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Empirical Analysis of Commercial Bank Performance and Its Non-Interest Income under the New Normal—Based on the Data from 17 China's Listed Commercial Banks of 2008–2015

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Keywords: Listed commercial banks, Non-Interest income, Net interest margin, Cost-to-Income ratio, Business performance.

Abstract. In the article, data from 17 listed commercial banks from 2008 to 2015 were selected as the sample. Through the construction of panel data model, empirical analysis was conducted about the relationship between the non-interest income and the commercial bank business performance. The result demonstrated that a significant positive correlation existed between the non-interest income and the commercial bank performance. Moreover, the development of non-interest income made greater contribution to state-holding commercial banks than share-holding or city commercial banks. Therefore, the commercial bank was able to take some approaches, such as the deduction of business cost, expansion of non-interest income scale, and enhancement of innovation, to improve profitability and business performance.

Introduction

In recent years, following the development of economy, Chinese finance has entered the new normal, and commercial banks confront unprecedented challenges and revolution. Current periodically decelerated economic growth has been insufficient to support the development of commercial bank business, which leads to the decrease of credit and earnings growth. With the acceleration of interest rate liberalization, the loan-deposit spreads and profit space become narrowed, so that traditional profit mode seems inefficient and commercial banks must explore novel profit increment. Meanwhile, financial innovation promotes the rapid development of various financial formats, such as internet finance, industrial capital and non-governmental finance, which results in the substantial decline of operating income and profit growth of commercial banks. Therefore, under the new normal, commercial banks in China cannot compete with other reformed financial institutions until they abandon the traditional operation modes and realize a complete transformation. The main strategic transformation for Chinese commercial banks includes product innovation, administration innovation and management diversification. During the process, the percentage of non-interest income increases, but whether it is able to improve the business performance of commercial banks has not yet reached a final conclusion. Based on previous relative results, this article performed a correlation analysis between non-interest income and business performance, and sought for their inherent relationship.

Literature Review

The non-interest income of commercial banks mainly comes from the intermediate business, consultation and investment. With features of low cost, good profit, significant risk difference, and high requirement for technical skills, non-interest income has become the essential part for financial innovation and profit increment. Researches about the relationship between non-interest income and commercial bank performance have been conducted, but there exist two contrast conclusions. Someone demonstrated the positive correlation between non-interest income and commercial bank performance, while accumulating evidences preferred the negative correlation.

Early researches generally demonstrated that the development of non-interest income benefitted commercial banks. For example, Brewer (1989), Templeton & Severiens (1992) and Canals (1993)

declared that the development of unconventional business of commercial banks promoted the profitability improvement. Based on the simulation result, Saunders and Walter (1994) considered that the expansion of commercial bank business was helpful for risk reduction. In 1996, Gall suggested that the improvement of non-interest income ratio (NIIR) contributed to the profit increase and risk decrease. Analysis about European banks from Smith and Wood in 2003 obtained similar result that the expansion of non-interest income business helped risk reduction. Recently, however, complete contrast conclusion was supported by increasing researchers. Lepetie (2007) and Ying Liu (2009) demonstrated that excessive reliance on the non-interest income might lead to earnings reduction and risk increase. In 2012, Brunnermeier reported that high NIIR probably triggered risk occurrence.

In China, study about the non-interest income was a fresh topic. Based on previous results, Chinese researchers provided a new perspective for non-interest income study and obtained some valuable achievements. The opinion that non-interest income positively influenced the commercial bank operation was supported by Wang and Liu (2013), Zhao, Pan and Zheng (2014), Peng and Ding (2016), who agreed that a positive correlation existed between non-interest income and business performance. Employing GMM method, a study reported by Dou (2015) estimated data from 16 Chinese listed commercial banks in 2008-2013 and demonstrated that NIIR positively correlated with return on assets (ROA). Pei (2016) did a segmentation study about different types of commercial banks, and found that the positive correlation between non-interest income and bank performance existed in state-holding commercial banks, while for the share-holding bank, the positive correlation was insignificant. Nevertheless, other researchers got the opposite conclusion. For instance, considering non-interest income volatility and business risk, Wang and Zhou (2008), Huang (2010), Zhang and Li (2010), and Zhou and Li (2011) stated that non-interest income had strong volatility, and high non-interest income was likely to trigger the increase of financial risk.

Reviewing previous research achievements, the correlation between non-interest income and commercial bank performance has so far proved inconclusive, which is probably attributed to the difference of bank size, selected samples and research method. The ownership structure and operating mechanism of state-holding, share-holding and city commercial banks are significantly distinctive, so that it is not suitable to do the research using the same model. Hence, in this article, we employed different regression methods to analysis panel data from 17 Chinese listed commercial banks from 2008 to 2015, and investigated their relationships according to different types of bank.

Based on the obtained conclusion, two competitive hypotheses were come up with in this article:

Hypothesis 1: A positive correlation existed between non-interest income and commercial bank performance.

Hypothesis 2: A negative correlation existed between non-interest income and commercial bank performance.

Empirical Analysis of Commercial Bank Performance and Its Non-Interest Income

Variable Selection and Model Construction

(1) Data Source

Given the accuracy and availability of data source, 17 listed commercial banks in China were selected as the target in this paper, including 5 state-holding banks, 8 share-holding banks, and 4 city commercial banks. The information in this article was from bank annual report and Eastmoney website.

(2) Variable Selection

Details of variables are listed in Table 1.

Table 1. Definition of Major Variables.

Variables		Index	Abbreviation	Description
Explained variable	Profitability	Return on assets	ROA	ROA is the net income divided by total assets.
Explaining variable	Non-interest income	Non-interest income ratio	NIIR	NIIR is the non-interest income divided by operating income.
		Square of non-interest income ratio	$NIIR^2$	$NIIR^2$ is the square of non-interest income divided by operating income.
Control variable	Internal control variable	Net interest margin	NIM	NIM represents the net interest income divided by average earning assets to reflect the influence of net interest income to business performance.
		Cost-to-income ratio	CIR	CIR means the operating expenses divided by operating income, which indicates how efficiently the bank is being run.
		Asset size	lnAS	LnAS is the natural logarithm of asset size.
	External control variable	Gross domestic product	GDP	GDP reflects the influence of external macroeconomic environment on bank performance.
		Money growth rate	MGR	MGR reflects the influence of monetary policy on bank operating performance.

(3) Model Construction

The constructed regression model is

$$ROA_{it} = \alpha_{it} + \beta_1(NIIR_{it}) + \beta_2\left(NIIR_{it}{}^2\right) + \beta_3(NIM_{it}) + \beta_4(CIR_{\mathrm{it}}) + \beta_5(LNAS_{it}) + \beta_6(GDP_t) + \beta_7(MGR_t) + \varepsilon_{it} \quad (1)$$

where deduces the ROA of commercial bank i in the year of t, is the NIIR of commercial bank i in the year of t, represents the gross domestic product (GDP) growth rate in the year of t, represents the money growth rate (MGR) in the year of t, is the intercept, is the coefficient, and is the random interference.

Descriptive Statistics

Table 2. Descriptive Statistics of ROA and NIIR.

Year	Average ROA				Average NIIR			
	All samples	State-holding commercial bank	Share-holding commercial bank	City commercial bank	All samples	State-holding commercial bank	Share-holding commercial bank	City commercial bank
2008	1.07	1.11	0.91	1.38	12.60	16.24	11.08	11.08
2009	0.99	1.07	0.89	1.12	15.89	21.55	15.39	9.84
2010	1.09	1.17	1.01	1.13	15.06	21.50	13.36	10.43
2011	1.20	1.28	1.17	1.21	16.78	23.06	15.46	11.59
2012	1.23	1.29	1.18	1.23	17.75	22.56	17.49	12.27
2013	1.20	1.29	1.17	1.15	20.02	23.58	21.51	12.62
2014	1.16	1.26	1.14	1.07	22.42	23.91	25.71	14.00
2015	1.05	1.16	1.02	0.97	25.28	25.31	29.05	17.72
Average value	1.12	1.20	1.06	1.16	18.23	22.21	18.63	12.44

Empirical Test

Likelihood ration was performed using Eviews 6.0 software to determine the constructed model type (fixed effect model or mixed effect model). The estimated result in Table 3 demonstrated that the

fixed effect model, rather than the mixed effect model, was suitable for all kinds of banks. Subsequently, based on the variable intercept effect model, Hausman was used to determine the selection of individual random effect model or individual fixed effect model. The result in Table 4 indicated that the PROB value of all listed commercial banks and share-holding commercial banks was 0.9864 and 0.9189 respectively, which was significantly higher than 0.05, so that the individual random effect model was suitable. However, for the state-holding and city commercial banks, the intercept was less than the estimators with the same coefficient, so that individual fixed effect model was suitable.

Table 3. Likelihood Ration Result of Commercial Banks.

Sample	Effects Test	Statistic	d.f.	Prob.
All samples	Cross-section F	4.01584	(16,111)	0.0000
	Cross-section Chi-square	61.6656	16	0.0000
State-holding commercial bank	Cross-section F	8.0393	(4,28)	0.0002
	Cross-section Chi-square	30.5904	4	0.0000
Share-holding commercial bank	Cross-section F	3.8318	(7,49)	0.0021
	Cross-section Chi-square	27.9411	7	0.0002
City commercial bank	Cross-section F	7.6689	(3,21)	0.0456
	Cross-section Chi-square	9.1492	3	0.0273

Table 4. Hausman Result of Commercial Banks

	Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
All samples	Cross-section random	0.0004	7	0.9864
Share-holding commercial bank	Cross-section random	0.0056	7	0.9189

Empirical Result Analysis

(1) Model Analysis

Regression result in four study groups was listed in Table 5. It showed that the values of R^2 in four groups were all above 0.6, indicating the great fitness of the model, and that the explaining variables exactly reflected the explained variables. Moreover, DW was closed to 2, which suggested that there was no autocorrelation in the model.

Table 5. Regression results.

	All samples		State-holding commercial bank		Share-holding commercial bank		City commercial bank	
	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
Constant	0.0060	0.0048***	-0.0571	0.0275**	-0.0184	0.0237**	0.0275	0.0002***
NIIR	0.0291	0.0001***	0.0635	0.0086***	0.0335	0.0272**	0.0407	0.0287***
$NIIR^2$	-0.0589	0.0000***	-0.1605	0.0101**	-0.0832	0.0106**	-0.1474	0.0161**
NIM	0.2118	0.0000***	0.2662	0.0724*	0.1216	0.0523*	0.0770	0.0316 **
CIR	-0.0160	0.0088***	0.0192	0.0634*	0.0025	0.6992	-0.0129	0.1203
LNAS	0.0001	0.2269	0.0043	0.0129 **	0.0022	0.0016***	0.0020	0.0017***
GDP	0.0062	0.1089	0.0063	0.1147	0.0058	0.3335	0.0010	0.8312
MGR	0.0005	0.8938	0.0002	0.9634	-0.0023	0.4266	-0.0045	0.0686*
R^2	0.6654		0.8709		0.6034		0.8291	
adjustedR^2	0.6443		0.8202		0.5867		0.7477	
F statistic	31.5687		17.1727		6.1370		10.1882	
Prob.	0.0000		0.0000		0.0000		0.0000	
D.W.	1.9280		1.3971		1.5777		1.3558	
Obs	136		40		64		32	
Model	individual random effect model		individual fixed effect model		individual random effect model		individual fixed effect model	

(2) Explaining Variable

In the four groups, regression coefficient of NIIR to ROA was significantly positive under 5 %, which suggested that the improvement of NIIR was beneficial to the business performance. However, the regression coefficient of $NIIR^2$ was significantly negative under 5 %, which suggested that the relation between non-interest income and business performance was inverse U shape. The increase of NIIR greatly improved the profitability of commercial banks. When NIIR went beyond a certain value, nevertheless, continuous increase of NIIR led to the decrease of profitability.

The coefficient of NIIR in state-holding, share-holding and city commercial banks was 0.0635, 0.0335 and 0.0407 respectively, which indicated that every 1 % increase in non-interest income brought more benefits to ROA in state-holding commercial banks than in hare-holding and city commercial banks. The possible reason was that NIIR in the state-holding commercial bank was substantially higher than it in other commercial banks, and bank's comprehensive service ability was the foundation for non-interest income development. In comparison with other commercial banks, state-holding commercial banks enjoyed advantages in sales network, customer resource and brand effect, which were able to satisfy the financial requirements from different customers and brought benefits to banks (Peng, 2016).

(3) Control Variable

In the four groups, the regression of net interest margin (NIM) to ROA was significantly positive under 10 %, indicating that the improvement of NIM promoted the development of profitability. The estimated coefficient of cost-to-income ratio (CIR) was significantly negative, suggesting that CIR acted as a disincentive to business performance. The regression coefficient of asset size (lnAS) was positive but not significant, which reflected that with the expansion of bank size, the effect of economic scale was no longer significant and persistent. However, the effect of lnAS on state-holding, share-holding and city commercial banks was still significantly positive, with regression coefficient of 0.0043, 0.0022 and 0.0020 respectively. Therefore, it is not difficult to know that at the present stage, the expansion of commercial bank promotes the development of profitability, and the negative critical point has not yet appeared.

Conclusion

In this article, data from 17 listed commercial banks in 2008-2015 were selected as the sample. Empirical analysis was conducted about the relationship between the non-interest income and the commercial bank business performance. The results demonstrated that in China, the contribution of non-interest income to bank performance was significant but not sustainable. Moreover, compared with non-interest income, NIM brought more benefits to bank performance. However, NIM gradually decreased annually and the difference of NIM among different banks was insignificant, so that the urgent issue was to improve non-interest income. The essential point of non-interest income development was the expense control. In the city commercial bank, NIIR was very low but made great contribution to the development of profitability and ROA, which mainly due to the superiority in operation cost control. In terms of the share-holding bank, however, it was at disadvantage in system support, asset scale and expense control, which led to the ordinary performance in comparison with state-holding and city commercial bank.

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