

## Research on listed bank profit model under the interest rate liberalization

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**ABSTRACT:** With constantly deepening the interest rate liberalization, shrinking the net interest margin and the ever-rising non-performing loan ratio, the traditional commercial banks with the main profit model of credit suffers from a severe challenge. The research significance of this paper lies in helping China's commercial bank convert management philosophy, developing a new financial business and improving the profit model. Through the empirical research of 80 samples of China's listed commercial banks: under the condition of interest rate liberalization, the net interest margin is still the current major profit model of the commercial bank, but the intermediate business is the future development model of the commercial banks.

**Keywords:** interest rate liberalization; listed bank; profit model

### 1 INTRODUCTION

The domestic and overseas scholars carry out a more in-depth research of the impact of the interest rate liberalization on the listed commercial bank profit model. Muados (1998)<sup>[1]</sup> finds that Spanish listed bank's operating efficiency under the interest rate liberalization mainly depends on the bank profit model. The banks with continuously innovated financial products can obtain more profits, and the interest rate liberalization will affect the bank profit model structure. Kevin J. Stiroh (2002)<sup>[2]</sup> has researched that the profit growth potential brought by the diversification of the intermediate business income of listed commercial banks in the United States is the future development trend. Chen Zuofu<sup>[3]</sup> (2009) mainly analyzes the main deficiencies of the current profit model of China's commercial banks: single profit model, similar market positioning, homogenization of banking products and narrow channels of integrated financial services. Rima Turk Ariss (2010)<sup>[4]</sup> takes the sample of data in commercial banks in 14 countries from 2000 to 2006, of which the listed commercial banks in Ireland stand out, and the profit of the listed commercial banks in Ireland is mainly from the intermediate business income, and such a profit model relies on the financial investment with more difficult risk control,

thus increasing various risks of listed commercial banks in Ireland during operation. Li Xiaofeng (2010)<sup>[5]</sup> carries out survey of the domestic and overseas financial markets in recent years, and finds that the commercial banks have changed in all aspects, such as the business environment, competition form, customer demand and so on. It requires that China's commercial banks have a re-understanding of the development model, and accelerate the transformation. Through international comparison of the interest rate liberalization, Ba Shusong (2012)<sup>[6]</sup> finds that the interest rate liberalization will lead to a substantial reduction in the traditional net interest margin, and the bank's asset-liability structure has changed significantly, which must explore a new profit model through an integrated management. The major ways of transition proposed in the above literatures are: transformation of business model through integrated management, optimization of business structure through financial innovation and customer structure adjustment. However, these researches mainly draw the experience of the interest rate liberalization of the developed western countries, without sufficiently considering the current status of China's bank's divided management, financial regulation and financial development of the Internet. Under such a current state, there are less empirical researches on the following issue: how China's commercial banks adjust the profit structure, transform the management ideas and find out the measures that are suit-

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able for China's bank development. This paper intends to conduct empirical research on China's listed commercial bank profit model, and provides a new perspective for the selection of bank profit orientation under a new complex and changeable situation, in order to promote the transformation of the listed commercial bank's development strategy.

## 2 STATUS ANALYSIS OF LISTED COMMERCIAL BANKS PROFIT

### 2.1 *Slow growth rate of interest income*

China's interest rate liberalization continues to move forward, but China's financial liberalization and market liberalization extent is not enough. The government agencies consider the potential risks of economy, and the banks are full of administrative color. The interest margin income still occupies a dominant position, but its growth rate begins to slow down. According to the latest bank financial statements and statistics in CNINFO in 2014, the interest income of Industrial and Commercial Bank of China accounts for 74.9% of the operating income in 2014, and increases by 11.3%, less than 3% in 2013. The interest income of Bank of Communications accounts for 75.97% of the operating income in 2014, and increases by 3.2%, less than 3.5% in 2013. The interest income of Shanghai Pudong Development Bank accounts for 79.7% of the operating income in 2014, and increases by 15.26%, less than 6% in 2013. The interest income of China Merchants Bank accounts for 71.7% of the operating income in 2014, and increases by 11.3%, less than 7% in 2013. Thus, the interest margin income of China's listed commercial banks is the main mode of the commercial bank profit, but with the constantly deepening process of the interest rate liberalization, the financial impact of the Internet, rising non-performing loan ratio caused by the economic downward pressure and a series of factors, the interest income of some commercial banks begins to slow down sharply, and non-performing assets begin to surge, and the risk of bankruptcy of commercial banks intensifies.

### 2.2 *Low proportion of intermediate business income*

The interest rate liberalization promotes continuous innovation and development of intermediate business and the intermediate business is also gradually developed into the third pillar industry of the bank, and the accelerated bank profit model is connected internationally. In 2014, the intermediate business income of Industrial and Commercial Bank of China increases by 13%, accounting for 25.1% of operating revenue, more than 3% in 2013. In 2014, the intermediate business income of Bank of Communications increases by 14%, accounting for 24.1% of operating revenue, more than 3.5% in 2013. In 2014, the intermedi-

ate business income of Shanghai Pudong Development Bank increases by 47.56%, accounting for 20.3% of operating revenue, more than 6% in 2013. In 2014, the intermediate business income of China Merchants Bank increases by 59.87%, accounting for 28.3% of operating revenue, more than 7% in 2013. Even so, compared with the ratio of 40% in developed countries, China's intermediate business ratio still has a huge gap, and the contribution of the intermediate business income to the operating revenue is still small. Therefore, increase of the intermediate business income ratio helps the bank to form a reasonable and healthy way of profitability, and resist the potential systemic risks.

### 2.3 *Inadequate financial innovation ability*

The intermediate business income of the developed western countries is subject to the investment banking business, transactional intermediate business, consulting business and other new types of business. The intermediate business of China's listed banks is subject to the business of bank card, payment and settlement, financial management and other traditional businesses, which is lack of core competitiveness, with serious homogeneity. In 2014, the business of bank card, financial management and settlement still ranks the top three ratio of China's intermediate business income and operating revenue, but the intermediate business of the majority of commercial banks accounts for the ratio of less than 20%, far below 40% of benchmark level in the developed western countries. It indicates that China's financial innovation has a tremendous rising space under the condition of inadequate financial innovation ability in China.

## 3 EMPIRICAL RESEARCH ON THE LISTED COMMERCIAL BANK PROFIT MODEL BASED ON INTEREST RATE LIBERALIZATION

### 3.1 *Proposal of research hypothesis*

The interest rate liberalization, financial liberalization and financial disintermediation have a rapid impact on the development of banking industry, and the bank profit model has been severely tested. However, China's commercial banks currently still consider the traditional interest margin income as the major income source, with relatively inadequate financial innovation ability and single profit model, without preventive measures against systemic and regional risks. Under the interest rate liberalization, whether the bank's intermediate business income has a significant positive impact on the bank profitability? How is the extent of impact of the net interest margin on the bank profitability? This paper analyzes how the listed commercial banks transform the profit model from the

perspective of the net interest margin and intermediate business, thus responding to the challenge of interest rate liberalization.

3.1.1 *Impact of net interest margin on bank profit*

The traditional bank interest income still occupies a dominant position, and the basic bank profit model does not have a fundamental change. On the one hand, the opening range of financial liberalization is not big enough, the mixed operation is not allowed in the bank, many innovative businesses are unable to carry out, and the net interest margin is still the main income source of the bank; on the other hand, the bank is lack of innovation ability, and copy the intermediate business model of the western countries, the operating revenue ratio of the intermediate business is still small. On this basis, we propose the following assumptions:

J1.1: The net interest margin has a positive correlation with the profitability in the same period;

J1.2: The impact of net interest margin on the bank profit in the same period is greater than the impact of intermediate business income on the bank profit in the same period.

3.1.2 *Impact of intermediate business on bank profit*

The ratio of the intermediate business income and the bank revenue is becoming higher, and gradually changes the bank profit structure. On the one hand, accelerating China’s interest rate liberalization, narrowing interest margin and single bank profit model lead to continuous decline in the bank profitability, so the bank must be transformed and upgraded; on the other hand, the development of innovative financial business promotes the rapid growth of intermediate business income, and improves the bank profit model, which is beneficial to the banks’ healthy development.

J1.3: The intermediate business income has a positive correlation with the profitability in the same period.

3.2 *Data source and model construction*

3.2.1 *Data source*

This paper selects 16 listed commercial banks in the Chinese mainland as the initial samples, and selects five-year financial data from 2010 to 2014 to do the research. The samples include ROE, net interest margin, total assets, capital adequacy ratio, non-performing loan ratio, electronic transaction replacement rate and so on. The general financial data are from the annual financial statements of the bank in CNINFO. The Internet data of “electronic banking items replacement rate” are from iResearch report.

3.2.2 *Empirical model construction*

This paper mainly researches the transition of the bank profit model through the intermediate business income

ratio and the impact of the net interest margin on bank profitability. The model is the impact of the ratio of interest income and intermediate business income on the bank profitability. For this model, return on net assets (ROE) is the explained variable, net interest margin (NIM) and net income ratio of intermediate business (IB) is the explanatory variable, and the income ratio, non-performing loan ratio and some other internal risk assessment factors and GDP and some other external macro factors are the control variables. The model is constructed as follows:

$$ROE = \alpha + \beta_1 NIM + \beta_2 IB + \beta_3 COD + \beta_4 NPLR + \beta_5 CAP + \beta_6 LR + \beta_7 EBR + \beta_8 M2 + \beta_9 CPI + \beta_{10} GDP + \beta_{11} shibor + \epsilon$$

3.3 *Variable definition*

3.3.1 *Explained variables of the model*

The return on assets of the bank is one of the most extensive indicators used to measure the bank profitability in the industry. The higher the indicator is, indicating that the utilization effect of the bank assets is good, and the bank works well in increasing revenue and saving money. The profitability of the model is expressed with return on assets (ROE), ROE = Net Income / Net Assets.

3.3.2 *Explanatory variables of the model*

For the explanatory variables of the first model, the traditional profit model is expressed with the net interest margin (NIM), that is, net interest margin = (interest income - interest expense) / total assets. The new profit model is expressed with net income ratio of intermediate business (IB), net income ratio of intermediate business = (intermediate business income - intermediate business expense) / operating revenue.

3.3.3 *Control variables of the model*

Table 1. Variable definition list

Type of variables	Name of variables	Symbol of variable	Introduction of variables
Control variables	Management level	COD	Operating cost / operating income
	Non-performing loan ratio	NPLR	Subprime loans+ doubtful loans+ loss loans/total loans
	Capital adequacy ratio	CAP	Capital / risk assets
	Liquidity ratio	LR	Current assets / current liabilities
	E-business items replacement rate	EBR	
	Gross domestic product	GDP	
	Rate of inflation	CPI	
	Supply of money	M2	
	Interbank offered rate	SHIBOR	

3.4 Empirical analysis

3.4.1 Descriptive analysis

Table 2. Variable descriptive analysis sheet

Variables	Average value	Maximum value	Minimum value
ROE	20.06%	26.65%	14.87%
NIM	2.44%	3.23%	1.21%
IB	17.06%	32.47%	5.90%
COD	31.90%	43.31%	23.12%
NPLR	0.90%	2.03%	0.38%
CAP	12.29%	16.20%	9.97%
LR	42.07%	60.89%	27.60%
EBR	74.47%	96.49%	49.88%
GDP	8.58%	10.60%	7.40%
CPI	3.18%	5.40%	2.00%
M2	14.58%	19.70%	12.20%
SHIBOR	2.93%	3.52%	1.70%

3.4.2 Correlation analysis

According to Table 3, through the correlation analysis test of Pearson, the largest correlation coefficient of two variables in the table is 0.48, within an acceptable scope of low level. The possibility of serious multicollinearity among variables may be lower. Meanwhile, the tolerance (TOL) and variance inflation factor (VIF) carry out further inspection of the relationship between variables, and the inspection result further indicates that there is no multicollinearity issue in the model.

(1) According to the regression results in Table 4, the jointly significant value of the model (F value) is 5.966, which is jointly significant; the goodness of fit (R2) is 0.499, indicating that the explanatory variables have a very good degree of explanation of the explained variables.

Table 4. Regression results

Number of samples	F value	R <sup>2</sup>	Adjusted R <sup>2</sup>
75	5.966	0.499	0.415

(2) Under the significant condition of 1%, as the net interest margin (NIM) of the explanatory variables, the regression results in Table 5 show that T value is 4.41, which is statistically significant. Its coefficient is 4.01, indicating that it has a positive correlation with the bank profitability, and the hypothesis is estab-

lished; the coefficient of the net interest margin (NIM) is more than the impact of intermediate business income (IB) on the listed bank profitability, and the hypothesis is established; T value of the intermediate business income (IB) is greater than 2, which is 3.78, and also statistically significant, and the hypothesis is established.

Table 5. Regression results

Variables and intercept	Coefficient	T value
NIM	4.01	4.41
IB	2.18	3.78
COD	0.1	1.24
NPLR	-1.23	-1.16
CAP	-0.33	-1.17
LR	-0.07	-2.21
EBR	0.59	-2.01
GDP	2.06	1.93
CPI	1.29	2.55
M2	1.02	0.365
SHIBOR	0.43	-0.265
Intercept	16.46	2.53

3.5 Conclusion and policy recommendations

3.5.1 Research conclusion

According to the net interest margin of the above empirical test, the analysis of the results of the impact of the intermediate business income on the listed bank profitability reaches the following conclusions:

(1) The net interest margin of the listed bank has a significant positive correlation with the bank profit. With a higher net interest margin, and stronger bank profitability, the coefficient before the net interest margin is still larger than that of the intermediate business income, indicating that the net interest margin is still China's current major profit source of listed bank. Therefore, the commercial banks should pay attention to the traditional credit business, and further implement transition and upgrading and vigorously develop intermediate business and other diversified businesses under the situation of continuous shrinking future net interest margin and increasing non-performing loans.

(2) The intermediate business income of the listed bank also has a significant positive correlation with

Table 3. Variable correlation analysis

Variables	NIM	IB	COD	NPL	CAP	LR	EBR	GDP	CPI	M2	SHIBOR
NIM	1										
IB	.1	1									
COD	.45	.02	1								
NPLR	.19	.4	.28	1							
CA	.32	.02	.03	.25	1						
LR	.32	.3	.2	.24	.36	1					
EBR	.18	-.2	.4	.04	.01	.01	1				
GDP	.29	-.1	.28	-.2	.09	.15	.06	1			
CPI	.11	.19	.4	.04	.02	.01	.05	.2	1		
M2	.07	.34	-.3	.16	.13	.13	.06	.02	-.6	1	
SHIBOR	.07	.48	-.2	.16	.01	.16	.06	-.4	-.5	.6	1

the bank profit. With continuous improvement of the intermediate business income, the bank profitability is also continuously improving. According to the regression analysis, the coefficient before the intermediate business is closer to the coefficient before the net interest margin, indicating that the bank has accelerated the transition, and the bank also continuously innovates on banking business.

(3) The non-performing loan ratio of the listed bank has a significant negative correlation with the bank profit. A large number of non-performing loans may cause a lot of credit non-compliance risks, increase debt burden of the bank, and significantly reduce the bank profit.

(4) The management level of the listed bank has a significant positive correlation with the bank profit, indicating that the bank should not only increase their business income, but also strictly control the operating revenue to improve their profitability.

(5) The development of national economy has a positive correlation with the bank profit. When the economic development is in the early stage, the bank mainly deals with the demand of loans and deposits of the corporates and individuals. Therefore, the bank profit is mainly subject to the interest income. With the continuous development of economic level, people's economic strength is strengthened, and the investment demand and channels are diversified, and the innovation and development of the bank's intermediate business is the main direction of the future bank profit.

(6) E-business replacement ratio of the listed bank has a positive correlation with the bank profit. The listed bank increases the investment of technology, and develops personalized products for different customer needs, and enhances the customer experience to a maximum extent. It also opens up the business channels and establishes a service platform, and enhances the listed bank profitability while reducing the bank's operating costs.

### 3.5.2 Policy recommendations

(1) To pay attention to the net interest margin income and optimize the credit structure

Viewing from the successful countries experiencing the reform of interest rate liberalization, the traditional net interest margin income is still a stable income source of the listed banks. With gradually improving China's financial markets, constantly diversified financing channels, and gradual deepening state-owned enterprise reform, the bank should actively adjust the credit structure, support the development of small corporates and individuals, continuously innovate on credit products, and vigorously develop bond investment and other transaction businesses.

(2) To accelerate the innovation of intermediate business and expand profit channels

Faced with the challenges brought by the interest rate liberalization, compared with the successfully

transitioned foreign banks, the intermediate business income of China's listed banks still accounts for a relatively low proportion. The bank has a lot of space to innovate on the intermediate business, expand profit channels and resist system risks. China's commercial banks can learn from the advanced experience of foreign countries, and implement innovation and development combined with the status quo of China's banking industry, and strengthen consulting, commitment and guarantee, overseas finance and development of other related intermediate businesses based on strengthening the intermediate business of the bank card, agency, payment and settlement.

(3) To increase IT investment, and fully integrate banking business

By the use of big data analysis and cloud computing and other Internet technology, the bank develops the personalized products for different customer needs, and enhances customer experience to a maximum extent, and also vigorously develops e-bank and micro-channel bank and other service platforms, and strives to develop direct-selling bank, network bank and other information channels, and also saves the bank's operating costs while expanding and facilitating customers.

## 4 CONCLUSION

Faced with the challenge of the interest rate liberalization, the commercial banks should maintain the traditional net interest margin income, and actively optimize the credit structure, and accelerate the innovation of intermediate business, expand profit channels, and also take the initiative to embrace Internet technology, and make full use of the Internet to integrate with banking business, so that the banks can walk in front of the age of financial reform.

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