Moral Hazard Under the Salary Incentive System of Bank Executives

An Empirical Analysis Based on the Bank's Non-performing Loan Rate and Executive Salaries

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ABSTRACT

The imperfect salary incentive system for bank executives is difficult to suppress the moral risk of the bank's high-level pipeline, which further leads to the weakening of the bank's credit risk management ability and easy to induce systemic risks. This paper selects the non-performing loan (NPL) rate of 20 banks from 2016 to 2019 as an indicator of the bank's credit risk management capability, studies its relationship with the bank's executive salary, and explores the moral hazard problem under the current bank executive salary incentive system. Two hypotheses are established for the relationship between the NPL rate and executive salaries, one is a positive correlation, and the other is an inverted U-shaped relationship. After regression analysis, it is found that the positive correlation between the NPL rate and executive salaries is more reasonable. This shows that even after strengthening the supervision of banks, the problem of moral hazard in the management of bank executives caused by the imperfect salary incentive system for bank executives remains exists.

Keywords: Bank executives, Salary level, Credit risk, Moral hazard.

1. INTRODUCTION

1.1 Analysis of the Status Quo of Bank Remuneration Policies

The separation of ownership and management rights in modern banks has led to a principal-agent relationship. In order to weaken the agency cost of the principal-agent relationship and maximize the interests of the principal, bank executive compensation incentives are adopted to promote scientific decision-making by executives and maximize corporate value. However, incentive mechanisms may induce credit management problems. According to research, ineffective or blind salary incentive mechanisms can cause adverse effects. It may cause executives to pay inconsistent with their income, resulting in laziness or free-riding; an unreasonable compensation system will cause some executives to choose higher-risk loans to achieve the target, which will harm the long-term interests of the bank in order to obtain current benefits. . Financial regulators have taken this seriously: The International Financial Stability Board (FSB) pointed out in a report in 2009 that the bank remuneration policies of G20 member states "excessively emphasize short-term profits and ignore long-term risks." The remuneration incentive policy jointly issued by the US multi-party regulatory agencies on June 5, 2010 pointed out that bank performance compensation should not encourage short-term profit-making behavior and incur long-term risks. (Financial Forum 2019 Issue 5)

1.2 Analysis of the Status Quo of Bank Risk Management

The problems of credit risk control and management of commercial banks in China are mainly reflected in three aspects: rising non-performing loans (NPL) ratio; high loan concentration; the emphasis on mortgage guarantees in credit management business; the bank's own risk management system is imperfect,

and the organizational structure complex. However, China's banking industry is currently at a very low level both in terms of NPL quota and NPL ratio, which shows that the overall asset quality of China's banking industry is relatively good. In the past few years, China's banking industry has adopted a countercyclical policy in the withdrawal of provisions. The level of provision coverage at the end of last year was 300%, indicating that the banking industry's ability to withstand risks is very strong.

This article studies the correlation between executive salaries and bank credit management under the above background. Bank credit risk mainly comes from three aspects: borrower risk, bank's own risk and operating environment risk. In order to study the degree of exposure to moral hazard issues, we select the NPL rate to quantify bank risk management. The NPL ratio refers to the proportion of NPLs of financial institutions in the total loan balance. NPLs are classified into five categories based on the risk basis, normal, special mention, substandard, suspicious, and loss, when assessing the quality of bank loans. Substandard, suspicious, and loss are collectively referred to as NPLs. This article focuses on studying the direct relationship between NPL rates and executive salaries to reflect the correlation between executive salary and bank credit management. Taking the executive compensation and NPL ratios of Chinese listed commercial banks from Sina Finance as a research sample, we use multiple linear regression methods to study the correlation between executive compensation and bank credit management and get some enlightenment and enlightenment on this basis.

2. LITERATURE REVIEW

The relationship between bank executive compensation incentives and executive risk appetite and risk behavior is a hot topic at home and abroad. When reviewing the literature, this article mainly selected several representative documents for reading and sorting, and found that domestic and foreign scholars have different conclusions on the relationship between executive compensation and risk-taking. This article mainly selects the NPL rate as an indicator to reflect the bank's credit risk management level, because in China, the NPL rate is an important indicator reflecting the quality of the bank's operation and directly related to the bank's credit level. Therefore, this article believes

that the selection of this indicator is of great significance.

2.1 Negative Correlation Between Bank Executive Compensation and Bank Risk-taking

Based on the panel data of American companies from 1993 to 1996, when it is further assumed that corporate risk is the only influencing factors of performance-sensitive executive compensation, corporate risk and performance-sensitive compensation have a strong negative correlation[1].

Liu (2020) based on the unbalanced panel data of China's 36 domestic listed banks from 2005 to 2009, using the senior executive compensation data of sample banks, and selecting NPL rate, bankruptcy Z index, and camel rating index as bank risk-taking variables. It is found that there is a significant negative correlation between the short-term compensation of executives and the risk-taking of Chinese banks, while the correlation between the proportion of long-term compensation of executives and the risk-taking of banks is not significant [2].

Meng and Yang (2021) are based on the management power theory, from the perspective of salary defense, using a total of 17,694 sets of unbalanced panel data of Shanghai and Shenzhen A-share non-financial listed companies from 2007 to 2018 to systematically investigate the excess of executives The relationship between salary and corporate risk-taking and the impact of property rights heterogeneity on the relationship between the two, and further explore the intermediary mechanism of the two. The results found that there is a negative correlation between the excess salary of executives and corporate risk-taking, and the negative correlation between the two is more obvious in state-owned enterprises[3].

2.2 There Is a Positive Correlation Between Bank Executive Compensation and Bank Risk-taking

Wang (2020) uses unbalanced panel data from China's listed banks from 2005 to 2019 to conduct research on the relationship between executive compensation gap and risk-taking. The study found that there is a positive correlation between the internal salary gap of the executives of China's listed banks and risk-taking, and compared with the salary gap between executives and employees, the internal salary gap of the executive team has a

stronger positive incentive effect on risk-taking; The larger the external salary gap of executives, the higher their risk-bearing [4].

Cai (2015) selected unbalanced panel data of 16 listed commercial banks in China from 2005 to 2013, and established a basic model to conduct regression analysis on the relationship between bank executive compensation and risk-taking. There is a positive relationship between risk-taking. On the one hand, the increase of executive compensation will increase the bank's risk-taking; on the other hand, the increase of bank risk-taking will also stimulate the increase of executive compensation [5].

2.3 There Is a Non-linear Correlation Between Bank Executive Compensation and Bank Risk-taking

Haq et al. (2010) used panel data of 212 U.S. bank holding companies from 1997 to 2004 to analyze the impact of executive incentives on bank risk-taking. The results show that bank executives hate risk, and bank shareholders prefer risk. The empirical results show that there is a U-shaped relationship between bank risk-taking and executive compensation incentives [6].

Song and Qu (2011), combined with the characteristics of Chinese commercial banks, selected 13 representative commercial banks' quarterly data from 2000 to 2010 and used the unbalanced panel model. The results showed that bank executive compensation incentives and risk-taking are still Show a significant inverted U-shaped relationship [7].

Li et al. (2016) selected bank risk-taking indicators, including NPL rate, asset volatility, stock price volatility, default rate, default distance (DD), Z-SCORE, etc., using China's listing from 2000 to 2014 The bank's sample data has empirically tested that there is a stable and significant inverted U-shaped relationship between bank executive compensation and bank risk-taking: when bank executives' compensation reaches 5.94 million yuan, the bank's risk-taking level has turned from an upward trend to a downward trend. trend. Judging from the current average level of bank executive compensation (2.254 million yuan), China's bank risk-taking is in a stage of rising with the increase in executive compensation. Therefore, when bank executive compensation reaches the critical value (approximately 4.48 million yuan and

5.94 million yuan), special attention should be paid to the bank's risk-taking behavior [8].

In summary, based on different theoretical assumptions, technical methods, and models, scholars have inconsistent conclusions on the relationship between executive compensation and bank risk-taking. This article will study the NPL rate and the level of executive compensation. Based on the analysis of the bank's high-level pipeline ethical risk, it is believed that the NPL rate and the level of bank executives' salary should be positively correlated or inverted U-shaped. The total assets of the bank are introduced, the most significant shareholder holding ratio and appropriation preparation rate are used as control variables to study the relationship between the two.

3. RESEARCH DESIGN

3.1 Hypotheses

Based on the analysis of the ethical issues of bank executives, bank executives will take the initiative to take risks for higher salary levels, leading to an increase in the number of high-risk loans, which further leads to an increase in the rate of NPLs. Based on this point, the following hypotheses are proposed:

H1: There is a significant positive correlation between the NPL rate and the salary level of executives.

According to the conclusions of Li et al. (2016), it is inferred that the relationship between NPL rate and executive salary may not be linear, but there will be a characteristic that the NPL rate increases with the increase of executive salary [8]. Based on this foundation, the following assumptions are made:

H2: The NPL rate has an inverted U relationship with the salary level of executives.

As the current executive salary incentive system is relatively complete, moral hazard issues have been taken seriously and suppressed, or executives are generally risk averse, strict control of NPLs, resulting in an unclear relationship between executive salary and NPL rate. Then there are the following assumptions:

H3: The relationship between NPL rate and executive salary levels is unclear.

3.2 Research Samples

This article selects the annual report data released by commercial banks from 2016 to 2019 as the research object. The data comes from Sina Finance and NetEase Finance and excludes the following outliers: 1) The data is less than four years; 2) Some indicators are missing; 3) Salary data is not continuous. Based on the above conditions, twenty banks were finally selected as research samples.

3.3 Variable Selection and Definition

3.3.1 Variable Definition

3.3.1.1 NPL Ratio

The NPL ratio (the proportion of NPLs in the total loan balances of financial institutions) is one of the significant indicators for evaluating the security status of financial institutions' credit assets. and it is also one of the important indicators for the regulatory authorities to supervise the credit risk of banks.

3.3.1.2 Executive Compensation

Senior management personnel refer to the personnel who are responsible for operating and making non-procedural decisions, determining the direction of the company's development, and undertaking important tasks for the company's development at the senior management level of the company. Executive compensation can be used as an incentive to eliminate the conflict of interests between executives and shareholders. It enables executives to pursue their own interests while also maximizing the realization of shareholder value. This article selects the top three executive positions of income, including chairman, secretary of the board, and president, and takes the average value of their salary as a variable to study.

3.3.1.3 Total Assets

Total assets refer to the total assets of the bank's balance sheet, which refers to all assets owned or controlled by the bank.

3.3.1.4 Proportion of the First Shareholder's Equity

The shareholding ratio of the largest shareholder refers to the ratio of the number of shares held by the shareholder with the most shares of the listed company to the total number of shares of the listed company. Normally, in the governance process of a listed company, the largest shareholder has the most control and the most say in the management of enterprise. However, the size of shareholding ratio of the largest shareholder affect the shareholder's motivation for decisions making in the business activities of the company, and thus varying degrees of agency problems will arise.

3.3.1.5 Provision Coverage Ratio

The provision coverage ratio is the ratio of the use of bad debt reserves that may actually occur in bank loans. It is an significant indicator for measuring the adequacy of loan loss reserves of commercial banks. This indicator reflects the degree of risk of bank loans, the social and economic environment, and the integrity of the bank's loans from a macro perspective.

3.3.2 Variable Selection

- The explained variable: An important indicator of bank credit risk evaluation: NPL ratio

- Explain variables: Executive compensation

- Control variables: Total bank assets; the shareholding ratio of the largest shareholder; provision coverage ratio

The specific variable names, variable symbols, and calculation methods are shown in "Table 1".

Table 1. Specific variables and calculation methods

	Variable name	Variable symbol	Calculation method
Explained variable	NPL ratio	NPL	
Explanatory variables	Executive compensation	LMS	The average salary of the chairman, secretary of the board, and president
		LMS2	The square of the average salary of the chairman, secretary of the board, and president
Control variable	Total assets	LNA	The logarithm of total bank assets
	The proportion of first shareholder's equity	TOPI	
	Provision coverage	PC	

- Model construction

Based on existing assumptions, two models are adopted to test the correlation between the NPL rate and the executive compensation of commercial banks. The model is constructed as follows:

Verify the positive correlation model:

$$NPL = \alpha_{0+}\alpha_1 \cdot LMS + \alpha_2 \cdot LNA + \alpha_3 \cdot TOPI + \alpha_4 \cdot PC + \varepsilon_1$$

Verify the inverted U-shaped model:

$$NPL = \beta_{0+}\beta_1 \cdot LMS + \beta_2 \cdot LMS2^2 + \beta_3 \cdot LNA + \beta_4 \cdot TOPI + \beta_5 \cdot PC + \varepsilon_2$$

4. EMPIRICAL ANALYSIS

4.1 Descriptive Statistics

4.1.1 Descriptive Statistical Analysis of Bank Executive Salaries

"Table 2" is a descriptive statistics of the average salaries of more than 20 banks' chairman, secretaries, and presidents from 2016 to 2019. It can be seen that the average, median and maximum salary of the three executives in the sample are increasing year by year, while the standard deviation decreases slightly. It can be seen that the salary gap between executives has a trend of narrowing year by year. In the past four years, the median salary of the three executives was always smaller than the average, and the difference between the average and the minimum was significantly smaller than the difference between the average and the maximum, indicating that three executives from more than 20 banks were selected salary has the characteristics of a large number of low-grade salary samples and a small number of high-grade salary samples, with a significant difference in salary between the two gears.

Table 2. Statistics on the average salary of bank presidents, chairman of the board and secretary of the board of directors (10,000 yuan)

Year	Sample size	Average	Medium	Standard deviation	Min	Max
2016	20	148.8	93.31	127.9	52.19	447.3
2017	20	156.2	96.04	121.6	60.08	458.8
2018	20	160.4	110.7	123.3	59.33	417.8
2019	20	168.3	116.5	116.8	55.66	412.4
Total	80	158.4	103.3	120.3	52.19	458.8

4.1.2 Descriptive Statistical Analysis of Variables

"Table 3" is the descriptive statistics of all the sample variables from 2016 to 2019. The maximum NPL ratio does not exceed 5%, indicating that banks have strictly controlled NPLs in the past four years. The median NPL ratio is 1.510%, the average value is 1.459%, and the median is higher than the average, indicating that the NPL ratio of a few banks in the sample has lowered the overall NPL ratio, and the NPL ratio of most banks is higher than the average level. After taking the logarithm of the average salary of the three executives, the median is 4.637, and the average is 4.836, indicating that the average salary of the three executives in a small number of banks in the sample is higher than the average. The median of total bank assets is slightly higher than the average after taking the logarithm, indicating that a small number of banks in the sample have lowered the average total asset level. The median shareholding ratio of the largest shareholder is lower than the average, indicating that the shareholding ratio of the largest shareholder of a few banks in the sample has increased the average level, and the minimum value in the sample is much smaller than the maximum value, and the largest shareholder of the sample bank holds shares. The ratio is quite different. The median funding coverage rate is less than the average, indicating that the funding coverage rate of most banks in the sample has increased the average level, and the gap between the minimum funding preparation rate and the median is small, indicating that the bank funding preparation rates in the sample are generally lower than the average. 200%, a few banks have reached the levels of 400% and 500%.

Table 3. Descriptive statistics of variables

Variable	Sample size	Medium	Average	Standard deviation	Min	Max
NPL(%)	80	1.510	1.459	0.335	0.750	2.370
LMS	80	4.637	4.836	0.646	3.955	6.129
LMS2	80	21.50	23.80	6.561	15.64	37.56
LNA	80	15.60	15.43	1.033	13.49	17.22
TOPI(%)	80	0.209	0.307	0.191	0.0773	0.692
PC(%)	80	1.837	2.304	1.006	1.324	5.241

4.1.3 Correlation Analysis Between Variables

"Table 4" is the correlation analysis between various variables, mainly showing the relationship between NPL and LMS. It can be seen from the table that the correlation coefficient between NPL and LMS is 0.186, and NPL and LMS are positively correlated at a significance level of 0.01, which is basically consistent with hypothesis 1. NPL and LMS2 are positively correlated, and not so significant, which is not consistent with the assumption that NPL and LNA are inverted U-shaped. There is a significant positive correlation between NPL and LNA. The larger the total assets of a bank, the higher its NPL ratio. There is a positive correlation between NPL and TOPI, but the correlation coefficient is not high and not significant. NPL and PC have a significant negative correlation. The higher the funding preparation rate, the lower the NPL rate.

Table 4. Correlation analysis of variables

	NPL	LMS	LMS2	LNA	TOPI	PC
NPL	1					
LMS	0.186*	1				
	0.0987					
LMS2	0.184	0.999***	1			
	0.102	0				
LNA	0.337***	-0.249**	-0.228**	1		
	0.00220	0.0260	0.0420			
TOPI	0.0340	-0.124	-0.110	0.601***	1	
	0.764	0.275	0.332	0		
PC	-0.831***	0.0370	0.0330	-0.433***	-0.190*	1
	0	0.744	0.771	0.000100	0.0911	

4.2 Empirical Results

"Table 5" shows the linear regression results of NPL and LMS. (1) The linear regression results of NPL and LMS, the results show that NPL and LMS are significantly positively correlated. (2) It is the non-linear regression result of NPL and LMS, and the result shows that NPL and LMS are in an inverted U relationship. Comparing the two results, it is found that although the goodness of fit of linear regression is lower than that of non-linear regression, the gap is small, but the F value of linear regression is higher, and in the correlation test of variables, NPL and The correlation of LMS2 is positively correlated, which is contrary to the negative coefficient of the regression result. In summary, it can be concluded that in this model, the linear regression of NPL and LMS is more reasonable.

Table 5. Regression results of NPL and LMS (t-statistics in parentheses)

	(1)	(2)
Variable	NPL	NPL
NPL	.	.
	(.)	(.)
LMS	0.120***	1.340**
	(3.95)	(2.20)
LMS2		-0.119**
		(-2.01)
LNA	0.051*	0.070**
	(1.98)	(2.58)
TOPI	-0.325**	-0.322**
	(-2.60)	(-2.63)
PC	-0.268***	-0.263***
	(-12.73)	(-12.64)
Constant	0.806*	-2.547
	(1.75)	(-1.47)
Observations	80	80
R-squared	0.760	0.772
adj_R2	0.747	0.757
F	59.26	50.12

a   *** p<0.01, ** p<0.05, * p<0.1

According to the linear regression results of NPL and LMS, it can be concluded that the NPL

rate is positively correlated with executive salaries, which is consistent with Hypothesis 1.

It can be seen that the NPL rate and the logarithm of the average bank executive salary are positively correlated at a significance level of 1%. (Table 5) When the executive salary increases, the NPL rate will be higher, and the bank will face more Big credit risk. This verifies the moral hazard problems faced by bank executives in managing banks. For the purpose of year-end performance requirements, corporate executives will lower the lending standards and absorb some high-risk loans to achieve higher performance indicators and obtain higher returns. In the long run, if these high-risk loans are not repaid in time, it will directly lead to an increase in the NPL rate. Although banks have been stricter in controlling NPL rates in recent years, this effect is still reflected in the data level from the perspective of empirical analysis, indicating that China's executive salary incentive policies still have certain flaws. From the perspective of control variables, the NPL ratio and the bank's total assets have a positive correlation at a significant level of 10% after taking the logarithm, indicating that the larger the size of the bank's assets, the NPL ratio will also increase. The NPL rate and the allocation preparation rate have a negative correlation effect at a significant level of 1%, indicating that the NPL rate is closely related to the allocation preparation rate. The higher the allocation preparation rate, the lower the NPL rate. The NPL ratio and the shareholding ratio of the largest shareholder show a negative correlation effect under the condition of a significant level of 5%. The sign is opposite to the correlation test result, indicating that the relationship between the largest shareholder's shareholding ratio and NPLs is still unclear.

4.3 Collinearity Test

"Table 6" shows the multicollinearity test among the variables. The average value is 1.570, and there is no serious multicollinearity problem.

Table 6. Multicollinearity test

Variable	VIF	1/VIF
LNA	1.880	0.533
TOPI	1.580	0.633
PC	1.240	0.805
Mean VIF	1.570	

5. RESEARCH CONCLUSION AND POLICY RECOMMENDATIONS

5.1 Research Conclusion

Banks with higher NPL ratios face higher risk control incentives.

The current performance-linked executive compensation structure system has led to a higher risk tendency for bank executives to engage in high-risk loan businesses in order to obtain high salaries. Such moral hazard issues still exist under strict control of bank risks. They increased bank risk exposure.

5.2 Policy Recommendations on Bank Executive Compensation

In order for banks to strive for more development opportunities and obtain their own development, they must take the initiative to take risks, which is conducive to the improvement of the bank's profitability. Moderate risk-taking is allowed, but excessive risk-taking can also cause potential losses and even bankruptcy crisis while enabling enterprises to obtain short-term high returns.

Based on the research results that bank executive compensation incentives are positively correlated with executive risk appetite and risk behavior (using NPLs as a reference indicator), we make the following recommendations from the aspects of internal and external supervision of banks, and the design and management of compensation systems for commercial banks:

5.2.1 Improving the Compensation Incentive Mechanism for Executives, and Introducing Risk Measurement Indicators into the Compensation Incentive Mechanism

Commercial banks in China should establish a remuneration mechanism that comprehensively considers market risks and performance factors. The current compensation system of commercial banks pays more attention to performance measurement indicators, lacks risk measurement indicators, and does not fully consider the impact of risk factors. The performance-linked bank remuneration system has led to an increase in the risk tendency of bank executives. In order to obtain high remuneration, bank executives vigorously

engage in high-risk loan business, which ultimately leads to an increase in bank risk exposure [9].

The design of the executive compensation system must fully consider risk factors. We suggest adding risk-adjusted capital return rate, NPL rate and other risk indicators in the salary evaluation system, and clearly setting indicators that fully reflect market risk, credit risk, operational risk, legal risk, and reputation risk in the performance indicators.

At the same time, banking institutions are basically in the form of cash compensation at this stage, so they are mainly short-term incentives. We recommend delaying the payment of executive compensation based on the duration of risk exposure and the type of risk, and appropriately introducing equity incentives, using both long-term and short-term incentives, so that the management can care about the bank's future development and reduce short-sighted behaviors.

In this way, the compensation system can not only restrain the executives in the short-term and reflect the current profits and risks of the bank, but also encourage them to strengthen their awareness of risk management and reflect the potential losses and risks in the future.

5.2.2 Commercial Banks Should Follow the Principle of Prudent Operation and Strengthen the Role of Internal Management

Starting from the banks themselves, first of all, commercial banks should consider strengthening risk management to avoid problems such as high loan concentration and insufficient risk dispersion caused by the aggressive risk strategies of bank executives.

Second, commercial banks should strengthen the design, implementation and management of the remuneration system. It is necessary to clarify the responsibilities and status of the board of directors, compensation committee and senior management in risk management. The board of directors and its remuneration committee should give full play to its role, actively take charge of the design and implementation of the executive remuneration system, and supervise the operation of the remuneration system for a long time, dynamically supervise and review the remuneration system, and implement risk awareness to the bank's company Governance is coming.

At the same time, it is necessary to create a good risk management cultural atmosphere, so that each employee can fundamentally accept the risk concept, so as to effectively implement the risk management strategies and systems of the banking institution.

5.2.3 Strengthening the Supervision of Executive Compensation

To enhance the transparency of executive compensation in commercial banks, the government should strengthen external supervision of executive compensation in commercial banks and weaken control over bank management. Supervised banks should submit reports on executive compensation and bonuses every year, transparently and openly, and disclose the incentive compensation arrangements for executives, including the disclosure of relevant information such as the content of the remuneration policy and the annual salary of executive compensation[10].

The government should issue relevant regulations on compensation incentives for commercial banks so as to encourage commercial banks to establish risk early warning mechanisms in the process of building compensation management.

AUTHORS' CONTRIBUTIONS

This paper is independently completed by Yuxin Zhang.

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