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Research on the Influence of Fintech Development on the Operating Benefit of Banks

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Abstract: This paper first theoretically analyzes the influence of the development of Fintech on the operating benefit of banks from the perspective of competition and diminishing marginal benefit, then the annual data of 38 banks listed in China's A-share market from 2015 to 2020 were selected for empirical and robustness tests by system GMM. The results show that there is a significant "inverted U-shaped" relationship between the development of Fintech and the operating benefit of banks, which is robust and dependable. Finally, relevant feasible suggestions for the development of Fintech in banks are provided, in order to help banks' digital transformation.

Keywords: Fintech; Bank; Operating Benefit; GMM

1. Introduction

With the digital economy has become a national strategy in China, the financial industry is accelerating into an important period of the technological revolution, the transformation of economic paradigms and the reset of production factors. In the context of the financial industry entering a new stage of comprehensive digital transformation, Fintech is becoming an important engine driving economic growth, and will also become the industry growth point and competition point of the financial industry in the future. As the ballast of the financial industry, banks have begun to try to use Fintech as the driving force for innovation-driven development, speed up the strategic deployment and safe application of Fintech, actively seek changes, and take multiple measures simultaneously, such as deepening scientific and technological cooperation, promoting reorganization, and other multi-dimensional exploration of technological empowerment, which means that banks is entering a new track of digital transformation and upgrading. Therefore, it is of great research significance to explore how banks can implement new development concepts according to their own characteristics and local conditions to realize high-quality development.

However, while Fintech drives the digital transformation of banks, the development of Fintech also faces many severe challenges, and the problem of unbalanced and insufficient development cannot be ignored. The digital gap brought about by the application of Fintech under the wave of digitalization has become increasingly prominent. The "Matthew effect" of digital development between large and small financial institutions has yet to be eliminated. Fintech applications are blooming and the key technologies need to be broken through. Thus, it has extremely important

practical value that studying the problem of the imbalance and inadequacy in the process of deepening the integration of finance and technology for promoting the development of Fintech.

Regarding the connotation of Fintech, there is no consensus in the academic community. From the perspective of technology, any technology that can be used to optimize financial services can be understood as Fintech [1]; From the perspective of financial attributes, Fintech is a financial activity and financial innovation that creates new products, improves the supply of financial services by using a series of emerging technologies such as big data technology, artificial intelligence, and cloud computing [2-3]; From the perspective of the sum of the relationship between finance and technology, the Financial Stability Board defines fintech as a technological means that can promote financial innovation and have a significant impact on business models, technology applications, business processes and innovative products in financial markets, institutions and financial services

The interpretation of the connotation of Fintech solves the problem of what Fintech is, and the internal logic and mechanism of how financial technology drives financial innovation and development has become a new research content for scholars. Some scholars put forward from the perspective of creative effect, Fintech has created a new financial ecosystem by restructuring organizations [4], reshaping service processes [5], and expanding service channels [6-7]. From the perspective of information effect, some scholars have proposed that Fintech reduces information asymmetry between financial institutions and customers [8-9], reduces transaction costs [10-11], and improves the efficiency of financial operations [12] by innovating data and information acquisition and utilization mechanisms. From the perspective of inclusive effect, some scholars have proposed that through technological innovation, fintech improves financial institutions' accurate assessment of customers' credit levels, lowers the threshold for financing, improves the convenience of financial services, and realizes inclusive finance [13-14].

Above all, it can be found that most of the academic research on Fintech focuses on the connotation and mechanism of Fintech, and few literatures empirically explore the impact of financial technology on the operation and management of banks from a micro perspective. So, this paper theoretically analyzes the influence of Fintech on the operating efficiency of banks, and verify it by constructing Fintech development index and establishing a regression model in order to facilitate the digital transformation of banks.

2. Theoretical Analysis

2.1. Competitive Effect

With the continuous advancement of interest rate liberalization, the competition between traditional businesses of banks is intensifying. The fierce competition makes it difficult for commercial banks to maintain growth in their traditional operating benefits, which in turn enhances banks' willingness to innovate and promotes traditional business and Fintech better integration [15]. By providing financial services with low prices, low thresholds and wide coverage, Fintech enhances banks' ability to reach long-tail customers such as ordinary personal financial consumers, small and medium-sized enterprises that were previously excluded by banks, increasing banks' operating benefit [16]. Due to the gradual penetration of Fintech enterprises in the supply of financial services such as payment and settlement and the demand for financial services such as Internet wealth management, and more and more banks entering the racing track of Fintech development, banks are

faced with competition from other financial institutions and emerging fintech companies. There will be more intense competition among banks to maintain the existing market share and compete for the remains. Therefore, Fintech will reduce the operating benefit of banks through internal and external competition.

2.2. Diminishing Marginal Benefit Effect

The traditional economic theory believes that there is information asymmetry between banks and customers, and banks cannot accurately grasp all the information of customers, which will lead to moral hazard and adverse selection. By using Fintech, banks can reduce information asymmetry and expand potential customer groups, thereby improving the operating benefit of banks. With the passage of time, the value of potential customer groups has been gradually divided up by banks, and the incremental benefits brought by Fintech have gradually subsided. While the original Fintech has been iteratively updated, making it that its operating and maintenance costs have continued to increase. Besides, the technology threshold of new fintech is also increasing, resulting in the increasing development period and cost. So, banks get the diminishing marginal benefit. Based on the analysis of the above two effects, this paper proposes the following theorem.

Theorem 1: There is an "inverted U-shaped" relationship between fintech and the operational benefit of banks.

In order to verify the relevant conclusions of proposition one, the system GMM model will be introduced for empirical research in the following.

3. Empirical Analysis

3.1. Sample Selection and Data Sources

This paper selects the annual data of 38 banks listed in China's A-share market from 2015 to 2020 as a sample, and the data sources is from Winder Database and other public websites.

3.2. Definition of Variables

3.2.1. Explanatory Variables

The academic community has not yet formed a unified consensus on measuring the development index of Fintech. This paper draws on relevant methods [17] and relevant references [18] to construct the development indicators of Fintech. The index system is shown in Table 1.

Table 1. The development index system of Fintech.

Primary Indicators	Secondary Indicators
Industry Resource Input	Fintech Capital Investment
Ability of Research and Application	Number of Fintech Patents
Degree of Social Cognition	Keyword Searching

3.2.2. Explained Variable

This paper uses ROA to measure the performance of banks. This index focuses more on the profitability of enterprises and can better reflect the operating benefit of banks.

3.2.3. Control Variables

When exploring the operational benefits of banks, from a macro perspective, the influence of social and economic development on the operational benefits of banks cannot be ignored. Therefore, this paper selects GDP to quantify the level of macroeconomic development. From a microscopic perspective, this paper selects the total deposits, non-performing loans, and net interest margins of banks to measure their influence on operating benefit. They are shown in Table 2.

Table 2. Definition of control variables.

Variable Name	Variable Notation
Gross Domestic Product	GDP
Total Deposits	TD
Non-performing Loans	BL
Net Interest Margins	NIM

3.3. Model Setting

This paper uses dynamic panel data and sets the systematic GMM model to empirically analyze the influence of the development of Fintech on the operating benefit of banks. The model expression is shown in formula (1).

$$ROA_{it} = \alpha_0 + \alpha_1 ROA_{i,t-1} + \alpha_2 FTI_t + \alpha_3 FTI_t^2 + \alpha_4 GDP_t + \alpha_5 TD_{it} + \alpha_6 BL_{it} + \alpha_7 NIM_{it} + \mu_i + \varepsilon_{it} \quad (1)$$

4. Results

4.1. The Results of Regression

Table 3. The results of regression and robustness test.

Variable Notation	Formula (1)	Test (1)
L.ROA	0.8223*** (0.1212)	0.7338*** (0.1240)
FTI	0.0099*** (0.0022)	0.0105*** (0.0028)
FTI ²	-0.0038*** (0.0008)	-0.0040*** (0.0010)
GDP	0.0519*** (0.0162)	0.0431*** (0.0189)
TD	0.0121* (0.0063)	0.0192** (0.0090)
BL	-0.0115** (0.0054)	-0.0172** (0.0076)
NIM	0.0085 (0.0083)	0.0136 (0.0100)
AR(2)	0.389	0.413
Sargan	0.430	0.315

¹ Standard error are in parentheses under the regression coefficients. ² ***, ** and * indicate significance at the 1%, 5% and 10% confidence levels, respectively. ³ AR(2) and Sargan show the P value.

4.2. Discussion

4.2.1. The Formula (1)

As the formula (1) shows, it can be included that:

First, the P value of AR(2) is greater than 0.1, and it has passed the autocorrelation test, indicating that there is no second-order serial correlation in the random disturbance term difference in the model; and in the instrumental variable over-identification test, the Sargan test P value is greater than 0.05, it has passed the Sargan test, indicating that all the instrumental variables in the model are valid; therefore, the system GMM model constructed in this paper is reasonable, and the estimation results are valid.

Second, the coefficient of FTI is positive but that of FTI2 is negative, and they are significant at the 1% level, which proves that there is an obvious "inverted U-shaped" between the development of Fintech and the operating benefit of banks, which is consistent with the previous theoretical analysis.

Third, the operation will have inertia that the operation of the past period will have a cumulative effect, which will have a significant co-directional effect on the current period; The coefficient of L.ROA is greater than 0, which is significant at the 1% confidence level, which is consistent with the operating inertia.

Fourth, from a macro-level analysis, the better the macroeconomic development and the better the market environment, the more individuals and enterprises need to carry out deposit and loan business. Banks can more fully identify the credit status of lenders and carry out long-term data tracking by Fintech, reducing the possibility of bad loans in banks, so that banks can expand the customer group of loans and improve the operating benefit of banks. The empirical results show that the coefficient of GDP is significant and greater than 0 at the 1% confidence level.

Fifth, from the micro-level analysis of banks, the more deposits held by banks, the more funds banks use for lending, and the stronger the ability of banks to create deposits. In addition, the higher the net interest income of banks, the less non-performing loans, and the better the operating benefit of banks. In the empirical results, the coefficient of total deposits and non-performing loans are significantly positive and negative at the confidence level of 10% and 5%, respectively, and that of net interest margins is negative, which is consistent with the theoretical analysis.

4.2.2. The Robustness Test (1)

In order to ensure the reliability of the empirical model and the empirical results, this paper adjusts the sample data capacity, excludes the data of large state-owned banks, and conducts the regression again. The results are shown in Table 3 test (1).

It can be found that there is no significant change in the test (1) compared with the formula (1), and no specific analysis will be made here. The test (1) in Table 3 show that the empirical model is reasonable and reliable, and the empirical results are robust and correct.

5. Conclusions and Suggestions

This paper analyzes the influence mechanism of competition effect and diminishing marginal benefit effect on bank's operating benefit, and establishes a system GMM model to regress the relationship between the development of Fintech and bank's operating benefit. The results show that

there is a significant "inverted U-shaped" relationship between the development of Fintech and the operating benefit of banks. Accordingly, this paper proposes the following suggestions.

First, banks should precisely position themselves, take the initiative to incorporate fintech into their business systems based on local economic development and customer needs, and rely on digital transformation to achieve precise empowerment of fintech.

Second, banks need to focus their investment on weak links, research, and development (R&D) priorities, select technology R&D and application models that meet their own endowments and actual needs, and build a distinctive financial technology innovation system.

Third, banks should continue to keep Fintech-business development-internal management go hand in hand, deepen the communication and linkage between business and technology, and promote the integration of technology and business, development of technology.

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