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THE IMPACT OF THE USE OF FINANCIAL DERIVATIVES ON CHINESE LISTED BANKS

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ABSTRACT: *With the deepening of global integration, the innovation and use of financial derivatives have received more and more attention, and China's financial derivatives market has developed rapidly. Based on the research on the main users of financial derivatives, commercial banks, using the data of 16 listed commercial banks in China from 2012 to 2017, this paper finds that the fair value of financial derivatives of commercial banks is negatively correlated with the risk level. The use of financial derivatives reduces their level of risk. In terms of performance improvement, banks' use of financial derivatives has a positive effect on improving performance. However, due to the lack of maturity of the market and products, this positive effect is not significant.*

KEYWORDS: Listed bank, Financial Derivative, Risk hedging, Performance improvement

INTRODUCTION

Since the 1970s, the international financial market has undergone tremendous changes. On the one hand, with the collapse of the Bretton Woods system, exchange rate fluctuations between the currencies of the countries and the US dollar have become increasingly apparent, and the international monetary system has begun to shift to a floating exchange rate system. Many countries in the West have begun to eliminate interest rate and exchange rate controls. Interest rate liberalization has made interest rate risks Increasingly prominent. On the other hand, with the deepening of the global economic and financial integration process, enterprises will inevitably encounter interest rate and exchange rate risks in international trade and market competition. In order to avoid the risks caused by exchange rate and exchange rate fluctuations, companies from all over the world have begun to seek measures to avoid risks. The function of financial derivatives hedging to avoid risks has been widely used by enterprises all over the world, and derivatives have gained unprecedented prosperity. Financial derivatives refer to financial instruments derived from primary assets. As long as a certain amount of margin is paid, the enterprise can trade in full, which is a typical leverage effect. The derivatives market is essentially a market for buying and selling risks and a market for risk management. It is an important tool for business management and risk transfer. Enterprises purchase financial derivatives and achieve risk transfer and risk management. The number of financial products used by companies over the past 20 years has increased significantly, and financial derivatives are playing an increasingly important role. It can be said that financial derivatives are internationally accepted risk management tools.

As a special kind of enterprise, commercial banks play the role of derivatives in the financial

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derivatives market, in addition to the role of agency transactions, that is, providing customers with transactions, realizing risk aversion and acquiring new profit margins. At the same time, it also participates in market transactions based on the regulatory risks caused by changes in hedged economic parameters. The wave of information technology and financial innovation has accelerated the transformation of banks in traditional businesses, and banks have increasingly used financial markets to transfer, transform and redistribute risks.

China has been using financial derivatives since the 1990s, and commercial banks have become the main operators of financial derivatives business. In addition, for Chinese companies, as Chinese companies accelerate their international operations, they also face price risks, raw material risks, exchange rate risks, and interest rate risks. The volatility of interest rates and exchange rates in the international financial market has become increasingly fierce. Besides, Chinese companies are increasingly intervening in cross-border trade and manufacturing, facing the risk of commodity price fluctuations in both raw materials and products, making Chinese companies use derivatives. The level of attention to managing risk is increasing.

Although many foreign scholars have conducted in-depth research on insurance companies, commercial banks and other companies and industries that frequently use financial derivatives, and have achieved rich results, but due to the late start of the Chinese derivatives market, the lack of innovation capabilities, the development speed of China's financial derivatives market is relatively lagging behind. At the same time, the difference between the regulatory legal system and the information disclosure mechanism, coupled with the development level of China's capital market, makes the reference and credibility of foreign research to Chinese banks decline.

However, with the advancement of the financial system reform, China's interest rate marketization process has been greatly accelerated. The reform of the exchange rate system has gradually started and continued to deepen. The capital market reform will also bring about a new round of rapid development. These precursors indicate that the development of China's financial derivatives market will usher in a new opportunity. As a participant in the financial derivatives market, commercial banks should actively develop and utilize financial derivatives, seize market commanding heights, and achieve financial innovation on the basis of risk control to enhance core competitiveness. Therefore, for Chinese commercial banks, it is of great practical significance to strengthen the research on bank risks and business performance of financial derivatives.

The second part of this paper reviews the relevant research literature on the impact of financial derivatives on banks at home and abroad. The third part involves empirical research on sample selection, variable selection, model setting, etc. The fourth part includes descriptive statistics, variable correlation coefficient, regression analysis; the fifth part draws conclusions and recommendations for the future development of financial derivatives.

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REVIEW OF RELATED LITERATURE

The important role of financial derivatives is to help companies manage and transfer risks, and is no exception for commercial banks. Many commercial banks attempt to use the risk hedging of financial derivatives to circumvent the bank's risk level. Summarizing domestic and international research on the impact of financial derivatives on banks, many scholars have proposed different theoretical hypotheses.

As early as the 1990s, Hirtle (1997) studied the operation status of financial derivatives in Bank of America Holdings in 1986-1994 and found that derivatives have a risk-taking effect, that is, financial derivatives are beneficial to commercial banks to reduce enterprises. risk. Yang et al. (2006) took the listed banks in South Korea as the research object. The conclusions of the research on the impact of financial derivatives on commercial banks did not change fundamentally. That is, derivatives have a certain positive effect on the risk-taking of commercial banks. Chalmers (2007) conducted research on the impact of the use of financial derivatives on the interest rate risk and exchange rate risk of commercial banks by using the relevant financial data of 146 banks in 10 countries in 10 countries in the Asia-Pacific region. The results show that whether financial derivatives can help commercial banks reduce risks is related to the length of time: in the short term, the use of financial derivatives can reduce the interest rate risk of commercial banks; but in the long run, the use of financial derivatives cannot effectively reduce the long-term interest rate risk of commercial banks.

China's Zhao Xu (2011) conducted a study on the use of derivatives of Chinese non-ferrous metal listed companies and found that the rational use of financial derivatives can reduce the company's endogenous risks to a certain extent. Si Wen (2013) based on the empirical data of 16 listed banks in China's Shanghai and Shenzhen A-share markets, studying the scale of derivatives of various banks during the period of 2006-2012, and the effect of overall derivatives and different types of derivatives on bank risk. After investigation, it was found that both the overall derivatives and the single derivatives classified by contract type had a significant positive effect on bank risk exposure, which would inhibit individual risks and systemic risks. Zhao Xu and Li Hao (2013) found that foreign exchange derivatives reduced the market risk and exchange rate risk of commercial banks by studying the transaction data of China's listed commercial banks' 2007-2011 semi-annual derivatives business, while interest rate derivatives increased banks. risks of.

Another view is that the use of financial derivatives increases the risks faced by commercial banks. Green and Figlewski (1999) found that derivatives transactions accompanied by the use of risk and valuation models often exposed banks and related financial institutions to model risks. In fact, the results also show that the pricing error caused by the imperfect model and the inaccurate volatility prediction and the mistakes of the hedging operation will cause the seller of the option to suffer huge losses. Shao and Yeager (2007) studied the data of large listed banks in the United States and found that the scale of use of credit derivatives is closely related to risk, that is, the use of derivatives accelerates the increase of risk. Atting and Dai (2009) used the 1999-2007 transaction data as a sample to study the financial derivatives business of

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the six largest commercial banks in Canada. The empirical results show that although commercial banks use financial derivatives for risk aversion and risk hedging, the trading behavior of financial derivatives increases the risks faced by commercial banks. Mayordomo M (2014) collected financial derivatives transaction data of US listed banks from 1997 to 2012, and studied the impact of financial derivatives on corporate risks by using the holding companies of listed banks as research samples. The results show that the scale of the use of financial derivatives affects its effect on corporate risk. That is, the larger the size of the financial derivatives held by the holding company and the higher the risk faced by the company, the conclusion is different from the previous assumptions.

China's Duan Junshan and Zhang Ruihao (2016) based on the annual data of 16 domestic listed commercial banks in China and Bankscope database from 2006 to 2014, examined the impact mechanism of financial derivatives on bank risk exposure and derived financial derivatives. The use of conclusions that will generally exacerbate the bank's risk taking. In addition, the use of financial derivatives will increase the bank's earnings volatility.

Based on the above review, it can be seen that foreign countries have more research on the use of bank risks and financial derivatives than in China. However, the conclusion is still controversial whether financial derivatives can hedge commercial banks. In addition, Chinese related research is still relatively lacking, and the different conclusions that have been obtained from the literature are likely to be caused by differences in the different periods of the research object, industry and economic environment. It is necessary to further explore whether financial derivatives can hedge risks. In view of this, this paper takes 16 listed banks in China as the research object, studies the risk hedging effect of financial derivatives, and proposes hypothesis1.

H1a: Assuming that other conditions are the same, the financial derivatives of Chinese listed banks have a risk hedging effect.

H1b: Assuming that the other conditions are the same, the financial derivatives of Chinese listed banks do not have a risk hedging effect.

Corresponding to risk control is the performance improvement of banks. The academic community has been studying whether financial derivatives can improve business performance by reducing financial costs and financing costs. For financial institutions such as banks, most studies have concluded that derivatives can help improve business performance.

Nace Smithson (1993) used 104 multinational corporations using financial derivatives in 1986 as the research object to explore the impact of financial derivatives on corporate taxation business, and then measure the impact on cash flow. The empirical results show that if a company's tax function is more prominent, the incentive for companies to use financial derivatives to reduce taxes is more obvious, which is beneficial to increase the company's cash flow. Allayannis and Weston (2001) collected data from non-financial companies operating in the United States from 1990 to 1995 as a sample of research, and analyzed the degree of correlation between the use of financial derivatives and company value. The value of Tobin Q

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is selected to reflect the value of the enterprise. The model analyzes the extent to which the value of the enterprise is affected by the financial derivatives transaction. The selection of financial derivatives is mainly based on foreign exchange derivatives. The empirical research results show that the use of financial derivatives has a positive relationship with the value of enterprises. The larger the scale of the use of financial derivatives, the higher the role of corporate value. Especially in the face of foreign exchange risk, the use of financial derivatives can avoid the company's corporate value from suffering 4.9% loss, which greatly enhances the company's value. When Allayannis and Weston (2001) used a sample of US non-financial companies to conduct research, they found that companies used derivatives at an overall premium of 3% to 8%. The use of derivatives has greatly increased the value of the enterprise. When Carter (2006) conducted research on companies in the aviation industry, he also found that companies using derivatives increased the value of the company by 12% to 16%, and also supported the value-adding theory of derivatives.

In China, Zhao Xu and Li Hao (2013) found in the empirical study on the use of derivatives in China's listed banks in 2007-2011 and their impact on bank risk and value, and found that large banks using derivatives can reduce bank interest rates. Endogenous risks such as foreign exchange risk are conducive to the improvement of bank value, while foreign exchange risk and bank value are intrinsically interactive causal relationship.

Jorion (2006) conducted a study based on the argument that financial derivatives trading can increase the value of the company. A total of 119 oil and gas companies from 1998 to 2001 were used as empirical samples. However, the empirical research results show that oil and gas companies reduce the correlation between the stock price of enterprises and the price of oil and natural products through the hedging function of financial derivatives, indicating that the hedging of financial derivatives cannot be the value of the company. Have an impact. Si Wen (2013) used the transaction data of the semi-annual financial derivatives business of China's listed commercial banks from 2006 to 2007 as a sample to study the impact of derivatives on the company's value. The study found that commercial banks carry out financial derivatives business with both economies of scale and scope, and financial derivatives businesses have a positive effect on their own value. However, due to various conditions, this positive effect is not very significant. Sven (2013) based on the impact of financial derivatives on the value of the company as a research starting point, through corresponding research shows that commercial banks engaged in financial derivatives business can produce economies of scale and a positive range of economies, through the continuous improvement of the scale of the use of financial derivatives can be improved The corporate value of listed banks, but due to data constraints and model settings, the impact between the two is not very significant.

According to the above literature review, it is not difficult to see that the existing researches believe that the current financial derivatives have different effects on the performance of commercial banks.

The above content shows that from the existing research and the mechanism of risk aversion of financial derivatives, the current financial derivatives of commercial banks can promote the

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improvement of performance to a certain extent, and therefore, hypothesis 2 is proposed.

H2: Limiting other conditions, the use of financial derivatives by listed banks in China is conducive to improving corporate performance.

METHODOLOGY

Based on the review of relevant literature, the impact of financial derivatives on commercial banks is mainly in the following two aspects: on the one hand, the impact on bank profitability, and most of the academic circles believe that financial derivatives can improve the bank's performance level; It is a controversy over the impact on the bank's risk level. This paper conducts empirical research on the profitability and risk level of Chinese commercial banks from financial derivatives transactions, and discusses the relationship between the two.

Model Sample Selection and Data Source

Considering the availability of data, this paper selects 16 domestic commercial banks listed in Shanghai and Shenzhen A-shares as a sample of research. Specifically, the five major state-owned banks: Bank of China, Industrial and Commercial Bank of China, Agricultural Bank of China, China Construction Bank, China Bank of Communications; eight joint-stock commercial banks: China Merchants Bank, Minsheng Bank, China Everbright Bank, China CITIC Bank, Industrial Bank, Shanghai Pudong Development Bank, Shenzhen Development Bank , Ping An Bank; three city commercial banks: Bank of Beijing, Bank of Nanjing, Bank of Ningbo. The new enterprise accounting standards implemented since January 1, 2007 prompted banks to begin to standardize the measurement and presentation of financial derivatives, and relevant data indicators have become increasingly sophisticated. In view of this, this paper collects time data from the semi-annual and annual data of 16 banks between 2012 and 2016, and forms panel data with the cross-section data of 16 listed banks, and conducts quantitative regression analysis to avoid previous research reports. The situation in which data is missing. The data comes from the annual reports of major listed banks and the CSMAR database. The statistical software used by the institute is STATA15.0.

Selection of Variables

Below are the variables that appear in the model.

Explained Variable

Profitability: DuPont analysis is a classic way to evaluate business performance from a financial perspective. The basic idea is to decompose the company's return on equity (ROE) into multiple financial ratio products, which is helpful for in-depth analysis and comparison of business performance. In the DuPont analysis, the measurement of bank profitability indicators mainly includes return on equity (ROE), return on total assets (ROA), and operating profit margin (OPM). The return on net assets is the ratio of net profit to shareholders' equity, which can reflect the efficiency of the bank's use of funds for profit; the operating profit rate is the

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ratio of the bank's operating profit to operating income, taking into account the bank's operating costs; the total return on assets The ratio of net profit to total assets, which shows the level of income brought by bank unit assets, can better reflect the bank's profitability. Therefore, this paper selects the ROA of total assets as an explanatory variable to measure the bank's business ability.

Risk level: In the past, the literature mainly used bad loan ratio, stock return volatility, total asset return volatility, and net asset return volatility to measure the bank's risk level. The bad loan ratio refers to the proportion of non-performing loans of financial institutions to the total loan balance. The higher the bad loan ratio, the higher the level of risk faced by commercial banks. Considering the availability of data, this paper selects the bad loan ratio as the explanatory variable to measure the risk level of the bank.

Explanatory Variables

The purpose of this paper is to study the impact of the use of financial derivatives on commercial banks, and the impact is explained in terms of both profitability and risk levels. Therefore, the use of financial derivatives in listed commercial banks is the explanatory variable of this paper. How to express the use of financial derivatives? By looking up the data, summarizing the previous research findings, the previous literature used the fair value measurement of the commercial bank's financial derivatives at the end of the period; some scholars used the nominal value of the commercial bank's final financial derivative contracts. However, considering that the fair value of financial derivatives will change with the market conditions, the stability is poor; while the nominal transaction amount and the actual transaction amount are quite different, and the use of nominal value does not reflect the real risk of the bank, etc. The natural logarithm of the fair value of financial derivatives at the end of the year is used as the explanatory variable of the model.

Control Variable

Considering that the profitability and risk level of commercial banks may be affected by other variables in addition to the influence of financial derivatives, in order to enhance the accuracy and credibility of the regression model, this paper incorporates other main influencing variables as control variables into the regression equation.

Profitability

(1) The size of commercial banks. The scale effect is also called scale economy, that is, the economic benefits brought about by the increase in scale. As a kind of enterprise, commercial banks generally have reason to believe that as the scale of commercial banks expands, they will show economies of scale and thus enhance the profitability of commercial banks. This paper refers to the common practice at home and abroad, and represents the scale of commercial banks by taking the natural logarithm of the bank's total assets.

(2) Bad loan ratio. The bad loan ratio refers to the ratio of the size of non-performing loans of

Print ISSN: 2053-4086(Print), Online ISSN: 2053-4094(Online)

banks to the scale of total bank loans. The greater the ratio, the higher risk the bank faces. As an important indicator of bank risk, bad loan ratio is likely to be inversely proportional to bank earnings.

(3) Loan-deposit Ratio. The loan-deposit ratio is the ratio of total bank loans to total deposits. From the perspective of bank profitability, the higher the Loan-deposit Ratio, the better. The low Loan-deposit Ratio of a bank means that it costs a lot and the bank's profitability is poor.

(4) Debt Asset Ratio. The Debt Asset Ratio, also known as the Leverage Ratio, is the ratio of total debt to total assets. It is used to measure the ability of companies to use creditors to provide funds for business activities, and to reflect the security level of creditors' loans: if the gearing ratio reaches 100% or exceeds 100%, the company has no net assets or insolvency.

Risk level

(1) Return on total assets. The return on total assets is the ratio of the net profit of the bank to the total assets. It reflects the ability of the bank to use the assets to realize the income. The higher the bank's total return on assets, the stronger the bank's ability, the higher the return on unit assets, and the lower the bank's risk level.

(2) Bank size. The existence of scale effect not only enhances the profitability of large banks, but also enhances their ability to withstand risks. China's listed commercial banks have long-term financial business and have sufficient experience to reduce the operational risks of financial derivatives business to a certain extent.

(3) Loan-deposit Ratio. The loan-deposit ratio is the ratio of total bank loans to total deposits. From the perspective of bank profitability, the higher the loan-deposit ratio, the better. The low Loan-deposit Ratio of a bank means that its cost is high, and the bank's profitability is poor, which in turn makes the bank's risk level rise.

(4) Debt-equity Ratio. The ratio of liabilities to owner's equity is the ratio of total liabilities to total owner's equity. The high debt-equity ratio indicates that the total capital of the bank has high debt capital, so the degree of debt capital protection is weak. The low debt-equity ratio indicates that the bank's own financial strength is strong, so the degree of protection of debt capital is relatively high.

Model Construction

According to the variables listed above, in order to study the impact of financial derivatives on the profitability and risk level of Chinese commercial banks, this paper constructs the following two empirical models:

Using ROA as the explanatory variable to measure the bank's business ability, the regression model:

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$$ROA_{it} = \alpha_i + \beta_1 LnDS_{it} + \beta_2 LnAsset_{it} + \beta_3 BLR_{it} + \beta_4 LDR_{it} + \beta_5 DAR_{it} + \varepsilon_{it} \quad (1)$$

The bad loan ratio is used as the explanatory variable to measure the bank's risk level, and the regression model:

$$BLR_{it} = \alpha_i + \beta_1 LnDS_{it} + \beta_2 ROA_{it} + \beta_3 LnAsset_{it} + \beta_4 LDR_{it} + \beta_5 DER_{it} + \varepsilon_{it} \quad (2)$$

Where:

ROA= return on assets of commercial banks

LnDS= logarithm of fair value of financial derivatives of commercial banks

LnAsset= the natural logarithm of the total assets of commercial banks

BLR= bad loan ratio of commercial banks

LDR= Commercial bank loan-deposit ratio

DAR= the debt-asset ratio of commercial banks

DER= the debt-equity ratio of commercial banks

DATA ANALYSIS AND RESULTS

This section deals with the results of data analysis and the discussion of the findings of the study, so presented in the following sub sections.

Descriptive statistics

Table 1 : Descriptive statistics of the variables

	ROA	LnDS	LnAsset	BLR	LDR	DAR	DER
Mean	0.0076	22.0010	29.0480	1.1790	68.6700	0.9356	14.7410
Median	0.0078	22.3520	29.0290	1.0950	70.4900	0.9357	14.5290
Maximum	0.0141	25.5950	30.8920	2.3900	81.9900	0.9534	20.4440
Minimum	0.0018	16.9170	26.2860	0.4300	47.9100	0.9154	10827.0000
Std. Dev.	0.0031	1.8380	1.0840	0.3960	6.3200	0.0079	1.9410

Source : Stata 15.0 output

According to the data in Table 1, the average return on assets of 16 listed banks in China is 0.0076, the maximum value is 0.0141, and the minimum value is 0.0018, which is close to 8

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times. The fair value of the financial derivatives of banks at the end of the period is the logarithm of 22.001, the largest. The value is 25.595, the minimum value is 16.917, and the standard deviation is large, indicating that the difference between banks is relatively large; the average value of the total asset log is 29.048, the maximum value is 30.892, and the minimum value is 26.286, indicating that there is still a certain difference in the size of each listed bank. The average bad loan ratio is 1.179, the maximum value is 2.39, the minimum value is 0.43, and the difference is 5 times. From the standard deviation, the bad loan ratio of each bank is not volatile; the maximum loan-to-deposit ratio is 81.99, the minimum value is 47.91, and the standard deviation is 6.32, indicating China. There is also a big difference in the size of deposits and loans between listed banks; the average debt ratio is 0.9356, and the standard deviation is 0.0079. The debt ratio between banks is not much different. From the results of Table 1, except for the ROA of the total return on assets, the standard deviation is 0.0031, and the rest of the variables are larger, indicating that the sample model is heterogeneous and adequately representative, and the sample data is well selected.

Correlation Analysis of Variables

Table 2 is a correlation analysis of the main variables assumed in the model (1).

Table 2 : correlation analysis of the main variables assumed in model (1)

	ROA	LnDS	LnAsset	BLR	LDR	DAR
ROA	1.000					
LnDS	0.932***	1.000				
LnAsset	0.978***	0.985***	1.000			
BLR	0.928***	0.903***	0.947***	1.000		
LDR	0.915***	0.919***	0.937***	0.875***	1.000	
DAR	0.986***	0.918***	0.992***	0.956***	0.922***	1.000

Stata 15.0 output

As can be seen from Table 2, the return on total assets is significantly related to the fair value of financial derivatives. At the same time, it is also very relevant to the four control variables in model (1): the total asset log of the bank, the bad loan ratio, the loan-to-deposit ratio, and the debt ratio. In addition, there is a strong correlation between the variables, indicating that they affect each other and act on the return on total assets. Correlation analysis illustrates the rationality of the selection of variables in the regression model (1).

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Table 3 is a correlation analysis of the main variables assumed in model (2).

Table 3 : correlation analysis of the main variables assumed in model (2)

	BLR	lnDS	ROA	lnAsset	LDR	DER
BLR	1.000					
lnDS	0.903***	1.000				
ROA	0.928***	0.932***	1.000			
lnAsset	0.947***	0.985***	0.978***	1.000		
LDR	0.875***	0.919***	0.915***	0.937***	1.000	
DER	0.960***	0.978***	0.983***	0.976***	0.915***	1.000

Stata 15.0 output

As can be seen from Table 3, the bad loan ratio of commercial banks is significantly related to the fair value of financial derivatives. At the same time, the correlation with the four control variables in model (2): total return on assets, natural logarithm of total assets, loan-deposit ratio, and debt-equity ratio are also very strong. This shows that the risk level of commercial banks is closely related to the scale of the use of financial derivatives and the size of commercial banks. In addition, there is a strong correlation between the variables, indicating that they affect each other and act on the bad loan ratio. Correlation analysis illustrates the rationality of the selection of variables in the regression model (2).

Empirical Test Results Analysis

Table 4 shows the coefficients and standard errors of the explanatory variables and control variables in models (1) and (2).

Table 4 ：Coefficient and standard error of model 1 and model 2

model（1）			model（2）		
	Coef.	Se		Coef.	Se
LnDS	0.000	0.000	LnDS	-0.126***	0.045
LnAsset	0.001***	0.000	ROA	-190.449	219.924
NGD	-0.000	0.000	LnAsset	0.552*	0.298
CDB	-0.000*	0.000	CDB	-0.005	0.003
LEVER	0.064***	0.021	CR	1.230***	0.190
_cons	-0.072***	0.018	_cons	-24.573***	6.611

Stata 15.0 output

It can be seen from Table 4 that in the control variables of model (1), the bad loan ratio and the loan-deposit ratio are negatively correlated with the return on total assets; the natural logarithm

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of the fair value of financial derivatives at the end of the period and the ending debt asset ratio and ROA are positive related. This initially proves the correctness of a in the study of the risk hedging of financial derivatives.

In addition, as can be seen from Table 4, the bad loan ratio of commercial banks is significantly related to the fair value of financial derivatives. At the same time, the correlation with the four control variables in model (2): total return on assets, natural logarithm of total assets, loan-deposit ratio, and debt-equity ratio are also very strong. This shows that the risk level of commercial banks is closely related to the scale of the use of financial derivatives and the size of commercial banks. In addition, there is a strong correlation between the variables, indicating that they affect each other and act on the bad loan ratio. Correlation analysis illustrates the rationality of the selection of variables in the regression model (2). It can be found from Table 4 that the coefficient before the natural logarithm of the fair value of commercial bank financial derivatives is negative and significant at the 1% confidence level. This initially proves that the use of financial derivatives reduces the level of risk faced by banks and verifies the correctness of H1a in Hypothesis 1. According to Table 4, the higher the bank's debt-equity ratio, the higher the level of risk faced by banks and the significant level at 1%.

Table 5 shows the results of empirical analysis of model (1) and model (2).

Table 5 Empirical analysis results of two groups of models

	ROA		NGD
lnDS	3.62E-05	lnDS	-0.126***
	(1.30)		(-2.81)
lnAsset	0.000575***	ROA	-190.4
	(3.55)		(-0.87)
NGD	-5.81E-05	lnAsset	0.552*
	(-0.79)		(1.85)
CDB	-0.00000363*	CDB	-0.00544
	(-1.79)		(-1.58)
LEVER	0.0641***	CR	1.230***
	(3.03)		(6.47)
cons	-0.0724***	cons	-24.57***
	(-3.98)		(-3.72)
N	65	N	65
adj.R-sq	0.985	adj.R-sq	0.956

t statistics in parentheses
Stata 15.0 output

Table 5 shows that the explanatory variable in model (1) is ROA, the explanatory variable is the scale of use of bank financial derivatives, and the control variable is four indicators such as bad loan ratio. According to the regression results of Table 5, the model returns well from the overall perspective. The adjusted R^2 statistic is 0.985, indicating that the model fit is very

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desirable. From the regression results, although the coefficient of the natural logarithm of the fair value of the financial derivatives of the bank is positive for the ROA, the effect is not significant. This shows that the bank's income level is not significantly related to the size of the financial derivatives it holds. This is inconsistent with the statement in Hypothesis 2. Considering that China's financial derivatives started late, the derivatives market is still in its infancy. Compared with foreign commercial banks, the scale of derivatives trading is small, which restricts the value of derivatives to a certain extent. In addition, China's interest rate marketization is not high, deposit and loan interest rates are strictly controlled, and the main income of commercial banks comes from deposit and loan spreads. In 2011, the net interest income of listed banks in China accounted for 78.4% of the operating income, while the proportion of the US banking industry was only 64.3%, which also greatly restricted the role of financial derivatives. Among the control variables of the model, the natural logarithm of the total assets at the end of the period and the ending debt asset ratio were tested at the level of 1%, and the coefficients were all positive. This phenomenon may be related to the scale effect of banks. The larger the size of a commercial bank, the lower its financing costs will have a positive impact on the total return on assets at the end of the period. The loan-deposit ratio is another control variable and is negatively correlated with the ending total asset return. This is consistent with our common sense that the increase in the bad loan ratio of commercial banks will expose banks to higher levels of risk, thereby reducing the bank's ability to operate.

For model (2), the explanatory variable is BLR, and the explanatory variable is the fair value of financial derivatives of commercial banks, that is, the scale of financial derivatives used by banks. The control variable is the four indicators such as the debt-equity ratio. According to the regression results of Table 5, the model returns well from the overall perspective. The adjusted R^2 statistic is 0.956, indicating that the model fit is very desirable.

From the regression results, the variables that are negatively correlated with the NPL ratio are the natural logarithm of the fair value of financial derivatives, the return on total assets, and the loan-deposit ratio. The variables that are positively correlated with the NPL ratio are total assets. Two variables, natural logarithm and debt-equity ratio. In the regression results, LnDS is negatively correlated with BLR at the 1% confidence level, indicating that the use of financial derivatives by Chinese commercial banks can help them reduce the risk level and manage risk, which is consistent with the statement in a (1). of. The two variables LnAsset and DER, which are positively correlated, indicate that the larger the size of a commercial bank, the higher the debt-equity ratio at the end of the period, which will make the risk level faced by commercial banks higher.

CONCLUSION AND RECOMMENDATIONS

Based on the empirical data of China's 16 listed commercial banks from 2012 to 2017, this paper examines the impact of the use of financial derivatives on commercial banks in terms of both profitability and risk levels. The results show that: (1) In terms of risk prevention, financial derivatives can help commercial banks hedge risks. In addition, variables such as loan-to-

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deposit ratio will also reduce the risk of commercial banks to a certain extent, but the effect of no financial derivatives is significant. (2) In terms of profitability, the use of financial derivatives by commercial banks has a positive effect on profitability. Derivatives are beneficial to commercial banks to improve their profitability to a certain extent, but this positive effect is not significant. This may be related to the fact that the Chinese derivatives market is still in its infancy and its development is not perfect. Based on the empirical research results and the development status of China's financial derivatives market, this paper puts forward the following four suggestions:

(1) Improve relevant laws and regulations

Scientific and sound laws and regulations are conducive to promoting the development of financial derivatives and preventing risks. The Interim Measures for the Administration of Derivatives Trading in Financial Institutions issued by China in 2004 is the first regulation of financial derivatives transactions in China. But it is only a departmental regulation with a low level of effectiveness. There is no specific financial derivative product at the legal level. Therefore, relevant departments should improve the legal system of supervision, formulate a law that comprehensively regulates financial derivatives, and unify the management standards for financial derivatives. In addition, it is necessary to improve the accounting system and information disclosure mechanism of financial derivatives, and reduce the risks brought by the uncertainty to the participants.

(2) Strengthening the development and application of bank financial derivatives

Compared with the mature financial derivatives market in foreign countries, China's financial derivatives started late and are still in the development stage. The lack of derivative varieties is one of the reasons for limiting the effective functioning of their functions. The empirical analysis of this paper shows that the use of financial derivatives will reduce the risk level of commercial banks and facilitate the risk management of banks. Today, international financial transactions are close, and commercial banks affected by interest rate and exchange rate risks will face greater risk challenges. Therefore, we must accelerate the development and application of derivatives in China, and develop more mature and rich financial derivatives to meet the inherent needs of risk management of financial institutions such as commercial banks.

(3) Training and absorbing professional talents

With the deepening of global financial integration, China needs more and more high-quality talents with financial knowledge. China's financial derivatives started late, and the lack of relevant professional talents will undoubtedly put China at a disadvantage in international competition. The complexity and professionalism of financial derivatives require that relevant practitioners receive good training and have excellent professional qualities. This not only requires them to have solid theoretical knowledge as the basis, but also to accurately grasp market demand and estimate risk levels. In this regard, China's commercial banks should actively cultivate and absorb talents, improve the ability of incumbents and

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cultivate professional ethics by formulating in-service personnel learning plans. Actively introduce foreign professionals, learn advanced methods from foreign countries, and improve their initiative in financial derivatives trading.

(4) Strengthen internal risk prevention and control and improve internal control system

In order to ensure that financial derivatives can be used correctly and reasonably, banks need to strengthen internal risk prevention and control, clarify internal work and strengthen risk prevention awareness. Nowadays, the internal responsibilities of many commercial banks' risk management departments are not clear, and traditional credit risk management and financial derivatives risk management are not distinguished, which undoubtedly increases the trading risk of banking financial derivatives. In this regard, commercial banks can set up a department specializing in risk management of financial derivatives, and control the initial, middle and late stages of derivatives trading to prevent possible trading risks in order to reduce the risk level faced by commercial banks.

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