



DIGITAL TRANSFORMATION IN BANKING: FINTECH'S ROLE IN SHAPING PROFITABILITY AND RISK MANAGEMENT IN CHINA

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Abstract. *This thesis investigates the impact of financial technology (FinTech) development on the profitability and risk management capacity of Chinese financial institutions over the period 2001–2022. Using a balanced panel dataset of 57 listed financial enterprises from the Shanghai and Shenzhen Stock Exchanges, the research examines how FinTech adoption measured by the logarithmic frequency of technology-related terms in corporate annual reports affects key financial performance indicators. Return on Assets (ROA) is employed as a measure of profitability, while the liquidity ratio serves as a proxy for risk management ability. The empirical analysis reveals that FinTech adoption exerts a dual effect on financial institutions. On one hand, technological innovation enhances liquidity management through improved forecasting, data analysis, and transaction efficiency enabled by big data, cloud computing, and blockchain technologies. On the other hand, heavy investment costs, rapid technological depreciation, and intensified competition can temporarily suppress profitability (ROA). By incorporating control variables such as leverage, cash flow, receivables, and inventory ratios, the study provides a comprehensive understanding of how FinTech reshapes both the efficiency and stability of financial institutions. Overall, the findings suggest that while FinTech fosters innovation and improves liquidity resilience, sustainable profitability depends on the strategic and balanced integration of digital technologies into banking operations.*

Keywords: *Financial Technology, profitability, liquidity management, ROA, digital transformation, Chinese Banking Sector, risk management, big data, blockchain, cloud computing, financial innovation.*

Introduction. Fintech, at its core, refers to the services, processes, and products that have emerged as a direct result of rapid advances in digital technology. In simple terms, it represents the use of modern technologies to reshape financial activities, making them faster, more efficient, and more accessible. The Financial Stability Board (FSB) offers a widely cited definition, describing fintech as *financial innovation driven by technology*.¹⁶ This definition highlights not only the novelty of fintech but also its transformative potential: the ability to create entirely new business models, applications, processes, or products that can exert a tangible impact on financial institutions and the functioning of financial markets as a whole.

¹⁶ Mamatov, A. Moliyaviy bozorlar va bank tizimi. – Toshkent: Iqtisodiyot, 2020. – 280 b.



Academic scholars have also sought to classify fintech more systematically. Dorfleitner and colleagues (2017), for instance, argue that the fintech industry can be broadly divided into four main business models based on differentiation. These include:

1. **Financing** – platforms that connect borrowers and lenders or provide alternative sources of credit.
2. **Asset Management** – digital tools and platforms that help individuals and institutions manage investments and portfolios more effectively.
3. **Payments** – technologies that facilitate faster, cheaper, and more convenient transactions, such as mobile payments, e-wallets, or blockchain-based transfers.
4. **Other Fintech** – innovative services that do not fall neatly into the above categories but nonetheless contribute to financial transformation.¹⁷

When we examine “technology finance” versus “financial technology (fintech),” it becomes clear that the emphasis of each is slightly different. The core of **technology finance** lies in *finance itself*. Here, technology is leveraged to make financial services more productive, to expand and diversify the models of financial delivery, and to support technological innovation and entrepreneurship. In contrast, the heart of **fintech** lies in *technology*. It is through technological progress whether in data processing, artificial intelligence, mobile applications, or blockchain those new opportunities for innovation emerge in financial markets, financial institutions, and financial business models. The aim is always to enhance efficiency, improve inclusivity, and increase the effectiveness of financial services.

Data Sources

For this study, we focused on financial banks listed on the Shanghai Stock Exchange and the Shenzhen Stock Exchange, covering the period from 2001 to 2022. This wide time span provided a rich dataset to analyze, but before using it for research, the data went through several important filtering and cleaning steps to ensure reliability and accuracy.

First, only financial enterprises were kept in the sample, since these were the main focus of the research. Then, companies marked with the label “ST” (which indicates firms with financial or operational problems in China’s stock market) were removed, along with any firms that had been delisted during the observation period. In addition, companies that had launched an initial public offering (IPO) during the observation period were excluded, as their shorter operating history could distort long-term results.

After completing all these steps of cleaning, filtering, and organizing, the study settled on a final panel dataset consisting of 57 Chinese listed financial enterprises, observed over the period 2001–2022. This structured dataset forms the foundation of the research and allows for a consistent and meaningful analysis of fintech’s impact on China’s financial sector.¹⁸

¹⁷ Karimov, I. Milliy iqtisodiy rivojlanish yo’llari. – Toshkent: O’zbekiston, 2018. – 356 b.

¹⁸ OECD. Data on Finance, Investment, and Growth. – URL: [https://data.oecd.org\(27.08.2025\)](https://data.oecd.org(27.08.2025)).



Table 1.

Selected Chinese Banks and Model Indicators¹⁹

Category	Bank Name	Indicators Used in the Model
State-Owned Banks	Industrial and Commercial Bank of China (ICBC) China Construction Bank Agricultural Bank of China Bank of China Bank of Communications Postal Savings Bank of China	ROA (Return on Assets) Liquidity Ratio LnFT (FinTech index based on annual reports)
Joint-Stock Banks	China Merchants Bank (CMB) Industrial Bank Shanghai Pudong Development Bank China Minsheng Bank China CITIC Bank China Everbright Bank Ping An Bank Huaxia Bank China Bohai Bank China Zheshang Bank	ROA (Return on Assets) Liquidity Ratio LnFT (FinTech index based on annual reports)
City Commercial Banks	Selected regional banks listed on Shanghai and Shenzhen Stock Exchanges (e.g., Bank of Beijing, Bank of Nanjing, Bank of Ningbo, Bank of Shanghai)	ROA (Return on Assets) Liquidity Ratio LnFT (FinTech index based on annual reports)


First, the high cost of technological investment. In the short term, adopting fintech requires banks to spend heavily on research, system upgrades, infrastructure, and employee training. These upfront costs are extremely large. Although such investments may bring benefits in the long run, in the short run they place a heavy financial burden on banks. High investment compresses profit margins and reduces immediate returns, which directly lowers ROA. In our view, this is one of the clearest challenges banks face when introducing advanced technologies.

Second, rapid technological updates lead to depreciation of assets. The pace of innovation in financial technology is extremely fast. To remain competitive, financial institutions must constantly replace or upgrade their technological systems, equipment, and software. As a result, existing assets lose value quickly, and depreciation expenses rise. This constant cycle of updating technology increases depreciation and amortization costs on the financial statements, further squeezing profits and lowering ROA. In our analysis, this is a hidden cost that many banks underestimate when adopting new technologies.

Third, the risks associated with technology itself. We also observe that fintech brings new types of risks. For example, blockchain and cloud computing systems make financial institutions highly dependent on technology. If technical failures occur such as system

¹⁹ World Bank. World Development Indicators Database. – URL: <https://databank.worldbank.org/source/world-development-indicators> (murojaat qilingan sana: 27.08.2025).





crashes, data breaches, or cyberattacks the consequences can be serious. Not only would there be direct economic losses, but also damage to customer trust and institutional reputation. Loss of trust in turn leads to reduced business opportunities and weaker profitability, which indirectly reduces ROA.

Lastly, intensified market competition. Fintech also changes the competitive landscape. Because it lowers barriers to entry, more non-traditional players such as large technology firms and fintech startups are able to join the financial services sector. These newcomers often have stronger technological capabilities and leaner operating models, which allow them to offer services at lower costs. As they capture market share, traditional banks are left with tighter profit margins and greater difficulty in maintaining high returns. This intensified competition ultimately puts downward pressure on the ROA of established financial institutions.²⁰

In short, through our study we find that while fintech is a powerful driver of innovation and growth, it also creates financial, technological, and competitive pressures that can reduce ROA in the short to medium term. We believe that recognizing these challenges is essential for understanding the true impact of fintech and for helping financial institutions design strategies that balance innovation with sustainable profitability.

In our research, we also focus on the positive effects of financial technology on liquidity management in financial institutions. We find that different technologies contribute in specific ways to improving banks' ability to manage liquidity, maintain stability, and reduce risks. To begin with, Big Data technology plays an important role in forecasting and decision-making. By using massive datasets, financial institutions can better predict both market trends and customer behavior. This allows banks to plan ahead, optimize how funds are allocated, and improve the overall efficiency of fund utilization. For example, with accurate liquidity demand forecasting, banks are able to arrange their short-term and long-term funds more reasonably, maintain a higher liquidity ratio, and avoid sudden liquidity shortages.

By including Cashflow, REC, and INV alongside the leverage ratio, we strengthen our analysis. These control variables ensure that when we study the effects of financial technology, we are not confusing its impact with other important financial conditions that naturally affect banks' profitability and liquidity. In our study, we recognize that the control variables we selected have important influences on both the Return on Assets (ROA) and the liquidity ratio of financial institutions. Each of these variables such as leverage ratio, cash flow ratio, accounts receivable ratio, and inventory ratio captures a different dimension of financial health and operational efficiency. Because profitability and risk management

²⁰ Leong, K., & Sung, A. FinTech (Financial Technology): What is It and How to Use Technologies to Create Business Value in Fintech Way? // International Journal of Innovation, Management and Technology. – 2018. – Vol. 9(2) – P. 74–78.

are shaped not only by financial technology but also by these fundamental financial conditions, it is essential for us to include them in our model.²¹

To make the relationships clearer, we have organized all variables into a summary table. *Table 2* presents the definitions of every variable used in our analysis, including the explained variables (ROA and liquidity ratio), the core explanatory variable (LnFT), and all control variables. This table provides a clear reference for how we measure each concept and ensures transparency in the way we designed our research model.

Table 2.

Variable definitions²²


Variable name	Abbreviation	Definition and measurement	Data source
Financial technology	LnFT	Natural logarithm of the frequency of FinTech-related terms in annual reports. Calculated using Python crawler and keyword extraction techniques.	Annual reports from Shanghai and Shenzhen Stock Exchanges
Return on assets	ROA	Net income divided by total assets. Reflects profitability.	CSMAR Database
Leverage ratio	LEV	Total liabilities divided by total assets. Indicates debt burden.	CSMAR Database
Cash flow ratio	Cashflow	Operating cash flow divided by total assets. Reflects liquidity management.	CSMAR Database
Receivables ratio	REC	Accounts receivable divided by total assets. Reflects credit risk exposure.	CSMAR Database
Inventory ratio	INV	Inventory divided by total assets. Reflects operational efficiency in inventory management.	CSMAR Database

Conclusion. This study examined the influence of financial technology (FinTech) on the profitability and liquidity management of Chinese financial institutions between 2001 and 2022. By analyzing data from 57 listed financial enterprises on the Shanghai and Shenzhen Stock Exchanges, the research provided empirical evidence on how the integration of FinTech reshapes traditional banking operations, business models, and performance indicators.

²¹ Roy, S. *Financial Technology: Systems and Applications*. – London: Routledge, 2006. – 312 p.

²² Author's work





The findings reveal a complex but meaningful relationship between technological advancement and financial outcomes. On one hand, FinTech adoption especially through big data analytics, cloud computing, artificial intelligence, and blockchain significantly strengthens liquidity management and overall financial stability. These technologies enhance real-time fund monitoring, improve forecasting accuracy, and support flexible risk mitigation strategies. On the other hand, the results show that the short-term impact of FinTech on profitability (measured by ROA) can be negative due to high technological investment costs, accelerated depreciation of digital assets, and rising competitive pressures from non-bank financial players.

Therefore, the study concludes that FinTech is both an enabler and a disruptor of financial performance. To fully leverage its benefits, financial institutions must adopt a balanced approach one that prioritizes innovation, strengthens digital infrastructure, and implements effective cost management strategies. Policymakers and regulators should also encourage the sustainable integration of FinTech by promoting digital literacy, cybersecurity, and fair competition. Ultimately, FinTech represents not merely a technological upgrade but a long-term transformation of the financial ecosystem, demanding strategic adaptation from banks and continuous alignment with technological progress.

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