

A Study on the Impact of Non-Interest Income on Commercial Banks Performance

Lingqi Zhao^{1,a,*}

¹*Institute of Finance, Dongbei University of Finance & Economics, Dalian, 116000, China*
a. 1912100216@mail.sit.edu.cn

**corresponding author*

Abstract: With an upsurge of interest rate marketisation and internet finance, the role of commercial bank revenue in China's non-interest sector is turning more significant in terms of the bank's operating performance. From 2017 through 2021, the study explores the relationship between non-interest revenue and operating performance in business banks. Simultaneously, the article explores the various degrees of influence of three forms of non-interest revenue on operating performance and compares non-interest income variances on operating performance amongst banks with different equity natures. The empirical data show that non-interest income from commercial banks beneficially effects on their profitability; the proportion of fees and commissions contributes more to the profitability; and the impact on operating performance is more pronounced for state-controlled and joint-stock banks than for urban and agribusiness banks. As a consequence, commercial banks should pursue other businesses aggressively in order to diversify non-interest income sources and play a role in bank operations.

Keywords: non-interest income, commercial banks, business performance

1. Introduction

With the massive influx of foreign banks, the ongoing expansion of interest rate marketisation, as well as the swift increase of internet financing, the traditional profit model of China's commercial banks, which is based on interest revenue, has been challenged in an unprecedented way, with the narrowing of deposit and loan spreads, increasing competitive pressure. The introduction in 2018 limits the non-interest operations of commercial banks to some extent. Commercial banks have begun to broaden their business models and boost the amount of non-interest revenue so as to adapt to the changing development scenario and improve their competitiveness. The first quarter non-interest income of 42 A-share-listed banks played a compensatory role in the process of sound and improving asset quality, and a number of large banks, with high growth in other non-interest income, achieved a marginal recovery in revenue growth. marginal recovery in revenue growth [1]. The subject of whether growing non-interest income may truly increase commercial bank profitability is becoming more prevalent.

In existing literatures, some studies have found that the more business types and non-interest income can help commercial banks increase their profitability since it diversifies their sources of income. Santomero and Chung studied a total of 185 financial corporations using the option pricing method and concluded that expanding non-banking operations may reduce risk [2]. Although bank

earnings are more consistent, non-interest business income fluctuates more than interest business revenue [3]. Domestic scholars Wang Zhijun, Xue Hongjian, and Wang Jiaqiang conducted comparative studies on the income structure of the banking business in the European Union, the United States, and the Asia-Pacific area [4-6]; Zheng Rongnian and Niu Muhong discovered that banks with high credit risk prefer to conduct non-interest business [7]. At the same time, other researchers feel that non-interest revenue has a detrimental impact because non-interest businesses not only lack significant profitability but also have high volatility. According to De Young and Rice, based on an analysis of 4,712 banks in U.S. in 1989-2001 data, banks with better management grow non-interest revenue more slowly, and the marginal growth in non-interest income increases marginal risk. [8]. Lepetit et al. observed, by using data from 734 European banks between 1996 and 2002, that banks boosting their non-interest service face larger volatility in markets and insolvency risk than banks primarily focused in common loans [9]. However, there is currently no standard for categorizing non-interest revenue, and it is unclear whether and how the various companies in non-interest income differ in their impact on commercial banks' operating achievement. The assumption is made in the paper:

Hypothesis: Non-interest revenue is significantly and positively related to commercial banks' business performance.

The following is how the paper's reminder is organized. Section 2 explains the data, including its sources, classification, and transformation into indicators for study. At the same time, we will present and summarize the study's findings, as well as explore the various reasons for presenting these findings. In Section 3, we will summarize the findings and analyze the research flaws and areas for improvement in order to improve the study's completeness and accuracy and take a more objective view of the role of non-interest revenue in banks' operating structure.

2. Empirical Research and Design

2.1. Data Sources

The data selected for this paper comes from CSMAR, wind database and bank annual reports. In the process of sample selection, if the bank's annual observations are less than three years, they are not included in the scope of examination, and the samples with missing data of relevant variables are also excluded. Finally, the available sample size is 24 listed banks, 5 state-owned, 5 joint-stock, 10 urban and 4 rural commercial banks are among them.

2.2. Variable Selection

2.2.1. Explained Variables

ROE: Return on Equity. The profitability of a bank can be fully reflected by ROE, while the level of return on equity is an important indicator of the strength of the profitability of owners' equity, so return on equity (ROE) is used as an explanatory variable in this article.

2.2.2. Explanatory Variables

Ratio of non-interest income to total income: represents maturity of a bank's non-interest business. The definition of non-interest income indicators there is currently no uniform standard for measurement, non-interest income is defined as except for interest revenue from deposits and loans, this definition can reflect the changes in income other than intermediation income, but also to ensure the integrity of the bank's income [10]. Non-interest income is divided into five categories in the bank's financial report: net commission and fee income, net income from investment, net gain from

changes in fair value, net gain foreign exchange and net gain from other operations. Non-interest income is primarily composed of two components in the actual business: fee and commission revenue and net investment income, while the other three enterprises contribute only a modest amount of non-interest revenue. Non-interest revenue is classified as commission and fee income, income from investment and other operating revenue in the paper.

2.2.3. Control Variables

Bank size is often considered to be a proxy for the strength of commercial banks, so the operational performance of banks may also be affected by the size factor, so the logarithm of the number of branches is selected as a measure of bank size in this paper. Net assets per share is related to the share price of listed banks, and the ability to capture a bank's operating performance is reflected in the share price. The deposit and loan ratios of the bank indicate its operating structure, whereas the non-performing loan ratio reflects its operating risk. Meanwhile, as an important part of the financial market, banks' operating performance is also affected by macroeconomic conditions, so this paper uses the GDP growth rate to reflect the macroeconomic environment. Table 1 shows the description of the meaning of variables.

Table 1: Definition of variables.

Type of variable	Variable Symbols	Variable Definition	Variable Description
Explained Variable	roe	Return on net assets	Indicates bank operating performance
Explanatory Variable	NOM	Non-interest income/operating income	Indicates the extent to which the bank's non-interest activity has developed
Control Variables	GDP	GDP growth rate	Indicates the macroeconomic background
	ASSET	Total Assets	Indicates bank size
	NAPS	Net assets per share	Indicates the asset quality
	NPL	Non-performing Loan Ratio	Indicates liquidity risk
	LDR	Deposit and Loan Ratio	Indicates bank's operating structure
	Year	Annual range is 2017-2021	Dummy variables

2.3. Empirical Model

$$roe = \beta_0 + \beta_1 NOM_{i,t} + \beta_2 ASSET_{i,t} + \beta_3 NAPS_{i,t} + \beta_4 NPL_{i,t} + \beta_5 LDR_{i,t} + \beta_6 GDP_t + \Sigma Year + \varepsilon \quad (1)$$

In the above equation, roe denotes the operational performance of the bank, NOM denotes the level of development in non-interest business, ASSET denotes bank size, the quality of assets is denoted by NAPS, NPL denotes Non-Performing Loan ratio reflecting the bank's liquidity risk and LDR denotes the bank's operational structure.

2.4. Analysis of Empirical Results

2.4.1. Descriptive Statistics

The statistical description is shown in Table 2. Based on the sample size, minimum and maximum figures for the ratio of non-interest income to operational income are -0.149 and 0.509, suggesting that the development of non-interest business varies substantially among banks. The minimum and maximum values of return on net assets (ROE) are 0.0594 and 0.172 respectively, and the mean and standard deviation are 0.111 and 0.0209, which indicates that there are also differences in the operating performance of the sample banks, indicating that the sample is suitably representative.

Table 2: Descriptive statistics.

	(1)	(2)	(3)	(4)	(5)
VARIABLES	N	mean	sd	min	max
Inasset	120	28.25	1.772	25.36	31.19
Indeposit	120	27.79	1.768	24.98	30.91
Inloan	120	27.56	1.837	24.62	30.66
LDR	120	0.810	0.143	0.459	1.130
NPL	120	0.0143	0.00321	0.00770	0.0239
roe	120	0.111	0.0209	0.0594	0.172
roa	120	0.00813	0.00121	0.00492	0.0115
NAPS	120	8.843	3.811	3.021	22.71
NOM	120	0.242	0.101	-0.149	0.509
FCIratio	120	0.155	0.0822	0.0296	0.376
NIratio	120	0.0820	0.0821	-0.385	0.291
OORratio	120	0.0258	0.0466	-0.113	0.320
GDP	120	0.0600	0.0201	0.0224	0.0811

2.4.2. Correlation Test

Results of the correlation test are illustrated in Table 3, the absolute value of coefficients of the correlation test between variables are less than 0.7, suggesting that the possibility of multicollinearity between the variables is small, so the sample data used in this paper is scientific and reasonable.

Table 3: Correlation test.

	roe	NOM	NVPS	NPL	LDR	GDP
roe	1					
NOM	-0.0450	1				
NVPS	-0.0380	0.488***	1			
NPL	-0.395***	0.00800	-0.153*	1		
LDR	-0.632***	0.370***	0.322***	0.356***	1	
GDP	0.188**	0.0420	-0.0280	-0.0570	-0.0110	1

2.4.3. Regression Analysis

The regression results show that the regression R-square of the main explanatory variables on the explanatory variables is all around 0.5, and the overall model fit is good, and the primary explanatory variables under consideration have a considerable influence on the explanatory variables (Table 4).

The non-interest income to operational income ratio has a regression coefficient of 0.032, and the regression result is noteworthy at the 10% level, demonstrating that non-interest revenue has a large positive relationship with the profitability for the majority of banks. Non-interest income, as opposed to net interest income, which relies heavily on interest rate changes and economic downturn changes, can provide diversified returns and distribute risks to achieve the task of stabilizing bank profitability.

Simultaneously, after non-interest earnings being classified into three categories: commission and fee income, income from investment, and other operating income, and comparing the impact of the three types of non-interest income to operating income on business performance, the ratio of fee and commission income to investment income shows reasonably significant regression coefficients, which suggests that the former influences business performance favourably. The findings demonstrate that the non-interest business of commercial banks is still in its initial stage and has not yet developed economies of scope, and its investment behavior has obvious volatility and risk, and has not yet reached a mature stage, and thus cannot bring about a significant improvement in commercial banks' performance [11].

Finally, the effect of other operating income's share on banks' operational performance cannot be determined with certainty. This is primarily due to the fact that in the economic context of changing exchange rates, exchange income is also subject to high volatility, in addition to the complexity of the composition of the income of commercial banks, the lower share of which affects the clarity of the conclusions due to its volatility.

Table 4: Regression analysis.

VARIABLES	roe			
	NOM	Fee commission income/operating income	Net investment income/operating income	Other operating income/operating income
NOM	0.032*			
	(1.95)			
FCI ratio		0.086***		
		(4.44)		
NII ratio			-0.032*	
			(-1.68)	
OOR ratio				0.019
				(0.60)
LDR	-0.097***	-0.113***	-0.094***	-0.093***
	(-8.29)	(-9.65)	(-8.17)	(-7.96)
NPL	-0.893*	-1.074**	-1.017**	-0.927*
	(-1.83)	(-2.34)	(-2.06)	(-1.87)
NAPS	0.000	0.000	0.001**	0.001**
	(1.06)	(0.99)	(2.49)	(2.05)
GDP	0.175**	0.133**	0.167**	0.180**
	(2.53)	(2.02)	(2.38)	(2.55)
Year	control	control	control	control

Table 4: (continued).

Constant	0.181***	0.193***	-0.185***	0.181***
	(17.98)	(19.61)	(17.71)	(17.71)
Observations	120	120	120	120
R-squared	0.496	0.556	0.492	0.481
r2_a	0.474	0.537	0.470	0.458
F	22.47	28.60	22.10	21.15

Notes: ***, ** and * suggest that the levels of 1%, 5%, and 10% are significant

2.4.4. Heterogeneity Test

Based on the type of ownership, the data is divided into two sample groups: state-controlled and joint-stock banks, and urban and agricultural banks. According to the results in Table 5, the operating performance of state-owned and joint-stock banks is more impacted by their share of non-interest revenue. This is because the state-controlled banks previously established a business network throughout the country to save fixed costs, and these banks are motivated by business growth based on maturity, the use of existing customer resources, and the brand effect can be more rapid expansion of non-interest income, so that it has a better profitability. However, urban commercial banks and agribusiness banks are too regional, the bank's assets, capital scale is small, etc. decided its customer resources are limited, thus lack of opportunities to increase fees and commissions income. This profit model of relying on deposit and loan spreads makes them more vulnerable to the double impact of the economic downturn and the marketing of interest rates, and the non-interest business development is insufficient. As a result, it is impossible to determine whether the operating performance of the bank is affected positively or negatively.

Table 5: Subgroup sample regression analysis.

VARIABLES	State-owned & Joint-stock Banks	City Banks & Agricultural Banks
	roe	roe
NOM	0.113***	-0.015
	(3.83)	(-0.57)
LDR	-0.148***	-0.123***
	(-5.87)	(-7.69)
NPL	4.083***	-2.631***
	(4.58)	(-6.35)
AVPS	0.000	0.000
	(0.52)	(0.64)
GDP	0.222**	0.123
	(2.36)	(1.65)
Constant	0.123***	0.234***
	(6.26)	(15.05)
Observations	50	70
R-squared	0.640	0.609
Company FE	YES	YES
F test	0	0
r2_a	0.599	0.578
F	27.38	23.79

Notes: ***, ** and * suggest that the levels of 1%, 5%, and 10% are significant

2.4.5. Robust Test

The dependability of the empirical findings need be ensured, so the paper conducted another regression with roa, i.e. return on total assets, as an explanatory variable. The robustness test results in Table 6 illustrate that non-interest revenue is associated strongly as well as favorably to bank operating performance at the 1% statistical level, a finding that is consistent with previous analyses, thus verifying the reliability of the empirical results.

Table 6: Robustness test.

VARIABLES	roa		roa
NOM	0.004*** (3.46)	Constant	0.010*** (14.16)
LDR	-0.003*** (-3.70)	Observations	120
NPL	-0.005 (-0.15)	R-squared	0.194
NAPS	0.000 (0.00)	F test	0.000144
GDP	-0.011** (-2.15)	r2_a	0.159
		F	5.495

Notes: ***, ** and * suggest that the levels of 1%, 5%, and 10% are significant

3. Conclusion

This paper examines how the non-interest income impact on operating profits in commercial banks, through empirical tests of the differences between commercial banks with different property rights properties and the influence of various non-interest proceeds types on operating efficiency. According to the report, the role of non-interest revenue in China's commercial banks has grown dramatically over the years and impacts positively on bank operating performance. The internal structure of non-interest income is getting richer and richer, with fees and commissions accounting for a higher proportion, which can make corresponding contribution to the operating performance; net investment income does not bring significant contribution to the operating performance due to its volatility and riskiness. Furthermore, due to the nature of commercial bank ownership, a state-owned and joint-stock bank's non-interest income has the potential to have a bigger effect on performance than an urban commercial bank or a rural commercial bank owing to the former's diversified business being carried out relatively earlier and being stronger.

The following aspects are the primary research weaknesses of this paper: firstly, in the heterogeneity analysis, after excluding the samples with missing data, there is the problem of insufficient sample size of agribusiness banks, which may have an impact on the empirical results, so that the relationship between non-interest income and profitability will be examined in next studies. Secondly, in the choice of explanatory variables, there is no fixed standard for the definition of non-interest income, whether to choose other more objective, standard and comprehensive variables is an important idea to improve the research. The primary focus of the research is the linear relationship between non-interest income and operating profitability, while whether there are other non-linear relationships between the two can also be a direction for improvement.

References

- [1] PricewaterhouseCoopers.(2023) *Analysis of China's Listed Banks' Performance in the First Quarter of 2023*. Retrieved from <https://www.pwccn.com/zh/industries/financial-services/banking-and-capital-markets/publications/banking-newsletter-a-newsletter-for-the-china-banking-community.html>.
- [2] Santomero, A.W., Chung, E. (1992) *Evidence in Support of Broader Banking Powers. Financial Markets, Institutions, and Instruments*, 1, 1-69.
- [3] Staikouras, C., Wood, G. (2003) *Non Interest Income and Total Income Stability*. Bank of England, Working Paper, 198, 3-43.
- [4] Wang, Z. J. (2004) *Non-Interest Income in the EU Banking Sector*. *International Financial Studies*, 7, 47-52.
- [5] Xue, H. J. (2006) *Analysing the Non-Interest Income of U.S. Commercial Banks*. *International Financial Studies*, 8, 20-25.
- [6] Wang, J. Q. (2007) *Income structure of commercial banks in the Asia-Pacific region: characteristics, causes and their prospects - a comparative analysis based on a global perspective*. *International Financial Studies*, 7, 30-35.
- [7] Zheng, R. N., Niu, M. H. (2007) *A study of the relationship between non-interest business and bank characteristics in the Chinese banking sector*. *Financial Research*, 9, 129-137.
- [8] De, Y. R., Rice, T. (2004) *Noninterest Income and Financial Pre-formance at US Commercial Banks*. *The Financial Review*, 39, 101-127.
- [9] Lepetit, L., Nys, E., Rous, P., Tarazi, A. (2008) *Bank Income Structure and Risk: An Empirical Analysis of European Banks*. *Journal of Banking & Finance*, 32, 1452-1467.
- [10] Hu, D. W., Zhu, A. Q. (2018) *Research on the Relationship between Structured Differences in Non-Interest Income and Operating Performance of Commercial Banks - Based on Empirical Data of 35 Listed Banks*. *The Economist*, 6, 82-87.
- [11] Huang, J., Zhang, Y. H. (2010) *Risk in commercial banks: size and non-interest income - the case of the United States*. *Financial Research*, 6, 75-90.