

Empirical Research on the Impact of Chinese Commercial Bank Revenue Structure on Growth Ability under the Background of Interest Rate Marketization

Yichu Zhou^{1*}

¹ HKU Business School, The University of Hong Kong, Hong Kong, China

Email Address

zhou.yichu-023@connect.hku.hk (Yichu Zhou)

*Correspondence: zhou.yichu-023@connect.hku.hk

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Abstract:

Commercial banks are one of the catalysts for China's economic development. Under the background of the market-oriented reform of interest rates, Chinese commercial banks are facing severe challenges while benefit from the reform. The market-oriented interest rate has narrowed the interest spread between deposits and loans, making it more and more difficult for commercial banks to generate income from their deposit and loan business, and this problem has profoundly affected the growth ability of commercial banks. Based on the financial data of China's listed commercial banks from 2014 to 2023, this research studies the impact of commercial banks' revenue structure on their growth ability under the background of interest rate marketization, and finds that the lower the proportion of commercial banks' net interest income to operating income, the stronger their growth ability. Under the background of interest rate marketization, the narrowing of interest rate spreads leads to insufficient growth capacity, and the higher proportion of net interest income will also reduce the motivation of banks to expand new business, thus hindering their long-term development. This research suggests that commercial banks should appropriately optimize their business structure, reduce their dependence on deposit and loan spread income, and strengthen cost management and risk management to achieve long-term improvement in profitability.

Keywords:

Interest Rate Marketization, Revenue Structure, Commercial Bank, Growth Ability, Interest Rate Spread

1. Introduction

Interest rate is an important macroeconomic variable, and the market-oriented reform of interest rate is one of the core reforms in China's economic and financial fields. Since the beginning of reform and opening up, China has continued to promote the market-oriented reform of interest rates, established and improved the interest rate

formation mechanism in which market supply and demand determine interest rates, and has formed a relatively complete market-oriented interest rate system, which has created favorable conditions for giving full play to the important regulatory function of interest rates on macroeconomic operations [1].

As an indispensable and important part of China's economic system, commercial banks have a close relationship between their business and interest rates, which affect the implementation of various policies such as China's capital, monetary and economic development. Commercial banks have not only benefit from the reform but are also facing more severe challenges. The market-oriented interest rate has caused the deposit and loan interest rate spread to continue to narrow, and the market interest rate has also changed from time to time, resulting in many impacts such as the income generation of the interest rate spread business [2] and the increase of loan risk [3], which has had a great impact on the most important deposit and loan business of Chinese commercial banks, and has also further affected the growth ability of commercial banks.

Therefore, it is of certain significance to study the impact of the revenue structure of commercial banks on their growth ability under the background of interest rate marketization, especially to study the correlation between the proportion of net interest income in operating income and the growth ability of commercial banks.

2. Theoretical Analysis and Research Hypothesis

2.1. Theoretical Analysis

Before the market-oriented interest rate reform, the deposit and loan interest rates of China's commercial banks were under the control of the People's Bank of China. The People's Bank of China has tighter control, and commercial banks have less say in interest rate decisions. Under the control of interest rates, the People's Bank of China has created profit margins for commercial banks, and commercial banks only need to carry out traditional deposit and loan business, and continuously expand the scale of deposit and loan business to obtain better profit income, so interest spread income has been the main source of profit for the banking industry in the past many years.

After the implementation of interest rate marketization, commercial banks can set their own prices for their financial products, and in order to seize market resources, the competition among commercial banks is extremely fierce. On the one hand, in the loan business, in order to seize high-quality customers, commercial banks will reduce the loan interest rate to issue loans with guaranteed asset quality, and increase their own loan scale through loan delivery, on the other hand, in the deposit business, banks will absorb depositor resources by increasing deposit pricing and continuously improve their deposit scale. Under the influence of the above two aspects, the spread between deposit and loan interest rates has been narrowing, and the downward pressure of the economy in recent years and the government's macroeconomic regulation and control of the interest rates of important loan products such as housing loans have strengthened this trend. From Figure 1, the average interest rate spread of China's major listed commercial banks from 2013 to 2022 has narrowed significantly under the background of interest rate marketization, which has a negative impact on the profits of commercial banks [4], and the profits of banks will decrease relative due to the decrease in interest rate spreads.



Figure 1. Trend of the average interest rate spread of China's major listed commercial banks.

Data source: National Interbank Funding Center [5], PwC Mainland China Banking Survey [6].

To sum up, in the context of interest rate market-oriented reform, the deposit and loan spreads of Chinese commercial banks have been narrowing, and it is becoming more and more difficult for commercial banks to obtain income through deposit and loan business. Commercial banks with a high degree of dependence on net interest income from operating income will face reduced profitability due to the narrowing spread between deposits and loans, reflecting a lack of growth capacity. A higher proportion of net interest income will also reduce the incentive for banks to expand new businesses[7], further suppressing the development of innovative businesses, and thus hindering the long-term development of banks.

2.2. Research Hypothesis

Referring to the existing research and the previous analysis of the change trend of the deposit and loan spread and the change of profitability of commercial banks in the context of interest rate liberalization, this research argues that the higher the dependence of commercial banks on the income of deposit and loan spreads, the more unfavorable the revenue structure is to the growth of banks. In summary, this research proposes the following research hypotheses.

Hypothesis 1: There is a significant negative correlation between the proportion of net interest income and the growth ability of commercial banks, and the proportion of net interest income can inversely reflect the growth ability of commercial banks.

3. Research Design

3.1. Data Sources

According to the 2012 edition of the industry classification of the China Securities Regulatory Commission, this research selects the data of commercial banks listed on the Shanghai and Shenzhen stock exchanges from 2014 to 2023 as the research sample, and the sample data are all taken from the CSMAR database. In order to avoid the adverse effects of some samples on the scientific results of the study, the observed values of the initial samples are reasonably screened as follows. In this research, we first delete the various types of *ST and ST companies, because these companies usually face major business problems, there is a high probability that there will be anomalies in the financial statement data, and the related companies are also subject to special treatment by the market, which is not generally representative, and

should be removed from the sample of this study. In this research, some samples with incomplete data are also deleted to avoid affecting the calculation of empirical regression. Finally, the extreme values of the sample data are eliminated to avoid the influence of the extreme values on the research results.

The data above were process and calculate by STATA 16 and Excel 2019.

3.2. Description of Variables

Referring to the existing research, this research uses the proportion of net interest income to operating income (net interest income ratio) as the indicator of revenue structure, and the growth rate of operating income (operating income growth rate) as the indicator of growth ability [8]. Refers to the existing research, this research introduces several variables as control variables: enterprise size, asset-liability ratio, equity concentration, and year dummy. Table 1 lists the shows the variable names and calculation methods for each variable.

Table 1. Variables description.

Variable Names	Variable Meaning	Calculation Method
OIGR	Operating income growth rate	The revenue for the current period/ revenue for the previous period
IIR	Net interest income ratio	Net interest income/operating income
Size	The size of the enterprise	The natural logarithm of the total assets
DAR	Debt-to-asset ratio	Total Liabilities/Total Assets
CRI	Concentration of shareholding	The proportion of shares held by the top three shareholders
Year	Year	Year dummy

3.3. Model Design

For the research on the impact of commercial banks' revenue structure on growth capacity, based on the previous theoretical analysis, this research takes the proportion of net interest income to operating income which is IIR as the dependent variable and the growth rate of operating income which is OIGR as the independent variable, and controls the variables such as enterprise size, asset-liability ratio, equity concentration, and year, and constructs the following model (1).

$$OIGR_{it} = \alpha + \beta_1 IIR_{it} + \beta_2 Size_{it} + \beta_3 DAR_{it} + \beta_4 CRI_{it} + \sum Year + \varepsilon_{it} \quad (1)$$

Where $i = 1, 2, \dots, 44$ and $t = 2014, \dots, 2022$. $OIGR_{it}$ indicates the growth rate of bank i 's operating income in year t , IIR_{it} indicates the proportion of bank i 's net interest income in year t . $Size_{it}$ indicates the size of bank i in year t , DAR_{it} indicates the debt-to-asset ratio of bank i in year t . CRI_{it} indicates the equity concentration of bank i in year t . $\sum Year$ is the year dummy. α is the constant term, ε_{it} is the residual term.

3.4. Descriptive Statistical Analysis

In the part of descriptive statistical analysis, the results of the sample data are shown in Table 2. In terms of the growth rate of operating income, the average growth rate of operating income of Chinese listed commercial banks in the sample is -3.32%, indicating that the growth of the banking industry is facing difficulties under the current economic situation, with the minimum value being -167.33% and the maximum value being 64.16%, which is very different, indicating that the situation varies greatly among different banks. The average proportion of net interest income is 84.19%, indicating that the operating income of China's listed commercial banks in

the sample is heavily dependent on interest rate spread income, of which the maximum value is as high as 99.44%, and almost all of the operating income comes from interest rate spread income. In terms of equity concentration, the average shareholding of the top three shareholders of China's listed commercial banks in the sample is 46.20%, and the maximum value is 95.54%, indicating that the equity concentration of China's listed commercial banks in the sample is generally moderate.

Table 2. Descriptive Statistical Analysis Results.

Variable	N	Mean	Minimum	Standard Deviation	Maximum
OIGR	322	-0.033248	-1.673279	0.255201	0.641589
IIR	322	0.8418558	0.5949121	0.0966024	0.99439
Size	322	28.19191	24.62865	1.694022	31.43093
DAR	322	0.9222706	0.813353	0.0154406	0.947314
CRI	322	46.20102	11.5923	25.01934	95.5418

4. Empirical Results and Analysis

4.1. Empirical Results

The Hausman test is first conducted to select the type of regression model to be studied. Based on the test results, a fixed-effect model was selected for the empirical study of regression. Table 3 shows the regression results of the impact of commercial banks' revenue structure on growth ability.

The regression results show that before and after the introduction of control variables such as enterprise size and asset-liability ratio, the proportion of net interest income of commercial banks and the growth rate of total assets show a significant positive correlation, and both pass the significance test at the level of 0.01, indicating that the higher the proportion of net interest income of commercial banks, the lower the growth rate of their total assets, which is consistent with the assumptions. This verifies the relevant theoretical analysis and assumptions that when the proportion of net interest income in the revenue structure of commercial banks is high, the bank has a high dependence on interest rate spread income, and shows insufficient growth ability, when the deposit and loan interest rate spread continues to narrow, and the higher proportion of net interest income will also reduce the motivation of banks to expand new business, thereby hindering the growth of their business.

Table 3. Empirical results of the impact of commercial banks' revenue structure on growth capacity.

	(1)	(2)
	OIGR	OIGR
IIR	-1.548***	-1.130***
	(-4.364)	(-3.037)
Size		-0.289***
		(-4.613)
DAR		-5.198**
		(-2.484)
CRI		-0.001
		(-0.078)
Cons	1.270***	13.878***
	(4.248)	(4.365)
Year	NO	YES
N	322	322

R2	0.064	0.132
F	19.040	10.482
***p<0.01, **p<0.05, *p<0.10		

4.2. Robustness Test

In the part of robustness test of this research, the above results will be tested using the method of substituting the explanatory variable. Referring to the existing relevant studies, the explanatory variable is replaced by the growth rate of operating income to the growth rate of total assets, and the regression results of the impact of commercial banks' revenue structure on growth ability after replacing the explanatory variable are shown in Table 4. The regression results show that before the introduction of control variables such as enterprise size and asset-liability ratio, the net interest income ratio of commercial banks shows a significantly negative correlation with the total asset growth rate, and it has passed the significance test at the 0.1 level. After introducing control variables such as enterprise size and asset-liability ratio, the net interest income ratio of commercial banks and the growth rate of total assets still shows a significant negative correlation at the level of 0.05, which means that the higher the proportion of net interest income of commercial banks, the lower the growth rate of their total assets. The significance of the regression results is slightly lower than that of the previous results, but the correlation between the revenue structure and the growth ability of commercial banks is consistent with the original results, and the original research results and inferences have been verified.

Table 4. Robustness Test of the Impact of Commercial Bank Revenue Structure on Growth Ability.

	(1)	(2)
	TAR	TAR
IIR	-0.151*	-0.027**
	(-1.756)	(-2.319)
Size		-0.019
		(-1.317)
DAR		2.815***
		(5.897)
CRI		-0.003*
		(-1.787)
Cons	0.245***	-1.836**
	(3.380)	(-2.532)
Year	NO	YES
N	322	322
R2	0.011	0.188
F	3.085	15.912
***p<0.01, **p<0.05, *p<0.10		

5. Conclusions

Based on the financial data of China's listed commercial banks from 2014 to 2023, this research constructs a research model on the impact of commercial banks' revenue structure on growth ability based on existing research and theoretical analysis, and takes the ratio of commercial banks' net interest income to operating income as the indicator of revenue structure. Taking the growth rate of operating income as the index of growth ability, the correlation between revenue structure and growth ability of commercial banks was regressed to analyze. The regression results show that the proportion of net interest income of commercial banks has a significant negative

correlation with the growth rate of operating income, and it has passed the robustness test.

In the context of interest rate liberalization, the narrowing of interest rate spreads leads to a decrease in profitability, reflecting the lack of growth ability, and a higher proportion of net interest income will also reduce the motivation of banks to expand new business, further suppress the development of their innovative businesses, and hinder the long-term development of banks.

Through the above research and analysis, this research hopes to provide some inspiration for the operation of the banking industry. This research suggests that commercial banks should not rely too much on the simple expansion of deposit and loan business to achieve enterprise growth, but need to optimize the business structure and improve the structure of the source of operating income on the premise of ensuring the steady growth of traditional advantageous businesses, strengthen the expansion of innovative financial business products, and gradually increase the proportion of non-interest rate differential business, so as to reduce the impact of the traditional deposit and loan business due to the continuous reduction of profits due to the continuous reduction of deposit and loan interest rate differences, so as to achieve long-term improvement of profitability and sustainable growth of enterprises.

Conflicts of Interest

The author declares that there is no conflict of interest regarding the publication of this article.

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