The Impact and Role of Internet Finance on Non-Performing Loans: An Empirical Analysis of 18 Major Commercial Banks

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Abstract: In the 21st century, the high-speed development of internet finance has consistently maintained a rapid and iterative trend. Internet finance has gradually integrated itself into all aspects of residents' lives. Meanwhile, non-performing loans play a vital role in the reform and development of the banking industry. The role of internet finance for non-performing loans positions both of them significantly. Furthermore, this impacts positively the advancement of the banking industry. This paper elaborates on the relationship between internet finance and non-performing loans while highlighting their roles. Relevant data of 18 large commercial banks in China from 2017-2022 has been selected. A dynamic panel model has been used to analyze the empirical data and shows that there is a nonlinear relationship between internet finance and nonperforming loans. This relationship promotes short-term and inhibits long-term benefits. Further analysis shows that the impact of internet finance on NPLs varies between different types of banks. Accordingly, relevant measures and suggestions are put forward.

Keywords: Internet financial; non-performing loan ratio; commercial banks

1 Introduction

Internet finance came into existence due to the rapid development of the technological revolution during the twenty-first century's Internet era and China's financial and economic system reform. It is a product of emerging Internet information technology combined with traditional finance. Additionally, the strong support of national policies and technological innovation have driven the rapid growth of Internet finance in China, leading to a preliminary competitive situation between it and traditional commercial banks in relevant business areas. As of December 2022, the transaction scale of China's third-party Internet payment market reached 33.5 trillion yuan, showing a year-on-year growth of 15.2% according to relevant data. As of June 2022, China's Internet finance users totaled 1.051 billion, having an addition of 19.19 million people from December 2021. The rate of Internet penetration reached 74.4%, which is a 1.4% increase from December 2021. However, social transformation and economic development have brought to light various hidden problems, the most notable of which is the phenomenon of credit default involving financial risks - non-performing loans rates continue to rise, as reported by relevant organisations. Relevant organisations reported that the balance of non-performing loans in the banking industry increased by 169.9 billion yuan compared to the

beginning of the year, in December 2022. Scholars are increasingly focusing on the impact of Internet finance on non-performing loans, which has become the subject of research and debate. Two representative views exist regarding Internet finance risk: scholars differ on whether the risk arises due to the rapid development of science and technology, and whether it can be prevented and controlled through modern and effective technologies, creating a positive and developing relationship; or if the risk will increase due to the development of technology, leading to more non-performing loans. An accurate, objective, and multifaceted analysis is required to assess the impact of Internet finance on non-performing loans. It is of great theoretical and practical importance to discuss and clarify the link between the two.

Within the hierarchy of the entire Chinese banking industry, the central bank holds the dominant position of formulating and implementing monetary policies. Policy banks are specialised financial institutions established with non-profit objectives to help develop the economy and promote social progress. Both types of banks will be less affected by Internet finance innovations. The uneven development across different regions due to the strong regional influence pose a unique variability in the impact of Internet finance on city commercial banks and other lower-tier banks that make it hard to study and analyse to draw accurate and universal conclusions. This study examines the impact of internet banking on non-performing loans by focusing on state-owned and joint-stock commercial banks, which constitute 18 of the largest commercial banks. The paper analyses the latest relevant data between 2017-2022 while presenting recommendations to optimise the asset structures of banks coupled with the relevant empirical analysis. This approach provides some guidance to promote the reform and innovation of commercial banks and build a harmonious symbiosis system between internet finance and commercial banks. This strategy plays a crucial guiding role in promoting the reform and innovation of commercial banks and building a harmonious symbiosis system between Internet finance and commercial banks.

2 Literature review

Scholars from home and abroad have conducted thorough research on the impact of internet finance on non-performing loans. Analyzing the collated literature, the research is mainly divided into two parts: the role of internet finance's impact and the factors affecting non-performing loans.

Werthamer and Raymond (1997)[1] argue that the growth of the Internet economy can reduce the cost of information acquisition, increase the availability of funds and improve market liquidity, thus promoting societal development. However, it can also have a significant impact on the benefits that financial institutions can gain, leading to decreased bank performance and regulatory challenges. According to Claessens et al. (2002)[2], the government plays a significant role in the growth of Internet finance, leading to different impacts on financial institutions based on national policies. Additionally, Zhu and Hua (2020)[3] discovered that Internet finance can crowd out banking business through capital conveyance and information transmission channels. The crowding-out effect of finance on banking business can lead to macroeconomic fluctuations, monetary policy misuse at the macro level, and concentration and contagion of banking risks at the micro level. Although research in this area started later in the domestic arena, the outcomes are quite fruitful compared to foreign countries. Li, Yuanbo and Zhu, Shunlin (2014)[4] analyse

the competitive relationship between internet finance and commercial banks based on the error term correction model test, and conclude that internet finance and commercial banks form a competitive relationship, and at the same time for the traditional commercial bank financial model presents a significant substitution effect. According to Niu Huayong and Min Deyin (2015)[5], Internet finance has an impact on the commercial banks' development by altering the level of competition in the intermediate business segment of the market. State-owned and joint-stock banks present different performances in this regard. Gu Haifeng and Xie Shujing (2021)[6] discovered that Internet finance leverages its benefits to deviate commercial banks' deposits and wealth management funds. As a result, commercial banks' profitability is negatively impacted, obligating them to increase the mismatch of deposit and loan maturities to promote bank liquidity to alleviate the downward pressure. According to Liu Mengfei and Wang Qi's findings in 2021[7], Internet finance has a more obvious negative impact on both interest income and non-interest income. Additionally, the level of national financial and economic development, non-performing loan ratio, and other factors have an important impact on the profitability of commercial banks from different aspects.

Secondly, research has been conducted into the factors influencing non-performing loans. Some scholars have investigated non-performing loans solely from a macroeconomic perspective. For example, Donato (1994)[8] analysed the issue and concluded that non-performing loans result from the excessive tightening of monetary policy, due to the central bank's incorrect control of money supply and the rise in interest rates, which increases the cost of financing. Other scholars include Salas and Saurina (2002)[9] and De Bock and Demyanets (2012)[10] analysed the repayment ability of lenders during rapid economic growth and the macroeconomic conditions of emerging market countries, respectively. Both studies concluded that the economic growth rate has a significant negative correlation with non-performing loans. Other scholars have also examined the development of the bank itself. Williams (2004)[11] and Wang Weicheng and Zhang Qiaoyun (2022)[12] conducted empirical research and analysis and concluded that the replacement of key executives or high turnover of the main executives could restrain the behaviour of commercial banks and lead to a significant increase in their non-performing loans. In contrast, Ekanayake E (2015)[13], using Sri Lankan commercial banks as a case study, concluded that the level of non-performing loans can be attributed not only to macroeconomic conditions but also to specific factors relevant to the bank itself, even though more research combines analysis of macroeconomic and internal bank factors. According to Cui Fucheng and Tao Hao's (2018)[14] study, shifts in macroeconomic elements generate short-term adverse but long-term beneficial effects, whereas banks' own changes lead to longer-term negative effects on NPLs through fresh loans in the medium and long term, as well as through market reaction mechanisms. In their study, Wang Haijun and Ye Qun (2018)[15] exposed that macroeconomic factors and government intervention in four dimensions lay the cyclical foundation of commercial banks' NPL generation, while the micro basis attributed to the potential credit risk and the internal control capacity of banks leads to the creation of NPLs.

The majority of the current research literature separates the role of Internet finance impact from non-performing loans impact and rarely analyzes and discusses them in conjunction. The paper combines these two factors to explore how Internet finance impacts non-performing loans, which holds practical and theoretical significance.

3 Theoretical analysis

In comparison with the inception of the banking industry towards the end of the 14th century and the more than six centuries of subsequent development, the emergence of Internet finance in the early 21st century is referred to as a "new show". This is mainly because the extensive growth of internet technology, including the fast-paced expansion of the internet, has led to the swift advancement of internet finance. Therefore, there is a need to analyse and discuss the relationship between the impact of internet finance on non-performing loans, taking into account both the long-term and short-term effects.

At the outset of the initial development of Internet finance, commercial banks were not able to effectively handle the impact that this type of development caused, leading to inadequate and inappropriate responses within a short period. This resulted in short-term intensification of internal competition within the traditional financial industry, primarily led by the banking sector. As a result, commercial banks, the industry leaders, faced a more severe impact, and their non-performing loans have increased. Looking from a long-term perspective, commercial banks are expected to gradually comprehend the internal rules, leveraging their scale of development, capital structure, and numerous other advantages. Drawing from past failures, they intend to set up a more detailed and powerful management system to effectively counteract the impact of the Internet finance with more comprehensive and effective measures. As a result, short-term negative repercussions will likely diminish or even turn positive! Based on the above analysis, we propose the following hypothesis 1.

Hypothesis 1 : The development of Internet finance will promote the formation of non-performing loans in the short term and suppress the formation of non-performing loans in the long term.

Various banks have created different management systems and institutional mechanisms. Their policies and measures vary when faced with the impact of Internet finance on non-performing loans. Improving the relevant management system and organisational mechanisms can swiftly and effectively alleviate some of the risks, and thereby reduce the influence of Internet finance. Currently, China's banks are categorized into five types: central banks, policy banks, state-owned commercial banks, joint-stock commercial banks, and local commercial banks. Given the emergence of Internet finance, the capacity to mitigate risks is especially crucial, in addition to the dominant central bank. Banks of differing types have unique main business, strategic approaches, and so on, which leads to varying degrees of risk mitigation capability. For this reason, flexible decisions about suitable management strategies should be shaped by a bank's particular situation. The above analysis leads to the following proposed research hypothesis 2.

Hypothesis 2 : The effect of Internet finance on non-performing loans differs among various categories of banks..

4 Research design

4.1 Variable description

Variable being explained. As this paper investigates the relationship between Internet finance and non-performing loans, it selects non-performing loans as the explanatory variable. Similarly, many scholars in the study of non-performing loans have chosen the bank's non-performing loan ratio as a representative variable in the majority of articles. Therefore, this paper selects the non-performing loan ratio to represent non-performing loans, denoted by NPL. Detailed data on the NPL ratio of the 18 major commercial banks selected for this paper for the period 2017-2022 are presented in Figure 1:
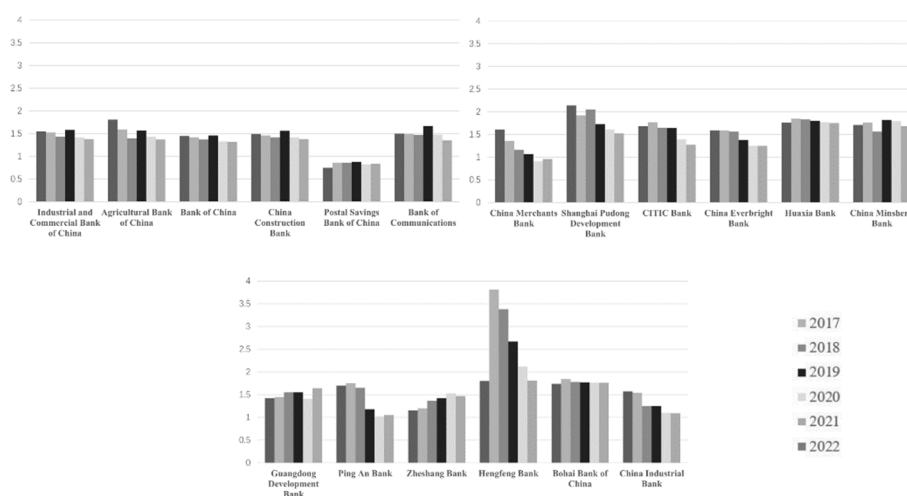

Fig. 1. Non-performing loan ratio of 18 major commercial banks in China(from 2017 to 2022)

Explanatory variables. As another research topic of this paper, Internet finance is the explanatory variable. Internet finance is categorized into five sections based on the types of product business: These sections include internet third-party payment, P2P network lending, investment and wealth management, network crowdfunding, and virtual currency. The scale of transactions in internet third-party payment and P2P network lending is significant in the overall scale. Therefore, these two variables are selected as representative variables of Internet finance that can objectively and effectively analyse the impact of Internet finance on non-performing loans of banks. This paper adopts the ratio of total assets of sample banks to the transaction volume of Internet third-party payments (TPI) and the ratio of total assets of sample banks to the transaction volume of P2P online lending (OLP) as the representative variables of the degree of Internet finance's influence on commercial banks in selecting and treating explanatory variables.

Control variable. Control variables in addition to non-performing loans and Internet finance are being considered. In this paper, specific variables have been selected as control variables based on the research literature of related scholars. These variables include GDP economic growth rate (measured as the annual growth rate of GDP), LDR deposit and loan ratio (measured

as the ratio of loan balance to deposit balance), and NIR non-interest income ratio (measured as the ratio of non-interest income to operating income).

Table 1 displays the descriptive statistics of all the aforementioned variables, indicating that each variable is distributed within a reasonable range.

Table 1. Descriptive statistical analysis of key indicators

Key indicators	Sample size	Minimum	Maximum	Mean	Median	Standard deviation
NPL	108	0.75	3.81	1.535	1.52	0.418
TPI	108	0.039	1.336	0.384	0.258	0.356
OLP	108	0.357	15.433	4.284	2.911	4.074
GDP	108	2.3	8.1	5.5	6.35	2.12
LDR	108	0.451	1.209	0.903	0.904	0.158
NIR	108	0.104	0.619	0.277	0.272	0.086

4.2 Data sources

The pertinent data from the banks included in this paper were taken from the annual reports between 2017-2022, which were disclosed and published by the Shanghai Stock Exchange and the official websites of the banks. Besides, other sample data was obtained from Oriental Wealth Network and Avery Consulting Network. Interpolation is employed to supplement some of the missing data. However, some of the outlier data caused by force majeure events is excluded to acquire a more objective analysis on the relationship between the two.

4.3 Model setup

This study examines whether the development of Internet finance aligns with the short-term positive correlation and long-term negative correlation law regarding the role of non-performing loans, as specified by model (1) in hypothesis 1.

$$NPL_{it} = \alpha_0 + \beta_1 TPI_{it} + \beta_2 OLP_{it} + \sum_{m=1}^{3} \gamma_{it}^m CTRL_{it}^m + \mu_{it} \tag{1}$$

Here, i refers to the serial number of each bank selected to conduct the study, and this study pertains to i represents the identification number allotted to each bank to conduct the study. The study includes a total of 18 state-owned and joint-stock commercial banks, making it a range of values from 1 to 18. Here, t defines the observation gathered at the chosen time of study. This research pertains to the period of 2017-2022 and NPL stands for non-performing loan ratio, TPI and OLP signify the degree of impact of Internet financing. α signifies the intercept while β stands for the regression coefficient of the degree of impact of Internet financing. CTRL signifies three groups of control variables, which include GDP, LDR and NIR based on the above-mentioned. Here, γ represents the regression coefficient of each control variable while μ represents the disturbance term of a sample bank in a certain time period.

Simultaneously, we construct the corresponding dynamic panel model (2) to address the potential case that the NPL ratio of the previous period could affect the NPL ratio in the research process, leading to endogeneity issues:

$$NPL_{it} = \alpha_0 + \varphi NPL_{i,t-1} + \beta_1 TPI_{it} + \beta_2 OLP_{it} + \sum_{m=1}^{3} \gamma_{it}^m CTRL_{it}^m + \mu_{it} \tag{2}$$

To facilitate and enhance discussion, we combined all sample banks for regression analysis while building the model. Additionally, we added the first-order lag term of the NPL ratio to eliminate endogeneity. Here, φ represents the regression coefficient of the above-mentioned lag term for the NPL ratio, while the remaining components are identical to those in the previous model (1).

5 Empirical results and analysis

5.1 Benchmark regression analysis and endogenous test

Benchmark regression analysis. In this paper, hypothesis 1 was tested for the first time by employing model (1) regression analysis. Benchmark regression analysis is applied to establish the connection between the influence of Internet finance on non-performing loans. Since banks adopt different business strategies, the size and structure of assets also differ. These variations impact non-performing loan rates to a certain degree. Therefore, it is not appropriate to consider all samples as a whole for estimation and analysis. Individual regression analysis was employed for each bank, and the specific results of the analysis are presented in Table 2.[1]

Table 2. Results of benchmark regression analysis

Sample bank	α_0	β_1	β_2	Sample bank	α_0	β_1	β_2
ICBC	5.899	1.833	0.009	CEB	12.173	-1.764	0.284
ABC	5.177	0.978	0.026	HB	2.009	-0.220	0.229
BOC	3.226	2.825	0.036	CMBC	-3.283	4.237	-0.163
CCB	6.453	0.888	0.023	GDB	15.589	5.489	3.118
PSBC	0.584	0.163	0.050	PAB	9.161	6.396	1.386
BCM	-1.309	4.765	0.140	CZB	-6.506	8.543	-1.193
CMB	-4.634	-1.895	0.628	HFB	-2.011	12.058	6.985
SPDB	7.052	4.154	9.419	CBHB	1.067	0.574	0.002
CITIC	5.112	0.536	-0.384	CIB	-2.753	11.333	0.024

Analysis of the above table data reveals varying levels of influence exerted by Internet finance on the NPL ratios of different banks. The regression coefficients for the six state-owned commercial banks are all greater than 0, indicating that the proportion of third-party payment and the scale of P2P network lending both have a positive impact on the NPL rate, implying that the advancement of Internet finance will result in the creation of NPLs and elevated NPL rate of banks. For joint-stock commercial banks, the regression coefficients for Internet finance are both greater than and less than 0, conveying that the impact of Internet finance on NPLs differs. The impact of finance on non-performing loans varies, with the 12 joint-stock commercial banks displaying different tendencies. Regarding third-party payment or P2P network lending, 3 joint-stock commercial banks have negative regression coefficients and

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[1] In a table, ICBC, ABC, BOC, CCB, PSBC, BCM, CMB, SPDB, and CITIC represent Industrial and Commercial Bank of China, Agricultural Bank of China, Bank of China, China Construction Bank, Postal Savings Bank of China, Bank of Communications, China Merchants Bank, Shanghai Pudong Development Bank, and CITIC Bank, respectively. The sample banks' abbreviations for China Everbright Bank, Huaxia Bank, China Minsheng Bank, Guangdong Development Bank, Ping An Bank, Zheshang Bank, Hengfeng Bank, Bohai Bank of China, and China Industrial Bank are CEB, HB, CMBC, GDB, PAB, CZB, HFB, CBHB, and CIB, respectively.

negative correlation (constituting 25%), whereas 9 banks exhibit positive regression coefficients and positive correlation (constituting 75%). To sum up the analysis, most cases indicate a positive relation between the two. Specifically, due to its own progress, Internet finance will elevate and improve the non-performing loan ratio.

Endogeneity test. The NPL ratio of commercial banks is a specific metric, its current size can be influenced by the previous period, thereby creating a corresponding endogeneity problem. Therefore, this study employs the endogeneity test to recognize the impact of this specificity. The endogeneity problem is commonly addressed by using two estimation methods: LSDVC estimation and GMM estimation. LSDVC estimation pertains to adjusting the estimated model coefficients by estimating the deviation of the LSDV method. GMM estimation, on the other hand, can be used as long as the model is accurately set up, thereby overcoming the limitations found in the traditional estimation methods. LSDVC estimation is mainly appropriate for long panel data that has small N and large T (long time, but short cross-section). In contrast, GMM estimation is best suited for long panel data that has small N and large T (long time, but short cross-section). The LSDVC estimation method is primarily appropriate for long panel data that has small N and large T (long time, but short cross-section). On the other hand, the GMM estimation method is best suited for short panel data that has small T and large N (short time, but long cross-section). This study employs the short panel data of 18 commercial banks for six years between 2017-2022. Hence, the GMM estimation method is used to conduct the endogeneity test. The dynamic panel model (2) generated previously is evaluated and analyzed with all sampled banks in totality. The findings of the evaluation are shown in Table 3.

Table 3. Results from the endogeneity test

Variant	L.NPL	TPI	OLP	GDP	LDR	NIR
Regression coefficient	-0.069	1.465	0.092	0.087	2.084	-2.092
AR(1)=0.021		AR(2)=0.352			Sargon=0.613	

The test results indicate that the regression coefficient of L.NPL is less than 0. Thus, there is a negative correlation between the NPL ratio of the lagged item for the current NPL. In other words, an increase in the NPL ratio in the previous period reduces the size of the NPL ratio of the current period, thereby reducing the size of the bank's NPLs. This, in turn, contributes to the development of the banking industry. Simultaneously, the test reveals that AR (1) is 0.021 and AR (2) is 0.352, satisfying the condition that AR (1) is less than 0.05 and AR (2) is greater than 0.1. Furthermore, Sargon's test value is 0.613, fulfilling the requirement of being greater than 0.1. This suggests that the selected instrumental variables are reasonable.

By analysing the results of the benchmark regression analysis and endogeneity test, it can be confirmed that the growth of Internet finance will encourage the creation of non-performing loans in the short term. However, in the long term, it will prevent their formation. The first hypothesis has been successfully verified.

5.2 Robustness test

To further strengthen the argument, this paper utilizes explanatory variable replacements for the robustness test. In accordance with Liu Mengfei's (2021)[7] approach, the measure of third-party payment and P2P online lending in relation to bank capitalization is replaced by the logarithm

of the average transaction sizes (CSI), which serves as a proxy indicator of Internet finance. Then this test is conducted, and the outcomes are presented in Table 4.

Table 4. Results of robustness tests

Sample bank	Constant term	CSI	Sample bank	Constant term	CSI
ICBC	5.815	0.982	CEB	9.190	2.735
ABC	4.711	0.208	HB	1.393	1.936
BOC	2.065	0.257	CMBC	-1.196	0.336
CCB	5.118	0.424	GDB	1.996	2.930
PSBC	0.762	0.323	PAB	2.951	2.516
BCM	1.187	1.945	CZB	1.024	-2.937
CMB	8.120	0.091	HFB	-9.681	1.394
SPDB	-2.125	-1.887	CBHB	1.070	0.326
CITIC	7.720	1.427	CIB	-0.959	4.193

The regression coefficients of CSI for all six state-owned commercial banks are greater than 0, indicating a positive correlation between CSI and the NPL ratio. The regression coefficient of CSI is both positive and negative in the 12 joint-stock commercial banks. 10 banks show a positive correlation, accounting for 83.33%, and 2 banks show a negative correlation, accounting for 16.67%. Comparison of the contents of Table 2 above reveals that there is no change in the direction of influence in state-owned commercial banks. In joint-stock commercial banks, however, the proportion of banks with a positive correlation with non-performing loans has increased further. To conclude, the rapid growth of Internet finance stimulates the creation of non-performing loans and influences bank asset structure, which is in agreement with the earlier findings.

5.3 Heterogeneity test

The non-performing loan ratio might be affected by the differences in structure, management systems and other factors between state-owned banks and joint-stock commercial banks. In order to further test Hypothesis 2, state-owned banks and joint-stock commercial banks were each subjected to a separate regression analysis. The test results are shown in Table 5.

The test results reveal that, among the six state-owned banks, the regression coefficients of the two variables of Internet finance, namely TPI and OLP, are positive, suggesting that the development of Internet finance has a positive effect on promoting the non-performing loan ratio in state-owned banks. In contrast, the regression coefficients of TPI and OLP in joint-stock commercial banks are both negative. This suggests that the rapid development of Internet finance in joint-stock commercial banks will effectively prevent the creation of non-performing loans. Furthermore, upon observation, it is evident that the three control variables in the model exhibit the same direction in both test groups. The first control variable is the economic growth rate of GDP. The table indicates that the annual GDP growth rate and non-performing loans regression results are negative, implying a negative correlation between the two factors. This suggests that the better the macro-economy, the fewer non-performing loans, thereby verifying that the non-performing loan ratio fluctuates with changes in the banking sector during economic cycles. Secondly and thirdly, the control variables are the deposit and loan ratio of LDR and non-interest income (NIR). The regression analysis of both the variables shows a positive correlation between NIR and the non-performing loans, indicating that if the non-interest income is higher, the rate of non-performing loans would also increase as will deposit

and loan ratio of LDR. Furthermore, the regression results of both variables are consistent. Moreover, the regression analysis of the second and third control variables, namely deposit and loan ratio LDR and non-interest income NIR respectively, reveals a significant positive correlation between the two variables and non-performing loans. The former implies that a higher deposit and loan ratio would lead to the formation of non-performing loans, while the latter suggests that higher non-interest income would increase the rate of non-performing loans.

Table 5. Results of the test for heterogeneity

Sample bank	β_1	β_2	γ_{it}^1	γ_{it}^2	γ_{it}^3
State-owned Commercial Banks	0.305	0.007	-0.002	0.540	1.319
Joint-stock Commercial Bank	-1.215	-0.471	-0.069	0.614	0.626

6 Conclusions and policy implications

6.1 Conclusions

This paper provides an empirical analysis of the role and influence of Internet finance on non-performing loans, based on relevant sample data obtained from 18 major commercial banks in China between 2017 and 2022. The GMM method was applied in conjunction with dynamic and static panel models to carry out the analysis. The empirical results show that:

1. Internet finance has a non-linear impact on non-performing loans, leading to both short-term and long-term effects on commercial banks' non-performing loans. Short-term static analysis suggests that the development of Internet finance will increase the formation of non-performing loans while worsening credit risk management of commercial banks. On the other hand, considering the long-term dynamics, the development of Internet finance during the previous stages has brought about positive effects that are currently reducing the credit risk. Therefore, the long-term development of Internet finance will help to effectively slow down the formation of non-performing loans..

2. For different types of banks, the impact of internet finance on non-performing loans is not uniform, suggesting significant disparities among them. Among the six state-owned banks, the expansion of internet finance will facilitate generating non-performing loans, whereas in joint-stock commercial banks, it has a favourable impact on their non-performing loans, reducing them and contributing to the optimization of their funding structure.

6.2 Policy implications

The paper's findings yield the following policy implications:

To begin with, the study analysed that there is a non-linear effect of internet finance and non-performing loans.. The impact of this relationship varies significantly in the long and short terms. Therefore, in order to effectively alleviate or eliminate the short-term adverse effects of non-performing loans on China's large state-owned commercial banks, it is imperative to establish effective business management methods and risk prevention mechanisms. This requires a good understanding and grasp of China's central financial and economic development, in line with the direction of social system reform. Furthermore, it is crucial to accelerate the banks'

transformation pace and harness the impact of internet finance in the long term for a favourable impact on non-performing loans.

Secondly, the impact of Internet finance on the non-performing loans of commercial banks varies depending on the operation methods and regulatory systems chosen by each bank. Therefore, each bank must leverage its strengths in determining the most appropriate risk management strategy for its own growth, based on its main business, policies, business strategy, and other factors.

In conclusion, for the management of non-performing loans, the national management should develop a targeted system aimed at enhancing the country's and society's development. The state's invisible hand should be utilized to build an improved credit structure system. At the same time, the relevant financial supervision and management should be strengthened, and lending activities carried out by the relevant banks should be monitored in real-time to avoid the management problems leading to an increase in the number of non-performing loans of commercial banks. Non-performing loans should also be addressed. Additionally, attention should be paid to controlling the market capital flow for loans and avoid directing too much money towards high-risk areas which can increase the overall market capital risk.

References

[1] Werthamer,R.W., Raymond,S.U.(1997) Technology and finance: The electronic markets. Technological Forecasting & Social Change.,55:39-53. doi:10.1016/S0040-1625(96)00144-8.

[2] Claessens,S., Glaessner,T., Klingebiel,D.(2002) Electronic Finance: Reshaping the Financial Landscape Around the World. Journal of Financial Services Research.,22:29-61. doi:10.1023/A:1016023528211.

[3] Zhu,C., Hua,G.H.(2020) The impact of China's internet finance on the banking systemic risk – an empirical study based on the SCCA model and stepwise regression. Applied Economics Letters.,27:267-274. doi:10.1080/13504851.2019.1613494.

[4] Li,Y.B., Zhu,S.L.(2014) The causality test between the innovation of internet finance and the economic development of commercial banks in China: based on an empirical research with a panel data of provinces. South China Jounal of Economic.,12:36-46. doi:10.19592/j.cnki.scje.2014.12.003.

[5] Niu,H.Y., Min,D.Y.(2015) The influencing mechanism of internet financialization on commercial bank. Journal of Hebei University of Economics and Trade.,03:66-71. doi:10.14178/j.cnki.issn1007-2101.2015.03.011.

[6] Gu,H.F., Xie,S.Y.(2021) Does internet finance affect the liquidity creation of commercial banks?. The Theory and Practice of Finance and Economics.,06:10-18. doi:10.16339/j.cnki.hdxbcjb.2021.06.002.

[7] Liu,M.F., Wang,Q.(2021) The impact of internet finance on the profit efficiency of commercial banks:an empirical study based on SFA. Jounal of Dalian University of Technology(Soical Sciences).,02:16-30. doi:10.19525/j.issn1008-407x.2021.02.003.

[8] Donato Masciandaro.(1994).Money and the Economy. Issues in Monetary Analysis. Giornale degli Economisti e Annali di Economia.,53:320-321. doi:10.2307/23247733.

[9] Salas,M., Saurina,J.(2002) Credit Risk in Two Institutional Regimes: Spanish Commercial and Savings Banks. Journal of Financial Services Research.,22:203-224. doi:10.1023/A:1019781109676.

[10] Reinout,D.B., Alexander,D.(2012) Bank Asset Quality in Emerging Markets: Determinants and Spillovers. IMF Working Papers.,12:1-1. doi:10.5089/9781475502237.001.

[11] Williams,J.(2003).Determining management behaviour in European banking. Journal of Banking and Finance.,28:2427-2460. doi:10.1016/j.jbankfin.2003.09.010.

[12] Wang,W.C., Zhang,Q.Y.(2022).Can the executive turnover of commercial banks accelarate the exposure of non-performing loans?a study based on the sources of successors and professional experience. Contemporary Finance and Economics.,07:65-75. doi:10.13676/j.cnki.cn36-1030/f.2022.07.007.

[13] N Ekanayake E.M.N, A Azeez A.(2015).Determinants of Non-Performing Loans in Licensed Commercial Banks: Evidence from Sri Lanka. Asian Economic and Financial Review.,5:868-882. doi:10.18488/journal.aefr/2015.5.6/102.6.868.882.

[14] Cui,F.C., Tao,H.(2018). Causes and Countermeasures of the Non-Performing Loans of Chinese Commercial Banks under the New Normal. Reform of Economic System.,04:139-145.

[15] Wang,H.J. Ye,Q.(2018).The emergence mechanism of the commercial banks′ non-performing loans in the new era —a four－dimensional analysis. Jounal of Xi′an Jiaotong University(Social Science).,04:47-56. doi:10.15896/j.xjtuskxb.201804007.