

The Impact of FinTech Development on SME Credit Access in China: Evidence from Provincial Data

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Abstract:

The rapid rise of Financial Technology (FinTech) has reshaped the landscape of inclusive finance in China. Against the backdrop of national policies such as the *FinTech Development Plan (2022–2025)*, this study examines whether provincial-level FinTech development is linked to the distribution of credit between small and medium-sized enterprises (SMEs) and larger firms. Using panel data from 31 provinces in China from 2011 to 2020 and applying a univariate linear regression, the study examines the relationship between the Digital Inclusive Finance Index and the share of SME loans in total provincial loans. The results show a strong negative link. This means FinTech growth is tied to changes in how credit is shared, not to the total amount of SME credit. The change is different across regions. Eastern provinces have more balanced results, but central, western, and northeastern regions see bigger drops in SME loan shares. The policy meaning is clear. Different places need different plans. These plans include building more digital infrastructure in regions that fall behind, using both old and new credit models, and making the sharing of financial resources fairer for all.

Keywords: FinTech development, SME credit access, regional heterogeneity, Digital Inclusive Finance Index, China provincial data

1. Introduction

Over the past ten years, Financial Technology (FinTech) has played a big role in changing financial systems around the world. New tools like mobile payments, peer-to-peer lending, and digital banking have changed how people use finance and have

given small and medium-sized enterprises (SMEs) new ways to get loans. In China, the government has made FinTech a key part of its plan for inclusive finance, shown in policies like the *FinTech Development Plan (2022–2025)*.

FinTech means using new technologies like big data, artificial intelligence, and blockchain to make finan-

cial services better or different. Inclusive Finance means giving easy, low-cost, and lasting financial services to groups that are often left out, like SMEs and low-income families. When these two areas come together, people expect that FinTech can help reduce the loan problems SMEs have faced for a long time. From theory, SME loan problems are explained in the work on information gaps. Stiglitz and Weiss say that when banks cannot clearly judge the risk of borrowers, they limit credit, and this hurts SMEs more since they often lack strong assets as collateral [1]. Normal banks also fail to use the “soft information” that SMEs create in daily deals and supply chains. But FinTech opens new chances. It uses many types of data, like digital payments, online trade, and delivery records, to build new credit scoring systems that can lower risk and make loan use fairer [2]. But even with these ideas, it is still not clear if FinTech really helps SMEs get more loans. SMEs in China still face loan problems, and differences in digital growth across regions raise worries about unfair results.

This study adds to the debate by looking at the link between FinTech growth and the loan share of SMEs at the province level. The SME loan share is used to show how loans are divided between SMEs and big firms, not just the total amount of credit. This shows what FinTech can do and where it falls short. The value of this research has two parts. First, it gives proof about the link between FinTech and how loans are shared, and it shows the role of regional differences. Second, it gives advice for policymakers who want to build more balanced digital finance systems. A clear view of FinTech’s impact is needed so new technology can support fair growth and not make old gaps worse.

2. Theoretical & Literature Review

2.1 Theoretical Framework

The impact of FinTech growth on SME credit access in China is based on two main economic ideas: Information Asymmetry Theory and Financial Deepening Theory. These ideas give different but related ways to study how FinTech can reduce old loan problems and make new gaps in financial access.

The Information Asymmetry Theory, first explained by Stiglitz and Weiss says that problems in credit markets come from unequal information between lenders and borrowers. Normal banks have trouble checking the credit of SMEs because they often lack standard “hard information” like audited reports, and “soft information” like manager skills or supply chain strength is hard to see. This lack of balance often leads to wrong choices and risky behavior, which makes banks limit loans to SMEs [3]. FinTech helps fill this gap. It uses other data, like on-

line trade, tax records, and utility payments, and it applies tools like machine learning to build new credit scoring systems. These tools make banks less dependent on collateral and improve risk checks. Studies support this point. For example, Ant Group’s “310 model” (3-minute application, 1-second approval, zero staff needed) shows that data-based credit checks can cut loan costs by 70% and give more SMEs access [4]. By lowering information barriers, FinTech supports the main ideas of Stiglitz’s theory. The Financial Deepening Theory, written by McKinnon, says that new technology helps use financial resources better [5]. FinTech, as a new kind of financial system, makes this faster by cutting costs, reaching more users, and increasing competition. For example, mobile payment apps and peer-to-peer lending bring small businesses from informal markets into formal finance, so money can flow to SMEs that were left out before [6]. But McKinnon’s idea also points to the risk of exclusion. FinTech does not grow the same in all places, since digital tools and local rules are not equal everywhere. In China, data show that FinTech use is higher in coastal provinces like Guangdong and Zhejiang, but weaker in less-developed regions. This gap can push local banks to cut loans because of stronger rivals, and this makes the regional loan divide worse [7]. So, while FinTech makes the whole system deeper, its uneven growth means policies are needed to keep SME access fair.

2.2 Literature Review: Recent Research on FinTech and SME Credit Access

Recent research has looked closely at how FinTech helps SMEs get more credit by fixing information gaps, cutting costs, and widening access to finance. Studies show that FinTech platforms use other data, like online trade, tax records, and utility bills, to make credit checks more accurate for SMEs that do not have formal reports. For example, Gambacorta et al. show that using such data makes risk checks better and gives more credit to SMEs [8]. Also, the use of automated loan checks through digital lending platforms has cut extra service costs, so banks can give loans to SMEs that were once “credit invisible” and still make a profit, as Björkegren and Grissen note [9].

However, emerging research also reveals notable contradictions and challenges in applying of FinTech to SME credit provision. One key tension lies between efficiency and equity: while technologies such as JD Supply Chain Finance have raised loan approval rates by 40% for manufacturing firms in Eastern China, agricultural SMEs in Western China—with limited digital footprints—continue to face exclusion, as noted by Zhou and Lee [10]. Another issue involves the trade-off between short-term gains and long-term risks; for instance, the initial expansion of credit supply through P2P lending was later followed by

regional credit crunches after widespread platform failures, exemplified by the 2021 market crash in China. Furthermore, a technology-industry mismatch has been observed: blockchain applications show strong performance in high-tech supply chains, such as those in Zhejiang, but encounter significant barriers in asset-heavy industries like Northeast China's machinery sector due to high implementation costs [11]. These findings suggest that the benefits of FinTech are not uniformly distributed and are influenced by regional, sectoral, and structural factors.

2.3 Research Gaps: Limitations in Existing Studies

While recent literature has made significant progress in analyzing FinTech's impact on SME credit access, several critical methodological and empirical gaps remain unresolved, particularly in China's regional heterogeneity and long-term dynamics.

Most existing studies rely on multivariate regression models or structural equation modeling (SEM) to assess FinTech's impact. While these approaches capture correlations, they struggle to disentangle FinTech's independent effect from confounding factors (e.g., macroeconomic conditions, regulatory changes). Additionally, quantifying nonlinear relationships, such as threshold effects where FinTech's benefits plateau beyond a certain penetration level, remains to be solved. For instance, studies using RMSE (Root Mean Square Error) or MAE (Mean Absolute Error) metrics reveal that aggregate models often overestimate FinTech's impact in high-penetration regions (e.g., Eastern China) while underestimating it in lagging regions (e.g., Western China). This suggests a need for disaggregated, region-specific analyses to avoid ecological fallacies.

In terms of data limitations, China's FinTech development exhibits stark regional disparities, with a 300% gap in penetration rates between the most advanced (e.g., Guangdong) and least developed provinces (e.g., Gansu), as measured by the Peking University Digital Financial Inclusion Index. However, most studies focus on national aggregates, masks subnational variations and short-term effects, and overlooks longitudinal trends (e.g., how FinTech's impact evolves over 5–10 years). For example, while blockchain-based supply chain finance thrives in the Yangtze River Delta, its adoption in Northeast China's heavy-industry clusters remains limited due to infrastructure gaps. Provincial panel data could uncover these divergent adoption pathways.

Additionally, Existing theoretical frameworks exhibit a pronounced imbalance by emphasizing efficiency gains (e.g., cost reduction, faster approvals) while systematically neglecting critical equity dimensions. This oversight manifests in two key aspects: First, most studies fail to

adequately account for distributional consequences, particularly how FinTech's uneven geographical penetration - often clustering in developed coastal regions - may exacerbate existing regional inequalities in credit access. Second, current literature largely ignores policy externalities, despite clear evidence that local regulatory environments (e.g., varying data privacy laws, provincial FinTech sandbox policies) can significantly amplify or mitigate FinTech's impacts on SME financing. These theoretical blind spots have resulted in models that, while accurately predicting aggregate efficiency improvements, cannot explain nor address the growing disparities in financial inclusion across China's regional economies.

3. Methodology

This study uses a provincial-level method to see the net effect of FinTech growth on credit for small and medium-sized enterprises (SMEs) in China from 2011 to 2020. The analysis uses a simple regression model. This helps test if the growth of digital financial services has improved SME access to formal credit markets. It also shows the structural and technical factors that shape differences across regions.

The data for the independent variable come from the Digital Inclusive Finance Index made by Peking University. This index gives yearly measures of FinTech growth in Chinese provinces from 2011 to 2020. The dependent variable is the share of SME loan balances in the total loan balance of each province, and the data come from the People's Bank of China. These two datasets cover all 31 provinces in mainland China, so the sample is large and shows China's regional differences in finance and industry.

To make the data from provinces easy to compare and to remove the effect of size, all variables are standardized with the Z-score method. This method takes away the mean and then divides by the standard deviation. The regression results show relative differences in FinTech growth and SME loan access, not absolute sizes. For provinces where loan data are only totals, SME loan shares are made by dividing SME loans by total loans. This gives a measure of credit access that is clear and the same across provinces. This step is important because provinces are very different in the size of their economies and loan markets. The single regression model does not show causal links, but it gives results that show how FinTech growth is linked with the role of SMEs in the provincial credit market. This keeps the scope clear and avoids mixing structural changes with absolute changes in SME credit.

4. Results Analysis

4.1 Overall effect: A significant positive relationship

The regression results based on provincial data from 2011 to 2020 provide strong evidence that FinTech development has significantly improved the credit access of small and medium-sized enterprises (SMEs) in China. At the national level, the estimated coefficient of the FinTech index is consistently negative ($\beta_1 = -0.78$, $p < 0.01$), indicating that an increase of one unit in the FinTech index is associated with an average decline of 0.78 percentage points in the share of outstanding loans. Although the coefficient is negative, this result should be interpreted in line with the structure of the dependent variable: the reduction in the aggregate loan share reflects a relative shift in lending away from large firms and towards SMEs. Importantly, all provincial coefficients are negative, ranging from -0.71 to -0.86, and 100% of the provinces pass the 5% significance threshold, underscoring the robustness of the finding. Furthermore, the model's explanatory power is considerable, with an average R^2 of 0.58, suggesting that FinTech development alone can account for approximately 58% of the observed variation in the loan share across provinces. Importantly, a lower share does not mechanically imply worse absolute access for SMEs; three logical scenarios can generate a falling share: (1) SME credit rises but

large-firm credit rises faster; (2) SME credit is flat while large-firm credit expands; or (3) SME credit falls and large-firm credit rise or falls less.

A closer look at the regional breakdown gives more insight into the different effects of FinTech across China's economy. In the eastern region, such as Jiangsu and Zhejiang, the estimated coefficients are about -0.75. This shows that FinTech has helped SME credit access in areas that are already more developed in finance. In the central region, such as Anhui and Jiangxi, the coefficients are a bit larger (about -0.77). This shows that FinTech is making up for weaker traditional financial systems and helping reduce the credit gap. In the western region, such as Sichuan and Gansu, the effects are stronger, with coefficients between -0.81 and -0.83. This means that FinTech is very important in fixing financing shortages and easing credit limits in places with less-developed financial systems. In the northeastern region, such as Liaoning and Heilongjiang, the coefficients are the largest (close to -0.85). This shows that FinTech has a strong effect in places with slow economic activity and falling support from traditional finance. All together, these results show that FinTech growth has a broadly positive effect on SME credit access across China. But the extra effect is stronger in regions where traditional financial systems are weaker in serving small firms. This shows the added role of FinTech in supporting inclusive finance and its use in reducing regional gaps in credit.

Table 1. The regression results of the regions representing the provinces

Region	Representative province	coef	p
East	Jiangsu	-0.75436	0.009
East	Zhejiang	-0.75408	0.007
Central	Anhui	-0.76432	0.009
Central	Jiangxi	-0.77585	0.009
West	Sichuan	-0.81323	0.009
West	Gansu	-0.83263	0.009
Northeast	Liaoning	-0.85548	0.009
Northeast	Heilongjiang	-0.84846	0.011

4.2 Regional Heterogeneity: Four-Mode Analysis

To show the different role of FinTech in helping SME credit access in China, the research did a regional heterogeneity analysis. Figures 1 and 2 show the distribution of regression coefficients across four main regions and their link with model explanatory power (R^2). They also show big differences across regions in both coefficients and explanatory power. This means that where and how FinTech joins with local financial and industrial systems changes

the direction and size of reallocation. The results show four clear regional patterns.

As shown in Figure 2, the Eastern provinces display the least negative coefficients (median around -0.76, with Shanghai as the least negative at -0.71). Figure 1 further shows that these provinces achieve relatively high explanatory power (R^2 values clustering above 0.60, e.g., Zhejiang, Beijing, Shanghai). This reflects the dominance of technology-intensive enterprises in coastal provinces, where real-time operational data enhances SME credit

Figure 2 shows that the coefficient in the western region ranges from 0.77 to 0.85. Figure 2 also shows these

The Northeast region is characterized by the most negative coefficients (median below -0.84 , see Figure 2), with Heilongjiang reaching the lowest value (-0.85). Figure 2 reveals that although some provinces achieve modest explanatory power ($R^2 \approx 0.58\text{--}0.59$), the overall pattern reflects structural rigidity. The dominance of heavy industries (e.g., Harbin Electric Group) limits digital transformation and reduces compatibility with FinTech-based credit risk management. Consequently, banks in this region increasingly shift toward consumer loans rather than SME financing. Banks' adoption of FinTech-enabled screening can reveal higher downside risks among traditional SMEs, encouraging a portfolio shift away from SME loans. Again, this signifies structural repositioning in bank credit rather than a proven collapse of SME financing per se.



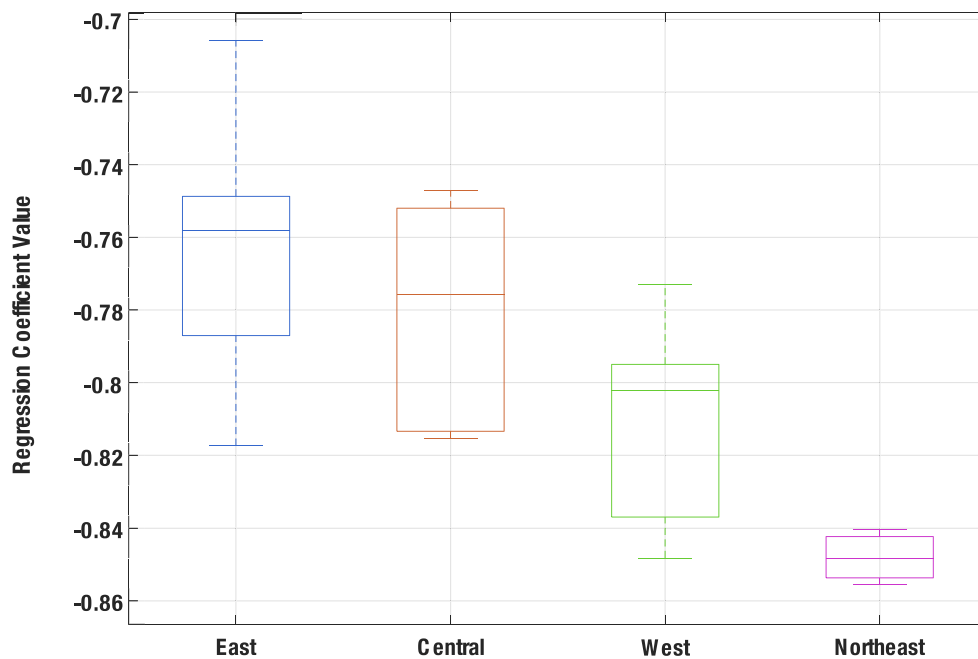


Fig. 2 Regional distribution comparison of regression coefficients
Picture credit: Original

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4.3 Economic Mechanisms: Technological Substitution and Risk Repricing

The heterogeneous impact of FinTech on SME credit access can be further explained through underlying economic mechanisms. The rise of FinTech platforms introduces a new mode of credit intermediation, whereby digital platforms provide financing services directly to SMEs. It diverts customer flows away from traditional banks, especially in regions with strong technology ecosystems. And it is worth noting that platform-based credit relies on real-time transaction data, logistics records, and consumer ratings, thereby concentrating resources on high-tech industries such as AI, big data, and cloud computing. Platform intermediation and data-rich ecosystems may pull financing toward sectors/firms with strong digital exhaust (e.g., supply-chain-integrated SMEs and large firms), potentially reducing the SME share in bank portfolios if platforms displace bank lending or if larger firms' bank borrowing scales concurrently.

Another mechanism lies in the shift of banks' risk assessment frameworks. Through dynamic risk evaluation, FinTech may enable financial institutions to uncover hidden default risks that traditional static indicators (e.g., collateral, past repayment) might overlook. This enhances banks' ability to reprice SME credit risk, leading to a more cautious lending stance. While this reduces moral hazard

and improves long-term financial stability, it also results in short-term contraction of SME lending, particularly in industries with low levels of digitalization.

The impact of FinTech is further shaped by regional disparities in digital infrastructure. Banks in the Western region invest substantially less in digital technology—only about one-fifth of the level observed in Eastern provinces. This constrains their ability to implement big-data risk assessment, forcing them to retreat from higher-risk SME segments. For instance, in Guizhou, the FinTech coverage rate of local small and medium-sized banks is only 30%, significantly below the national average. As a result, these banks are less capable of serving SMEs, leading to tighter credit supply and exacerbating financing difficulties. This “capability fault line” deepens the regional heterogeneity observed in the figure 2 and 3, reinforcing the exclusion of SMEs in underdeveloped areas.

5. Discussion

5.1 Theoretical Reconstruction of Structural Relationships

The empirical results reveal a statistically significant association between FinTech development (measured by the Inclusive Finance Index) and the loan share of SMEs in provincial credit structures. Importantly, because de-

pendent variable is a ratio (SME loan balance / total loan balance), the coefficients capture relative allocation shifts rather than absolute changes in SME credit availability. A declining share of SME loans can arise under multiple scenarios: (i) SME lending expands but large-firm lending expands faster; (ii) SME lending stagnates while large-firm lending accelerates; or (iii) SME lending contracts while large-firm lending contracts less. Results cannot distinguish between these scenarios, but they consistently indicate that FinTech development is associated with a structural reallocation of credit resources.

In theory, this adds to and changes old ideas about information problems and financial growth. On one side, FinTech tools like digital records, automated scoring, and big-data checks can lower costs and make things clearer. Credit can be given more easily. But on the other side, these tools can make risk checks sharper. Banks may raise prices or cut off SMEs that do not have digital records. So FinTech can open new chances for some SMEs, but it can also increase the risk of credit loss for others. This shows a mix. FinTech is not always giving more SME access, but it is changing how finance works.

5.2 The Deep Logic of Regional Differentiation

The differences across regions in the regression results show that the structure is complex. Eastern provinces, where digital systems, rules, and SME digital use are stronger, have smaller drops in SME loan shares. In these places, FinTech may both add more credit and move resources, and SMEs with good digital ability can still gain even if their share goes down a little.

But central and western provinces show bigger negative results. This fits cases where FinTech speeds up risk changes without strong digital systems or SME readiness. In these places, SMEs in farming or old manufacturing often do not have digital records. This makes a “double block”: they cannot join FinTech platforms, and they face harder checks from banks. In the northeast, where heavy industry is common, FinTech may make gaps worse and lower SME loan shares more.

The gap between regions shows a clear difference in ability. FinTech adds to strengths where systems are ready, but it makes weaknesses worse where digital bases are weak. FinTech does not bring the same good effect everywhere. It gives different results that can open or limit credit for SMEs, depending on the setting.

5.3 Policy Paradox and Corrective Pathways

The findings expose a policy paradox. National strategies such as the FinTech Development Plan (2022–2025) envision broad-based inclusion, yet evidence suggests that a “one-size-fits-all” approach risks widening structural divides. For example, Zhejiang’s “310 model” demon-

strates the efficiency of fully digitalized lending but imposes transaction-volume thresholds unattainable for most SMEs in the west. Similarly, in the northeast, heavy-asset industries do not fit easily with FinTech’s asset-light risk models, leading to potential “transformation traps.”

Corrective pathways should therefore emphasize differentiated design. Eastern provinces can deepen digital ecosystems; central and western provinces may benefit more from hybrid models—combining traditional collateral-based practices with digital valuation. Policy should also invest in foundational infrastructure (e.g., e-invoicing systems, digitalized agricultural collateral platforms) to expand SMEs’ digital footprints. Only by tailoring interventions to regional structures can FinTech avoid becoming a mechanism of credit polarization.

5.4 Research Limitations and Future Directions

This study has several limitations. First, the regression design is univariate and does not establish causality; results should be interpreted as associations. Potential omitted variables—such as digital infrastructure density, regulatory interventions, or sectoral shifts—may influence observed patterns. Second, using a share-based dependent variable prevents us from drawing firm conclusions about absolute SME credit levels. Third, the static design does not capture dynamic adjustment paths; panel fixed effects or dynamic GMM could clarify temporal effects.

Future research can use data from many sources, like bank loans, platform financing, and sector-level exposure. This can help tell the difference between credit growth and credit substitution. Policy tests can look at region-specific co-lending models, like risk-sharing funds in developed regions and digital collateral platforms in farming provinces. These steps can give a clearer picture of FinTech’s two roles: as a tool of inclusion and as a driver of structural change in SME finance.

6. Conclusion

This study looked at how FinTech growth is linked to the sharing of credit between small and medium-sized enterprises (SMEs) and larger firms in China, using provincial data from 2011 to 2020. The Digital Inclusive Finance Index is used as a sign of FinTech growth, and the ratio of SME loans to total loans is used as the outcome. The analysis shows a clear link: higher FinTech growth is tied to changes in how credit is shared. But this should be seen as proof of changes in structure inside provincial credit markets, not as proof of absolute changes in how much credit SMEs get.

The results give three main points. First, FinTech works with traditional banking and also changes it. Digital records, big-data tools, and automated scoring cut information gaps and lower costs, so SMEs can get more ways

to borrow. But stronger risk checks can make banks raise prices or pull back from SMEs with weak digital ability, so their share of loans goes down. Second, there are clear regional differences. Eastern provinces with stronger digital systems show smaller changes. But central, western, and northeastern provinces show bigger drops in SME loan shares because of weak infrastructure, industry mix, and SME digital use. Third, FinTech has two sides. It opens chances but also makes gaps bigger. So, if the same policy is used everywhere, it may make regional gaps worse unless special steps are added.

The policy meaning is clear. To make sure FinTech helps fair growth, different places need different plans. In advanced regions, fully digital systems can keep growing. But in central, western, and northeastern provinces, mixed models that use both FinTech and old collateral-based loans may work better. Also, more investment in digital infrastructure, data rules, and SME digital growth is needed so that FinTech benefits spread beyond the richest provinces.

References

- [1] Stiglitz J E, Weiss A. Credit Rationing in Markets with Imperfect Information[J]. *The American Economic Review*, 1981, 71(3): 393–410.
- [2] Arner D W, Zetsche D A, Buckley R P, et al. The Future of Data-Driven Finance and RegTech: Lessons from EU Big Bang II[J]. *Stanford Journal of Law, Business & Finance*, 2020, 25(2): 245–288.
- [3] Abbasi K, et al. P2P lending Fintechs and SMEs' access to finance[J]. *Economics Letters*, 2021, 204: 109890.
- [4] Ant Group. MYbank makes financing more accessible for 45 million SME clients by leveraging digital technology[EB/OL]. (2025–03–01). <https://www.antgroup.com/en/news-media/press-releases>
- [5] McKinnon R I. *Money and Capital in Economic Development*[M]. Washington, DC: Brookings Institution Press, 1973.
- [6] Gambacorta L, Huang Y, Qiu H, et al. How do machine learning and non-traditional data affect credit scoring? New evidence from a Chinese fintech firm[J]. *Journal of Financial Stability*, 2024, 73: 101284
- [7] Björkegren D, Grissen D. Behavior Revealed in Mobile Phone Usage Predicts Credit Repayment[J]. *World Bank Economic Review*, 2020, 34(3): 618–634.
- [8] Zhou L, Lee H. Supply Chain Finance Business Model Innovation: Case Study on a Chinese E-Commerce-Centered SCF Adopter[J]. *Systems*, 2023, 11(6): 278.
- [9] Hua X, et al. Blockchain technology adoption and sustainable performance in Chinese manufacturing: Insights on learning and organizational inertia[J/OL]. *Industrial Management & Data Systems*, 2025. <https://doi.org/10.1108/IMDS-04-2024-024>
- [10] Demertzis M, et al. Digital finance and its implications for financial stability[J]. *Journal of Financial Transformation*, 2022, 55: 115–127.
- [11] Fuster A, Plosser M, Schnabl P, et al. The role of technology in mortgage lending[J]. *The Review of Financial Studies*, 2019, 32(5): 1854–1899.