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Executive compensation and bank risk in China

Qiubin Huang*

University of Science and Technology Beijing, China

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Abstract

Executive compensation is an important mechanism of corporate governance for banks, but its effect on bank risk remains inconclusive. Based on a sample of banks listed in China, we uncover a significantly positive relationship between executive compensation and bank risk during the 2007–2018 period. The finding is robust to model specifications, the risk measures used, and the way to calculate executive compensation.

Keywords: executive compensation; bank risk; Chinese banks; corporate governance
JEL Classification Codes: G21, G28, M52

1. Introduction

The 2008 global financial crisis has triggered a hot debate on the connection between executive compensation and bank risk. Boateng et al. (2022) argue that structuring executive incentives to maximize shareholder value in banks tends to encourage excess risk-taking. Empirical studies on US banks show that bank risk is *positively* related to the sensitivity of executive compensation to risk (Gande and Kalpathy, 2017), the incentives generated by executive compensation programs (Bhagat and Bolton, 2014; Ongena et al., 2022), and the percentages of short- and long-term incentive compensation (Guo et al., 2015). In contrast, Shah et al. (2017) uncover a *negative* relationship between bonuses awarded to bank executives and risk-taking of US banks.

In this paper, we are particularly interested in the impact of executive compensation on bank risk in China for two reasons. First, the connection between executive compensation and bank risk is not straightforward, as suggested by the aforementioned studies. Moreover, we cannot directly apply lessons from US banks as executive compensation scheme (Conyon and He, 2011) and governance arrangements (Zhang et al., 2021) in China differ much from that in the US. Second, to the best of our knowledge, the impact of executive compensation on bank risk in China has not been well explored.[1] As Chinese banks have become more globally important

* Corresponding author. E-mail: qiubinhuang@ustb.edu.cn.

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[1] Recent studies have examined Chinese banks from different perspectives, such as political connection (Hung et al., 2017), ownership concentration (Huang, 2022, 2020), systemic risk (e.g., Huang et al., 2019), and financial regulation (e.g., Jiang et al., 2019).

(Huang et al., 2019) and share many similar features with banks in other countries (Jiang and Kim, 2020), our study will not only yield policy implications for promoting bank safety in China, but also offer insights for other countries.

2. Methodology and data

To examine the impact of executive compensation on bank risk, we start from the following two-way fixed effects panel regression with heteroskedasticity robust standard errors:

$$Risk_{it} = \beta_0 + \beta_1 Compensation_{it-1} + \beta_{it} Control_{it-1} + \lambda_t + u_i + \varepsilon_{it}, \quad (1)$$

where $Risk_{it}$ and $Compensation_{it-1}$ indicate bank *i*'s risk and executive compensation in year *t* and year *t*-1, respectively; $Control_{it-1}$ includes a series of control variables that may affect bank risk; λ_t and u_i denote year and bank fixed effects, respectively; and ε_{it} is the error term.

Following Laeven and Levine (2009), we use the natural logarithm of the Z-score (ln $Zscore$) as our primary measure of bank risk. A bank's Z-score equals the sum of its return on assets (ROA) and equity-to-asset ratio divided by the standard deviation of ROA, such that a lower Z-score indicates that the bank is riskier. As a robustness check, we employ additional market-based indicators to capture bank risk. The first one is systematic risk (*Beta*) which is obtained from the capital asset pricing model, and the second is total risk (*Volatility*) calculated as the standard deviation of bank stock returns. Both indicators are calculated for each bank on the basis of daily stock returns within a year following Pathan et al. (2021).

For the key explanatory variable $Compensation$, we use the natural logarithm of the aggregate annual compensation of the top three executives (ln $Rew3Exe$) as our main analysis. For sensitivity analysis, we also calculate the natural logarithm of the aggregate annual compensation of the top three directors (ln $Rew3Dir$) and of the top three executives plus the top three directors (ln $Rew3Exe3Dir$). To control for variables that may affect bank risk, we consider a set of variables that are widely adopted in the banking literature (Bian and Deng, 2017; Huang, 2022; Pathan et al., 2021). Table 1 summarizes these variables.

Table 1. Description of variables.

Category	Variable	Definition
Risk	ln*Zscore*	The natural logarithm of Z-score
	Volatility	The standard deviation of bank stock returns
	Beta	Reaction of bank stock returns to the movements of the stock market index
Compensation	ln*Rew3Exe*	The natural logarithm of rewards to the Top 3 executives (*Rew3Exe*)
	ln*Rew3Dir*	The natural logarithm of rewards to the Top 3 directors (*Rew3Dir*)
	ln*Rew3Exe3Dir*	The natural logarithm of *Rew3Exe* plus *Rew3Dir*
Controls	ln*Assets*	The natural logarithm of bank assets
	EquLia	The equity-to-liability ratio
	OwnCon	The sum of shares percentage of the Top 5 shareholders
	ROE	Return on equity
	BoardSize	The number of directors
	ln*NetProfit*	The natural logarithm of net profit
	AssetGrowth	Yearly growth of a bank's total assets

We estimate Eq. (1) with the key explanatory and control variables lagged one year along with time and bank fixed effects to mitigate possible endogeneity and omitted bias (Bai et al., 2019; Huang, 2020). Besides, we apply the stepwise regression with backward elimination approach

to remove insignificant variables to avoid multicollinearity. Our analysis is based on the 16 largest banks listed in the Chinese stock market where their aggregate assets account for more than 70% of the total assets of all Chinese commercial banks (Huang et al., 2019). Our analysis focuses on the period of 2007–2018 as the Chinese banking restructuring reform was basically completed at the end of 2006 (Huang et al., 2019) whereas data on executive compensation after 2018 has not been released yet. Table 2 presents the descriptive statistics of our variables.

Table 2. Descriptive statistics.

Variable	Obs	Mean	Std.Dev.	Min	Max
ln*Zscore*	191	3.628	.377	2.39	4.525
Volatility	186	.02	.009	.007	.045
Beta	186	.859	.274	.152	1.761
ln*Rew3Exe*	178	15.627	.652	14.245	17.236
ln*Rew3Dir*	178	15.474	.756	13.305	17.362
ln*Rew3Exe3Dir*	178	16.266	.668	15.018	17.929
ln*Assets*	192	28.708	1.297	25.048	30.952
EquLia	192	6.638	2.097	-12.06	15.037
OwnCon	188	.635	.238	.246	1
ROE	189	17.845	4.626	4.176	41.125
BoardSize	187	20.802	4.135	11	33
ln*NetProfit*	192	24.057	1.373	20.236	26.419
AssetGrowth	192	19.173	12.384	-4.272	73.015

Data source: RESSET and author's calculations.

3. Empirical results

Table 3 presents the results for the relationship between executive compensation and bank risk captured by Z-score. Column I records the results by using the stepwise regression with backward elimination approach. We find that the coefficient of ln*Rew3Exe* is -0.08, which is statistically significant at the 5% level. As the dependent variable (ln*Zscore*) indicates the distance from default, the results suggest that executive compensation is positively associated with bank risk. The coefficients of the four control variables selected by the stepwise regression technique have expected signs and are significant, which suggest that higher values in bank size (ln*Assets*), solvency (*EquLia*), ownership concentration (*OwnCon*) and performance (*ROE*) help reduce bank risk. Column II shows that the above findings remain unchanged when controlling for more variables. Columns III and IV show that our findings still hold when we change the way to measure executive compensation.

Given that the literature is inconclusive regarding the effect of executive compensation on bank risk,[2] we further examine whether there might be a nonlinear relationship between executive compensation and bank risk. To this end, on the basis of the model shown in Column I of Table 3, we add a squared term of executive compensation (ln*Rew3Exe*×ln*Rew3Exe*) to the model and rerun the regression, where the coefficient is insignificant (see Column V of Table 3). This result does not support the nonlinear relationship between executive compensation and bank risk in China. Overall, our results suggest that bank executive with higher compensation tends to take more risk. This finding is supported by the theoretical analysis of Bolton et al. (2015) and in line with the findings of several studies on US banks (see Bhagat and Bolton, 2014; Gande and Kalpathy, 2017; Guo et al., 2015), but contrary to the findings of Shah et al. (2017).

[2] In particular, based on a sample of U.S. firms, Kuo et al. (2014) find that there is a significant inverse U-shaped relationship between executive pay and firm performance.

Table 3. Executive compensation and Z-score of banks.

	I **Stepwise**	II **Full**	III **Rew3Dir**	IV **Rew3Exe3Dir**	V **Nonlinear**	VI **Interaction**
ln*Rew3Exe*	-0.081**	-0.067**			-1.627*	-0.080**
	(-2.648)	(-2.482)			(-1.796)	(-2.875)
ln*Assets*	0.266***	0.309***	0.278***	0.256***	0.269***	0.268***
	(4.075)	(3.725)	(4.342)	(3.959)	(4.448)	(4.492)
EquLia	0.120***	0.126***	0.119***	0.108***	0.117***	0.119***
	(6.337)	(6.627)	(6.006)	(6.530)	(5.998)	(6.445)
OwnCon	0.579**	0.463	0.566**	0.539**	0.566**	0.422*
	(2.712)	(1.735)	(2.579)	(2.278)	(2.775)	(2.002)
ROE	0.024***	0.024***	0.024***	0.019***	0.024***	0.023***
	(3.219)	(4.271)	(3.220)	(2.961)	(3.182)	(3.311)
BoardSize		0.001				
		(0.227)				
ln*NetProfit*		-0.088				
		(-0.852)				
AssetGrowth		-0.000				
		(-0.008)				
ln*Rew3Dir*			-0.055*			
			(-2.130)			
ln*Rew3Exe3Dir*				-0.090**		
				(-2.731)		
ln*Rew3Exe*×ln*Rew3Exe*					0.050	
					(1.745)	
D_ln*Rew3Exe*×*ROE*						-0.021***
						(-2.970)
β_0	-4.283*	-3.593*	-5.010**	-3.608*	7.589	-4.198**
	(-2.120)	(-1.804)	(-2.462)	(-1.829)	(0.978)	(-2.390)
R-squared	0.936	0.942	0.934	0.933	0.938	0.939

Notes: This table reports estimation results of Eq. (1) under different specifications with bank- and year-fixed effects. The dependent variable is the natural logarithm of Z-score. Column I is the results by using the stepwise regression with backward elimination approach while Column II considers more control variables. Columns III and IV are results when we capture executive compensation in different ways. Column V aims to detect the potential nonlinear relationship between executive compensation and bank risk. Column VI examines the interaction effect of executive compensation with ROE. The numbers in parenthesis are *t*-statistics. ***, ** and * indicate the significance at the 1%, 5% and 10% levels, respectively.

To examine whether our finding depends on bank characteristics, we include the interaction terms of executive compensation with the selected control variables to the model indicated in Column I of Table 3 and rerun the regressions.[3] For brevity, we only present the results when the interaction term is significant. We find that only the interaction term of executive compensation with ROE is statistically significant (see Column VI of Table 3), but this does not change the negative relationship between executive compensation and Z-score of banks.

To provide additional insights and serve as the robustness check, we also examine the impact of executive compensation on two market-based risk indicators of banks. The indicators are the volatility of bank stock returns (*Volatility*) and systematic risk of bank stocks (*Beta*). Table 4 reports the regression results following Eq. (1). We find that executive compensation has significantly positive effects on *Volatility* (Column I) and *Beta* (Column IV), while the nonlinear effect of executive compensation does not exist. Besides, the positive effects remain evident even we control for the interaction terms of executive compensation with other bank

[3] Before adding the interaction terms, we demean the variables to be interacted following the suggestion of Balli and Sørensen (2013) so that the interaction terms are more robust and interpretative. For instance, the interaction of executive compensation with ROE (D_ln*Rew3Exe*×*ROE*) is calculated as the difference of ln*Rew3Exe* and its mean multiplied by the difference of *ROE* and its mean.

characteristics (Columns III and VI). Overall, the results suggest that higher executive compensation is associated with higher bank risk.

Table 4. Executive compensation and market-based risk measures.

	Panel A: Volatility			Panel B: Beta		
	I	II	III	IV	V	VI
ln*Rew3Exe*	0.002**	-0.004	0.001**	0.092*	0.552	0.093*
	(2.294)	(-0.228)	(2.189)	(1.974)	(0.422)	(2.047)
ln*Assets*	-0.004***	-0.004***	-0.005**	-0.047	-0.047	-0.046
	(-3.050)	(-3.058)	(-2.861)	(-0.536)	(-0.539)	(-0.560)
EquLia	-0.000	-0.000	-0.000	0.019	0.020	0.018
	(-1.201)	(-1.215)	(-1.104)	(0.789)	(0.853)	(0.792)
OwnCon	0.001	0.001	0.004	-0.394*	-0.390*	-0.514*
	(0.218)	(0.208)	(0.632)	(-1.867)	(-1.855)	(-2.050)
ROE	-0.000	-0.000	-0.000	0.009	0.009	0.008
	(-0.461)	(-0.474)	(-0.343)	(1.053)	(1.089)	(0.989)
ln*Rew3Exe*×ln*Rew3Exe*		0.000			-0.015	
		(0.308)			(-0.349)	
D_ln*Rew3Exe*×*ROE*			0.000			-0.016
			(1.462)			(-1.460)
β_0	0.128***	0.171	0.126**	0.713	-2.819	0.778
	(3.146)	(1.149)	(2.926)	(0.293)	(-0.288)	(0.345)
R-squared	0.924	0.924	0.925	0.744	0.745	0.747

Notes: This table reports estimation results of Eq. (1) under different specifications with bank- and year-fixed effects. Panels A and B examine the impact of executive compensation on the volatility of bank stock returns (volatility) and systematic risk of bank stocks (Beta), respectively. Columns I and IV examine the linear effect of executive compensation while Columns II and V detect the nonlinear effect. Columns III and VI examine the interaction effect of executive compensation with ROE. The numbers in parenthesis are *t*-statistics. ***, ** and * indicate the significance at the 1%, 5% and 10% levels, respectively.

4. Conclusion

This paper examines the impact of executive compensation on bank risk in China. Using Z-score, systematic risk and stock return volatility as three proxies for bank risk, we uncover a positive relationship between executive compensation and risk for Chinese listed banks. The results suggest that bank executives with higher compensation tend to take more risk.

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