The Impact of Financial Technology on Systemic Risk in Banking: An Empirical Analysis Based on Text Mining

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Abstract. The development of financial technology has a profound impact on the systemic risk of commercial banks. This study constructs a FinTech development index for each listed bank using Python web scraping techniques from a micro perspective. It applies the CoVaR method to measure the spillover level of each listed bank's systemic risk to the banking sector. Based on panel data from 16 listed commercial banks in China from 2009 to 2021, this research explores the impact mechanisms and transmission effects of FinTech on systemic risk in banking. The results show a positive correlation between the development level of FinTech in Chinese listed banks and systemic risk in the banking industry. As the FinTech development in these banks progresses, the spillover level of systemic risk exceeds the risk dispersion effects. There is also heterogeneity among different types of banks; the development of FinTech in state-owned banks, for instance, reduces their spillover levels of systemic risk.

Keywords: Financial Technology, Banking Systemic Risk, Conditional Value at Risk, Spillover Effects

1 Introduction

In 2022, the People's Bank of China issued the "Fintech Development Plan (2022-2025)," setting a roadmap for the digital transformation of the financial industry over the next three years. The widespread application of fintech is continually advancing the upgrading and reform of traditional industries, profoundly altering the business models of traditional banks. The impact of fintech on the banking sector is profound, spanning from online and mobile banking to smart and ecological banking, affecting every business domain and management aspect including retail, governmental and corporate services, product development, channel management, risk control, and talent development. The rapid integration of fintech not only breaks industry boundaries but also transcends the spatial and temporal limits of risk propagation, posing new challenges to financial regulation, monetary policies, and industry stability. The development of fintech, especially under relatively lagging regulation, increases the volatility within the banking system and raises the potential for systemic risks, making it crucial to measure the extent of risk spillover brought by fintech for the stability of the banking industry.

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2 Literature Review

In recent years, the deepening application of financial technology has impacted financial market structures, altering the operational models of traditional commercial banks and the overall risk levels in the banking sector. Scholars are divided on the impact of fintech on bank risk. Theoretically, some argue that advances in fintech and regulatory technologies reduce information asymmetry and credit asset price volatility, thus mitigating credit risk for banks. Financial technology's rapid development also enhances economic risk prevention and early warning capabilities, significantly reducing systemic risk levels. Liu, Lian'ge(2019)[1] suggests that fintech integration across traditional banking sectors, through cross-validation, enhances risk warning systems and improves dynamic perception and risk control in banking, helping to mitigate financial risks. Luo Hang(2020) [2] demonstrate that fintech enhances societal credit and information processing capabilities, helping to curb the spread of systemic financial risks. However, other scholars argue that integrating fintech into banking not only increases inherent risks in traditional business areas but also introduces new, technology-related risks and other complex risks arising from the integration of fintech. Yang Wenyao(2019) [3] believe that financial innovations alter the characteristics of financial risks, making them more covert and contagious; the reliance on extensive data and technological innovation exacerbates industry risks. Liu Mengfei(2020) [4] and Zhou Daishu(2020) [5] argue that fintech penetration into traditional financial fields changes the nature of traditional financial risks, making them more intertwined, covert, and contagious, and posing greater challenges for regulation.

Empirical analyses also fail to reach a consensus. Yang Wenjie(2020) [6] find that while the development of fintech and heightened market competition may increase bank risk, Jin Hongfei(2020) [7] find varying impacts on risk levels among different types of commercial banks based on data analysis from 2010-2018 for 261 domestic banks. They suggest that fintech usage reduces risk levels and enhances risk-bearing capacity for large commercial banks, but the opposite is true for smaller banks. Yang Wang(2020) [8], using data from 135 commercial banks between 2012-2017, conclude that the relationship between fintech and commercial bank risk-taking is an inverted U-shape. Wang Zhihong(2021) [9] note that while fintech changes banking business and product models, it also increases the complexity of financial risks, raising the likelihood of risk occurrences in commercial banks.

This literature review indicates that current research primarily focuses on the impact of fintech development on banking risks from theoretical, superficial, or operational perspectives, with few empirical studies delving into the risk transmission mechanisms and mutual impacts. This paper aims to explore the pathways of systemic risk spillover effects in the banking industry due to fintech development, constructing systemic risk indicators for the banking sector to empirically analyze the spillover effects of fintech development on banking industry systemic risk.

3 Mechanism of Influence and Model Construction

3.1 Mechanism of Fintech's Spillover Effect on Banking Systemic Risk

Single Bank Risk Spillover Mechanism.

From an individual banking business development perspective, commercial banks are increasingly adopting financial technology to drive their digital transformation. Integrating cutting-edge technologies like big data, cloud computing, blockchain, and artificial intelligence, financial technology not only optimizes and enhances traditional banking services but also fosters the innovation and development of new financial products. Moreover, the application of financial technology has shifted many banking operations from offline to online, necessitating higher demands on system stability, fluidity, and comprehensiveness.

For large commercial banks, which have advantages in assets, technology levels, and human resources, the approach typically involves either in-house development or strategic collaborations with fintech companies to transform traditional banking services and improve product channels, thereby building a fintech ecosystem together. The application of these technologies significantly increases transaction efficiency and reduces information distortion. However, it also introduces risks associated with technological flaws, parameter errors, and algorithm failures.

Many small and medium-sized commercial banks, with weaker technological foundations and constraints in capital, talent, and scale, struggle with their digital transformation. Facing challenges like economic downturns, profit declines, narrowing business scopes, and increased regulatory pressures, smaller banks, particularly city and rural commercial banks, seek partnerships with third-party fintech companies to expand their survival space. For example, the fintech company Twenty-Six Degree Technology has provided operational support, talent development, and system assistance to many city commercial banks; Qihang Shares has partnered with over 2,000 commercial banks. The relationship between commercial banks and fintech companies has evolved from mere outsourcing to cooperative development and now to joint operations, leading to a multidimensional interaction of business and data. Small commercial banks have become increasingly dependent on third-party fintech companies for data management, technological architecture, information systems, and ecosystem development, which can easily lead to the indirect transmission of operational risks from fintech companies to the banking sector. This dependency on third-party fintech companies creates new risks, and in the case of a crisis, it could escalate into a systemic risk within the banking industry. Additionally, the control of customer transaction and behavior-related data by a few tech giants poses the risk of data and technology monopolies, further increasing the dependence on third-party fintech solutions and potentially leading to systemic risks in the banking sector.

Internal Systemic Risk Spillover in Banks.

In the context of deep integration of financial technology, the rapid development of internet finance and the entry of large tech companies into the finance sector have blurred the boundaries between financial service providers. From a business scope perspective, fintech companies have expanded from mobile payments to online loans, equity crowdfunding, wealth management, and digital inclusive finance, quickly accumulating a vast customer base and capturing funds traditionally held by banks, leading to significant customer and capital losses for banks. Moreover, traditional commercial banks, unable to effectively serve the long-tail market, face rising operational costs, decreased efficiency, and weakened profitability. On the asset side, the development of financial technology has diverted funds from banks, causing misaligned competition between them, further increasing their operational costs and squeezing their profit margins.

Banks, in their digital transformation, have established multi-faceted cooperation mechanisms with government, industry, academia, and research institutions, broadening the scope of banking services but also leading some banks to become overly dependent on third-party partners, weakening their own management and risk control capabilities. Additionally, the development of financial technology has altered the monetary supply and demand in the financial markets, further promoting the reform of interest rate marketization. With the rapid adoption of mobile payment technologies, which have almost replaced cash, the demand for physical currency continues to decline. This change has significantly enhanced banks' credit expansion capabilities but has also exposed them to higher credit risks. Furthermore, the swift growth of internet finance has disrupted the traditional monopoly over funding costs, causing significant and frequent fluctuations in asset prices, which can easily trigger liquidity crises in the banking sector, thereby increasing systemic risk within the industry.

Risk Transmission Mechanisms in Financial Markets.

The development of financial technology has not only improved the quality and efficiency of financial services but has also altered the ways and speeds of risk transmission, increasing the entire financial industry's vulnerability. With advancements in fintech, the interconnectedness and integration among financial products have deepened, forming multi-layered interactive structures. At the institutional level, financial institutions form a highly interconnected and dependent network through cross-holdings, asset transfers, and guarantees. This network's characteristic is its reliance on its nodes, which increase the system's inherent vulnerability. Additionally, contagion is a typical characteristic of systemic risk; once triggered, risks can rapidly propagate through these interconnected nodes across the entire financial system.

As fintech rapidly evolves, financial regulation also progresses experimentally. Despite regulations becoming more refined, traditional regulatory concepts still focus on "too big to fail" institutions as primary sources of systemic risk, often leading to regulatory oversight that disproportionately focuses on large financial institutions while neglecting smaller ones. In reality, smaller, decentralized financial institutions, more motivated and capable of taking risks outside regulatory oversight, face higher probabilities of operational, business, and new technology-related risk outbreaks, making them more vulnerable overall. Simultaneously, as fintech swiftly advances, major tech companies have increasingly ventured into financial services. These companies, with their platform, technology, user, and data advantages, often use exclusionary practices and price wars to suppress potential competitors when entering financial markets. Their aggressive market share expansions, irrespective of costs, come with high-risk contingencies. If platform operations fail or cybersecurity incidents occur, they are more likely to trigger systemic risks. In a highly interconnected banking system, any change in a single bank's risk-bearing capacity can propagate through the network to other regional financial institutions, potentially causing significant systemic spillover effects in the entire financial system. Based on these spillover paths and mechanisms, this study proposes the following hypotheses:

Hypothesis 1: The development of financial technology alters commercial banks' operational mechanisms, intensifying market interconnections while exacerbating risk spillover effects, easily triggering systemic risks in the banking industry.

Hypothesis 2: The integration of financial technology into banking operations worsens internal stability within the industry, intensifying internal risk spillover and increasing the likelihood of triggering systemic risks.

Hypothesis 3: The development of financial technology has a heterogeneous impact on systemic risk spillover across commercial banks, with state-owned large banks experiencing lower spillover levels compared to joint-stock commercial banks.

3.2 Measuring the Development Index of Financial Technology

This study focuses on the enabling role of financial technology across various banking sectors, particularly on how it enhances service quality and operational efficiency. By employing text mining techniques, we aim to construct a measurement index to assess the degree to which 16 listed banks autonomously utilize financial technology. Drawing on the findings of Li Xuefeng(2020) [10], and Jin Hongfei (2020) [7], we utilize the Jieba text segmentation library in Python to conduct word frequency analysis of terms related to financial technology in the banks' annual reports. This will establish a keyword library categorized into five areas: technological applications, payment settlements, financial scenarios, risk management, and channel management (Table 1).

Table 1. Keywords Related to Financial Technology.

categories	the keywords related to financial technology
Technical Applications	Artificial Intelligence (AI), Virtual Reality (VR), Cloud Computing Blockchain, Big Data Data, Mining Intelligence, Machine Learning Biometrics, Quantum Computing
Payment and Settlement	Near Field Communication (NFC), Payment Third-Party Payment, Aggregated Payment QR Code Payment,Online Payment Mobile Payment, Digital Currency, Seamless Payment,Mobile Payment Internet Payment
Scenario-Based Finance	Industrial Chain Finance, Supply Chain Finance, Scenario Ecosystem, Platform Ecosystem, Open Platform, Data Platform, Smart Bank, Data Platform, Internet of Things (IoT) ,Ecological Cloud, Ecological Customer Acquisition
Risk Management	Relationship Graph Information, Anti-Fraud Model, Big Data Credit Reporting, Big Data Risk Control, Digital Risk Control, Intelligent Credit

	Granting, Smart Risk Control, User Profiling, Scoring Model, Predictive Model
Channel Management	Online Banking, Open Banking, Mobile Banking, Pocket Banking, Intelligent Banking, Ecological Banking, Electronic Channels, Mobile Internet, Internet Banking Self-Service Terminals

In the second step, using Python web scraping technology, the names of 16 listed banks are matched with keywords (e.g., "Construction Bank" + "AI") and searched annually on Baidu News from 2009 to 2021, yielding a total of 12,305 data entries. Due to Baidu's search mechanism not filtering out irrelevant information, to ensure the accuracy of the results, keywords are locked in quotation marks during the advanced search on Baidu News, and only records where the keyword appears in the text of the news webpage are noted. The number of news articles for each keyword per bank per year is then summed and logged to construct an annual Financial Technology Development Index (BFT) for each bank.

3.3 Construction of Systemic Risk Measurement Model for the Banking Sector

The development of financial technology impacts the entire financial market, altering the risk status of individual commercial banks and the entire banking system. This paper adopts the Conditional Value at Risk (CoVaR) method to measure systemic risk in the banking sector, drawing from the research of Adrian and Brunnermeier (2016). CoVaR is defined as the VaR of all other institutions when one institution is in financial distress, effectively depicting the risk spillover among institutions. Initially, the model uses the system's total losses as the dependent variable and a financial crisis in a bank as the explanatory variable, constructing a quantile regression model at a confidence level q. The specific form is as follows:

$$R_t^z = \alpha_i^q + \beta_i^q R^j + \varepsilon_{i,t} \tag{1}$$

Representing the return rate of the banking system at time t, by substituting the risk value at the q% quantile for an individual bank (q) based on (1), the overall risk value for the entire banking sector can be derived.

$$\text{CoVaR}_t^j(q) = \alpha_i^q + \beta_i^q \text{VaR}_t^j(q) \tag{2}$$

$$\triangle \text{CoVaR}_t^j(q) = \text{CoVaR}_t^j(q) - \text{VaR}_t^j(q) \tag{3}$$

In equation (3), the term represents the contribution of an individual bank to systemic risk. The reason for subtracting the banking sector's risk value when an individual bank is in a median state is because risks emerging from one bank can spread to others, triggering systemic risk across the entire banking industry.

4 Empirical Analysis

4.1 Sample Selection and Data Processing

Our study focuses on 16 publicly listed banks in China, using data sourced from the Wind database and annual reports of the banks. The sample period covers daily closing stock prices from January 1, 2009, to December 31, 2021. Each bank is represented by the initial letter of its name. This period includes the COVID-19 pandemic, which not only accelerated the development of financial technology but also tested the resilience of the banking system, making the empirical research more representative. The sample size is 3128, and for computational ease and accuracy, the financial technology index and bank stock closing prices are converted into log return rates and multiplied by 100 as follows:

$$R_t=100*\ln (P_t/P_{t-1}) \quad (4)$$

In the formula: represents the stock return on day t; and represent the closing prices of the stock on day t and day t-1, respectively.

Table 2. Descriptive Statistics and Unit Root Test Results for the Stock Returns of 16 Banks and the CSI Bank Index.

	Bank	Mean	S.D	Min	Max	ADF value	p	Jarque-Bera statistic	p
pa	PAB	0.00496	2.4927	-54.2865	9.5629	-52.109	0	9070.545	0
pf	SPDB	-0.01334	2.0893	-36.1028	9.5595	-51.244	0	12561.66	0
hx	HXB	-0.00516	2.0092	-34.0792	9.5801	-55.730	0	343741.6	0
ny	ABC	0.00263	1.3180	-10.4233	9.6414	-49.716	0	10496.26	0
jt	BOCOM	-0.00221	1.6541	-10.9543	9.6247	-51.871	0	11856.78	0
zg	BOC	-0.00117	1.4170	-11.6287	9.6581	-52.852	0	11700.22	0
zx	CNCB	0.00698	1.9617	-10.5643	9.6129	-52.155	0	3365.855	0
xy	CIB	0.01152	2.4435	-61.9802	9.5791	-45.693	0	1158763	0
js	CCB	0.01527	1.5973	-10.5766	9.5661	-54.169	0	5648.458	0
gd	CEB	-0.00391	1.7522	-10.4443	9.6627	-47.591	0	3568.208	0
ms	CMBC	-0.00511	1.8095	-19.7048	9.5437	-54.167	0	41578.27	0
nj	NJCB	0.00927	2.4060	-60.7442	9.5621	-50.816	0	2774260	0
zs	CMB	0.04109	1.9453	-21.2001	9.5211	-52.661	0	1423.879	0
nb	BON	0.06395	2.2980	-27.2356	9.5634	-53.879	0	25293.19	0
bj	BOB	-0.02426	1.9199	-21.0920	9.5801	-56.113	0	73512.6	0
gs	ICBC	0.01119	1.3765	-10.4282	9.5310	-53.724	0	7515.917	0
zz	CSI	0.02695	1.5670	-10.5019	8.6484	-56.284	0	730.1171	0

The analysis results from Table 2 indicate that state-owned banks have higher overall returns than joint-stock commercial banks and perform better. In terms of volatility, the returns of state-owned commercial banks fluctuate less, indicating more stable earnings compared to joint-stock banks. The Jarque-Bera test results, with p-values of zero and significantly below the 0.05 level, lead us to reject the null hypothesis that "the return series of commercial banks are normally distributed."

4.2 Measurement Mode

Before conducting quantile regression analysis, this study first tests the stationarity of the returns series of the banks to avoid spurious regression. The ADF unit root test results show that the ADF values for all banks' returns series are below the critical values at the 1% significance level, indicating that these series are stationary. These series are thus suitable for further quantile regression analysis, where the coefficients obtained are typically negative. The smaller the coefficient value, the greater the systemic risk faced by the bank.

Drawing on the research of Adrian & Brunnermeier[11], this study constructs a regression model where the change in CoVaR (△CoVaR) is the dependent variable, and the financial technology development index (BTF) serves as the independent variable. The following panel model is established:

$$\triangle \mathrm{CoVaR}_{it}^{j}=\alpha_1+\alpha_2 \mathrm{BFT}_{it}+\alpha_3 \mathrm{Control}_{it}+\varepsilon_{i,t} \quad (5)$$

'i' represents the bank and 't' represents the time, indicating the contribution of bank 'i' at time 't' to systemic risk, represents the state of fintech development of bank 'i' at time 't', and are control variables. Based on related literature, GDP growth rate was chosen as a macroeconomic variable, ROA (return on assets) representing bank profitability, CAR (capital adequacy ratio) indicating the bank's ability to withstand systemic risks, CSB (cost-to-income ratio) representing bank operational capabilities, and NPL (non-performing loan ratio) indicating the quality of bank assets. ε represents the residual. Descriptive statistics for banking systemic risk, fintech development state, and other variables are presented in Table 3.

Table 3. Descriptive Statistical Analysis.

Variable	Obs	Mean	SD	Min	Max	skew	Kurt
△covar	206	-0.6979	0.4956	-1.8637	0.7959	0.0430	2.9525
BTF	220	3.2652	1.2714	0.0000	6.4785	-0.0895	3.0506
ROA	232	0.0103	0.0023	0.0035	0.0158	-0.2922	3.1430
CAR	222	12.8443	2.4018	7.1900	30.6700	2.3466	16.7570
NPL	234	1.2229	0.4382	0.3800	2.9100	0.3669	3.0825
CSB	219	30.9957	5.5619	19.2700	46.2600	0.4216	2.7517
GDP	255	7.9907	2.5108	2.3000	14.1600	0.2718	4.3649

From Table 3, it is observed that the Financial Technology Development Index ranged from 0 to 6.4785 from 2009 to 2021, with an average of 3.2652, indicating a clear temporal trend in the development of banking financial technology. Using quantile regression to construct a risk spillover effect model at a 95% confidence level, the ΔCoVaR values for banks ranged from -1.8637 to 0.7959, with an average of -0.6979.

The negative ΔCoVaR for the banking system indicates that risks from financial technology increase the level of systemic risk in the commercial banking system, leading to higher potential losses. The non-performing loan rate among commercial banks ranged from 0.38 to 2.91, showing significant variation in asset quality among listed banks.

4.3 Empirical Analysis

This study utilizes Stata14 and a two-way fixed effects model, chosen after a Hausman test, to account for technological progress over time. To handle heteroscedasticity, robust standard errors are employed. To explore heterogeneity in the impact of financial technology on systemic risk across different types of banks, the sample is divided into overall listed commercial banks, state-owned commercial banks, and joint-stock commercial banks. The overall sample regression results are as follows table 4:

Table 4. Panel Regression Results on the Impact of Financial Technology Development on Bank Systemic Risk.

	Model 1(All-sample Banks)	Model2(Joint-stock Commercial Banks)	Model3(State-owned Commercial Banks)
BTF	-.08118*** (-2.26)	-0.101***(-1.96)	0.083 (0.78)
ROA	-62.07** (-2.42)	-44.39 (-1.20)	-51.30 (-0.83)
CAR	-0.0447* (-1.69)	-0.0570* (-1.84)	-0.00254 (-0.02)
NPL	0.181** (2.14)	0.277* (2.08)	-0.319 (-1.67)
CSB	-0.0319** (-3.01)	-0.0331** (-2.54)	0.0622 (1.74)
GDP	-0.109*** (-6.18)	-0.0859*** (-3.68)	-0.175**(-7.88)
_cons	219.9*** (5.43)	196.1*** (5.12)	261.2 (2.06)
N	171	112	59
R^2	0.7031	0.7603	0.3769
F	29.12	49.83	42.83

***p＜0.01，**p＜0.05，*p＜0.1

Based on the empirical results, the following conclusions are drawn: First, from Model 1 across the entire sample of banks, the development of financial technology in the banking sector shows a negative correlation at a 1% significance level. Generally, the smaller the value, the greater the systemic risk faced by the banking sector, indicating a positive correlation between the development of financial technology and systemic risk in China's listed banks. Currently, the level of financial technology development in China's banking sector leads to a risk spillover effect exceeding its risk diversification function, thus increasing the systemic risk spillover effect in the banking sector, confirming Hypothesis One.

From Models 2 and 3, the regression results for joint-stock commercial banks show a negative correlation between financial technology development and systemic risk at a 1% significance level, suggesting that the development of financial technology actually correlates positively with the increase in systemic risk for joint-stock commercial banks. In other words, although advances in financial technology have enhanced the operational efficiency and innovation capacity of joint-stock commercial banks, they may also introduce new risks, increasing the overall risk level for these banks. However, the regression results for state-owned commercial banks do not show a significant correlation between the development of financial technology and systemic risk, indicating heterogeneous effects of financial technology development within different banks, confirming Hypotheses Two and Three. The reasons might be that state-owned commercial banks, during the development of financial technology, create highly independent ecological cooperation models without outsourcing core components like credit review and risk control, focusing instead on using technology for risk prevention or investing heavily in intelligent risk control development. From the data mined in the construction of the financial technology development index, from 2009 to 2021, a total of 102 entries related to financial technology risk management were gathered via Python from Baidu News, with large state-owned controlling banks accounting for 48 entries, or 47% of the total. This indicates that large state-owned controlling banks focus more on the development of intelligent risk control compared to joint-stock or city commercial banks. Another reason could be the significant advantages of state-owned banks in financial strength and strategic positioning, allowing them to take the lead in financial technology investment and application. Among the major state-owned commercial banks, except for the Postal Savings Bank of China, which has not established a financial technology subsidiary, China Construction Bank, Industrial and Commercial Bank of China, Bank of China, and Agricultural Bank of China have all set up financial technology subsidiaries, enabling state-owned banks to more effectively utilize technologies like big data, artificial intelligence, and blockchain to enhance service efficiency, strengthen risk management capabilities, and develop new financial products and services to meet customer needs and respond to market changes.

4.4 Robustness Test

To ensure the robustness of the previous empirical results, this study replaced the risk quantification indicators, introducing Z-score and Non-Performing Loan (NPL) rate as alternative variables for bankruptcy risk measurement in the robustness test. The Z-score involves the bank's Return on Assets (ROA), Capital Adequacy Ratio (CAR), and the standard deviation of the capital return rate, which is calculated using the moving average method for the standard deviation of ROA. The results are presented in the following table 5:

Table 5. Robustness test results are as follows.

	Model 1 (explained variable Z-score)	Model 2 (explained variable NPL)
BTF	0.197** (1.95)	0.0605**(2.01)
ROA	-507.058 ***(-7.84)	-136.95***(-8.54)
CAR	0.299 *** (4.97)	-0.0415** (4.97)
NPL	-0.598 **(-1.84）	
CSB	-0.0622 ** (-2.13)	-0.0445 *** (-2.13)

GDP	-0.1209**(-2.15)	0.012 (0.74)
_cons	11.348***(6.11)	4.2858***(9.68)
N	172	173
R^2	0.7117	0.5856
F	62.12	43.23

***p<0.01，**p<0.05，*p<0.1

According to the robustness test results shown in Table 5, the signs of the explanatory variables are consistent with previous results. The development of financial technology in listed banks shows a positive correlation with the Z-score and the banks' non-performing loan rates, indicating that the development of financial technology has a greater impact on the risk-taking of commercial banks than on risk diversification. These robustness tests support the core hypothesis of this study.

5 Conclusion

This paper analyzes the impact mechanisms of fintech development on systemic risks in the banking industry from three perspectives: individual bank risk spillover mechanisms, internal systemic risks within banks, and risk transmission mechanisms in the financial market. The study uses data from 16 listed commercial banks from 2009 to 2021, constructing the fintech development index BFT with text mining techniques. Using $\triangle$CoVaR to measure banks' contribution to systemic risk, the paper incorporates GDP growth rate, return on assets, capital adequacy ratio, cost-income ratio, and non-performing loan ratio as controls. The empirical results indicate a positive correlation between the development of fintech and systemic risk in the banking sector, suggesting that as fintech evolves, the spillover of systemic risk in commercial banks increases. Additionally, the impact of fintech on systemic risk varies among different types of banks. The integration of fintech in banking services does not universally deteriorate internal stability; instead, its effect depends on the specific business lines and research directions within fintech development.

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