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Analysis on the Profit Model Transformation of Commercial Banks Under the Background of Internet Finance

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ABSTRACT: *With the widespread application of big data and cloud computing technology, Internet finance represented by third-party payment and peer-to-peer lending is constantly impacting traditional financial institutions represented by commercial banks with its advantages. This paper adopts the two-way fixed effect regression of panel data, and conducts theoretical analysis on related theories covering the transformation of Internet finance and commercial bank profit model. In this paper, the relevant data of 15 representative commercial banks in China from 2010 to 2017 was selected, and panel data was collected to build a model. After empirical testing, it is concluded that Internet finance has a negative impact on the profitability and profit structure of traditional commercial banks. Based on this, this paper proposes measures for the transformation of the profit model of commercial banks in China.*

KEYWORDS:*Internet finance, commercial bank, profit model*

1. Introduction

In recent years, Internet finance has been developing rapidly in China, which has had a great influence on the operation of national economy. Since the first year of Internet finance in 2013, represented by peer-to-peer lending and third-party payment, Internet finance has developed rapidly, which has enriched the activities and mobilized the vitality of China's financial market, and exerted a significant impact on traditional financial institutions such as commercial banks. The emergence of Internet finance has greatly improved the allocation efficiency of financial resource. Abroud (2015) proposed that the development direction of Internet finance is to make finance internet-based, which means that the cost of financial transactions through Internet trading platforms is lower, so the inclusiveness of financial services is realized. For commercial banks, traditional business has been greatly impacted[1], Norden et al. (2014) researched that Internet finance will have a significant negative impact on the spread between loan and deposit rates of commercial banks. However, some scholars believe that Internet

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finance will have a positive impact on the profitability of commercial banks[2]. Kao et al. (2010) found that due to the platform effect and customer aggregation effect, the development of third-party payment has a promoting effect on the profitability of commercial banks[3]. Wang Hua et al. (2018) put forward that the long-tail effect and spillover effect of the development of Internet finance affected the financial efficiency of the financial market, which encouraged the integration and symbiosis of traditional finance and Internet finance[4]. From the above research results, it can be seen that whether the development of Internet finance inhibits or promotes the profitability of commercial banks has not yet reached a consistent conclusion. This is mainly because the influence mechanism of Internet finance on the profitability of commercial banks represented by third-party payment and peer-to-peer lending is more complicated. The rising cost of capital and financial disintermediation affect the risk operation and earnings quality of commercial banks at the same time (Gu Haifeng, Yan Jun, 2019) [5]. Based on this, this paper intends to embody the profit model of commercial banks as two important dimensions of profitability and profit structure, clarify the influence of Internet finance on the overall profit model of commercial banks. In this paper, panel data was collected to build a model, relevant data from 2010 to 2017 of 15 representative commercial banks in China was adopted, appropriate variables were chosen for empirical testing and analysis of the final results. All these have important theoretical and practical significance for commercial banks to scientifically respond to the challenges of Internet finance.

2. An Empirical Analysis of the Impact of Internet Finance on the Profit Model of Commercial Banks

2.1 Hypothesis proposal and sample selection

2.1.1 Internet Finance and Commercial Bank Profitability

(1)The disintermediation trend of Internet finance to commercial banks

From the perspective of financial intermediary theory, commercial banks have huge institutions and high operating costs. On the contrary, Internet financial institutions rely on their own platform’s advantages to get rid of time and space constraints, efficiently and transparently realize the matching and transaction of funds between the supply and demand sides, which reduce transaction costs, accumulate a large number of stable customer groups, and have a diversion effect on commercial bank deposits (He Qizhi, 2016) [6]. Therefore, the trend of disintermediation in the financial field was obvious, and financial disintermediation has accelerated. Among them, the impact of third-party payment on the profitability of commercial banks is mainly reflected in the on-balance sheet business level. It converts small demand deposits from a large number of customer groups into large-rated fixed-term deposits, which diverts the demand deposit business of commercial banks, also, the large-term deposits converted by third-party payment

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are deposited in commercial banks, which leads to an increase in interest expenses of commercial banks and has a negative impact on profitability[7].

(2) The impact of the inclusive financialization of Internet finance on commercial banks

From the perspective of long-tail theory, there is a big difference between the customer goals of commercial banks and Internet finance. The business philosophy of traditional commercial banks is to focus on 20% of high-net-worth customers with rich assets and high credit ratings, and use such customer groups to achieve 80% of the income; although the short-head group in the financial market has a high net worth and more mature, its total amount is limited, while the long-tail group has great transaction demand and high efficiency, and its total amount tends to be infinite. Internet finance seizes market pain points, concentrate on exploring the business potential of the long-tail group, focusing the business on low- and medium-asset and low-credit customers, serving "small and micro" enterprises and individual customer groups, and achieving inclusive financialization of the financial market, thereby lowering the threshold of financial services[8].

In addition, Internet finance is effective in risk control while meeting the financial business needs of the existing long-tail market and tapping the hidden wealth of the long-tail market. Relying on Internet information technology, big data and cloud computing, Internet finance constitutes a complete market user's risk profile evaluation system, which makes the risk reasonably controlled within an acceptable range, which again has a negative influence on the profitability of commercial banks to a certain extent[9]. Based on the above two points, the first hypothesis of this paper is proposed:

H1: Internet finance has a negative impact on the profitability of commercial banks.

2.1.2 Internet finance and profit structure of commercial banks

From the perspective of financial function theory, commercial banks have objective restrictions on their scale structure and organizational structure. Commercial banks rely more on the form of traditional offline physical financial outlets, which makes their business types relatively simple. For a long time, the deposit-loan gap has been the main source of profit. And with the continuous advancement of China's financial market reform process, interest rate liberalization allows financial institutions to have independent pricing rights for products and services, but they also face the impact of Internet finance.

In terms of advantages, interest rate liberalization can relax the freedom of product pricing for commercial banks, allowing their products and services to move closer to the law of value, and to a certain extent help commercial banks to promote their products and services. However, in terms of disadvantages, for now, the main business of commercial banks is still interest income. Interest rate liberalization leads to interest contraction by affecting interest margins, which depresses the profit

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margin of commercial banks, thereby affecting the profit structure of commercial banks[10]. And the sharp drop in interest income will be transmitted to non-interest income such as foreign exchange, which will affect the profit structure of commercial banks.

Compared with commercial banks, the advantages of Internet finance are more obvious under the influence of interest rate liberalization. First of all, the interest rate structure of the Internet financial platform closely follows the market. In addition to the benchmark interest rate or annualized rate set within the specified range, financial businesses such as Internet insurance and Internet personal finance management are integrated with each other, and various financial tools are used flexibly. This provides consumers with financial products with higher yields and controllable risks. Its attractiveness and interest rates of deposits and loans are generally higher than those of commercial banks, and the sustainable development of inclusive finance can be achieved by using its sophisticated risk management and control system.

On the other hand, although commercial banks have explored online business and broadened their business scope in recent years, the functions of commercial bank’s apps are similar, and there is no special function to attract customers, and Internet financial giants such as Alipay are "Winner takes all" in payment and settlement, occupying most of the market share. Moreover, most of the e-commerce platforms and offline payments are dominated by third-party payment tools, and with "baby-like" products to break the traditional offline model and expand the business scope, so as to complete various businesses in the traditional financial field more efficiently. Third-party payment platforms provide different funds limits and financial products for different customer credit ratings. Differentiated and diversified financial services have made peer-to-peer lending and online investment increasingly popular, further reducing the profit margins of commercial banks’ deposit and loan business.

Based on previous studies, from another perspective, this paper believes that the current profit model of Internet finance is exactly the trend of commercial banks under the highly market-oriented interest rate. At the same time, Internet finance uses its complete and diversified profit model to invade various markets of commercial banks. Various means such as third-party payment, peer-to-peer lending, online crowdfunding, cloud computing, big data, Internet of Things, and mobile payment have comprehensively formed the backbone of current Internet finance, and has completed the renewal iterations of phenomenon-level financial profit models, such as the sharing economy. Therefore, it is not difficult to observe that Internet finance has a negative impact on the profit structure of commercial banks in the context of interest rate liberalization.

In short, in commercial banks, the high cost of information referral, the conservativeness and inefficiency of the operating model and the single profit model, in contrast, in Internet finance, the disintermediation trend of information interaction, the efficiency and flexibility of the operating model, and the diversification of profit models and the inclusive effect, together have led to the negative impact of Internet

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finance on the profitability and profit structure of commercial banks in the context of interest rate liberalization. Thus, the second hypothesis of this paper is proposed:

H2: Internet finance has a negative impact on the profit structure of commercial banks.

2.1.3 Sample selection

There are a large number of commercial banks in China. Considering the availability of data and the purpose of this paper, according to objective conditions, this paper selects 15 commercial banks as the research sample, mainly including four large state-owned banks, nine joint-stock commercial banks, two urban small and medium-sized commercial banks. The above banks can basically reflect the current management level of China's commercial banks. At the same time, these commercial banks have a certain degree of heterogeneity in their business philosophy, business model, main business and consumer group, which meet the requirements of sample differentiation and data diversification. The sample range of panel data selected in this paper is from 2010 to 2017. According to the annual reports of listed commercial banks, from 2010 to 2011, commercial banks ended their golden period of development, and profit growth showed an inflection point. The concept of "Internet finance" was born in 2012, and 2013 was called the first year of Internet finance. But the influence of Internet finance on commercial banks should be slightly earlier than this period. Therefore, choosing this period as the sample interval can better reflect the impact of Internet finance on the profit model of commercial banks.

2.2 The construction of empirical model

2.2.1 Model setting

In order to systematically and comprehensively analyze and verify the impact of Internet finance on the profit model of commercial banks, this paper three-dimensionally expresses the profit model of commercial banks from two aspects of profitability and profit structure, and selects a panel data model for regression analysis. To test the hypothesis mentioned above, this paper establishes a two-way fixed effects model as follows:

$$Y_{1it}=\alpha_0+\alpha_1 Internet_t + \alpha_2 Control\_Variables_{it} + \mathcal{E}_{it} \quad (1)$$

$$Y_{2it}=\alpha_0+\alpha_1 Internet_t + \alpha_2 Control\_Variables_{it} + \mathcal{E}_{it} \quad (2)$$

Note: In the model, Y_{1it} is the explained variable of model (1), which represents the profitability of the i-th commercial bank in year t, and Y_{2it} is the explained variable of model (2), which represents the profit structure of the i-th commercial bank in year t, $Internet_t$ is the key explanatory variable, representing the level of Internet finance development,$Control_Variables_{it}$is the control variable of each

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commercial bank that changes over time, α_i represents the coefficient of each variable, and $\mathcal{E}_{it}$ represents the error term.

2.2.2 Variable definitions

In this paper, the difintion of main variale is designed as shown in table1.

Table 1 definition table of main variable

Variable type	Variable name	Definition	Calculation formula
Explained variable	ROE	Return on equity	Net profit/average stockholder's equity ×100%
	NIS	Net interest spread	Net interest income/Total bank assets
	ROA	Return on total assets	Net profit/average total assets×100%
	NIM	Net interest margin	Net interest income/average balance of average interest-earning assets
Key explanatory variable	TPP	third-party payment	(third-party payment)
	P2P	peer-to-peer lending	(peer-to-peer lending)
Control variable	SIZE	Total bank assets	Ln (Total assets)
	CIR	Cost-Income radio	Operating expenses/operating income ×100%
	NPL	Non-performing loan ratio	Loan provision ratio/provision coverage ratio ×100%

2.2.3 Data sources

The above financial indicators of the listed banks are derived from Wind database (wind) and the 2010-2017 annual financial reports of the listed banks, and Internet financial data comes from Almanac of China's Finance and Banking and iResearh (www.iresearch.com). To eliminate the influence of extreme values on the regression results, in this paper, the continuous variables are treated with winsor at the level of 1%. Moreover, considering that third-party payment (TPP), peer-to-peer lending (P2P), and the bank's total assets (SIZE) may have an impact on the model analysis, and that the economic significance of the variables does not change after taking the logarithm, this paper takes the logarithm of the variables P2P, TPP and SIZE and assigns them to LnP2P, LnTPP and LnSIZE.

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3. Empirical test

3.1 Descriptive statistics

Table 2 shows the descriptive statistics results. It can be seen that the profitability and profit structure of the samples used in this article are quite different, and the bank size, business model and risk management also show strong heterogeneity.

Table 2 Descriptive statistics results of each variable

Variable name	Definition	Maximum value	Minimum value	Mean	Standard deviation
ROA	return on total assets	0.0147	0.0064	0.0109	0.0019
NIM	Net interest margin	0.0323	0.0132	0.0232	0.0034
ROE	Return on equity	0.2665	0.1140	0.1795	0.0345
NIS	Net interest spread	0.0010	0.0004	0.0007	0.0001
LnTPP	Third-party payment	18.8583	13.8832	16.5910	1.7264
LnP2P	Peer-to-peer lending	14.6588	7.2226	11.5976	2.4856
LnSIZE	Total bank assets	17.0769	12.4704	15.2446	1.0523
CIR	Cost-Income radio	0.4331	0.2159	0.3117	0.0460
NPL	Non-performing loan ratio	0.0239	0.0038	0.0115	0.0044

3.2 Empirical results

Table 3 shows the regression results of model (1), in which the explained variable is ROE, column (1) shows the regression results of adding only the explanatory variable — third-party payment (LnTPP), and column (2) is the regression results after adding the explanatory variable — third-party payment (LnTPP) and the control variable at the same time. From this, it can be seen that regardless of the setting, the coefficient of the third-party payment (LnTPP) is always negative, and there is a negative correlation between the third-party payment (LnTPP) and profitability (ROE), which is obvious at the level of 1%. Column (3) shows the regression results of only adding the explanatory variable—peer-to-peer lending (LnP2P), and column (4) is the regression results after adding both the

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explanatory variable—peer-to-peer lending (LnP2P) and the control variable. From this, it can be seen that, in terms of key explanatory variables, columns (3) and (4) have reached a consistent conclusion that peer-to-peer lending is negatively correlated with profitability at the level of 1%. And with the increase of the scale of peer-to-peer lending, the profitability of commercial banks is notably reduced. Therefore, the first hypothesis H1 of this paper is verified.

*T*able 3-3Regression results of Model(1)

ROE				
Variable	(1)	(2)	(3)	(4)
LnTPP	-1.2273*** (0.1721)	-2.1182*** (0.3540)		
LnP2P			-0.8211*** (0.1151)	-1.4171*** (0.2368)
LnSIZE		4.7603* (2.5415)		4.7603* (2.5414)
CIR		-.27468** (0.0945)		-.2747** (0.0945)
NPL		-2.7972 (1.8201)		-2.7972 (1.8201)
Year	Control	Control	Control	Control
N	120	120	120	120
R^2	0.5386	0.2834	0.5386	0.2834

Note: ① Results (1) and (3) respectively represent the estimated results of the impact of Internet finance (represented by the third-party payment (TPP) and the P2P lending (P2P)) on the profitability of commercial banks; Results (2) and (4) respectively represent the estimated results of the impact of Internet finance (represented by the third-party payment (TPP) and the P2P lending (P2P) with the three explanatory variables) on the profitability of commercial bank.②The robust standard error of the regression is shown in brackets; ③*, **, and *** indicate significant at the level of 10%, 5%, and 1%, respectively.

Table 4 are the regression results of model (2), in which the explained variable is NIS, column (1) shows the regression results of adding only the explanatory variable —third-party payment (LnTPP), and column (2) is the regression results after adding the explanatory variable—third-party payment (LnTPP) and the control variable at the same time. From the results, it is obvious that the coefficient of the third-party payment (LnTPP) is always negative, and the third-party payment (LnTPP) has a negative correlation with the profit structure (NIS), which is obvious at the level of

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1%. Column (3) shows the regression results of only adding the explanatory variable —peer-to-peer lending (LnP2P), and column (4) is the regression results after adding both the peer-to-peer lending (LnP2P) and the control variable. From this, it can be seen that, in terms of key explanatory variables, columns (3) and (4) also show a consistent conclusion, that is, peer-to-peer lending is negatively correlated with the profit structure at the level of 1%. And with the increase of the scale of peer-to-peer lending, the profit structure of commercial banks is impacted. Therefore, the second hypothesis H2 of this paper is verified.

Table 4 Regression result of Model (2)

NIS				
Variable	(1)	(2)	(3)	(4)
LnTPP	-0.0032*** (0.0006)	-0.0033*** (0.0011)		
LnP2P			-0.0021*** (0.0004)	-0.0022*** (0.0007)
LnSIZE		-0.0037 (0.0048)		-0.0037 (0.0048)
CIR		-0.0018*** (0.0004)		-0.0018*** (0.0004)
NPL		-0.0099*** (0.0026)		-0.0099*** (0.0026)
Year	Control	Control	Control	Control
N	120	120	120	120
R^2	0.4756	0.1311	0.4756	0.1311

Note: ① Results (1) and (3) respectively represent the estimated results of the impact of Internet finance (represented by the third-party payment (TPP) and the P2P lending (P2P)) on the profitability of commercial banks; Results (2) and (4) respectively represent the estimated results of the impact of Internet finance (represented by the third-party payment (TPP) and the P2P lending (P2P) with the three explanatory variables) on the profitability of commercial bank.②The robust standard error of the regression is shown in brackets; ③*, **, and *** indicate significant at the level of 10%, 5%, and 1%, respectively.

From the above regression results, it can be seen that Internet finance represented by the third-party payment and peer-to-peer lending has a negative impact on the profitability and profit structure of commercial banks, which changes the profit model of commercial banks. Due to the rapid development of Internet finance, aiming at the financial consumption needs of long-tail customer groups, commercial banks have lost a large number of original customers, and part of the profit sources of have been eroded by Internet finance. On the one hand, Internet finance uses third-party payment to squeeze part of commercial banks' intermediate business income and weaken their intermediary functions. On the other hand, after financial products such as Internet Money Fund Management (Yuebao) further affect bank deposits business and form financial disintermediation, the Internet P2P business

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diverts part of the commercial bank's petty loan business, which has a negative impact on the bank's profitability. The negative impact will change the previous profit structure based on the difference between deposits and loans and form a new profit model for commercial banks.

4. Conclusion and suggestion

The empirical results indicate that internet finance has a significant impact on the profit model of commercial banks. First of all, with the rapid development of the Internet and the information technology, Internet finance represented by the third-party payment and peer-to-peer lending has keenly captured the long-tail consumer group by virtue of its low transaction costs, advantages of disintermediation, good synergy and less information asymmetry, which has a negative impact on the profitability and profit structure of commercial banks and changes the traditional profit model of commercial banks. As a result, this leads to the loss of original customers and profits of commercial banks, and decreases the profitability of commercial banks. Secondly, with the development of Internet finance, it has a negative impact on the traditional profit structure of commercial banks, which is dominated by interest rate spreads. On the one hand, Internet finance uses third-party payment to squeeze part of the commercial bank's intermediate business income and weaken the intermediary function, on the other hand, after financial products such as Internet monetary fund management (Alibaba's Yu'e Bao) further affect bank deposits business and form financial disintermediation, the Internet P2P business diverts petty loans and savings deposits businesses from commercial banks, which causes a negative impact on the profitability of commercial banks, changes the profit structure of commercial banks based on deposit-loan differentials in the past, and impacts the profit model of commercial banks that rely on low-cost savings and interest spread income. Therefore, a new profit model for commercial banks has been formed.

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