foreign trade collaboration. The building and extension of the free trade port are intricately linked to the advancement of foreign trade.

Cross-border trade capital flows often involve the movement of capital from nations that import commodities to countries that export commodities, resulting in a reciprocal relationship between the flow of products and the flow of capital. Due to China's continued regulation of cross-border money flows, it is possible for cross-border arbitrage capital to be surreptitiously channeled through the foreign trade channels of free trade ports. The engagement in cross-border arbitrage trade poses potential hazards to several aspects, such as import and export regulations, foreign trade financing operations conducted by banks, and foreign exchange management. These risks have the potential to disrupt the regular functioning of the economy and have implications for the establishment and sustained growth of the Hainan Free Trade Port. Therefore, it is imperative to enhance the detection and monitoring of cross-border arbitrage transactions in order to mitigate the potential hazards that such activities may pose to the domestic economy of China.

### **3.3.4. Risk of cross contagion**

The Hainan Free Trade Port serves as a significant conduit for the bi-directional movement of commodities and resources, functioning as a crucial nexus that links China's internal and international markets. The expansion of the Hainan Free Trade Port has led to a substantial growth in the volume of cross-border transactions. The FTTP (Financial Technology and Payment) system may encounter financial risks due to information asymmetry and country-specific hazards in cross-border transactions. These risks might potentially have spillover effects through the cross-border route. Additionally, offshore risks can also impact the safety of the native onshore financial market through the FTTP. Furthermore, the extensively liberalized financial landscape within a free trade port significantly expands the scope for financial innovation. The port exhibits substantial potential for financial innovation, which is anticipated to lead to a notable rise in the complexity of financial services. Consequently, there is a likelihood of heightened diversification risks being brought to the forefront. Hence, it is imperative to enhance measures aimed at averting the propagation of financial risks across borders, industries, and markets. Moreover, it is crucial to exercise stringent control over the extent of risk transmission, with the ultimate goal of safeguarding the stability and systematic functioning of diverse businesses inside and beyond the jurisdiction of Hong Kong.

### **3.3.5. Legal regulatory risk**

The development of Hainan's free trade port has led to advancements in its financial infrastructure, resulting in the introduction of innovative financial practices and the gradual integration of mixed business operations. Consequently, it is imperative to enhance supervision during and after the implementation of these initiatives. Furthermore, there is a need to bolster the legal and regulatory framework to align with the construction of the free trade port, thereby effectively mitigating risks associated with trade, investment, finance, and related domains.

**Figure 3. Financial-related policies and regulations in China's FTZs**

Time	Main regulatory documents
2013	Administrative Measures for China (Shanghai) Pilot Free Trade Zone
2013	Administrative Measures for the Filing of Foreign Investment Projects in China (Shanghai) Pilot Free Trade Zone Administrative Measures for the Record-keeping of Enterprises Established by Overseas Investment in China (Shanghai) Pilot Free Trade Zone Special Administrative Measures for Foreign Investment in China (Shanghai) Pilot Free Trade Zone (Negative List) (2013)
2013	Opinions on Financial Support for the Construction of China (Shanghai) Pilot Free Trade Zone
2015	Pilot Measures for the Administration of China (Guangdong) Pilot Free Trade Zone
2015	Regulations of China (Tianjin) Pilot Free Trade Zone Opinions of the State Council on the Implementation of the Negative List System for Market Access Program on Further Promoting the Pilot Program of Financial Openness and Innovation in China (Shanghai) Pilot Free Trade Zone and Accelerating the Construction of Shanghai International Financial Center
2015	Guiding Opinions of the People's Bank of China on Financial Support for the Construction of the China (Guangdong) Pilot Free Trade Zone
2016	Circular of the People's Bank of China on the Expansion of Pilot Macprudential Management of Full-Caliber Cross-Border Financing
2018	Circular of the State Council on Several Measures to Support the Deepening of Reform and Innovation in Pilot Free Trade Zones (Guo Fa [2018] No. 38)
2019	Circular of the Sichuan Branch of the State Administration of Foreign Exchange on the Development of Foreign Exchange Innovation Business in the China (Sichuan) Pilot Free Trade Zone
2019	Implementing Rules for Further Promoting the Pilot Reform of Foreign Exchange Management in China (Shanghai) Pilot Free Trade Zone (Version 4.0)

### 3.4. Suggestions for Preventing Potential Financial Risks in Hainan Free Trade Port

#### 3.4.1. Formulate scientific and flexible financial policies for Hainan Free Trade Harbour

The scientific character of Hainan's financial policy for the free-trade port serves as a guiding principle and essential assurance for future development. This ensures that the policy can effectively regulate and direct the financial development of the free-trade port, thereby yielding favorable outcomes. The implementation of well-designed and adaptable financial policies can contribute to the preservation of financial stability, thereby alleviating the burden on financial institutions and facilitating their ability to adapt. Additionally, such policies can foster positive investor sentiment among both local and international stakeholders. The Hainan Free Trade Port is currently exposed to the global market, which is characterized by numerous influential factors and significant volatility. In light of this, China must prioritize the implementation of a financially sound policy for the Hainan Free Trade Port, while also emphasizing the need for adaptability. This approach will enable the financial market of the free trade port to effectively respond to prevailing circumstances and facilitate its development.

#### 3.4.2. Promote the opening up of the financial market of the free trade harbour in an orderly manner

Currently, China has achieved significant advancements in the unrestricted exchange of Renminbi (RMB), the liberalization of capital transactions, and the market-oriented determination of interest rates. These developments have established a strong groundwork for the financial liberalization of the Free Trade Zone (FTZ). Moving forward, it is imperative to deepen the financial liberalization of the FTZ by building upon these achievements. The systematic progression of financial liberalization in Hainan's Free Trade

Zone encompasses various key aspects, including the international settlement of the Renminbi (RMB), the marketization of interest rates, and the marketization of exchange rates. Additionally, it involves the meticulous organization of specific implementation details within the financial system. While promoting innovation and facilitating economic liberalization, it is crucial to use caution and prudence in order to mitigate potential financial risks associated with the broadening scope and rapid pace of liberalization. In order to safeguard the stability and security of the domestic financial market, it is imperative to adopt a progressive and orderly approach to opening up the financial sector of Hainan Free Trade Port. This approach will effectively mitigate potential financial risks.

#### 3.4.3. Establish and improve the financial-related legal system of Hainan Free Trade Harbour

In order to facilitate the economic advancement of free trade ports, it is imperative to establish comprehensive legislation pertaining to the financial regulation of such ports. In light of the greater innovation and complexity observed in the financial system of free trade ports compared to domestic financial markets, it becomes imperative to build a comprehensive framework for financial supervision in these ports through dedicated legislation. Regarding the particular structure of financial regulatory legislation, the national legislature has the authority to establish distinct laws and regulations for free trade ports. These regulations would outline the financial regulatory system specific to the free trade port. Alternatively, with the approval of national authorities, the free trade port can develop its own management regulations that align with its unique developmental characteristics. The legislation pertaining to the financial supervision of free trade ports should possess a requisite level of flexibility and adaptability. It ought to be formulated in alignment with the distinctive features and

developmental objectives of Hainan's free trade ports. This approach will enable the achievement of favorable progress by avoiding constraints on the openness and innovation of financial services within the ports, while simultaneously ensuring effective regulation.

#### **3.4.4. Improve the financial regulatory system of Hainan free trade harbour**

Free trade ports exhibit notable distinctions from other domestic financial systems, rendering the sectoral management model unsuitable for effectively overseeing them. Inadequate coordination within this model can hinder the prevention and control of the intricate financial risks associated with free trade ports. Hence, it is imperative to promptly institute a regulatory framework and policy interventions that align with the financial risks associated with the Hainan Free Trade Port. Simultaneously, there is a need to enhance the domestic and international financial regulatory exchange mechanism by bolstering amicable collaboration among nations and regions. This will effectively mitigate and address financial risks, enhance the efficacy of cross-border regulatory cooperation, and facilitate the development of Hainan Free Trade Port as a regional financial hub.

#### **3.4.5. Establishing a scientific and sensitive early warning mechanism for financial risks in Hainan's free trade harbour**

In order to effectively detect financial risks in the Hainan Free Trade Port at an early stage, it is imperative to utilize the data provided by financial supervisory departments and the immediate economic information release and supervision platform of the Free Trade Port. This data should serve as the foundation for establishing a robust information supervisory network and mechanism. Furthermore, it is essential to develop a systematic financial risk early warning and processing system that aligns with the ongoing construction of the Free Trade Port. This system will enable timely, scientific, and accurate assessment and handling of financial information, thereby enhancing the efficacy of mechanisms designed to address and mitigate financial risks. By doing so, the accumulation of risks can be prevented, and financial security can be ensured.

## **4. Conclusion and Outlook**

This paper undertakes an analysis of the predicament surrounding the management of digital financial risks. It achieves this by examining the current state and trajectory of digital financial development, scrutinizing the distinctive attributes of digital finance in contrast to the progression of traditional financial risks. Furthermore, it integrates these findings with the prevailing conditions of financial development and establishment in Hainan Free Trade Port (FTTP). Subsequently, it puts forth risk management strategies aimed at facilitating the advancement of digital finance in Hainan FTTP, with a focus on the present circumstances. Nevertheless, it is imperative that the advancement of digital banking encompasses not only the current state but also prioritizes the anticipation and strategic preparation for future progress. Hence, this study presents a perspective on the prospective trajectory of digital finance's future development.

## **4.1. The future of digital finance is digital, intelligent and personalised**

The phenomenon of digitalisation is expected to emerge as an indispensable and enduring trend in the progression of digital finance. The incorporation of big data, blockchain, artificial intelligence (AI), and other technological advancements in the field of finance has led to the digitization of financial services. This digitization has not only provided clients with easy services, but has also significantly decreased operational expenses for businesses. Moreover, it has facilitated financial innovation and improved the capacity to protect customer data and cash. The future of digital banking centers around the integration of intelligence, which enhances and advances the process of digitalization, ultimately fostering the emergence of personalized financial services. In the forthcoming era, the competitive market will place greater emphasis on personalised services and products. Personalisation is poised to become a crucial determinant in market competition. The provision of customised services and products to customers will undoubtedly emerge as a prevailing trend. Consequently, personalisation represents a significant avenue for the future advancement of digital finance.

## **4.2. The future development of digital finance will focus more on risk management and regulation**

The increasing complexity and innovation of digital financial products will eventually give rise to more intricate hazards. Consequently, enhancing digital financial risk management will become an essential prerequisite for stabilizing the financial market and protecting the interests of investors. Furthermore, digital financial risks possess a high degree of transmissibility, rendering them arduous to detect and evaluate. These risks also exert significant societal consequences. In the event that a single institution encounters difficulties, it has the potential to initiate a "chain reaction," thereby propagating the risk on a broad scale. Consequently, this can result in severe repercussions for both the overall financial market and society as a whole. Furthermore, it is anticipated that the future financial regulatory framework will continue to evolve and enhance, prompting investors to increasingly prioritize the assessment of risk-return ratios. One perspective suggests that the enhancement of regulatory bodies will compel institutions to enhance their internal risk management systems and fortify their business risk management practices. However, it is important to note that investors will have elevated expectations when it comes to investment risk management. Consequently, financial institutions will surely strengthen their risk management capabilities in order to establish a distinct competitive edge.

## **4.3. Fintech innovation will become the focus of digital finance**

The conventional financial sector has started to gradually adjust to the pace of digital finance development, necessitating the expansion of technological means to offer diverse financial services to various stakeholders. Consequently, the future competition within the digital financial market is expected to intensify. In order to enhance their market competitiveness, digital financial institutions will inevitably focus on the innovation of digital financial services and products. Moreover, financial science and

technology innovation plays a crucial role in driving the advancement of digital financial innovation. The role of financial science and technology innovation is crucial for the transformation and upgrading of financial institutions, as it provides significant technical support for the growth of digital financial services and product innovation.

Given the expansive potential of digital finance, it is imperative for digital financial institutions to capitalize on the opportunities presented by digitization and intelligence. This entails enhancing risk management and supervision, as well as consistently engaging in financial technology innovation. By doing so, the objective of fostering the sound growth of the digital financial industry can be achieved. Simultaneously, in the forthcoming advancement of digital finance, it is imperative to consistently strive for novel advancements and advances, particularly in enhancing the oversight and regulation of financial hazards, with the aim of fostering the high-caliber development of the digital financial sector.

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